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THE TWENTY-NINTH COLLEGE DAY AND AGRICULTURAL CONFERENCE, 1940.

The twenty-ninth College Day and Agricultural Conference organised by the Madras Agricultural Students' Union, Coimbatore was held between 13th and 17th July. Hardly two months ago owing to the need for economies during a period of war, the Union executive was entertaining doubts and fears about the feasibility of holding the annual conference which fell due in July this year. It is now a matter of satisfaction both to the members of the Union and agricultural interests of this province that thanks to the efforts of the Director of Agriculture, these fears were allayed and the holding of the annual conference has become an accomplished fact. Though bereft of some of the usual side shows associated with the conference eg. the staging of an agricultural exhibition and a departmental conference of gazetted officers, the conference which is now over will go down in the history of the union as one of its most successful sessions.

Saturday, the 13th July witnessed the College Athletic Sports. One noteworthy feature of the years' sports was the inclusion in the programme of standard Olympic events and the change over to the metric system for track events. The Union was "At Home" to the large congregation of members and guests who had assembled to witness the contests. At the conclusion of the sports Mrs. K. M. Unnithan kindly gave away the trophies and prizes to the successful competitors.

At 12 noon on Monday the 15th July, Mr. S. V. Ramamurty, M.A., I.C.S., Member, Board of Revenue, of Madras and president-elect of the conference, was received at the entrance to the conference hall by Messers A. R. C. Westlake, Director of Agriculture, Madras, Mr. R. C. Broadfoot, President of the Union and Mr. M. C. Cherian, Vice-president.

Mr. R. C. Broadfoot, president of the Union welcomed the large and distinguished gathering with a welcome speech (reported elsewhere).

At this stage a loyalty resolution couched in the following words was moved from the chair and unanimously adopted.

"This conference of the Madras Agricultural Students' Union places on record its whole-hearted loyalty to the cause for which Great Britain and India are fighting and resolves to contribute all the help that lies within the power of its members for the successful prosecution of the war".

The secretary then read several messages received from the patrons, members, friends and wellwishers of the Union who were unable to be present but accorded their best wishes to the success of the conference.

The annual report of the Union was then read by the secretary, the chairman of the conference then gave away the prizes and medals won by the students of the College during the academic year 1939—40.

The chairman then delivered his presidential address (reproduced elsewhere) which was as inspiring as it was erudite and was listened to by the gathering with rapt attention. He complimented the Department of Agriculture on the high standard of work turned out by it but laid stress on the real background against which one has to view prospects of agricultural development through the help of scientific research, and the need for setting right the maladjustments between agriculture and industry. The rest of the afternoon's proceedings was occupied by a symposium on "Soil erosion" to which six papers were contributed. A pleasing feature of the symposium was that three of the papers were extra-departmental contributions representing the Forest department, the South Indian Tea Industry and the Indian Coffee industry respectively. In the interesting discussions which followed the members of the department and the general public took part.

On the 16th morning the conference was resumed at 9 a. m. when six papers covering a wide range of agricultural subjects were presented and discussed. In winding up the proceedings the chairman made a masterly summing up of the papers and the discussions which followed. He made a strong plea to the scientists to recast their attitude to tradition because science was latent in tradition and there was much in the cultivator's traditional methods which could give the scientist greater confidence to follow new lines and enrich old practices. The chief difference he could detect between science and tradition was that the former was built up as the result of experience gained leisurely through a long space of time, while the latter aimed at quick results and the saving of time. The chairman urged that the way of finding an economic living for the educated unemployed was by adopting an agro-industrial economy and not merely agricultural economy. Villages which could ill afford to provide the modern amenities of life had to be regrouped into units so that each group can provide the necessary amenities.

Mr. A. R. C. Westlake, Director of Agriculture, in a humorous speech proposed a vote of thanks to Mr. Ramamurty for his very interesting and illuminating address. On behalf of the Madras Agricultural Students' Union Mr. M. C. Cherian proposed a vote of thanks to the several members of the Union and friends who contributed to make the conference and other functions a success.

On 16th night the members of the Union entertained Mr. and Mrs. Ramamurty and other visitors, when short pieces in English, Telugu and Tamil were staged. The histrionic talents exhibited by the actors, most of

whom were students of the College, were widely appreciated by the audience.

On the 17th morning the members of the Union met in the Freeman hall where the union was 'At home' to its members. After *chota hazri* they adjourned to the conference hall where the annual general body meeting of the Union was held under the chairmanship of Mr. R. C. Broadfoot, President of the Union. The annual report and statement of accounts were adopted and the office-bearers for the year elected.

The afternoon was spent in visits to the Research Institute, Central Farm and Crop-breeding stations where the district officers and the lay public were shown round the work in progress and the results achieved in the immediate past.

Welcome Address.

(By R. C. Broadfoot Esq., President of the M. A. S. Union.)

Mr. President, Ladies and Gentlemen,

Once again it is my privilege as President of the Madras Agricultural Students' Union to extend the Union's welcome to all of you attending this the 29th College Day and Conference and I hope you will all add your quota to make the conference as successful as its predecessors. Economic restriction limits the number of departmental officers permitted to attend, but it is for each one to make the most of the opportunities offered to revive these contacts with their *alma mater* and with friends who may be present from distant places.

To-day's symposium deals with the problems arising from soil erosion—a subject of great importance throughout the world. Its importance to Indian agriculture is also recognised and it is hoped that the papers now contributed will furnish some assistance in controlling this very serious problem.

To you, Sir, I would express on behalf of the Union our grateful thanks for accepting our invitation to preside over this Conference. As a former Secretary to Government in the Development Department and later as Director of Agriculture you became aware of the many problems confronting us and we look on your presence here today as an assurance of your continued interest in the Agricultural Department and its work. We extend a welcome to Mr. Westlake who as Acting Director of Agriculture attends this Conference for the first time. As his stay will extend beyond the period of the Conference there will be opportunities to show him the work of this Institution in greater detail before he leaves.

We miss from this conference and mourn the loss sustained by the deaths during the year of Rao Sahib T. V. Rajagopalachari, a former vice-president of of the Union and Rajah Sir Vasudeva Raja of Kollengode, one of our patrons. We offer our condolences to the bereaved families.

This conference meets under the shadow of a dark and heavy war cloud which starting in September last has grown to alarming dimensions engulfing many of the smaller neutral nations of Europe. While thinking of the fate of many smaller nations of Europe we must realise the need for steps being taken to ensure India's protection and for this reason alone it is our duty to give what assistance we can to secure victory for the Empire against the aggressive forces seeking to destroy it.

For financial reasons the Departmental Exhibition which has been a feature of the last three conferences has been dropped this year, but arrangements have

been made by all heads of sections to receive interested visitors in their own sections and show them the work in progress in each section. It is hoped that a large number of visitors will avail of this special invitation. The truly agricultural community will be dealt with at the Central Farm and adjoining plant breeding stations, where farm managers will make the necessary arrangements for visitors' inspection.

The season so far has been favourable; good, though unexpected, rains in May have relieved the strain of previous years' low rainfall and fodder crops in particular have never been better in this area.

The college continues to work successfully and the results of the last B. Sc. Ag. degree examinations are satisfactory both to the students and the teaching staff. Students who have been lucky, or should I say diligent enough, to secure prizes will receive these at the close of the presidential address and I would in one word congratulate them on their achievements. Prize winners invariably do well in after life, but runners up and less successful students may derive consolation from the knowledge that character is perhaps as great an asset in practical life and it has been the aim of this college to teach its students to be able to stand on their own legs when the need arises.

It is gratifying that the college should continue to maintain its popularity among similar institutions providing instruction of a professional character. The number of applications received this year, though slightly lower than in the preceding two years, made the work of the Selection Committee sufficiently onerous. The new students joined the college early in the month and are therefore just settling down to their work. Some of the selected students have been fortunate to secure places in other colleges and having accepted these, it is clear that Agriculture was an emergency choice and the final strength is 44 against a maximum of 48 usually chosen. Hyderabad and Orissa are again represented by State-selected students.

This welcome address closes with the usual request and that is for students leaving the college to keep in touch with the college and their former student friends through the medium of the Madras Agricultural Students' Union. It is again emphasised that outside officers do not bear their share in the work of the Union. If the best results are to be expected it is necessary for all members to contribute their quota in cash or kind. *The Madras Agricultural Journal* will look after their literary contributions, but cash provides for necessary expenditure for printing and distribution of the monthly journal. Is it therefore too much to beg from you continued and extended support in a worthy effort of which we are justly proud?

Messages.

The following are some of the messages received :--

Sir Mirza Ismail, Dewan of Mysore:

I thank the president and members of the Madras Agricultural Students' Union, Coimbatore, for their kind invitation to the 29th College Day and Conference to be celebrated from the 13th to the 17th July and send my best wishes for the success of the function and the prosperity of the students and staff of the College.

Mr. V. I. Muniswamy Pillay, till recently Minister for Development in the Government of Madras:

I regret my inability to be present on the occasion due to prior engagements but wish the several functions thorough success. I am glad to find you

have chosen Sri. S. V. Ramamurty to preside, and you are bound to hear very valuable and practical things from one who has been connected for several years in agricultural administration.

Mr. P. H. Rama Reddy, Director of Agriculture (on leave):

Regret absence, wish all functions complete success.

Rai Bahadur N. Nallathambi Sarkarai Manradiar, Pattagar of Palayakottai;

I thank you for your kind invitation for the 29th College Day and Conference; but regret very much my inability to attend. I wish the functions every success.

Dewan Bahadur D. Ananda Rao, Retired Director of Agriculture, Madras:

I very much regret my inability to be present on the occasion but I take this opportunity to wish the Conference and festivites connected with the College Day every success. Soil erosion is one of the important causes of the infertility of our soils and if anything could be done to reduce it, I am sure the ryot would be grateful if the means suggested are within his capacity to follow.

Rao Bahadur B. Viswanath, Director, Imperial Agricultural Research Institute, New Delhi:

Wish College Day and Conference success.

The Zamindar of Bodokhemidi, Berhampore:

I thank you for the kind invitation for the 29th College Day and Conference but I regret my inability to attend.

Rao Bahadur M. R. Ramaswami Sivan, Retired Principal of the Agricultural College:

As one connected with the Union and its functions from the very inception 29 years ago, I very much regret my inability to attend these functions in person. My heart is there, and my hearty good wishes are with you all for a successful session. We cannot have, at this juncture, a better person to preside at our meetings than Mr. S. V. Ramamurty, our popular ex-Director of Agriculture; and I am sure that he will give us, the necessary guidance to march on in the cause of our motherland and of the British Empire.

Rao Bahadur C. Tadulingam, Retired Principal of the Agricultural College:

Wish college Day Conference every success.

Rao Bahadur Y. Ramachandra Rao, Locust Entomologist, New Delhi:

Best wishes success College Day Conference.

Mr. K. Ramiah, M. B. E., Botanist and Geneticist, Institute of Plant Industry, Indore:

I very much regret I shall not be able to attend. I am missing a very interesting session and I must congratulate the Union in its choice of the president for the year. I wish your conference and College Day all success.

Rao Sahib Dr. T. V. Ramakrishna Ayyar, Retired Government Entomologist:

As one who was closely connected with the College and union for some years and as an amateur farmer at present, please allow me to convey to you and all the other members of the Union my hearty good wishes for the success of the functions and the continued prosperity of the College and the Union, which is now entering on its thirtieth year. I am sorry at my inability to be present for the functions.

Mr. A. Ranganatham, Formerly Minister, Government of Madras:

I offer you my warmest congratulations at your capture of Mr. S. V. Ramamurty, I. C. S., as President of the College Day celebration and conference. I know of few who are as devoted as he to the motherland and anxious to give their very best in her service. I wish the conference every success.

His Holiness Kasivasi Saminatha Thambiran:

We wish the function a grand success.

Mr. R. G. Nallakuttalam Pillai, Srivilliputhur:

Wish the conference every success.

Mr. M. R. V. Panikkar, Principal, Madras Veterinary College;

I regret my inability to be present on the occasion, but I wish the celebrations all success.

Rao Bahadur A. K. Menon, Superintendent, Kerala Soap Institute, Calicut:

I regret my inability to be present, but I wish the function all success and continued prosperity for your association.

Dr. C. N. Acharya, Indian Institute of Science, Bangalore:

Though I regret my inability to be present on the occasion, my best wishes go out for the success of the function. I note from the programme that you are arranging for a symposium on 'Soil erosion' and wish that increasing attention may be paid to such scientific discussions in future years, with special reference to the conditions existing in this province.

Report of the Managing Committee of the Madras Agricultural Students' Union, Coimbatore for the year 1939—'40.

(Presented on the opening day of the Conference.)

Mr. President, Ladies and Gentlemen,

The Managing Committee of the Madras Agricultural Students' Union beg to present their report for the year 1939–'40.

The Union is extremely fortunate in having Mr. S. V. Ramamurty, a distinguished member of the Indian Civil Service, to preside over the deliberations, of this—the twenty-ninth College Day and Conference. Mr. Ramamurty is no stranger to this gathering and to the Agricultural Department. As the Director of Agriculture, he has been responsible for the development of the Department to a remarkable extent. Let me, on behalf of the committee, thank you, Sir, very sincerely for readily accepting our invitation to preside over this Conference, in the midst of very strenuous duties and numerous calls on your time.

We also take this opportunity of welcoming our new Director of Agriculture, Mr. A. R C. Westlake, I. C. S., to our midst and we are confident that under his able guidance the Department will continue to progress.

The year under report has been a very eventful one in the annals of not only our country but also of all the peoples of the world. Although, we, as a body of workers in the field of Agriculture, are not directly concerned with the march of world events, we cannot ignore the tragic happenings in the West. The fate of civilisation and of mankind, not only of the European countries but the entire nations of the world, is hanging by a thread and that thread is the might of the British Empire, or perhaps more appropriately, the right of the British Empire. Britain has taken to arms on a noble cause, to preserve humanity from destruction and degradation and the Union prays and hopes that the Almighty will bless mankind and that the cause of justice will prevail in the end.

The European war is bound to have its repercussions on every nation on the globe and at a time of war, all industry, commerce and agriculture of a country, get paralysed, resulting in total economic upheavals, as the stress of war continues. In recent years, we, in India have considerably increased our out-put of cotton, jute, rice, sugar and groundnut. But at the present time, due to the practical closure of continental markets and the consequent difficulties of exporting these commodities overseas, combined with the high railway freights for the internal movement of produce, both the external and the internal trade of India have been adversely affected. It is at this time that a better utilisation of raw products for industrial purposes in India, has to be seriously considered. Let us now take for instance some of our existing difficulties in regard to a few of our more important crops. India produces a large quantity of short staple cotton which is purchased only by Japan at a price dictated by her. To get over this helplessness, we are not able to augment our area under, and production of, long staple cotton owing to climatic and geographical factors. Under these conditions, the utilisation of short staple cotton for industrial purposes in this country, needs investigation. The Indo-Burman relationship stands in the way of our securing a fair price for our rice. The banning of the export of surplus Indian Sugar by the International Sugar Syndicate, has given a severe set-back to an otherwise flourishing industry. We are however, glad that the Ministry of Food in Britain has decided to purchase one lakh of tons of Indian sugar, out of an estimated surplus of nearly 5 lakhs of tons. Although large stocks of ground nut, coffee, and tobacco are held up in the country at the present time, for want of export facilities as a result of the international situation, we are glad to note that the Government are taking all possible steps for the proper disposal of these products to give relief to the ryots. The country awaits eagerly, the recommendations of the Board of Industrial Research, the National Planning Committee and such other bodies, to solve many of the existing hardships. The Union hopes and trusts that at the end of the war, this country will find itself in a very advantageous position in regard to her agriculture and prime industries.

Agricultural Graduates. The Union respectfully begs to bring to the notice of the Government and the landed aristocracies of this province, that at present, about 100 graduates in Agriculture from this College, are without employment and about 30 to 35 are added to this number every year. While we are painfully aware of the fact that the provincial Agricultural Department will not be able to absorb all the graduates, we could humbly suggest that in view of the splendid practical and scientific knowledge attained by them, compared with other graduates, they may be employed in preference to others, in Education, Cooperative and Revenue Departments. We are sure that an Agricultural graduate as a Cooperative Inspector, a Revenue Inspector or as a teacher of science subjects in schools, is distinctly at an advantage than his compeers from the Arts Colleges. We earnestly appeal to the Government and to the landed aristocracies, to utilise the services of these young men, full of hope and prom ise

College Day and Conference 1939: The Celebration of the Annual College Day and the organisation of an Agricultural Conference form one of the most important functions associated with the activities of the Union. Founded in the year 1911, the Madras Agricultural Students' Union is today celebrating its 29th anniversary. Twenty-nine years is but a considerable period in the life of an organisation, and like many other institutions that stand for national solidarity and the betterment of life, the Union has passed through various phases and vicissitudes in its affairs. Although it is run entirely by a non-official agency, the Union stands today as the foremost medium of the department as a vehicle of thought and a promoter of the cause of scientific agriculture in this Presidency. The Union only wishes that it had the financial support of the

Government which is lacking, to make it more useful and be of greater service to all those that have the cause of better agriculture in their minds.

The twenty-eighth College Day and Conference was celebrated last year from the 13th to 16th July under the distinguished presidency of the Hon'ble Mr. V. V. Giri, Minister for Industries and Labour. The conference was attended by many distinguished visitors. Fifteen papers dealing with a wide range of agricultural subjects were read and discussed.

On the 13th night, the members of the Union entertained the President of the Conference and other visitors by staging dramas and humorous scenes in English, Tamil, and Telugu. The Annual athletic sports were held on 15th July 1939 and Mrs. D. D. Warren kindly gave away the prizes.

As usual an agricultural exhibition depicting the various activities of the Department was held in the Freeman Building for the benefit of the visitors and the public.

The Madras Agricultural Journal. The publication of the Journal is the most important activity of the Union. The Journal which was published regularly every month, continued to maintain a high standard of excellence in scientific journalism and it is a matter for gratification that its columns are being sought not only by the research workers in the different departments and institutions but also by the public who are interested in scientific agriculture. In view of the useful services rendered by the Journal to the cause of Indian agriculture, may we repeat our request to you sir, and through you to the Government of Madras to kindly consider the grant of a subsidy to the Union, to enable it to be of greater service to the country.

Our Members. We have great pleasure in recording that the services of one of our members, Rao Bahadur T. S. Venkataraman. C. I. E, Government Sugarcane Expert have been extended in view of the valuable work that he is now engaged in. We congratulate Dr. R. Sankaran, and Dr. N. Parthasarathy, who have been appointed as Cotton Botanist in Sind, and Sugarcane Geneticist under the Government of India, respectively. We are glad to record that Rao Sahib Dr. T. V. Ramakrishna Ayyar, our member was chosen as the President of the Agricultural section of the Indian Science Congress held at Madras in 1940. It is also gratifying to note that two of our members Messrs. K. Ramiah, M. B. E. and Rao Bahadur Y. Ramachandra Rao have been chosen as the Presidents of the Agricultural and Entomological sections respectively of Indian Science Congress for the year 1941. It gives us great pleasure to mention that Messrs. S. Sundaram and T. Venkataramana Reddy have been awarded the M. Sc., degree of the Madras University and we take this opportunity to record our congratulations to these young men.

Retirement. Since our last report, Rao Sahib G. Jogi Raju Pantulu who was an Assistant Director of Agriculture, has retired from service. Mr. Jogi Raju was a tried and selfless worker and is well known to the members of this Department for his contribution to the advancement of agricultural improvements in this Presidency and we wish him a long and healthy retired life.

Obituary. We record with considerable regret the passing away of Rajah Sir Venganad Vasudeva Rajah of Kollengode, our Patron. We all, miss today the familiar and forceful personality of Rao Sahib T. V. Rajagopalachariar who was snatched away by death on the 8th of March 1940. There was hardly any College Day and Conference in recent years which he did not attend and in the discussions and deliberations of which he did not take an active part. The passing away of Rao Sahib T. V. Rajagopalachariar has created a void in this conference which it is difficult to fill. We take this opportunity to convey our condolences to the members of the bereaved families.

Acknowledgments. It is now our pleasant duty to record our thanks to all those that helped the Union during the year. The Union owes a deep debt of gratitude to the Hon'ble Mr. V. V. Giri, who presided over and guided the deliberation of the conference last year. To the gentlemen who contributed papers for the Conference and to Mrs. D. D. Warren who kindly gave away the prizes for the sports, we tender our sincere thanks. We record our grateful thanks to Mr. P. H. Rama Reddy for the invaluable help rendered by him to the Union and in arranging the conference last year. We cannot adequately thank Mr. R. C. Broadfoot, who as President continued to help the Union in its various activities.

Our thanks are due to all the ladies and gentlemen who in various capacities helped the Union in the celebration of the College Day and Conference last year.

Presidential Address.

By S. V. RAMAMURTY Esq., M. A., I. C. S.,

(Member, Board of Revenue, Madras).

Ladies & Gentlemen,

Let me first say that it was with much pleasure that I accepted the invitation of the Madras Agricultural Students' Union to preside over this conference. It affords me an opportunity to renew my acquaintance with a sphere of activity where I myself worked along with you for three years and derived much pleasure and intellectual profit therefrom. The work of the Agricultural Department gives its scientists a happy way of blending a pursuit of pure truth with activities of practical value. Many of us who are interested in pure knowledge while at universities become engaged in work of purely utilitarian value, thereby ignoring lines of thought and aspiration which we pursued as students My own sphere has been mainly in the field of Revenue and Magisterial administration. But pure science, the vision of the world it gives, the zest of intellectual adventure and creative opportunity it provides has always retained its attraction for me and it was eagerly indeed that I caught up the knowledge which the Agricultural Research Institute had gathered and the methods of work it pursued. I was in the happy position of being not merely the head of an agricultural department but of one which was among the most alive of the agricultural departments of India. The keenness of work displayed by several of your research officers could be matched in India only, I think, in the Punjab. One may be permitted to think that in science, as in other departments of life, Madras and the Punjab share a happy balance of idealism and realism.

I had the opportunity too of enhancing my experience of agricultural science not only in India through the meetings of the Imperial Council of Agricultural Research in the palmy days when Sir T. Vijayaraghavachariar moulded its life and built up its vigorous traditions but also by a journey in Europe which I devoted mainly to an exploration of agricultural developments in the countries where science and organisation were most insistently applied to Agriculture. This experience I enjoyed in itself and as I gained it. Later it became part of my equipment which I found very helpful when

as Commissioner of Land Revenue and Irrigation I had to deal with problems relating to the qualitative use of land and water. Most knowledge is pleasurable and in the long run, it is also useful.

I have been recently reading some of the annual reports of the Madras Agricultural Department. I was glad to see that the lines of work with which I was familiar, some indeed of which I helped to introduce myself, have received the fostering care of successive directors and have made creditable contributions to the welfare of the population. The old lines of criticism are, however, still heard. We have advocated in the past as now that there is a need for intelligent young men to go back to land. This does not mean that our agriculture has scope for finding occupation for a larger part of the population than now. It only means that our agriculture has need for greater intelligence to be devoted to it than now, when a person who cannot possibly get on in a town drifts back to a village and to land. On the other hand, the fact that agriculture hardly pays the population that is engaged in it is not a condemnation of the efficiency of its practical methods. What is wrong with its practice is due to its economics and the economic organisation of the country. I have had occasion to take what I call economic soundings in villages in different districts in the presidency. My general conclusion is that two-thirds of a village population has land which gives half an economic holding for each family, the remaining one-third being labourers. To the owner of land, his holding on the average gives Rs. 5 a month of grain and that stands between the family and starvation. In a poor district, a family requires another Rs. 5 a month and in a medium district another Rs. 10 a month. This is made up in various ways where possible—by working as a labourer or as a bandy driver or as a petty shop-keeper. If the land in a village is divided into economic holdings, one-third of the population will have neither land nor labour and this can be tolerated only if industrial development in the country absorbs one-third of the village population, thereby producing an even distribution of population between agriculture and industry. In the absence of industries to absorb surplus village population, more people than land needs, must live in villages and the distribution of land among them is such that it just provides an insurance against starvation.

It is against this back-ground that we have to view the prospects of Agricultural development in the country through the help of scientific research. Scientific research in agriculture does not set right the maladjustment between agriculture and industry that there is in the country. It does not make the villager other than the inheritor of poverty and ignorance. It can offer what to each individual is a small improvement but this to the country in the aggregate means a large increase of wealth. The enthusiasm and impetus to organisation in agriculture cannot therefore come as much from the individual agriculturist as it should from the authorities responsible for collective life and progress. On the officers of the Agricultural Department, there is therefore a special duty cast of not only offering valuable

goods but also making the buyer appreciate the value of the goods. Demonstration and propaganda thus take their place side by side with research which by itself is not likely to achieve practical results in this country unlike, say in advanced countries of Europe, where an educated population is ready to take up the valuable information which scientific research obtains, for their needs. The greater, however, the difficulty, the greater must be the zest you can feel in your task. According to each individual and according to his mood, the Agricultural Service offers opportunities on the one hand of forgetting man and peering into the mysteries of the Universe and on the other forgetting all distant ends and helping man to bear his burden of feeding himself and his near and dear ones from day to day.

It is indeed surprising how closely these two apparently opposite ways of occupying one's attention are connected. It was reported some time ago that a Committee appointed by President Roosevelt to make a list of a dozen scientific discoveries which are likely to help in making a social revolution, included in its list the scientific discoveries of Agro-biology. There are two basic formulae on which this science is built. One is that if a cause x produces agricultural produce y (weighed as dry crop), then $\frac{dy}{dx} = c(a - y)$, where c and a are constants. This is a result claimed to connect the quantity of any crop in any part of the world under any climate with the cause which may be amount of water or manure or seed supplied. The formula involves only two constants. One is the maximum of the effect produced by a living agent and the other is a constant set by the environment. The formula is, it seems to me, one of the neatest and yet most comprehensive formulae science has ever discovered. A formula which holds true over an infinite variety of soil, climate and seed seems to me to be almost as wide as a general law of causation applying not merely to plant life but also animal and human life. It seems to me to hold out the hope of what may be called vegetarian science! We know that man can be vegetarian and yet do all the functions which man who may eat any food may do. We can assert this now with greater confidence when even in fighting, brain is even more effective than brawn for the destruction that is often the aim of fighting. Perhaps science can deal with plants and get all the results which any science may get. It may not for instance be necessary to starve or over-feed guinea pigs to find out results in nutritional science. Plants may obligingly take their place. If I remember right, the idea was begun to be used in the Research Institute by Mr Viswanath, now Director of the Imperial Agricultural Institute, whom Coimbatore helped to find himself for the service of India.

The other basic result in Agro-biology that I have referred to is that the maximum of crop which seed of any variety may produce is $\frac{318}{n}$ where n is the percentage of nitrogen in the dry crop. Both these seem to me to

be very valuable formulae which may set the boundaries for the progress that is possible in agricultural science in India. We have the particular danger in India where development of agricultural science has been recent that initial progress may lead to hope of unlimited progress. These formulae of Agro-biology caution us that beyond particular limits, more cause does not produce more effect. We have therefore to be particularly vigilant as to the values of the constants c and a which are imposed by the environment and the individual agent.

In this connection, there is one type of individual agent and one view of the environment which the Agricultural Science has hardly learnt to recognise. The agent is man and the environment is his social and economic environment. If the formula $\frac{dy}{dx}=c(a-y)$ be applied to man himself and x is the amount of knowledge of agricultural science applied to him and y is the amount of welfare drawn out, there are two boundary constants a and c. There is a maximum amount of welfare which knowledge of a particular kind can evolve in an Indian living in this country India with its past and present. It won't do to say that in England or Italy, Englishmen or Italians have so much increase of welfare through the application of agricultural science and so expect the same effect in India. To find the constants a and c applicable to Indians in India in relation to agriculture, this Institute has to study not only plants and insects and animals in relation to soil and climate but also study man in relation to his past history and present environment. I have sometimes said that in Indian agriculture the missing link is man. The considerations I have now advanced confirm my view of your need to study man. In the alternative, the work of those who have studied manures and insects and plants has to be co-ordinated with the work of those who have studied man.

It is indeed a wide range of thought and activity that agriculture offers to its votaries. More than this, it is essential for the nation that one-half at least of its people should be engaged in agriculture so that the nation may feed and live. This thought comes prominently to our minds at a time of war, when country is cut off from country and each nation is thrown on to itself for its primary needs. We have imported during the last year several crores worth of rice which it should be possible to produce in this province itself, with its large and numerous irrigation sources and the long-sustained tradition of rice production. What is needed is a systematic ascertainment of the needs of the province and the planning of how to meet the needs. With the control which the Government have over the use of water and land, there is scope even for a short range adjustment of rice production. The war has also brought to the fore-front the need for a rapid production of commodities for the cause with which India is identified. There is for instance scope for a large extension of the cultivation of pyrethrum and castor. In all these matters, there is a case not only for the execution of

the results of research but also, due to the crisis of the war, for a quick mobility in such execution. For this, the close co-operation of the Agricultural and Revenue Departments as well as of enlightened agriculturists is needed. I trust that the war will produce the stimulus for such a co-operation which can be continued with profit at times of peace.

I have been much interested in that the choice of the special subject for this year's discussion has fallen on soil erosion. This is a subject which in recent years has received considerable prominence in the United States of America and in South Africa and is beginning to do so in India. Soil which Nature has taken centuries to form may be eroded in a few years by a too rapid exploitation. Such exploitation may be intensive or extensive. Over-grazing and intensive mechanical cultivation have laid bare soil to wind and water in tracts of America and Africa colonized by Europe. Soil which has been conserved by a sparse indigenous population is being depleted by the strain of this increased use to which it is put. The result is a threatened reversion to infertility. Expensive measures are being taken in the U. S. A. for instance for the conservation of soil. In this country, soil erosion is due mainly to extension of cultivation. For many centuries, a steady though comparatively low physical standard of living has been kept up by methods of cultivation which used soil not with greed but with restraint. Under the impetus of modern agricultural science, we feel that our use of the soil has been too conservative and that there is a case for an increased pace of exploitation. The cultivator in general, however, has not begun to feel and act with us in this direction But with the rapid growth of population as a result of peace and of methods of conserving life, the pressure on the land for food has grown and there has been a marked extension of cultivation. In the Salem District, I found that during the last 50 years, the area of cultivation had grown from about a million acres to a million and a half. The population grew in much the same proportion. Waste land which served as catchment area for rain and for the flow of rain water to tanks has been increasingly converted into cultivated land. The soil of such land has tended to be washed away into tanks. About half the tanks in Salem have lost a third of their capacity for storing water through being silted up. The economy of wet and dry cultivation in villages has thus been disturbed. The drying up of tanks has led to the drying up first of irrigation wells and then even of drinking water wells. Salem was, I found, in the process of being converted into something like the condition of the Ceded Districts.

Not only was waste land in the plains cultivated, cultivation began to creep up hill sides. The scanty soil of the hill side as well as stones and coarse sand began to be washed down. Rain water flowed away rapidly, leading to erosion of the water courses. Certain steps were taken to prevent an extension of such soil erosion in Salem and the extension of these steps to other areas in the Central Districts has been under consideration.

There is danger of soil erosion when new irrigation projects are executed, particularly in country with a steep slope. The area of the proposed Tungabhadra project is an example. There is special work being done at the Hagari Agricultural Research Station to deal with soil erosion that irrigation in Bellary and other Ceded Districts may produce.

In all these cases, the root cause of the trouble is a lack of balance between what the soil can sustain and what the population demands from it —whether from an increase of numbers or an increase in their standard of living or both. While science can increase the returns from soil by the application of improved physical, chemical and biological methods, there seems to be a limit to the population and the standard of living which the soil resources of a country can sustain. There is indeed a need for a third major formula in Agro-biology which indicates the maximum crop that can be sustained during any length of time even by perfectly fertile soil. It is perhaps a recognition that such a boundary exists that is the secret of long sustained civilizations like India and China. It has been calculated by Agro-biologists that rice is the one crop that can maintain the largest population per square mile. Wisdom in agriculture is apparently part of the essential basis of a harmonious civilization.

It is therefore the task of agricultural scientists not only to teach us to get more from soil when we do not get enough but also to be restrained in our demands on soil and its fertility so that our life and civilization may not be a brief flash but a steady light shining through time. In such a task, I wish the Madras Agricultural Students' Union all success in taking its due share.

List of Prize Winners.

1.	The Robertson prize	E. Jaganatha Rao.
2.	The Clogstoun prize	L. Venkataratnam.
3.	The Keess prize	E. V. J. Cunha.
4.	The Sampson prize	L. Venkataratnam.
5.	The Dewan Bahadur R. Raghunatha Rao prize	M. Ramiah.
6.	The D'Silva Memorial prize	G. Rama Rao.
7.	The Goschen prize	G. Rama Rao.
8.	The Anstead prize	P. Venkateswara Rao.
9.	Rao Bahadur K. S. Venkatarama Ayyar prize	K. N. Doraiswami. C. Sankar Rao.
10.	The Dewan Bahadur L. D. Swamikannu Memorial prize	K. Bhaskaram.
11.	The Certificate course cup	G. Rama Rao.
12.	The Old Cuddapah District Agricultural Association prize	C. Sankar Rao, B. Sc. I N. Bhaskar Reddy, B. Sc. II B. Narayana Reddy, B. Sc. III
13	The Gupta prize	B. Narasimham.
14.	The M. K. Nambiar Memorial prize	G. Rama Rao.

Papers.

First Session—Monday 15th July, 12 noon to 3-30 p. m.

Symposium on Soil Erosion.

1. Land reclamation methods—Sequelae to soil erosion—*M. Satyanarayana.*
2. Forestry and its relation to the problem of soil erosion—*J. A. Wilson.*
3. Prevention of soil erosion on Tea estates in South India—*J. D. Manning.*
4. Soil erosion and the Coffee industry—*W. W. Mayne.*
5. Relative efficiency of roots and tops of crop plants in protecting the soil from erosion—*C. Vijayaraghavan and V. Panduranga Rao.*
6. Soil erosion by surface run-off—*A. Subba Rao.*

Second Session—Tuesday 16th July 1940, 9 a. m. to 12 noon.

1. The Annamalai University colonisation scheme—*C. S. Krishnaswamy.*
2. Tenants' needs and Departmental limitations—*M. Balakrishnan Nair.*
3. Contribution of the Andhras to the economic prosperity of the Pandyan country—the southern districts of the Madras Presidency—*P. R. Subramanya Ayyar.*
4. Preliminary observations on insect free storage of grains *T. V. Subramaniam.*
5. Prevention of the deterioration of seeds in regard to purity and quality *C. Balasubramanian.*
6. The role of " 3S " Societies in the cotton tracts of South India *N. C. Thirumalacharya.*
7. Co-operation in Agriculture—*P. V. Krishna Iyer.*

Chairman's Concluding Remarks.

Gentlemen,

I am sure you will all agree that we had a very successful conference. I congratulate the Madras Agricultural Students' Union on the selection of an important subject like soil erosion which is of great importance to the country. We have listened to several aspects of soil erosion—the influence of forests in mitigating the evil and the methods adopted in tea and coffee plantations where the harm done by soil erosion can be very serious but for the very rational methods adopted. We listened also to two papers on the results of the experimental work done at the Dry Farming Station, Hagari one on the comparative effects of raising different crop plants and the other on the results of different mechanical methods adopted to combat erosion. I share Mr. Ramanathan's, disappointment that his favourite crop (cotton) has not scored a high rank among tha several crops whose effects on soil erosion were tested at Hagari (laughter). It is a matter of satisfaction to me that my favourite *Phaseolus trilobus* (pillipesara) has secured a high rank (laughter). Perhaps when these experiments are repeated for some years and the results analysed statistically, the Cotton Specialist may have cause for some satisfaction (renewed laughter).

India is a country where cultivation has been going on for thousands of years and conditions of soil erosion were present right through. It is estimated that cotton has been in cultivation in this country for even 4 000 to 5,000 years; for cotton fibres were discovered in the ruins of Mohanji Daro. If cotton had been grown as long as that, what had happened to the cotton tracts of India during these 5,000 years?

There is need to recast the attitude of science to tradition. Scientists should modify their attitude towards what is usually dubbed as superstition and examine whether there is any scientific basis underlying the superstition. At Madras, I met an Australian lady who was conducting research in agricultural science in an institute near London. She told me that one line of research she was conducting was the effect of new moon, full moon &c. on growing crops. She gave me a copy of her paper in which I found that crops sown at these periods showed significant differences. Tradition was a thing to which the scientist even as the layman ought to pay respect. Tradition was the father of Science even as Poetry was the father of Grammar. Grammar was latently present in poetry; so also science was latently present in superstition. So that, unlike modern children who want to teach their daddies, scientists should pay respect to the cultivator whose knowledge is based on tradition. There is much in the cultivators' work which on verification would give the scientist greater confidence to follow or which on examination may suggest to him further lines by means of which to enrich old practices. It would also help to conserve the knowledge that had gone behind us in order to build up the future.

I was much interested in the work done in the Cotton Specialist's laboratory in crossing Co. 2 cotton with Uganda and the prospects of crossing, *Karunganni* with American cottons. The Punjab was forging ahead in raising long staple cotton. But I feel sure that under the guidance of Rao Bahadur Ramanathan and his assistants, Madras would again come up in the race, so that with better conditions of cultivation which nature has provided, it would be possible for Madras to be once more the leading long and medium staple producer in India.

I was greatly interested to listen to the paper on the Annamalai University colonisation. Agricultural colonies had been receiving attention for many years. Mysore, Punjab, Cawnpore, Annamalai and Travancore had made experiments. The criticism of experienced officers like Rao Bahadur T. S. Venkataraman was that there was lack of adjustment between men available and the economic conditions into which we wanted to fit them. Instead of changing their psychology, I would take Mr. Venkatraman's own work and experience as furnishing a remedy to the problem propounded. Just as Mr. Venkatraman brought about a cross between bamboo and sugarcane or between sorghum and sugarcane we want a cross between the rural and urban mentality. One human scientist was able to achieve this in India and that was the founder of the Dayal Bagh. Dayal Bagh is a place where educated men live and live a decent civilised life making both agriculture and industry meet. It is an *agro-industrial* economy which has got the good points of both the village and the city.

I feel that so far as the educated unemployed are concerned, if we want to find an economic life for them, it must be in some kind of hybrid between town and village. The village by itself has not got the amenities

of civilized life, whereas the town has too much of these. While we cannot abolish villages we can atleast reorganise and regroup them and provide for the group what we cannot provide for the individual.

So far as land colonies were concerned I found that where I did not succeed with educated men I succeeded with uneducated men. I am speaking from my experience of the Chintaldevi farm which was offered to Agricultural graduates without any response from them. I conducted enquiries to get land-less labourers to farm this colony. I succeeded because the difficulties which existed in the case of the educated unemployed did not exist in the case of these people. These uneducated men knew cultivation. They already had houses. They had some means of livelihood. Unlike the educated unemployed, they were men accustomed to small returns which land gives. With the application of co-operation to agriculture, it was possible to fit them to the economic conditions of India and to prevent these gifts of land made to the land-less labourers from falling into the hands of the capitalist and the exploiter.

It is necessary and possible for the individual educated man to go to the villages. The way of finding an economic living for him was by *agro-industrial* economy and not merely by *agricultural* economy. This is the view I have arrived at after thinking over the problem and discussing it for some years.

My interest in agricultural science is not only official but also personal. I hope in the coming years not only to continue my personal interest in it but also utilise it in my own official life as Member of the Board of Revenue. I look forward to cooperation from all of you in the work in which you and I are interested (applause).

College Day Athletic Sports

The annual athletic sports run by the Madras Agricultural Students' Union came off on Saturday the 13th July. That mid-July weather in Coimbatore can be anything but dependable proved true again this year. The light showers which began on Friday continued at intervals throughout the night and Saturday dawned with an overcast sky. For once the S. W. moonsoon appeared to have the better say over the optimistic sports committee and carried on its vendetta at regular intervals till about 2—30 p. m. Just as the expectant crowd began to despair of a successful sports meet at 3 p. m. the sun came out from his hiding throwing a vivid light on the arena and with it a ray of hope and good cheer on the competitors and the large congregation of spectators. Precisely at 3 p. m. the bugle announced the commencement of the programme and the rapid change from the erstwhile showery weather to bright sun enabled the spectators to emerge from the safety of their tents to the open and those in the open to discard their macintoshes and umbrellas. Ideal weather prevailed till late in the evening when once again the monsoon had undisputed sway over the night and the whole day following.

One important reform which was introduced for the first time was the change over of the track events from the British to the metric system in conformity with the Olympic standards. The system of awarding marks for the

champion-ship was also altered, the Olympic events alone counting for the award. The competitions were keen though it cannot be claimed that the achievements were of a high order. Only one record was broken, Devadas Kamath clearing 30 feet 8§ inches in shot put. For the first time in the history of these sports the championship was shared by two competitors C. V. Govindaswamy and H. N. Kamath each scoring 18 marks out of a possible maximum of 36 marks which an individual could score.

Mr. R. C. Broadfoot in a neat little speech congratulated the competitors and the sports officials on a very successful programme and requested Mrs. K. M. Unnithan to give away the trophies and prizes. At the conclusion of this function Mr. K. M. Thomas, president of the Sports committee proposed a vote of thanks to Mrs. Unnithan. The Union was 'At home' to the ladies and gentlemen who responded to their invitation. The thanks of the Union are specially due to the several gentlemen who acted as sports officials.

The successful conclusion of the day's functions were in no small measure due to the untiring efforts of Mr. H. Shiva Rao, Vice-president of the Students' Club and his band of voluntary workers. The excellent arrangements made for refreshments for the large gathering were in the hands of Mrs. M. C. Cherian and the committee.

List of Prize Winners.

Cross Country Race (5 miles). 1. D. Sundar Raj. 2. R. M. Sastri. 3. M. Doss. Time 38 min. 14 2/5 sec.

Pole Vault. 1. T. Chellapa. 2. C. M. George. Height 7 ft. 11 in.

110 metres hurdles. (The Ramaswami Sivan Cup). 1. D. Narasimhamurti 2. C. M. George. 3. R. M. Sastri. Time 20 2/5 sec.

16 lbs. Shot put. 1. Devadas Kamath. 2. K. M. Somanna. 3, B. S. Krishnan. Distance 30 ft. 8 5/8 in. (new record).

100 metres dash. (The Saidapet Old Boys' Cup). 1. L. Narasimha Rao. 2. C. V. Govindaswami. 3. H. N. Kamath. Time 12 4/5 sec.

Long Jump. 1. C. V. Govindaswami. 2. D. Chinnapa Reddi. 3. C. M. George. Distance 16 ft. 10 3/8 in.

200 metres hurdles. 1. D. Narasimhamurthi. 2. C. M. George. 3. R. M. Sastri. Time 33 1/5 sec.

High Jump. (The Tadulingam Cup). 1. C. Ramakanta Reddi. 2. H. N. Kamath 3. S. Krishnamurti Rao. Height 4 ft. 9 in.

Hop, Step and Jump. 1. H. N. Kamath. 2. C. M. George. 3. D. Sundar Raj. Distance 34 ft. 5 3/4 in.

400 metres race. 1. C. V. Govindaswami. 2. H. N. Kamath. 3. C. M. George. Time 62 2/5 sec.

Javelin throw. 1. K. M. Somanna. 2. D. Sundar Raj. 3. Chinnappa Reddi. Distance 85 ft. 10 in.

1500 metres race. (The Anstead Cup). 1. H. N. Kamath. 2. R M. Sastri. Time 6 min. 33 3/5 sec.

Cricket ball throw. 1. H. T. Monnapa Hegde. 2 H. N. Kamath. 3. K. M. Somanna. Distance 95 yds. 2 in.

Invitation Race (800 metres). 1. J. Christy (Govt. Secondary and Training School). 2. M. Saywell (Stanes European High School). 3. A. Ramaswami (Union High School). Time.

Old Boys' race. 1. A. M. Kulandai. 2. J. Colaco.

4 × 400 metres Intertutorial Relay Race. (The Chunampet Shield). 1. Mr. K. M. Thomas' wards. 2. Mr. P. V. Ramiah's wards.

Intertutorial tug of war. (The Ramnad Shield). 1. Mr. C. N. Ayyangar's wards. 2. Mr. B. M. Lakshmipathi's wards.

Joint Championship. C. V. Govindaswami. H. N. Kamath.

Report of the Managing Committee for the year 1939—40.

(*Presented to the general body.*)

The Managing Committee of the Madras Agricultural Students' Union beg to present the following report of the activities of the union for the year 1939—40.

Membership. The strength of the Union as it stood on 31st May 1940 was 503, as against 450 of last year. It is gratifying to note that this is the highest membership on record ever since the inception of the Union. Indeed it should have given us great pleasure to record this appreciable increase in strength but for the fact that a large number of officers of the Department (nearly 40%) are still not members of the Union, in spite of our very earnest endeavours in the form of personal appeals and despatch of complimentary copies of the Journal to over 150 officers of whom only about 15 enlisted themselves as members during the year. In this connection the managing committee have great pleasure to record their gratefulness to Sri. M. Anandan, one of our members who has been responsible for enlisting six more members during the year. We hope that his example will be followed up by other members. We take this opportunity to appeal to all the officers who are not members already, to enlist themselves and also help in securing more members in the future. We would also request the students that pass out of the College every year to continue to retain their membership, as they get the exclusive benefit of concession rates till they are employed.

Office bearers. There has been no change in the office bearers of the Union during the year. The vacancy in the list of resident members of the council caused by the unfortunate demise of Rao Sahib T. V. Rajagopalachariar was not filled up.

General Body meeting. There has been no occasion to call for a general body meeting during the year. A meeting of the resident members was held on 13—3—40, when a resolution condoling the death of Rao Sahib T. V. Rajagopalachariar was passed.

Meetings of the Managing committee. Eight meetings of the committee were held during the year.

Madras Agricultural Journal. The Journal continued to be published with unfailing regularity and promptness. Seventeen meetings of the Editorial Board were held during the year. A fairly good number of articles on various subjects was received for publication in the Journal and we have great pleasure to record our thanks to the various authors who have contributed to the success of the Journal. We appeal once again to the officers of the Department to evince greater interest in the conduct of the Journal by sending more popular articles to help the cause of scientific Agriculture. In this connection, particular mention must however be made of the publication of the special number of the Journal with *Students' Annual Supplement*, in March 1940. The publication of this special number was undertaken in accordance with the resolution given notice of by the Managing committee and passed unanimously by the General Body in its meeting held on 16th July 1939. The monthly publication of 'mofussil news and notes, in the Journal is a new feature introduced during the year and we are glad that the contribution from the districts is appreciated by the readers.

Editorial Board. We have great pleasure in recording our thanks to Mr. K. M. Thomas, Editor and to the other members of the Editorial Board for the able and efficient conduct of the Journal during the year. We also record our appreciation of the promptness of our printers, The Scholar Press, Palghat.

Subscribers. The number of non-member subscribers to the Journal during the year was 215 as against 230 of last year and 180 in the previous year. We request the mofussil members to enlist more subscribers and make the Journal more popular among the people of this Presidency. 32 Journals (Indian and Foreign) as against 30 of last year were on the exchange list.

Finance. The Auditor's report and the financial statements are now presented to you. It gives us very great satisfaction to note that our finances have made a marked progress during the year. From the statement of income and expenditure account you will find that there is a saving of Rs. 503—0—7 as against the excess of expenditure over income of Rs. 130—0—8 in 1938—39. We hope that this satisfactory condition in finance will be maintained in the coming year. An amount of Rs. 800 has been provided for in the budget estimate for 1940—41 for effecting an extension to the Union building. The committee recommends to the general body to pass this amount as extension is found to be indispensible to relieve the existing congestion in the office.

Employment of Agricultural Graduates. We regret to note that the Madras Agricultural Students' Union which also serves as an employment bureau for the Agricultural graduates has not been able to do anything in this direction. We hope that the authorities will take cognisance of the lot of a large number of Agricultural graduates whose education, talents and energy are being wasted.

Ramasastrulu-Munagala endowment. Three papers were received for this competition this year but no prize was awarded, as the judges were of opinion that the papers contributed were not of a high standard. The thanks of the committee are due to Dewan Bahadur D. Ananda Rao, Chairman of the committee, Rao Bahadur K. Gopalakrishna Raju and Mr. K. Ramiah, M. B. E., for judging the papers.

Acknowledgements. It is our pleasant duty to thank the various members of the Union, who helped and cooperated with its activities during the year. We have great pleasure in recording our grateful thanks to the conveners and members of the various subcommittees who whole heartedly helped us in celebrating the College Day and Conference last year. Our thanks are due to Mr. J H. Longrigg, Principal, of the Forest College, for loaning us tents and chairs. We particularly thank Mrs. M. C. Cherian and Mrs. M. Kantiraj, for arranging the tea on the sports day last year. The Union is greatly indebted to Mr. R. C. Broadfoot, Principal and President of the Union who has been as kind, helpful and sympathetic as ever, towards the affairs of the Union.

K. Sanjiva Shetty,
Secretary
(on behalf of the Managing Committee.)

Annual General Body Meeting.

The annual General Body meeting of the Madras Agricultural Students' Union was held on Wednesday, the 17th July 1940 with Mr. R. C. Broadfoot, President of the Union in the chair. One hundred and forty one members including 64 students were present.

The minutes of the previous meeting were read by the Secretary Mr. K. Sanjiva Shetty. This was adopted. The annual report including the statements of accounts for the year 1939—40 was then presented before the meeting. In considering the budget for the year 1940—41, Rao Sahib V. Muthuswamy Ayyar proposed that provision may be made in the budget for the contribution of a sum of Rs. 25/— to His Excellency the Governor's War Fund, for Indian defence purposes. This was seconded by Rao Bahadur V. Raminatha Ayyar and was

unanimously passed by the house. Rao Bahadur V. Ramanatha Ayyar then suggested that the charges under 'Establishment' be debited to the journal account, as the establishment was maintained more for the sake of the journal than for other purposes. Mr. M. A. Sankara Ayyar pointed out that the establishment was maintained for the work connected with the membership of the Union and for keeping accounts and the actual work done by the establishment for the printing of the journal was proportionately small. Mr. M. C. Cherian suggested that 50 per cent of the cost of the establishment be debited to the journal account and the rest towards the office expenditure as usual. This was agreed upon. Rao Bahadur V. Ramanatha Ayyar wanted to know the extent and nature of improvements contemplated for the union building for an estimated expenditure of Rs. 800/— during the year 1940–41. The Secretary explained that with the estimated amount, it would be possible to provide an extra room of 15′ by 12′ with verandhas on the front and the rear and that this extension was very necessary to relieve the congestion of space as at present. The estimates were then passed as amended.

The next item in the agenda, viz subject for the Ramasastrulu Munagala prize competition was taken up for consideration. The Secretary explained to the house that the judges appointed for considering the papers, received for the above competition had remarked that it was very difficult to judge papers on economic enquiries and those bearing on pure research in one and the same year. They suggested that the competition be open for papers on economic enquiries in one year and for research in another. This evoked a good deal of discussion and finally it was agreed that the recommendations of the board of judges be accepted and that these take effect from next year. Rao Bahadur V. Ramanatha Ayyar suggested that this system be adopted for at least three years and this was seconded by Mr. C. M. John. The question of notifying the scope of the competition for the year 1940–41 was left to the discretion of the Managing committee. The resolution was then put to vote and passed unanimously.

The following office bearers were then elected for 1940—41.

Vice President :— Mr. P. V. Ramaiah.

Editor :— Mr. K. M. Thomas.

Secretary :— Mr. T. Nataraj.

Mofussil Vice Presidents :— Messrs. M. V. Raghava Rao, M. Anandan and R. Swami Rao.

Mofussil members for the council :— Messrs. M. Damodara Prabhu, K Jagannatha Rao, A. Muhammad Ali and K. Kuppumuthu.

Resident members for the council :— Messrs. C. Balasubramania Mudaliar, M. S. Kylasam, Rao Sahib V. Muthuswamy Ayyar, and Mr. G. Rama Rao (Student).

Manager :— Mr. K. Ramaswamy.

Treasurer :— Mr. A. M. Kulandai.

Managing Committee :— Messrs. V. Gomatinayagam Pillai, K. Sanjiva Shetty P. A. Venkateswara Ayyar, and T. Chellappa (Student).

Editorial Board :— Messers M. Kanti Raj, M. C. Cherian, Dr. N. Krishnaswamy, and Mr. Narayanamurty (Student).

In winding up the proceedings, the President of the meeting Mr. R. C. Broadfoot thanked all the members of the Union and the members of the various committees for the successful conduct of the college day and conference. He particularly thanked Mrs. M, C. Cherian and the committee for the excellent arrangements they made for the 'At home' on the sports day. He also thanked Mr. J. H. Longrigg of the Madras Forest College for kindly loaning the chairs and tents for the occasion. Mr. M. C. Cherian proposed a vote of thanks to Mr. R. C. Broadfoot for evincing keen interest in the affairs of the Union.

Forestry and its Relation to the Problem of Soil Erosion.*

By J. A. WILSON, I. F. S.
District Forest Officer, Coimbatore.

Introduction. It is impossible in the short time at my disposal to deal fully with such an important subject, for it is one on which a long series of lectures could be given. I have therefore chosen to deal with the subject from a rather unusual angle. I presuppose a general knowledge of the subject among my listeners.

What exactly is soil erosion? Put into the simplest of language it is the gradual wearing away of the soil by the effects of wind and water. We all know that soil erosion is nature's revenge on man for his misuse of land, and that the only remedy against erosion is to stop this misuse, and take steps which we have studied to check this menace where it has already started

Agents of erosion. For soil to waste away, movement must take place, and there must always be a conveying agent, since soil has no automotive power. As stated above the two conveyors are wind and water. The rate at which erosion takes place naturally varies with the type of soil, but is chiefly determined in terms of the velocity of the conveyor If therefore we could control these velocities, we should be able to control erosion. The ignorant may smile at any suggestion of attempting to control climatic factors such as wind and rain, and indeed it is futile to claim that one can bring climatic factors under complete control. Yet it is possible to vary local climatic conditions to an appreciable extent. Any old man of Coimbatore, for example will tell you that the appalling winds which drive us to distraction are much worse now than they were fifty years ago. I have repeatedly heard the view expressed in the Ceded Districts that during the last fifty years the rainfall has become much more irregular and undependable, while such rain as falls, usually falls, as a veritable downpour—excellent for tank filling purposes, no doubt—but bad as being the cause of a good deal of wash and the resulting silting up of tanks. These are impressions, they have so far as I know no foundation in statistical records, for such are kept in very simple form. But old men often think over such matters and their views should not be rejected altogether. There are many indications that the impressions are correct, and that local variations of climate do take place as the years pass. If so there must be reasons for it.

The effects of forests on climate (i). *Wind erosion.* First take the case of the wind. At school we studied cyclones, and anticyclones, the main world air currents such as the monsoons, and trade winds, and their

* Paper read at the twenty-ninth College Day and Conference of the M. A. S. U. July 1940.

causes. We studied the question of sea breezes and land breezes. We found that movements of air (winds) took place from regions of high barometric pressure towards regions of low barometric pressure, and we also learnt that hot air rises thus creating low barometric pressure zones. How many of us have been thankful for a cooling sea breeze in our Presidency town, without thinking of what caused it, namely the heating up of the soil during the day, the rising of the air above the hot soil surface, and the resultant inflow of air from the sea.

Winds are however of two types, the main inter-continental currents of the monsoon type and local well known winds of which our Coimbatore wind is a typical example. With the knowledge we have, it is not difficult to realise that the more extreme the limits of the factors which cause winds, the worse the winds will become. It is beyond the power of man to control the main world air currents, but so far as local winds are concerned forests are of some importance. In France, the U. S. S. R. and the U. S. A., a good deal of work to this end actually has been done with some measure of success. Let us consider the action of a forest. First of all a forest offers a mechanical obstruction and reduces the ground velocity of a wind. Everyone of us knows the value of trees as wind-breaks around our villages and farms This is the direct side of the question. There is however a very valuable indirect effect of forests which is apt to be overlooked. Forests obstruct the passage of the sun's rays to the soil and reduce ground temperatures during the day, while at night they tend to moderate the fall in ground temperature. They reduce the temperature of the air around them by virtue of the physiological and physical processes incidental to plant growth. Trees transpire water, and in the process of evaporation much heat is absorbed from the sun's rays. Plant tissues therefore never become heated to the same extent as bare rocks or bare soil. This moderating effect on the extremes of temperature all makes for a reduction in the velocity of local air currents.

It is for these reasons that in the U. S A. a scheme for the establishment of a great central belt of forest was put forward as a cure for the high winds that have developed since large areas of prairie were converted into arable lands for the production of cotton. The devastation wrought by dust storms was so enormous that it was considered sound policy to expend large sums on the planting of this belt of trees. A much older and better known example of tree planting to check winds is that of the French Landes, where thousands of acres have been put under maritime pine plantations, again at enormous cost to the state. In this case, however, the project has proved profitable in the long run apart from having achieved the important object of preventing soil drift and giving security to a large number of cultivators whose lands were previously threatened by shifting sand dunes. Coming nearer home we have several cases of casuarina plantations down the East coast from Ganjam to Tinnevelly established to control sand drift and these also have been fairly successful.

Modern experience shows however that though regular belts may check sand drift and help to moderate extreme climatic factors the effect is much more pronounced if irregular plantations are established here and there in key positions after a detailed study of local topography, so that the maximum effect of high ground may be obtained. The establishment of plantations in wind-swept areas is not easy, but it can be done, and the cost has to be faced when the alternative is the loss of soil fertility which is the cultivator's basic capital.

Having considered this question of the effect of forests on climatic factors which cause winds and on the winds themselves one cannot but be forced to the conclusion that the alleged deterioration of local climate in parts of Madras is in part the result of the conversion of vast areas of unreserves which carried a degraded scrub jungle into arable lands, and the denudation and deterioration of many of the hills of Salem, Trichinopoly, Chittoor, Anantapur and the Ceded Districts.

(ii). Water erosion. Now let us turn to the consideration of water, which is responsible for the more spectacular types of erosion with which every text book is filled. We have to consider two aspects of the question, the pulverising effect of the heavy drops in a heavy rainstorm, and the actual carrying away of the particles of soil by the 'run-off'. The pulverising effect of rain depends on the rate of precipitation. A light shower does little damage, while a heavy thunderstorm may cause considerable destruction. The heavy drops pulverise the surface soil particles, and converts them into very fine mud which goes to choke the surface pores. This checks the rate of absorption of moisture and increases the run-off. It has been stated by many that forests tend to increase the rainfall. There is no proof of this and all too much credence has been given to the theory. All available evidence points to the fact that the topography of a country exercises a far greater influence on rainfall than the mere existence of forests no matter how extensive. There is, however, evidence that forests do exercise a limited local effect merely because they lower the temperature of moisture laden winds. What is being repeatedly emphasized is that a judicious distribution of blocks of forest here and there over a country-side does tend to moderate the climate and this effect extends to moderation of the rate of precipitation, since the more extreme the various climatic factors such as temperature, the more severe are the small cyclones that result in the heavy storms which cause the damage.

Let us now pass to the 'run-off' which actually carries with it the soil particles. A light shower causes little run-off even on bare soil. A heavy storm precipitates moisture at a far greater rate than soil can absorb it. Gravity comes into action and the surplus drains off to lower levels. The faster the run-off the more the erosion. Nor does the damage end there, for water charged with soil particles has a pronounced scouring action and so gullies are formed. These in turn are scoured out into ravines and so

develop what the American would call 'bad lands'--useless for cultivation. Ravines it should also be noted cause lateral drainage from surrounding land and result in a fall in the sub-soil water level. These processes start in the hills and their effect is cumulative as we proceed towards the plains.

Now how do forests affect matters? We must remember that most of our forests are on the hills and their effect therefore operates chiefly in these areas. The canopy of leaves first breaks the heavy drops and largely checks their pulverising action on the soil. The dead leaves which go to make up the humus layer help in this for they absorb the force as such drops which penetrate or fall from the canopy hit them. The water runs under the leaves and reaches a soil in which the surface pores are open. Absorption therefore is much greater. As the water is absorbed it is assisted down to the sub-soil strata by the roots of the trees and shrubs and goes down to feed deep seated springs. Run-off is at a minimum, and soil erosion is much reduced. It is not claimed that forests are a complete check on run off, but that they exercise a very moderating effect. This is of the utmost importance in the hills or shall we say in the water catchment areas, and we as foresters do claim that good forests are the best form of check on what has been called 'the march of the hills to the sea'. It is impossible to divorce erosion pure and simple from water conservation when considering this matter, and the one is as important as the other. Without soil we are helpless Without water we are equally helpless.

Anyone who knows his South India can quote instances of this type of benefit conveyed by forests. Even in Coimbatore District I quote the case of the Bhavani as observed at Satyamangalam. Here it is possible to tell from the colour of the river whether heavy rains have taken place in the Nilgiris or in the heavily forested areas of Eastern Malabar where the river rises. The Nilgiris yield a flow of what is almost liquid mud, while the run off from East Malabar is comparatively clear. Any ryot around the irrigated zone of Gobichettipalayam welcomes heavy rain in the Nilgiris, for he gets from it valuable silt, while the opposite is the view of the irrigation authorities.

Summarising what has gone before, forests reduce extremes of climate whatever factor we may examine, temperature, wind, rainfall, atmospheric humidity or evaporation, and as a result reduce erosion which increases the more extreme the climate. The destruction of forests tends to lead to a deterioration of climate because it makes the climate more extreme. I have previously touched on local impressions voiced by old men. I now quote the example of Mesopotamia, once a rich garden land of plenty supporting a wealthy and happy people, and now a ghastly desert supporting only a sparse poverty-stricken population.

The destruction of forests still continues. To every thinking man this is a matter for serious consideration. We can no longer afford to take a short-sighted view. We have the future of the human race to consider.

Erosion has become a world problem over vast areas. At the same time as we are bringing more and more land into the arable class, more and more land is passing from arable to waste since it has become sub-marginal for cultivation and such land is often in such a condition that it will never again carry a vegetative cover. This cannot go on for ever and the ultimate result can only be starvation.

Forestry and Agriculture are kindred subjects. Each has its place in the economy of a country. There is however a balance between the two and it is to the advantage of the pure agriculturist that this balance should be maintained.

To you agriculturists I say in closing that without wishing to deprecate in any way the ordinary anti-erosion methods which you are taught to adopt on your cultivated lands, you should remember that the forests are also your friends. Their effects are not spectacular, but they are none the less effective, and they are in themselves extremely important agents in checking the most pressing problem of modern times—erosion—the greatest enemy of the human race.

I congratulate the Madras Agricultural Students' Union on its selection of this subject for discussion. It is my fervent hope that the members of this Union who can visualise the dangers of soil erosion to the country, would strive hard at all times to keep the control of erosion as one of the most important objects of their lives.

Prevention of Soil Erosion on Tea Estates in South India.*

By J. D. MANNING, B. Sc. (Agri) Edin.,
U. P. A. S. I., Tea Scientific Officer, Nilgiris.

Introduction. The object of my contribution to your discussions, is to describe, what steps have been and are being taken to prevent soil erosion on tea estates in S. India. In one way tea estates present a special problem, but what I have to say about anti-erosion measures, applies very largely to any form of hill cultivation.

Perhaps there are some of you not familiar with the tea industry in S. India, so I shall begin by saying that there are in Mysore, the Madras presidency and Travancore approximately 160,000 acres of tea. The chief districts in the Madras presidency are the Nilgiris, Wynad and Anamallais. In Travancore state tea is grown on the Kanan Devan Hills or High Ranges and in South and Central Travancore. Mysore and Cochin states have a comparatively small acreage.

Under an international scheme of restriction, practically no new areas are now being planted and the figure of 160,000 acres, remains very

* Paper read at the twenty-ninth College day and Conference of the M. A. S. U., July 1940.

constant. The area hardly falls at all because, odd as it may seem, it does not pay to abandon tea—even the worst tea. Practically the whole of the large acreage is situated on the hill sides and mountain slopes of the Western ghats, and the plantations vary in elevation, from under 1000 feet to well over 7000 feet. Moreover, the tea is planted on land, sometimes very steep, which formerly carried medium to heavy jungle, though there is a certain amount of grass-land tea. Under virgin jungle or grass, the soil is so well protected that soil erosion hardly takes place. But as soon as such land is cleared for planting with a new crop, it immediately becomes liable to erosion, and from the very start the problem of erosion must be faced and tackled or else deterioration of land and crop takes place at a rapid pace. The problem is somewhat intensified because tea requires a fairly heavy rainfall, and in the tea districts we seldom have a rainfall of less than 50 inches per annum, and not unusually it goes to 200 inches and over. Most of this rain falls during the South West monsoon. You will appreciate then, that on hillsides and mountain slopes where there is a heavy rainfall, the prevention of erosion is a matter of the first importance, and particularly so, because tea is a perennial crop and with good treatment, we can expect the same plants to go on producing productive crop, for 70 years or more, provided they are well cared for.

Kinds of erosion. Under the conditions which I have mentioned, three forms of erosion can take place (i) erosion by wind; (ii) gully erosion and (iii) surface wash. The first of these is hardly a serious problem in tea estates; the second—gully erosion—is rather more serious, but chiefly we are concerned with erosion due to surface run-off. When this takes place, not only is the top soil gradually carried away, but with it the soil humus, the soluble nitrogen, the phosphates and potash. None of these valuable constituents we can afford to lose. In this short address, I shall confine myself very largely to erosion by surface run-off because as I have said, this is the type of erosion which presents the real problem.

Surface wash. This surface run-off, takes place chiefly, when the rate of rainfall is greater than the amount of water, that can be absorbed by the soil, at the time of fall. So, unless protective measures are taken, we find during heavy rain that all excess water which is not immediately absorbed by the soil, rush down the slopes and carry with it constituents which make up the top soil.

Principles of Protective Measures The greater the pace at which this water moves down the hill, over the surface, the larger is the quantity of soil that is washed away, so that, all efforts aimed at preventing erosion must be based on two chief principles. The first principle must be to render the soil as absorptive as possible so that it will rapidly absorb a large proportion of the water falling at any given time. The second step is to reduce to a minimum the rate at which any excess water can move over the soil surface. If a very large proportion of the rainfall is absorbed as it falls, and the excess can move but slowly, then erosion by surface run-off is

reduced to a minimum. That represents the ideal set of conditions we should aim at, and now the problem is how to achieve those ideal conditions.

Increasing the absorptive capacity of the soil. I shall first deal with the absorptive power of the soil. It is not possible immediately to change the type of soil but we must see that the soil is kept in good physical condition, has no hard pan either on or near the surface and is well drained. Its power of absorbing water should thus be raised to the maximum capacity. The periodical addition of organic matter, materially helps in increasing the power of absorption. Attention is paid to all these points on tea estates and by adopting them it has been possible to ensure that a large proportion of the heavy rainfall penetrates into the soil. But such methods, which after all are only good farming practices, are insufficient in themselves because during the time of heaviest rains and continual rainfall there is a certain amount of excess rainfall, and it is the steps, taken to deal with this latter mass of water (1" of rain = 110 tons of water per acre) which finally decides how much erosion does take place.

There are several methods which decrease the speed of movement of excess water and thereby decrease the rate at which the surface soil can be moved. Moreover, the slower the movement of excess water over the soil surface, the more time there is for the soil to absorb this water.

Protective measures. The methods resorted to, on tea estates are:—

(i). *Terracing.* I expect you all will have seen terracing done at some time or other, and in any case it is adequately dealt with in many text books. Terracing is most effective when it is so supported as to be permanent, and its main feature is, that it tends to convert a hill-side into a series of flats and thereby reduces the rate of surface run-off. It is effective, especially if done on contour, but it is an expensive method. Since we have other methods which are as good and somewhat less expensive, terracing is not an universal feature of South Indian tea estates.

(ii). *Maintaining surface drains.* There are various systems of surface drainage and great use is made of such drainage systems in South Indian tea estates. One usually thinks of drains as being a means of carrying away water as quickly as possible, but for purposes of control of erosion their use has been modified so that the anti-erosion drains have come to mean drains which collect excess surface water, and move it off as slowly as possible. These drains really are very effective, and especially so, if they are not too far apart and are well designed so that water cannot travel far, over the soil surface before it reaches a drain, and when it does reach a drain the slope is so gradual that its rate of movement in the drains is reduced as far as possible. In many cases it is the custom to have ordinary surface drains well placed, gradually leading the water away, but more often than not, modifications have been made in the drains themselves to reduce still further the rate of water movement. One of these modifications entails digging "silt pits" in the drains every few yards. This reduces the rate of

movement, and facilitates deposition of silt in the pits. Later, the soil so collected, can be spread back, on the land from which it has come—always on the upper side of the drain. A second modification is what is known as a "lock and step" drain. This is no more than an ordinary drain with a series of steps and locks whose purpose is to reduce the speed of water movement thereby allowing the soil carried by the water, to settle in the drains, eventually to be replaced on the land. There are still more modifications of this method but suffice now to say that these drainage systems are effective methods of preventing soil wash.

(iii). *Raising shade trees and cover crops.* Finally, I want to mention what I consider to be the most effective method of controlling erosion. It amounts to no more than seeing that the soil is never bare and exposed. An exposed soil, subject to the heavy beating effect of rain, is most liable to erosion. Now it has become almost a fetish on tea estates to keep the land covered and this is done by growing shade trees – which break the fall of rain – and also by growing cover crops between the rows of tea or allowing soft weeds to grow. When by such practices the soil is completely covered on the surface and fully occupied by the root systems of plants, erosion is reduced to a minimum, and it is perhaps the only real way, how the problem can be tackled effectively. I know it sounds all wrong and looks untidy to have a cover of weeds growing amidst tea, and we do know that their presence reduces yield by 5 to 10 per cent. But so much importance is placed on preventing any kind of erosion, that most planters are prepared to sacrifice this loss of yield, to keep their soil intact. Eventually, of course, it pays a handsome dividend to do so. Unlike the annual crops, tea is a crop which can stand a certain amount of weed growth and cover crop, provided always that the weeds are never allowed get out of control and that any harmful weeds are always removed.

Conclusion. It is by a combination of these methods that the problem of soil erosion is being tackled on tea estates in S. India today, and I think I can truly claim for the planters that not only do they realise their responsibility in this direction, but that they have studied the problem intelligently and are putting into practice the most effective measures. After all it amounts to nothing less than that—and it is the message which I should like to leave with you today- there are two ways of managing land, viz. either you can (a) *mine* it—take from it all it will give and take no care for the future; or you can (*b*) *farm* it - treat it intelligently as a living and lasting thing and realise that the land and yourself have a future to think of. Be always suspicious of erosion--it goes on much more rapidly than one would believe by appearances. Regard it as a major problem.

Soil Erosion by Surface Run-off.

By A. SUBBA RAO, D. Sc., F. Inst. P.,
Soil Physicist, Dry Farming Station, Hagari.

Introduction. In the black soil areas of the Ceded Districts conditions are generally favourable for heavy losses of soil and water by surface run-off after rains. Sheet erosion has been responsible for a steady deterioration in the depth and fertility of the soil. The main factors contributing to this are (1) the heavy type of soil—which does not allow the rain water to be absorbed as fast as it is received, (2) the undulating nature of the land and (3) the great intensity of the rainfall. About half the annual rainfall of the tract is received within a limited period of four to six weeks between September and October. Unless proper preventive measures are adopted, most of the rainfall received in heavy instalments is lost as surface run-off carrying with it large quantities of the rich surface soil. A knowledge of the exact amount of soil and water lost by run-off is essential for an understanding of the magnitude of the problem.

Experimental. During the last three years data on the amount of soil and water lost by surface run-off have been collected in plots specially constructed for the purpose.

Two plots 66′ × 8¼′ (area 1·25 cents) with a gradient of 1 in 80 were selected. On three sides each plot was enclosed by galvanised iron sheets and the run-off was collected into masonry cisterns towards which the plots slope. The amounts of water and silt collected as run-off were measured after each rain. Samples of run-off waters were analysed for total salts, lime and nitric nitrogen. Nitric nitrogen determined in samples of rainwater served as a correction for the values obtained for samples of run-off. The silts collected in the different seasons were analysed separately. During 1937—38 both the plots were kept under the same treatment viz. hand hoeing by the blade harrow given before the rainy season. The results of the first season served as duplicates.

The effect of Scooping. The effect of scooping the land on the control of the erosion was studied during 1933—39 and 1939—40. In one of the run-off plots, scoops were formed before the rainy season and the amounts of water and silt collected in the run-off tanks after each rain were studied. The results obtained for the last three seasons are summarised below in Table I. It will be seen from the figures that in the control plot 44 and 48 per cent. of the rainfall was lost as run-off during 1937-38 and 1938-39 respectively. During 1939 the run-off tanks overflowed on two occasions and the results given in the table are exclusive of the data on those two days. The silt washed off in the control plot is considerable as it amounted to 6·6, 9·9 and 7·4 tons per acre respectively for the rainfall of 9·2″, 15·7″ and 8·4″ for the three years under study. For every inch of water lost, the amount of

silt carried off was 1·65, 1·31 and 2·69 tons per acre in the control plot for the three years under study. Under the same conditions of gradient and size of plot, 4·3 tons of soil per acre was lost from a clean fallow at the Dry Farming Station, Sholapur, during 1935-36.

TABLE I. Run-off results—Hagari Experimental Station.

	1937—38 Average of two control plots.	1938—39		1939-40 *	
		Control.	Scooped.	Control.	Scooped.
1. Number of days when there was run-off.	11	13	10	16	10
2. Total rainfall on days when there was run-off in either of the plots.	9·16″	15 66″	15 66″	8·36″	8 36″
3. Rainwater lost.	4·00″	7·52″	3 29″	2 73″	1·34″
4. Rainwater lost—expressed as per cent of rainfall received.	43 67	48·01	21·01	32·66	16·03
5. Silt washed off in tons per acre.	6·58	9·86	3·60	7·35	2 44
6 Silt washed off in tons per inch of rainwater lost.	1·65	1·31	1·09	2·69	1·82
7. Total salts lost in pounds per acre.	100·60	132 86	95·79	65·00	41·72
8. Lime (CaO) lost in pounds per acre.	2·45	20·07	16·79	5·46	2·62
9. Nitric nitrogen lost in pounds per acre.	0·11	0 59	0·29	0·19	0·09

* Excluding 2 days when the tanks overflowed—Rainfall being 3·82″ and 2·61″ within 24 hours on 10—8—39 and 25—10—39 respectively.

Intense storms received during a short spell contribute most to the run-off. The pockets into which one of the run-off plots was thrown by scooping, effectively decreased the run-off of water to less than half the value of the control plot, while the silt washed off was only about one-third.

Analysis of silt collected in 1937-38 clearly showed that the soil washed off the land is richer than the original soil both from the physical and chemical point of view as shown in the tables below : —

TABLE II Mechanical analysis of silt collected in 1937-38.

Heads of analysis.	Silt.	Soil 0—1 foot depth. East Block.
Clay (per cent)	56·8	44·9
Silt ,,	26 9	17·1
Fine sand ,,	8·5	15·7
Coarse sand ,,	1·4	17·5

TABLE III. Chemical analysis of silt cellected in 1937-38.

Heads of analysis.	Silt.	Soil 0—1 foot depth. East Block.
Loss on ignition	7·14	3·12
Insoluble matter	63·95	75·49
Iron and alumina ($Fe_2O_3 + Al_2O_3$)	20·95	13·19
Lime (CaO)	3·83	3·45
Magnesia (MgO)	1·52	0 92
Potash (K_2O)	1·28	0·29
Phosphoric acid (P_2O_5)	0·041	0 054
Nitrogen (N)	0·043	0·024

The mechanical analysis shows that the silt washed off consists of 83·7 per cent. of the fine fractions, clay and silt, while the original soil contains only 62 per cent. The nitrogen content of the silt was 0·043 per cent. while that of the soil was 0 024 per cent. Potash was about four times as much as was contained in the soil. Similarly the 'loss on ignition' is higher for the silt than for the soil. During the course of the washes, the coarser particles settle down and the finer richer material is washed off. The results of the analysis for the silt collected during 1938—39 are in general agreement with the above data. (Data on the run-off for the first two years were published in an article entitled 'Soil and Water Losses by Run-off' in the *Madras Agricultural Journal* Vol. XXVII, pp. 244—246, 1939).

Methods Adopted to Control Erosion. Among the chief methods adopted to control erosion and conserve the rain water may be mentioned (i) bunding the land at regular intervals, (ii) bunding combined with deep ploughing periodically and (iii) scooping the land. The beneficial effect of scooping in checking erosion was shown above. The relative efficiency of the different cultural methods in checking erosion and increasing the powers of absorption of the soil may be seen from a study of the moisture condition of the differently treated plots before and after periods of intense rainfall. The following are a few typical figures for soil moisture which illustrate the effect of cultural treatments on the absorption of rain-water, when it is received in heavy instalment.

TABLE IV. Moisture contents of differently treated soils

Treatment.	Moisture per cent in the layer 0—3 feet			Rainfall absorbed in inches.
	on 16th August 1938.	on 31st August 1938.	Difference.	
		Rainfall between the dates :		6·15″
Control	18·1	22·1	4·0	1·9
Bunded	19·0	24·1	5·1	2·5
Ploughed in March '38 and bunded	17·2	25·1	7·9	3·8
		on 1st Septr. 1938.		
Control	15·3	21·2	5·9	2·83
Bunded	15·4	24·8	9·4	4·51
Scooped with basin lister and bunded	16 6	26·8	10·2	4.90
Scooped with *Danthies* and bunded	15·7	26 4	10·7	5·14

The treatments are most effective in checking erosion, during the first spell of heavy rains and in years of poor rainfall. In years of very good rainfall, however, the effect of the treatments is not so conspicuous in the conservation of rainwater as there is a tendency for the different plots to attain the maximum field capacity; but there is the lasting benefit of saving the soil, which is, otherwise, washed off in large quantities as shown in the earlier part of this note.

EXTRACTS

Fertilizer Placement.

With recognition of the fact that absorption of nutrient substances by plants from the soil was a matter of competition or antagonism between the plants and soil, much attention has been paid to fertilizer placement with the object of giving the maximum advantage to the plant. The subject has been fully investigated in the United States where the superiority of localised applications of fertlisers for crops planted in hills and rows is now widely recognised. One of the main technical problems is the design of an efficient distributor which will sow seed and fertilizer in one operation without damaging the seed. Most writers agree that the fertilizers should be placed in bands near, but not too near, and at the side of, rather than directly above or below, the seed or plant. **Placement in bands under, above, or mixed with the soil around the seed usually delays emergence of the crop and reduces yield.** This is due to the greater tendency of fertilizer salts to move vertically rather than laterally in the soil. Lateral bands allow the seed to develop without coming in contact with salts at a stage in its growth at which high concentrations would be injurious.

The optimal distance of the fertiliser band from the seed varies with the rate of application, the texture of the soil and the sensitivity of the crops. **Under average farm conditions, placement 2 inches from the seed row and 3 inches below ground is satisfactory.** W. S. Blair recommends narrow bands 3 inches from the seed and 2 inches deep in the soil for potatoes, turnips, mangolds and fodder corn. An uncontrollable factor which may cause injury to germination in placement fertilising is the moisture content of the soil. J. A. McMillan and F. Hanley have studied drilling fertilizers with the seed at Cambridge. Barley did better with a moderate dressing of fertilizer drilled down the same coulter with the seed than when an equal dressing was broadcast. Sugar beet was more sensitive than barley to high concentrations of fertilizer salts. It was safer to use separate coulters for fertilizer and seed in order to minimise risks to germination in droughty periods. A. S. Alov obtained two to three times as great an effect with row placement as with broadcasting of complete fertilizers on cereals.

The danger of damage to the seed from contact with high salt concentrations is obviously greatest with soluble fertilizers (generally nitrogenous) and least with those (phosphatic) which are strongly absorbed by the soil. J. B. Hester describes three "systems of nutritional variations" designed to eliminate the differences in the solubility and fixation of three main nutrient elements in fertilizing tomatoes. Superphosphate may be placed immediately under the seeds and nitrogen and potash placed further away and at a later date when the plants are ready to use them; or super-phosphate may be placed in, and the nitrogen and potash broadcast; or complete mixtures low in nitrogen and potash may be placed in the row and side dressed with high nitrogen potash mixtures. Similarly, placement of superphosphate in contact with the seed and nitrogen and potash in side bands, is recommended for potatoes.

J. E. McMurtrey has shown that nutrient deficiency symptoms can be produced in individual tobacco leaves by with-holding the nutrient from a portion of the root system and suggests that placement of different fertilizer ingredients in different bands may not be a desirable practice.—*Soil and Fertilizers* (by G. V. Jacks) 497—498.

Crop and Trade Reports.

Statistics—Crop—Groundnut—1940—Summer and early crops—Condition report. Sowings of the summer crop of groundnut are generally below normal owing to the scarcity of rains, after November whilst sowings of the early crop in the districts of Salem and Coimbatore are above normal due to the good rains received during the period April to June.

Harvest of the summer crop of groundnut has commenced in parts. The yield is expected to be generally normal. The condition of the early crop of groundnut is satisfactory.

The wholesale price of groundnut (shelled) per imperial maund of 82⅔ lb (equivalent to 3,200 tolas) as reported from important market centres on 8th July 1940 was Rs. 4—4—0 in Vizianagaram, Rs. 4—2—0 in Cuddalore, Rs. 4—0—0 in Vizagapatam, Rs. 3—13—0 in Guntur, Rs. 3—11—0 in Bellary, Rs. 3—10—0 in Adoni, Rs. 3—7—0 in Nandyal and Hindupur, Rs. 3—6—0 in Cuddapah and Rs. 3—2—0 in Tadpatri. When compared with the prices published in last report, i. e., those which prevailed on 9th April 1940, these prices reveal a fall of about 32 per cent in Tadpatri, 26 per cent in Guntur, 25 per cent in Cuddapah and Cuddalore, 23 per cent in Nandyal, 21 per cent in Vizagapatam, 20 per cent in Hindupur, 16 per cent in Adoni, 13 per cent in Bellary and 11 per cent in Vizianagaram. (*From the Director of Industries and Commerce*).

Cotton Raw in the Madras Presidency. The receipts of loose cotton at presses and spinning mills in the Madras Presidency from 1st February to 12th July 1940 amounted to 354,485 bales of 400 lb. lint as against an estimate of 366,800 bales of the total crop of 1939—40. The receipts in the corresponding period of the previous year were 340,060 bales. 322,300 bales mainly of pressed cotton were received at spinning mills and 90,325 bales were exported by sea while 82,968 bales were imported by sea mainly from Karachi.

(*From the Director of Agriculture, Madras*).

Correspondence.

To

The Editor, Madras Agricultural Journal.

Tephrosia candida, DC, as an insecticide.

Sir,

It has been found out at the Forest Research Institute, Dehra Dun, that the root-bark and seeds of *Tephrosia candida*, DC. contain *retenone* which, while it is an effective insecticide is non-poisonous to human beings and warm blooded animals. This discovery of a cheap source of this insecticide is of immense value to the Indian agriculturists who are too poor to pay for the costly insecticides imported from foreign countries, though they suffer considerable loss of crop through ravages of insect pests. If this insecticide could be placed in their hands at a low cost or if the cultivators themselves could be encouraged to grow this plant and prepare the insecticide they would readily use them to save their crops.

Tephrosia candida, DC., is a weak shrub, 5 to 8 feet in height with slender, woody, grooved branches clothed with brown or grey persistent velvety hairs. Leaves, odd-pinnate with 7 to 14 pairs of narrowly oblong leaflets 1—2" long which are grey—or white-silky beneath. Racemes are terminal and axillary 3 to 9" long, of pure white or reddish drooping flowers ½ to 1" long. Pod, 3—4" long, brown, slightly curved and 10—15 seeded.

It is found in the Himalayas, Khasia hills in Assam, Chittagong, Malaya, etc. It is largely grown as a cover and green manure plant among plantation crops in Assam, Burma, Bombay, South India, and Ceylon. In some localities, the plant is popularly called "Boga medaloa" by its Assamese name. It can be easily grown in waste places with some care.

The information on the insecticidal properties of this plant has been the subject of a memorandum recently issued by the Government of Madras.

Madras Herbarium, Agricultural Research Institute, Coimbatore
20th July 1940.

Yours &c.
K. Cherian Jacob.

Imperial Council of Agricultural Research

(From the Government of India)

Publication of monographs. At the 21st meeting held in Simla on June 27, 28 and 29, the Advisory Board of the Imperial Council of Agricultural Research decided that in order to collate the great deal of information which has already been published in reports, magazines and bulletins, monographs should be published on "Rice Breeding and Genetics in India", "Dry Farming", "Rinderpest" and "Animal Nutrition".

Potato growing. The possibility of increasing the production of potatoes in India was discussed. With the entry of Italy into war the supply of seed potatoes to Bombay and to a lesser extent to Sind has been cut off and the possibility of obtaining supplies of seed from Kenya and from other Indian provinces was discussed. The continuation of the Simla Potato Breeding Scheme was agreed to.

Uses of Linseed Fibre. A scheme submitted by the Central Provinces and Berar Government for the commercial utilization of linseed fibre was approved. As a side-line to this scheme comparative trials will be made of hand-scutching, dry-scutching and retting of the fibre. A suitable hand-scutching machine has already been developed and there are prospects that the production of this fibre might become a cottage industry. The fibre is used in the villages for the making of string and rope and is combined with cotton or jute in coarse fabrics. It can also be cottonised, by which process it is bleached, softened and spun into fabrics.

Growing of Mixed Crops. During the discussion of a scheme for research in the Central Provinces and Berar, into mixed farming it was stated that the system of growing mixed crops has proved of great benefit in dry farming, it being found that in the United Provinces where *Arhar* and groundnut are grown together, the *Arhar* is improved in quality and quantity.

The Advisory Board approved of the extension of research in dry-farming in Bombay where four sub-stations are to be set up to try out under cultivators' conditions, the methods evolved at the main research stations. A dry-farming research station is also to be established in the Thar-Parkar district of Sind, which is an area of very low rainfall.

Scheme for Fruit Research. The Advisory Board agreed in principle to the expansion of the work already being done at the Lyallpur Agricultural College on the preservation, canning and drying of fruits and appointed a committee to work out details of a scheme for an All-India Fruit Preservation Station on the lines of the station at Campden, in England.

A scheme of research into the improvement of orange crop in Coorg and into methods of marketing the crop was also approved.

The extension for three years of publication of the magazine *Indian Farming* was agreed to.

College and Estate News.

Students' Corner. At the first general body meeting of the Students' Club held on the 27th June, with Sri H. Shiva Rao, the Vice-President in the chair, the following office bearers of the Students' Club were elected for the year 1940—41.

Club secretary	Sri. N. Bhaskara Reddy.
Games secretary	,, K, M. Somanna.
Tennis Captain	,, H. T. Monappa Hegde
Cricket Captain	,, S. V. Srinivasan.
Hockey Captain	,, D. Chinnappa Reddy.
Foot-ball Captain	,, C. A. Ramakantha Reddy.
Representative for class III	,, S. N. Ramasubrahmaniyam,
Representative for Class II	,, H. Gurubasappa.
Representative for Class I	,, D. Sridhara Sastry,
Badminton Captain	,, A. Subba Raju
Volley-ball Captain	,, S. Krishnamurthy.

It is a noteworthy feature of the current year's elections that almost all the office bearers were elected uncontested.

The inaugural address of the Students' Club was delivered on 17th July 1940, by A. R. C. Westlake Esq. I. C. S, Director of Agriculture, Madras with R. C Broadfoot, Esq., Principal in the chair. The meeting was well attended. The speaker dealt on the literary tastes of the English speaking public, discussed the merits of several authors and recommended a good list of books of literary interest.

Freshers for Class I assembled on 2nd July and the hostel is full. Thirteen students have joined the short course in Agriculture.

The Parlakimidi scholarship. Information has been received that in response to a representation made by the Director of Agriculture, the Government of Madras have modified the conditions of the award of the scholarship for higher studies in Agriculture, at New Delhi as follows:—

"The said scholarship shall be awarded to a native of any of the Districts of Vizagapatam, East Godavari, West Godavari, Kistna, Guntur, Nellore, Cuddapah, Kurnool, Anantapur, Bellary and Chittoor, who is

(1) a graduate of the College of Agriculture, Coimbatore with special distinction in Agricultural Botany. or

(2) an upper subordinate of the Madras Agricultural Department, who has served in that Department for not less than five years and has shown during that period special aptitude for scientific research, in agriculture.

The Association of the Upper Subordinate Officers of the Madras Agricultural Department.

The Annual general Body meeting of the above Association was held on the 4th July 1940, in the Agriculture Lecture Hall of the Freeman Building, with Sri. D. Marudarajan, President, in the chair.

The Minutes of the last General Body meeting were read by the Secretary, Sri. P. A. Venkateswaran and adopted by the General Body. The Annual Report for 1939—40 was then presented. This was also adopted unanimously.

The letter No. 16074/40—1 dated 10th July 1940 received from the chief Secretary to the Government of Madras was next considered and the following resolution, moved from the chair, was passed unanimously :—

This Association wishes, in response to the letter No. 16074/40—1, dated 10th July 1940, from the chief secretary to the Government of Madras, to express the whole-hearted support and cooperation of the members of this Association in the endeavours of His Excellency the Governor of Madras and the Secretary be authorised to communicate this resolution to the chief secretary to the Government of Madras.

The following office-bearers were elected for the year 1940—41.

Sri. D. Marudarajan	*President.*
,, M. S. Kylasam	*Secretary.*
,, V. V. Rajagopalan ,, C. Balasubramaniam ,, P. A. Venkateswaran	*Members of the working committee.*
,, V. Gomathinayagam Pillai	*Auditor.*

M. S. Kylasam proposed a vote of thanks to the retiring committee. The meeting then adjourned to tea.

Weather Review—JUNE 1940.

RAINFALL DATA

Division	Station	Actual for month	Departure from normal @	Total since January 1st	Division	Station	Actual for month	Departure from normal @	Total since January 1st
Circars	Gopalpore	10·6	+4·8	31·6	South	Negapatam	1·3	0·0	4·0
	Calingapatam	4·3	+0·4	20·1		Aduthurai *	2·6	+2·2	8·7
	Vizagapatam	2·4	-2·5	13·8		Madura	4·0	+2·6	12·6
	Anakapalli *	5·3	+0·8	20·0		Pamban	2·8	+2·6	11·5
	Samalkota*					Koilpatti*			
	Maruteru *	4·0	+0·3	10·4		Palamkottah	0·3	-0·2	7·0
	Cocanada	7·2	+2·4	17·2					
	Masulipatam	1·5	··3·0	5·3					
	Guntur*	4·6	+1·1	10·2	West Coast	Trivandrum	18·2	+4·8	32·4
						Cochin	24·8	-3·7	39·8
Ceded Dists.	Kurnool	3·1	+0·7	7·8		Calicut	26·9	-7·1	35·8
	Nandyal*	0·0	0·0	0·0		Pattambi *	18·2	-5·7	25·9
	Hagari *	1·3	-0·6	10·8		Taliparamba *			
	Siruguppa*	2·6	-0·3	7·1		Kasargode *	34·9	-3·4	42·5
	Bellary	1·7	-0·2	10·9		Nileshwar*	38·6	-2·2	47·0
	Anantapur	1·0	0·0	5·5		Mangalore	28·1	-8·7	34·8
	Rentachintala	0·0		0·0					
	Cuddapah	5·6	+2·7	15·8					
	Anantharaju-pet *	2·8	+0·6	9·8	Mysore and Coorg	Chitaldrug	2·9	0·0	8·6
						Bangalore	4·7	+1·8	14·0
Carnatic	Nellore	1·2	0·0	11·7		Mysore	4·9	+2·0	13·7
	Madras	1·0	-0·9	7·0		Mercara	37·6	+11·2	47·7
	Palur *	0·9	-0·9	4·4					
	Tindivanam *	3·4	+1·2	8·4					
	Cuddalore	1·4	-0·1	5·4	Hills	Kodaikanal	5·7	+1·6	24·2
						Coonoor			
Central	Vellore	4·2	+1·9	8·9		Ootacamund *	10·0	+3·7	24·5
	Salem	4·0	+1·0	16·4		Nanjanad *	11·2	+3·9	21·6
	Coimbatore	1·0	-0·7	14·0					
	Coimbatore A. C. & R. I.*	2·2	+0·7	10·8					
	Trichinopoly	3·5	+2·1	9·3					

*Meteorological Stations of the Madras Agricultural Department.

@ From average rainfall for the month calculated upto 1937 published in the Fort St. George Gazette.

General. A temporary advance of the monsoon occurred on the west coast on the 5th of the month, but has not maintained. An advance again took place on the 14th which extended into western Deccan by the 17th and the monsoon continued to be fairly active till the end of the month. Conditions became unsettled in the north of the Bay on the 22nd and a depression appeared on the 24th which, developing into a cyclonic shower crossed the Orissa coast on the 26th and traversing the north of the Peninsula disappeared in the west Central Provinces on the 27th. Another depression appeared over the head of the bay on the 30th.

Rainfall was general over the presidency, and above the average except on the Malabar coast and locally in the Ceded districts and Circars. Other climatic elements were normal.

The chief falls reported were :

1.	Mercara.	... 6·3	(28th).
2.	Alwaye	... 6·0	(8th).
3.	Mercara.	... 5·9	(27th).
4.	Trivandrum.	... 5·6	(14th).
5.	Cochin.	... 5·6	(7th).
6.	Calicut.	... 4·7	(23rd).
7.	Cuddapph.	... 3·5	(15th).
8.	Gopalpore.	... 3·4	(25th).

Weather report for the Research Institute Observatory for June 1940.

No. 6/40.

Absolute maximum in shade	95·0°F
,, minimum ,, ...	71·0°F
Mean maximum in shade	88·9°F
Departure from normal	+0.1°F
Mean minimum in shade	73·4°F
Departure from normal	+0·3°F
Total rain for the month	2·18 inches.
Departure from normal.	+0·70 inches.
Heaviest fall in 24 hours during the month	0·65 inches on 24th.
Total number of rainy days	3
Mean daily wind velocity	4·2 m. p. h.
Departure from normal	-3·2
Mean humidity	72%
Departure from normal	+2·5%

The local thunderstorm showers continued till the 3rd week of the month when the regular south west monsoon set with the characteristic south westerly wind. The temperature for day and night remained normal. Humidity was in excess of the normal as also rainfall.

P. V. R. & T. S. L.

Departmental Notifications.

Gazette Notification.

1. Posting.

Name of officers.	From	To
Sri K. Raghava Acharya,	Asst. Director of Agriculture (on leave),	Asst. Director of Agriculture, Cuddapah.

Subordinate Services.

1. Transfers.

Name of officers.	From	To
Sri K. Dorai Raj,	Offg. Asst. in Chemistry, Coimbatore,	Offg. Asst. in Paddy, Coimbatore.
,, R. Soundararajan,	Offg. Asst. in Cotton,	Offg. Asst. in Chemistry, Coimbatore
,, T. Lakshmipathy Rao,	A. D., Kovuur,	A. D., Bhimavaram.
,, Ch. Venkatachalam,	A. D., Bhimavaram,	A. D., Kovuur.
,, M. Somayya,	A. D., (on leave),	A. D,, Bhimilipatam.
,, D. Hanumantha Rao,	A. D., (on leave),	A. D., Pithapuram.

„ M. Satyanarayana,	A. D., Pithapuram,	F. M., A. R. S., Samalkot.
„ P. Lakshminarayana,	A, A. D., Ramachandrapuram,	A. A. D., Cocanada.
„ D. Panakala Rao,	A. D., Cocanada,	A. D., Ramachandrapuram.
„ S. Ponnuswami Naidu,	A. A. D,, Ambasamudram,	A, A. D., Parmakudi.
„ I. Kurma Rao,	A D., Gudivada,	A. D., Sompalli.
„ C. Sitarama Sastri,	A. D., Repalle,	A. D., Gudivada.
„ M. L. Narayana Reddy,	A. A. D., Palakonda,	A, A. D., Anakapalle.
„ M. Gopala Rao;	A. A. D., Tekkali,	A. A. D., Vizianagaram.
„ V. N. Subbannacharya,	Offg. Asst. D. A., Cuddapah,	A. D,, Proddatur.
„ M. K. Gopalan.	A. D., Proddatur,	A. D., Rayadrug.
„ M. Krishnaswami Iyengar,	A. A. D., Rayadrug,	A. D., Dharmavaram.
„ K. Purushottam,	A. D., Guntakal,	A. D., Gooty.
„ S. Lakshminarayana,	A. D., Nandyal,	A. D., Pathikonda.
Janab Shaik Hussain Sahib,	A. D., Pathikonda,	A. D., Anantapur.
Sri S. Krishnamurthi Rao,	A. D., Anantapur,	A. D., Kudligi.
„ V. V. V. Suryanarayana,	A. D., Cuddapah,	A. D., Sidhout.
„ S. Veeravaradaraju,	A. D., Madurantakam,	A. D., Trivellore.
„ S. Kuppuswami Ayyangar,	A. D., Trivellore,	A. D., Kalahasti.
„ K. Satyanarayanamurthi,	A. D., Madanapalli,	A. D., Kalyanadrug.
„ R. H. Krishnan,	A. D., Sriperumbudur,	F. M. D. F. S., Hagari.
„ R. Shunmughasundaram,	F. M. D. F, S., Hagari,	A. D., Bellary.
„ R. Krishnamurthi,	A, D., Saidapet,	F. M., A. R. S., Nandyal.
„ A. Venkatarangam,	A. D., Nellore,	A, D., Rapur.
„ S. Rama Rao,	A. D,, Kovuur.	A. D., Udayagiri.
„ N. Venkaiah,	A. D., Kandukur,	A. D,, Kanigiri.
„ T. A. Rangaswami Ayyangar.	A. A. D., Arantangi,	A. A. D., Tindivanam.
„ E. N. Rengaswami Ayyangar,	A. A. D., Tindivanam,	A. A. D., Villupuram.
„ T. V. Srinivasacharlu,	A. A. D., Villupuram,	A. A. D., Cuddalore.
„ G. J. Balaraj,	A. A. D,. Pattukottai,	F. M. A. R. S., Aduthurai.
„ A. Shanmugasundaram,	F. M. A. R. S., Aduthurai,	A. D., Pattukottai.
„ K. R. Nagarajan.	F. M. A. R. S., Palur.	A. D,, Arantangi.
„ P. Krishnamurthi,	A. A. D., Narasannapeta,	A. A. D., Salur.

2. Leave.

Name of officers.	Period of leave.
Sri R. Krishnamurthi, A. D., Saidapet,	L. a. p. for 2 months from the date of relief.
„ S. Kuppuswami Ayyangar. A. D., Trivellore,	L. a. p. for 2 months from the date of relief.
„ M. R. Balakrishnan, Asst. in Chemistry (on leave),	L. a. p. on m. c. for 2 months and 11 days from 6--6--40.
„ C. S. Gopalaswami Rao, Mycology and Entomology Asst., Bellary,	L. a. p. for 4 months from 15—7--40.
„ M. C. Krishnaswami Sarma, Asst. A. D., Sattur,	L. a. p. on m. c. for 3 months from 26—6—40.
„ M. Jeevan Rao, A. D., Sidhout,	L. a. p. for 1 month from 20—7—40.
„ D. Panakala Rao, A. D., Cocanada,	L. a. p. for 4 months and leave on half average pay for 8 months from 12—7—40.

,, P. Narayanan Nair, A. D., Coimbatore	L. a. p. for 4 months from 15—7—40.
,, D. Shanmugasundaram Pillai, A. D., Aruppukottai,	Extension of l. a. p. for 1 month from 13—7—40.
,, P. Somayajulu, A. D., Salur,	L. a. p. for 60 days from 15—7—40.
,, A. G. Ramaswami, Sub Assistant in Entomology, Coimbatore,	Extension of l. a. p. on m. c. for 2 months from 6—7—40.
,, P. S. Venkatasubrahmanyam, F. M., A. R. S., Tindivanam,	Extension of l. a. p. for 1 month from 30—6—40.
,, P. Govindakutty Kurup. F. M., Pomological Station, Coonoor,	L. a. p. for 2 months from 15—7—40.
,, S. Krishna Nayak, A. D., Kasaragod,	L. a. p. for 2 months from 15—7—40.
,, G. J. Balaraj, Asst. A. D., Pattukottai,	Extension of l. a. p. on m. c. for 2 months from 29—6—40.
,, A. Venkatadri Reddi, Nursery, F. M. F. R. S., Kodur,	Earned leave for 60 days from 7—6—40.
,, C. K. Subramania Ayyar, Sub-Asst. Entomology, Coimbatore,	L. a. p. for 1 month from 25—7—40.
,, V. N. Subbanna Acharya, Subordinate Agri. Service,	L. a. p. for 2 months from 22—7—40.

Agricultural College and Research Institute, Coimbatore.

Additions to the Library during the quarter ending 30th June 1940.

A. Books.

1. *Agriculture in Mysore—2nd revised Edition. Mysore Agri. Dept. Pubn.* (1939). 2. *Text Book of Agriculture.* Brash, J. G. (1939). 3. *Agriculture and Farm Life.* Phillips, H. A. et al. (1939). 4. *Statistical Methods with special reference to Field Experiments.* Saunders, A. R. (1939). 5. *Modern Sewage Disposal.* Pearse, L. (Ed.) (1938). 6. *The Peanut Industry: A selected list of references.* Hennefrund, H. L. (1939). 7. *A Survey of the Marketing of Cotton in the Punjab.* Sehgal, L. K. (1938). 8. *Report on the cost of production of crops in the principal sugarcane and cotton tracts in India—Supplement volumes to Bengal, Bihar, Mysore, Hyderabad, Baroda and United Provinces* Impl. Council of Agri. Res. (India) Reports. (1940). 9. *Propagation of Horticultural Plants.* Adriance, G. W. & Brison, F. R. (1939). 10. *Fruit Crops: Principles and Practices of Orchard and Small Fruit Culture.* Talbert, T. J. & Murneck, A. E. (1930). 11. *Methods of Research in Agricultural Economics (Conference Lectures).* Wellman, H. R. (1939). 12. *Financing Agriculture.* Norton, L. J. (1938). 13. *Kenya Colony Land Settlement Committee Report.* Mortimer, C. E. Ch. (1939). 14. *Economic and Commercial Geography.* Dubey, R. (1939). 15. *Vitamin and Vitamin Deficiencies, Vol. I—Introductory & Historical; Vitamin B—1 and Beri-Beri.* Harris, L. J. (1938). 16. *The Chemical Analysis of Foods and Food Products.* Jacobs M. B. (1938). 17. *A Text Book of Microbiology.* Burdon, K. L. (1939). 18. *Micro-organisms and Fermentation—5th Edn. Rev.* Jorgenson, A. (1939). 12. *Plant Biology.* Godwin, H. (1989). 20. *The Genetics of Garden Plants Rev. Edn.* Crane, M. B. & Lawrence, W. J. C. (1938). 21. *The Evolution of Genetic System.* Darlington, C. D. (1939). 22. *Dairy Cattle and Milk Production—III Rev. Edn.* Eckles, C. R. (1939).

B. Special Reports and Proceedings.

1. American Fertilizer Practices (Second Survey). A survey among 32,000 Farmers in 36 states—U. S. A. 1939. 2. Review of the Sugar Industry of India for 1938-39. (Supplement to Indian Trade Journal.) 1940. 3. Review of the Oil Seed, Oil and oil Cake Markets (of the world) for 1939-1940. 4. A Summary of the more important results arrived at or indicated by the Agricultural Stations and Research Officers in the Punjab during 1936-1938. 5. Report of the first Imperial Veterinary Conference 1935-1939. 6 Proceedings of the Rewaiian Sugar Planters' Association 1939-1940. 7. Proceedings of the Annual Congress of the South African Sugar Technologists' Association 1940. 8 Proceedings of the Indian Central Cotton Committee 41st 1940. 9 Proceedings of the 19th meeting of the Advisory Board of the Imperial Council of Agricultural Research 1939-1940. 10. Proceedings of the 2nd meeting of the Crops & Soils Wing of the Board of Agriculture and Animal Husbandry in India held in 1937-1939. 11. Proceedings of the Association of Land-Grant Colleges and Universities. U. S. A. 1939-1940.

C. Ix. Administration Reports of Agricultural Depts.

12. Administration Report of the South Arcot Groundnut Market Committee for 1939-40. 13. Administration Report of the Cochin State Agricultural Department for 1938-39. 14. Administration Report of the Mysore State Agricultural Department for 1937-38. 15. Annual Report of the Coffee Scientific Officer, U. P. A. S. I., for 1938-39. 16. Annual Report of the Assam Agricultural Dept. for 1938-39. 17. Annual Report of the Bengal Agricultural Dept. for 1938-39. 18. Annual Report of the Scientific Officers and Agricultural Station Superintendents of Bengal Agricultural Dept. for 1938-39. 19. Annual Report of the Principal, Nagpur Agricultural College for 1938-39. 20. Annual Report of the Central Provinces and Berar Agricultural Dept. for 1938-39. 21. Annual Report of the Central Provinces and Berar Agricultural Dept. Northern Circle. 22. Annual Report of the Central Provinces and Berar Agricultural Dept. Southern Circle. 23. Annual Report of the North-West Frontier Province 1935-37. 24. Annual report of the Council for Scientific and Industrial Research Commonwealth of Australia for 1938-39. 25. Annual Report of the National Institute of Agricultural Botany for 1938-39. 26. Annual Report of the Palestine Agricultural Department for 1938-39. 27. Biennial Report of the Kansas State Board of Agriculture for 1938. 28. Annual Report of the Agricultural and Experiment Union of the Ontario Agricultural Dept. for 1938. 29. Annual Report of the Imperial Institute, London for 1938. 30. Annual Report of the Imperial Agricultural Bureau, England for 1938-39.

D. Reports of Agricultural Stations:

31. Madras Agricultural Stations—Annual Report for 1938-39. 32. A Review of the work of the Experiment Stations of the Empire Cotton Growing Corporation for 1938-39. 33. Annual Report of the Delaware (U. S. A.) Agricultural Experiment Station for 1938-39. 34. Annual Report of the Hawaii (U. S. A.) Agricultural Experiment Station for 1938-39.