Commissioner of Agriculture, and our Director. We understand that the visit was chiefly in connection with the permanence of the Sugarcane Breeding Station at Chettypalayam. Though run by the Madras Government it is in essence an all India concern the object being to supplant inferior local canes all over India with others capable of yielding a larger amount of gur, jaggery or sugar.

We draw the attention of our readers to the contribution "Students Union" by "Hustle." We do not profess to follow our contributor to the length he suggests in his earnest article but in view ofthe importance of the subject, we propose to open our correspondence coloumns to suggestions as to ways in which the funds and activities of the union could usefully be directed.

A contribution regarding the Union.

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*Insects in Agriculture.

The Farmer's joy.—The Farmer's Curse.

The biological interrelations between plants and animals are so close that from the very early days when half civilised man gave up his hunting and predatory habits for a settled life and began to grow crops and tend cattle, the various lower forms of life associated with these early possessions of primeval man also became his life-long companions for weal or woe. Gradually, during ages of civilisation as man began to clear wild jungle and grow different crops in large areas for his food, clothing and other comforts, his relations directly and indirectly with lower forms of life became more and more pronounced. Every one of us farmer or no farmer is more or less aware of the casual relations existing between man and lower animals from

*A lecture delivered at the Park Fair Exhibition January 1916.

time immemorial. But the unfortunate thing is, that, beyond this mere idea we know hardly anything regarding the teeming millions of animal life that surrounds us. Excepting perhaps some of the higher animals, most of the rest of the animal world, especially lower forms of life hardly ever receive our serious attention. This ignorance of Nature and even indifference to know, must be attributed to nothing else than the peculiar way we have been trained up and the atmosphere in which we get our training. I have often heard it said, that those who love nature are apt to be long-lived and that their lives are likely to be happy ones. In spite of the fact, that we have a good many grey-haired old men among us, few people in this country appear to realise that idea. In the western countries we often find a love of nature fostered through early childhood and we come across men of various occupations who study plants and animals as a hobby or a pastime, or even sometimes, as a relief from the daily drudgery, of life. On the other hand we find very few people who have a leaning towards nature study in this country. It is not because we are unfit for this work but because of the peculiar attitude we present towards natural objects, especially lower animals. We have been somehow trained to look upon lower animals as unworthy of any attention, and with prejudice and aversion. Lower animals, especially minute forms like insects are regarded as a cursed lot specially created to torment and be a nuisance to higher animals. When this is the sort of attention paid to natural objects, we can easily imagine the cause of our ignorance regarding the various remarkable inter-relations existing between us and lower animals. However, due to various known and unknown causes the conditions are changing and a marked reaction is seen to take place. Educated men have begun to realise the fact that of all lower animals insects play an important part in the many departments of human interest. The recent discoveries by eminent men of science that small and apparently innocent creatures like the mosquito, the house-fly, and the bed-bug are capable of disseminating some of the deadly diseases among man, have more than anything else brought to the foreground the importance of the study of insects and their ways, and I hope in due course insects will receive better and far more serious attention at our hands than they have been till now.

It is not now my intention to-night to deal with the various aspects of insect activities but shall only devote the short time at my disposal to place before you a few disconnected thoughts on the influence of insects on Agriculture.

THE FARMER'S CLASSIFICATION OF INSECTS:—Among the various living beings inhabiting this world of ours, no other group of animals, except perhaps the fishes, can approach the insect community either in numerical strength or in the wealth and variety of species. From the farmer's point of view all insects fall into three convenient groups. First those that cause injury to his crops and other property and bring about loss, secondly, those that are beneficial to him either helping him to fight injurious insects or giving him useful products and the third division including the rest of the insect world which so far as we know at present do not interfere with the Agriculturist either for good or evil: we might therefore confine our attention to the first two divisisions.

A—INJURIOUS INSECTS:—Insects causing injury to the farmer in various ways may be called insect pests. An insect becomes a pest when it damages crops or other things and causes appreciable loss thereby. There is a general idea that insect pests, especially those affecting crops, appear more frequently nowadays than in past years. I have also come across many an old land-lord asserting with a pride of the past, that during his palmy days they had to contend very little with crop pests. We have to admit the truth of this statement to some extent. For, as civilisation advanced and man began to conquer and control nature in various ways, what is called the natural balance of life became often upset and animals and plants began to exhibit abnormal conditions. Ordinarily the lives of animals and plants are so wonderfully adjusted in nature that the extra-ordinary increase of one species to the detriment of another is held in check and practically impossible, and this condition is called the natural "Balance of Life." But under artificial environments produced by man, this even level of life is upset and we hear of insect out-breaks. The circumstances mainly responsible for these changed

conditions are, among others, the destruction of wild jungle for various purposes, the growing of single crops in extensive areas, the indiscriminate destruction of several insect enemies-such as birds, bats etc. etc., and the frequent transport of insects and plants from country to country. These causes, as they are taking place daily, must account to a great extent for the frequent occurrence of pests in these days.

CROP-PESTS :— Most important among insects affecting the farmer's properties are what are called crop-pests affecting growing crops in the field ; and of the various crops grown the farmer regards his staple food and industrial crops as the most important. In Southern India staple food crops like Paddy, Cholam, Ragi, Cumbu, etc have all to pay their toll to insect pests. It is not possible at present to detail all the pests affecting each of the important crops grown by our farmers. But I shall add a word or two only about a few of the important ones to give an idea of their work and the nature and extent of the loss brought about. Foremost among crop pests in India is the insect called the Paddy Stem Borer. This insect is found in all rice-growing tracts in India and may be regarded as the most important of all crop-pests in Southern India. The insect is a moth and the immature stage of the moth, called the caterpillar, bores through the growing paddy stem and kills the shoots. If the plant attacked is in ears, we get no grains but only chaff. It may be stated in this connection that insect pests of plants called borers—because of their habits of tunnelling through plant tissue of different kinds, stem, roots, shoot, fruit etc.—are the most serious of all. They feed hidden and in many cases we only find the plant damage as an external indication of the work done by them. Thus our most important pests are borers. Cholam and Sugarcane have their borers doing often considerable damage. Nor are other important crops like, cotton, tobacco, castor etc free from attacks of borers. The cotton bollworms—insects boring into the bolls and top shoots of the cotton plant-cause a great deal of damage in cotton areas. A good many fruit trees also suffer from the attacks of borers. There are various other insects which though not so serious as

borers, do damage to crops in other ways such as by defoliating the plants, cutting, rolling, or twisting the leaves, nibbling the shoots, flowers or the bark, and feeding exposed in various ways. Of this group of insects which are commonly seen exposed the well known ones are Grasshoppers, Hairy Caterpillars, Ordinary caterpillars, Plant lice, Bugs and Beetles of sorts.

Just as man, insects too have their peculiar tastes. Each crop or set of allied plants has its characteristic insect guests and these latter generally confine themselves to only one or other of these plants. In this way we may sort out crop pests of Cereals, of Pulses, of Fibre crops, etc. etc. or pests of graminaceous, leguminous, cucurbitaceous or cruciferous plants.

It may be stated that very few cultivated crops are immune to the attacks of insect pests. While there are some plants which are subject to the attacks of only one or two specific pests there are others which have to feed more than one insect intruder. As examples of the latter may be mentioned paddy, cotton and red gram. Insect injury to plants begins from their very existence in the field up to the time of harvest and each stage of different plants has its peculiar insect enemies. While the plant is young the tender seedlings are cut, as it grows the stem, shoots and foliage suffer, while as it blossoms and puts forth fruits it is subject to the attack of blossom-eaters and fruit-borers. And it is interesting to note that the life of the plant and its insect guests are so very wonderfully adjusted that the fruit attacking insect comes into existence just when the plant puts out fruits and the leaf-eaters appear just when the plant is young. So much for crop pests.

PESTS OF STORED PRODUCTS:—The farmer, who thinks that he has nothing to do with insects as soon as his crops are off the field, is one who knows very little of the depredations of insects on other things belonging to cultivators.

Just as there are insects attacking growing crops in the fields, there are others levying their toll on stored products such as grains,

pulses, seeds etc., in granaries, warehouses, shops and godowns. We have often heard of weeviled rice and pulses. Of all these the most important is the rice weevil a minute dark creature having a prominent snout. Very recently there was a serious outbreak of a boring beetle attacking stored paddy in South Arcot and other places and causing substantial damage.

PESTS OF CATTLE :—Nor are the farmer's cattle free from insect attacks. Various kinds of flies, mosquitoes and fleas affect cattle and make them emaciated and unfit for agricultural work. Especially is this the case in rural tracts near jungles. In these places we find cattle often infected with hundreds of blood-sucking flies and looking a very miserable lot!

EXTENT OF DAMAGE:—I have thus given a few facts regarding the activites played by injurious insects on the farmer's crops, his stored products and his cattle. The unfortunate thing about our farmers is that they do not fully realise the steady and substantial loss caused them in this way. To the average farmer it is only the occassional flights of locusts and plagues of caterpillars that appear impressive and prominent but he is blind to the many other insects which silently but steadily levy a heavy toll on his crops and other things year after year. The ravages of the paddy stem borer, the cotton bollworm etc. may be brought under this category. In this country where scientific agriculture is of very recent growth we have hardly any statistics or data showing the extent of damage and loss caused by insects of different kinds. To give our farmer an idea of such a thing I will just invite his attention to the following remarks of an eminent American on the extent of loss sustained by insect damage in that country "The yearly losses from insect ravages to crops aggregate nearly twice as much as it costs to maintain our army and navy, more than twice the loss by fire, twice the capital invested in manufacturing agricultural implements, and nearly three times the estimated value of the products of all the orchards and vineyards in the United States!!" For India, we are rather too early in the field for such statistics; but I might, however, invite

your attention to a statement made in this connection by the late Mr. Noel Paton till lately the Director General of Commerical Intelligence. After making careful investigations on the rice Industry of India and Burma he concludes that the annual loss to India due to the attack of weevil on rice exceeds 120 million rupees!. To those who have any doubts about this I recommend a perusal of Mr. Noel Paton's interesting pamphlet on "Burma rice" published by the Government Press Calcutta in 1912. There is no doubt therefore that a good percentage of the Indian agriculturist's crops goes to feed insects, when we only consider that one single insect like the rice weevil is capable of exacting such a heavy toll!.

B—HELPFUL INSECTS:—From these grim facts showing the substantial damage done to the farmer by insect-pests we will now turn to the other side of the picture—a pleasanter but little recognised one, I mean that part played by certain insects for the good of the agriculturist. To convince our average ryot that there are good individuals among insects is rather difficult. Being very familiar only with the more obvious injuries done by insect pests he often concludes that there cannot be any good insects and the only good ones according to him are dead ones. It is therefore necessary that every farmer should know, that among insects there are several forms which are eminently beneficial to him and learn to recognise the good from the bad and not condemn all alike. "The first step towards vanquishing an enemy" says Curtis "is to ascertain correctly its habits, the next is to be certain of its appearance as not to mistake one party for another, and a third and no less important object is to be well acquainted with our friends and allies". Due to this want of discrimination between good and bad I have many a time received decidedly helpful insects sent in as doing serious damage to crops! The good influence exercised by certain insects on the farmer's belongings may be divided into.

i. HELP GIVEN BY INSECTS AS NATURAL ENEMIES OF PESTS.

ii. HELP GIVEN AS FERTILIZERS OF FLOWERS IN MANY CASES.

iii. GIVING PRODUCTS USEFUL TO MAN IN VARIOUS WAYS.

i. INSECTS AS NATURAL ENEMIES:—Under the first group we have what are called Predatory and Parasitic insects. The first includes those that catch other insects as prey and devour them. Of predacious insects there are many that feed on insects that are crop pests and in this way help the farmer to check them. Some of the prominent among predators are the praying mantis, dragon flies, beetles, bugs, wasps and flies of different kinds. Among these one group of small beautiful beetles which glory under the dignified name of "Lady birds" do a great deal of beneficial work. The young ones of these beetles play a very important part by checking plant lice, because they almost entirely feed on them. Most of you must have perhaps seen wasps carrying green caterpillars and storing their nests with these creatures as food for their young ones. Very often these caterpillars thus carried from fields happen to be important crops pests! The other class of insects which are called Parasites do their work of destroying pests in a somewhat different manner. Instead of all at once devouring the host, parasitic insects generally lay eggs on the bodies of other insects which they ultimately destroy. The young ones coming out of these eggs feed on the host by gradually eating up its tissues. In this manner one parasite is able to kill several insects by laying eggs in a number of them. Many insect parasites attack important crop pests and in this way greatly check the rapid multiplication of crop pests. "Out breaks of injurious insects says Dr. Howard "are frequently stopped as if by magic by the work of insect enemies of the pests" and this work is very effectively done in many cases by parasitic insects. Taking advantage of this habit of parasites, several eminent men in various countries have begun to import and propagate natural enemies from different countries and some of these efforts have proved successful. I know of one case myself of an American Entomologist carrying 15000 live parasites of the Guava fruit fly from Bangalore to Australia in order to try it against the fruit fly pest there. But with regard to this method of checking pests there is

a great diversity of opinion between Entomologists as to the final results produced by such a transportation of insect forms from their original homes to new places.

ii. INSECTS AND FLOWERS:—We now come to a most remarkable and wonderful part played by certain insects which in many cases results in great benefit to the cultivator. I mean the relations between insects and flowers of various kinds. Botanists will tell us that cultivated plants of various kinds are so constructed that cross fertilization takes place by insect agency in many cases. This beneficial work is done by insects of various kinds which feed on the nectar of flowers; as the insect visits one flower after the other it carries unconsciously some pollen on its limbs or body and deposits the same on the next flower of the kind it visits, in this way bringing about what is called cross-fertilization. Various important plants like apple, pear, etc., depend on bees for this work while plants like Tobacco Petunia etc., have to get the help of night-flying moths. In several cases where plants come into blossom and do not bear fruits, one of the reasons might be the absence of proper insect agency for cross pollination. One remarkable instance of this close relation between an insect and a plant is found in the case of the edible smyrna fig the proper fructification of which entirely depends upon a species of minute wasp called 'Blastoptaga.' The presence of this insect appears to be a *desideratum* for the proper pollination of the fig. In the Coffee plantations of the hill districts in Southern India it is beginning to be felt that the indiscriminate destruction of honey bees by hill tribes interferes with the proper pollination of Coffee flowers by these useful insects, and this question is now being investigated. This aspect of the activity of insects for doing good to the agriculturist will in itself form a theme for special study, since very little is on record regarding this fascinating subject.

iii. INSECTS GIVING USEFUL PRODUCTS:—We now come to the third aspect of insect activity for good. Though last this is not the least important of all; for in this case the insects concerned instead of helping the cultivator to fight his insect enmies or his flowering plants to be pollinatad bestows on him certain things which may be regarded

as priceless objects which man gets from the insect world—I mean Silk, Lac and Honey. Of course this aspect of insect activity is not directly concerned with ordinary agriculture but I venture to think that Silk-farming, Lac-cultivation and Apiculture are more related to the science of Agriculture than any other. I do not propose to go into detail regarding each of these important items but I simply make mention of these to show the agriculturist that there are among insects such wonderful creatures like the silk worm and the honey bee which have been giving man from time immemorial such remarkable products as silk and honey, the former forming some of the finest of man's garments and the latter one of his best delicacies. Apart from these three important members of the insect world, there are others which serve as objects of ornament, medicine and even food for man in different parts of the world. Perhaps some of you are surprised at my last remark; but it is a well known fact that winged white ant-*eesul*-forms a delicious article of food among some of the low caste cultivating classes in Southern India.

NECESSITY FOR GENERAL KNOWLEDGE REGARDING INSECTS:—Gentlemen, I belive I have given you a brief summary of the different insect activites as they affect the agriculturist. I think it proper before I bring this to a close to add a few remarks regarding the practical side of the question. It is perhaps clear from what I have said above that the intelligent farmer who would wish to spare as much as possible of his valuable crops from the ravages of noxious insects, and who would like to make the best advantages of useful forms in every way, will do well to acquire some general ideas regarding the elementary facts about insects and their ways. It is in fact to impress this side of the question that I have availed myself of this opportunity to speak to you. The possession of a few fundamental facts regarding insects and their habits would prove a great asset to one who wants to devise measures either to destory or to encourage the multiplication of an insect of economic importance. As I have already stated the number of insects is legion and the methods in which they lead their lives is diverse, but it is not difficult to gather a few primary facts applying to all insects in general which will go a great

way in guiding the farmer to deal with the situation more effectively. "The annual loss suffered by Agricultural communities through ignorance of Entomological facts is very great. Unless the farmer has correct information as to the best manner in which to combat insect pests he is likely to suffer loss of a serious nature." The first and foremost thing a farmer should know in connection with insects is to distinguish bad ones from those that have been proved by scientific research to be beneficial. This can be done by first possessing a general knowledge of insects, and then by the more effective and practical method of observation in the fields by the simple "art of seeing which is so useful, so universal and yet so uncommon! This knowledge will avoid mixing up good and bad insects and the latter to escape scot-free. From among noxious insects affecting a plant the farmer can by experience distinguish those insects which are major pests or those causing serious damage to the crop from others of minor importance which hardly ever do any appreciable harm. From the point of view of the nature of attack on plants almost all insects fall into two great groups—one includes those that have their mouth parts adapted for cutting and tearing plant or animal tissue such as grass-hoppers, beetles and caterpillars. The other group contains those which are unable to cut or tear but are only able to suck up liquid nutrition from plants or animals such as flies, mosquitoes, bugs, butter-flies and moths. A plant attacked by one of the biting insects will show torn leaves, cut up shoots, or scraped bark, while if it is a sucking insect the plant will keep its form but will show a regular fading away of the part due to the drainage of plant sap. A know-ledge of this fact will enable us to find out the particular group of insects biting or sucking which causes the damage and this will help us in devising the control measures suited to each.

LIFE HISTORIES OF INSECTS:—There is one important feature among insects in general which all farmers will do well to have some clear ideas about. What I mean is about the life history of insects in general or what is technically known as Metamorphosis among insects —a series of striking and remarkable changes undergone by many insects as they pass from their childhood to maturity. This is a very

common phenomenon taking place unceasingly in nature all around the farmer but about which very few, if at all, know anything. The passage of a common butterfly from the tiny egg to the worm like caterpillar feeding on leaves, the change of this caterpillar into an apparently dead object—the chrysalis, and final change into the winged butterfly—all these phenomena are still closed pages to our average farmer. The life histories of all insects follow one or other of two ways. Those that show all these four stages, egg, caterpillar or grub, pupa and adult. Butterflies, moths, bees, wasps, and flies etc., all follow this method while there are others like the grasshoppers, bugs etc., which do not possess a pupa stage but have young ones more or less similar to parents but only different in size, colour and want of wings. With this knowledge we can at once have a general idea of the life history of any insect which might attack our crops.

FACTS REGARDING CONTROL MEASURES:—It must be emphasised that the life history of an insect is the most important factor to be considered before any measures are adopted to destroy it. For, unless the life history is clearly known of each insect it is impossible to state when, where or how to strike it at its weakest point. There are some that lay eggs in clusters of a hundred or more in well-exposed places while in the caterpillar or adult stage they are very active, dispersed and difficult to check. In such cases the insect can be easily and effectively checked by collecting these egg clusters and destroying them. There are others in which the caterpillars or grubs feed gregariously—thousands of them in each leaf or branch, while there are still others having their vulnerable point in their adult condition such as flying to lights etc., When such cases are known it will be found very easy and effective to adopt the control measures in time. An ignorant farmer allows these vulnerable points of insects pass unchecked and finds himself in a fix when the creature has increased in numbers and assumed serious proportions! The important points which we learn by following the life history of an insect are its distribution, nature and extent of injury to crop; the period it occupies in each of its different stages; its habits, its natural enemies, the other plant or plants on which it feeds, its natural haunts and

a number of other points will be of very great use to devise control measures. To take only one example out of the many well known measures the coconut beetle—the cultivator is often ignorant of the fact that the earlier stages of this beetle are spent in his manure heaps and dead trees; and if only these are properly attended to there will be a remarkable reduction in the damage caused by this pest. The importance therefore of the knowledge regarding life histories and habits of insects cannot be exaggerated.

When once we get some idea of the ways of an insect pest, methods of control become a matter of common sense. It need hardly be stated that the best remedial measure is the one which is practicable, cheap and effective. Our farmer friends want ready made medicines which will drive any kind of noxious insects like magic. But one who has known about the ways and habits of various insects can easily understand the folly of such a request. The good old saying that 'Prevention is better than cure' is nowhere more applicable, than in controlling insect pests. All control methods fall into one or other of the three, viz. Agricultural, Mechanical or Insecticidal. The chief of what are called agricultural methods consist of clean cultivation, a proper rotation of crops, applying of good fertilizers etc. There is the common custom of leaving the stubbles and plant remains after harvest in many cases. The farmer should remember that these should be destroyed or properly disposed of, else they harbour pests which will attack the next growing crop. We often find this neglect in the case of many plants especially, cholam, cotton, brinjal, and cucurbitaceous plants. There are certain fertilizers which when applied to a crop, while keeping insect pests away, either do not affect the crop injuriously, or in many cases make the plants grow with additional vigour. Among others, Kainit and the various kinds of oil seed cakes, possess this property. Drainage, irrigation, ploughing etc, at the proper time and with a knowledge of the insects they affect chiefly, have all their insecticidal value.

Under mechanical ways of checking pests come the various contrivances used to control insects. Handpicking, use of hand nets and bags, the use of light traps etc form some of these

useful methods. Insects like grasshoppers, plant bugs etc. can be easily checked by the use of hand nets and bags. There are certain insects which have a peculiar attraction for lights and these can be trapped by means of a light hung in the middle of a field. Cockchafers and various other insects can be controlled in this manner.

Then come what are called Insecticidal methods or the use of various chemical and medicinal preparations to kill or drive pests. The common method of dusting ashes over insect attacked plant is a matter of common knowledge to all. There are various other crude local methods of this kind; but in many cases the methods are adopted without knowing the why and the wherefore of the operation. To dust ashes over a plant which is being killed by a stem borer is simply to waste time and material!

INSECTICIDES:—Insecticidal methods are of recent introduction into India and it must be stated that in a poor country full of small holdings like this, insecticidal methods will not commend themselves to ordinary ryots, nor will they be found practicable in the case of extensive field crops. They will however be found very useful in dealing with insects affecting orchards vegetable and ornamental gardens. In these cases and in some valuable industrial crops like Cotton, Coffee etc insecticidal methods might be found practicable, paying and effective. Various kinds of what are called insecticides are sold in the market under different names. But most of these can be brought under two kinds; those called stomach-insecticides which affect biting insects generally and others called contact-insecticides which have power chiefly over sucking insects. Thus the knowledge of the mouth parts of insects, as stated once before, helps one to select the particular kind of insecticide for use. Against plant lice, active bugs and other bugs called scales contact poisons are generally used. Against leaf-eating caterpillars, beetles

grasshoppers etc., if insecticides are to be used, generally stomach poisons are selected. A very important contact poison which will be useful against many sucking insects—and some of our worst pests are these—has been found in Fish Oil Soap, a substance for which we are very much indebted to the Fisheries Department. This substance is manufactured at the Fisheries Depot in Malabar. There are others called fumigants used to fumigate insect-infested things and the process of fumigation is employed in the case of insects affeting stored products.

KNOWLEDGE OF NATURAL ENEMIES:—Before leaving the question of control measures one important matter which I wish to impress on farmers is that they should encourage all natural enemies which more than any artificial methods control insect pests to a remarkable degree. The indiscriminate destruction of insectivorous animals such as various kinds of birds, lizards etc. should be discouraged. The crow, the mynah and various other birds help the farmer a great deal and these should be allowed to have free play. The method of allowing ducks freely into paddy fields infested with grasshoppers cannot be too highly commended.

CO-OPERATION—Co-operation which plays now a days a very important part in most human activities has its place in this subject as well. The control of pests in various agricultural mechanical, and insecticidal ways will be effective only if there is co-operation between neighbouring farmers. One farmer might clear his fields of weeds or bag the insects in his fields, but from the adjacent field the owner of which is idle the pests again come and attack and make the work of the first man fruitles. So a great deal of co-operation is also found necessary in such matters.

Conclusion Gentlemen, I have, I believe, placed before you, in however unconnected a manner, some facts connected with the influeuce of insects on Agriculture. But before concluding I would

just add a few remarks regarding what the Government has done and is doing in this matter. To reduce the frequent losses brought about by insect pests and to help the farmer who may not in various cases be able to work single-handed, the Government has appointed special officers to give expert advice to the farmers in such matters. These officers are doing their best in this direction. There is also a good deal which the expert has to learn from the cultivator regarding local conditions etc., besides various observations in the fields which the farmer is able to make, being the man on the spot. Most of the important insect pests have been noted and the life histories of many of these have been worked out. We are now at a stage when the real work of making practical use of the knowledge has come and with the help of the intelligent farmers it is believed that the work will progress successfully. The average Indian ryot is a very intelligent and shrewd individual, not only ready to take up whatever suggestions are given to better his condition, but fearless to point out our mistakes. Mistakes we do make—and who does not make mistakes?—and is only through mistakes that we finally succeed! As one example of the readiness with which the Indian agriculturist takes up a suggested remedial measure may be mentioned the case of the beetle pest that recently did considerable damage to stored paddy in Chingleput and South Arcot. People were convinced of the success of the measure we suggested—(viz. Fumigation with a chemical) and there were many demands for fumigating insect attacked paddy!

Gentlemen, the whole subject resolves therefore into this viz. Education of the farmer and his children in the simple facts regarding Insects in other words—Nature-study in Rural schools.

In course of time as the farmer becomes interested in these matters and helps and co-operates with the scientific experts in fighting his pests, a great portion of India's produce could be

saved from the clutches of noxious insects and added to the material wealth of the country.

[Mr. Ramakrishna Aiyar then showed and explained a series of coloured slides which illustrated the life histories of several of the most harmful and most beneficial insects of India. These included the rice stem borer, the rhinoceros beetle, a weevil attacking stored grain, the mulberry and castor silkworms and the lac insect.]

The Students' Union.

Contributed.

When the excitement of the Annual gathering at Coimbatore has died away, and the newly elected committee of the Union get to work, it is time for the union members, and those who have the welfare of the union at heart to take stock of its position and see whether their union is really a power for good—whether it is indeed a power at all and whether when members have paid their subscriptions and read their monthly Journal, they do not consider that they have done their duty by the Union. If this is so, the case of the union is a deplorable one. It is true it has for the past six or seven years been successful, it has attracted considerable notice and to the casual observer of its finances, it might be considered in an extremely flourishing condition. We would not have it otherwise, but is this enough?

The objects of the Union and how they are to be attained are set down in paras 2 and 3 of the rules which are published from time to time in the union journal. The celebration of College Day; the holding of a Conference at that time; and the publishing of a journal are three important means whereby the objects of the union are to be obtained. The fourth duty of the union as therein set down, namely, to maintain a corrected list fo addresses of old students, is at present so far as is known, in