

THE DEVELOPMENT OF THE MECHANISATION COMMITTEE OF THE SOUTH AFRICAN SUGAR ASSOCIATION

By GEORGE S. BARTLETT

The attention of the Sugar Industry was first drawn to mechanisation in 1947 when Mr. O. W. M. Pearce was commissioned to make a survey of developments in mechanisation. As a result of this, and also the enthusiastic efforts of a small group of men, a Mechanisation Sub-committee was formed in 1948. Among these early pioneers of mechanisation were Messrs. W. F. C. Jex, A. A. Lloyd, O. W. M. Pearce, U. W. M. Campbell and J. Garner, and as their activities grew, other names, such as A. C. Barnes and B. H. Abrahamson and then later van der Walt, Woods and many others were heard when talk revolved around mechanisation establishments, cane harvesters and self-loading trailers.

Much interest was aroused throughout the Sugar Industry by the activities of these gentlemen and as they grew, it was found that a more permanent establishment was required. Thus, in August of 1951 Mr. Abrahamson occupied the Mechanisation Committee's Central Headquarters at Umhlali where work commenced in earnest on the Abrahamson Cane Harvester, the Abrex Planter and a variety of other mechanical devices. In addition, it organised a number of demonstrations and carried out investigations into the usefulness of particular machines in sugarcane agriculture. A series of five bulletins were issued for the general information of all growers and a close liaison was kept with manufacturers.

The Committee was re-constituted in 1952 as a Mechanisation Working Committee under the Experiment Station Committee which was responsible for laying down the broad policy under which the Mechanisation Committee operated. The Committee's efforts eventually came to a standstill for a variety of reasons and the establishment at Umhlali was terminated on August 31st, 1953. The Committee, however, continued its liaison work with the growers and manufacturers. In 1954 Mr. A. C. Barnes, at the request of the Committee submitted a report entitled "Research on Field Mechanisation for the Sugarcane Industry". This report called for the establishment of a Research Organisation which was to be staffed by a Director, Assistant Agricultural Engineer, a workshop mechanic, clerk and necessary skilled and unskilled labour.

Following this, Mr. Walter Boa was seconded from the National Institute of Agricultural Engineering in the United Kingdom for a period of approximately one year and arrived in South Africa in December, 1954. During the following year, Mr. Boa examined

the conditions of the Sugar Industry and prepared an extensive report entitled "A Field Mechanisation Establishment for the South African Sugar Industry" which was submitted in August, 1955. This report was similar in content to that of Mr. A. C. Barnes but went much further into the details of the purpose, organisation and control of the establishment.

In the meantime, a limited programme of field testing was carried out and the beginning of a workshop was erected at the South African Sugar Association's Experimental Farm at Chaka's Kraal. It was intended that this should be the start of an "Agricultural Machinery Testing Service" and the headquarters for experimental work with farm machinery. Numerous manufacturers and agents were informed of these developments and many replied expressing their interest in this scheme.

In September 1955, the recommendations contained in Mr. Boa's report were put to Council but no decision was taken, and from that date no further progress was made until August 1957 when the matter was again raised in Council.

At this time, however, an energetic group of Zululand growers had formed their own "Zululand Cane Mechanisation Committee" under the leadership of Mr. Bruce Morris. The efforts of the original Committee had stimulated new ideas from these growers and they were making a solid contribution to remedy the labour problems in their area. Their functions were as follows:

- (a) Collecting and disseminating to growers information relevant to mechanisation.
- (b) Disseminating information to growers regarding proper and most efficient use of machinery.
- (c) Training operators in the proper use of machinery.
- (d) Testing machines supplied by manufacturers for adaptability in the Industry.
- (e) Suggesting alterations to the manufacturers of machines.
- (f) Assisting in and promoting the development of prototype machines.
- (g) Recommending the adoption of suitable machinery by growers.

In view of this, Council agreed to refer the matter to the Growers' Association for consideration and recommendation. In due course a sub-committee was formed of representatives of both the Growers' Association and the Millers' Association to draft

the constitution of the present Mechanisation Committee. This provided for three regional committees consisting of representatives from both the Millers' and Growers' groups and an Industrial Field Mechanisation and Labour Saving Committee which was the policy-making and controlling body of the organisation. This organisation is laid down in the first bulletin issued by the Committee entitled "Organisation and Administration". In due course, I was appointed to the post of Mechanisation Field Officer and commenced my duties in May, 1959. Since then a secretary has also been appointed.

During the past ten months the Committees have endeavoured to perform their duties as laid down by the Constitution. The Industrial Committee has been concerned primarily in establishing an overall policy of the Sugar Industry toward sound field mechanisation and co-ordinating this policy throughout the Industry. It is also responsible for administering the funds granted to the Committee by the S.A.S.A. which includes the granting of financial assistance to worthwhile projects.

This policy is put into practice through the three Regional Committees whose members endeavour to maintain a close liaison between the Industrial Committee and the individual growers. It is at this level that many of the problems or ideas from growers are first examined, and if found to merit further attention are then passed on to the Industrial Committee.

A close liaison has been kept with manufacturers and their representatives so that all new implements appearing on the sugar belt are brought to the attention of the Committee while, in return, the Committee can pass on the Mechanisation needs of the Industry to the manufacturers. As a result of this, much work has been done by the machinery firms in developing new implements or modifying existing ones to suit the conditions existing on the cane belt. Demonstrations of new production or prototype machines have been organised for the various committee members where constructive criticism and discussion has occurred. A close contact has been kept with some of the smaller engineering firms where advice and in some cases technical assistance, has been granted by the Committee members and myself. This liaison has also been extended overseas and the Committee has established contacts which keep it informed of developments in other sugar-producing countries. Engineers and executives from overseas implement firms have called on the Committee for advice regarding the mechanisation needs and field conditions of our Industry so that our needs will be better catered for. In return information and assistance has been provided to overseas enquiries regarding specialised machinery developed in South

Africa, such as the self-loading trailers and the Inca cane cutter.

Another aspect of the liaison with the manufacturers is the field of testing of prototype machinery. So far this work has been rather limited due to the broad field of endeavour which has to be covered. It is hoped, however, that this service will be extended as the Committee organises itself to meet this need.

Another activity of the Committee is the assessment of a new idea or invention brought forward by individuals seeking financial assistance for its development. Each case has been thoroughly examined, and it is the policy of the Industrial Committee that the idea must not only be basically sound engineering-wise, but that there must also be a definite need in the Industry for the finished product.

It is the policy of the Industrial Committee to keep in close touch with field experiments and research in agronomic practices. Any new developments or methods of cane agriculture which will improve the ultimate cane crop are passed on to the machinery firms so that the machines will keep abreast with these new developments. To this end the Director of the Experiment Station has been co-opted to the Industrial Committee to keep it informed of any pertinent developments at the Station. Agronomists employed by the various Miller - cum - planter companies have also been approached from time to time to give their expert opinion on the way a particular operation should be carried out.

An effort was also made to get growers and technicians together to discuss the problems of infield cane handling. This took the form of a symposium which was held in the Library of the Experiment Station. All members of the four committees were invited along with company agronomists and members of the Experiment Station staff. Although no definite conclusions were reached, I feel it can be safely said that the symposium did stimulate thinking among all those who attended, especially regarding the problem of soil compaction. As a result of this, I have been informed that the Experiment Station is to speed up its investigation into the physical characteristics of the various soil types throughout the Sugar Industry. Not only that, but I have also noticed an increased interest in soil compaction on the part of the manufacturers of self-loading trailers and other types of infield machinery, since a report on the symposium was published in the Sugar Journal.

The third field which the Committee endeavours to cover is its contact with the grower. This is a tremendous task due to the number and geographical

location of the growers throughout the Industry. The Regional Committee members report their activities and any new developments to their particular planter group.

In addition, a number of field demonstrations were organised in the earlier part of 1959 but it was found that these became too numerous to handle. Consequently, it was decided that a single annual demonstration and show be held at which will appear all the cane machinery and implements available in the cane belt. This year's demonstration is planned for September and will be held in the Chaka's Kraal area for a period of two or three days. So far over 30 companies have expressed their desire to take part. In addition to this, the Committee has used the facilities of the Sugar Journal and has presented slide and film shows to disseminate among the growers as much news as possible.

This has been a brief outline of the history and present activities of the Mechanisation Committees. I have made no attempt to discuss any of the many individual problems which have been tackled.

During the past few months there have been many arguments and discussions not only between members of the various Committees but also between growers, engineers, salesmen and a variety of other interested parties. Some of these have led to dead ends, while others have yielded results which, whether large or small, have contributed to the store of knowledge and experience which is being built up through the existence of the Mechanisation Committees.

Now if you will bear with me I would like to present to this Congress some of my own ideas and opinions for your consideration.

During the past ten months I have had considerable opportunity to discuss mechanisation problems with many members of the Sugar Industry. As a result of this, I feel that the activities of the Mechanisation Committee can be divided into four main groups, viz. Research, Machinery development, Field testing and Education. Of these, I would like to discuss Research and Education in detail while just mentioning the others in passing.

Research

Considerable discussion has occurred in the past regarding the research activities of the Mechanisation Committee. Much of this has revolved around research aimed at developing new machinery for use within the cane belt. It has been proposed that a workshop be established and that a variety of individuals be engaged to develop new machinery for the Industry.

While I must acknowledge that these proposals were made at a time when the Industry was experiencing considerable difficulty in obtaining suitable

native labour, I would like to ask whether it would be advisable to follow this policy today. The efforts of the previous Mechanisation Committee in attempting to develop machines for the Industry may not have met with complete success, but it can be said that the existence of the Mechanisation Committee at the time stimulated other individuals and organisations to improve on each others ideas which ultimately resulted for example, in the great variety of production models of self-loading trailers which are available today. I believe that the word "stimulate" is the key to this whole problem. There are hundreds of people in Natal who are extremely stimulated by any idea which, when developed, will return to them a certain margin of profit, and might I add at this stage, that it is only the ideas which will make a person a profit which will ever reach the production stage and thereby be of benefit to the Sugar Industry as a whole.

The problem which presents itself, therefore, is how the Mechanisation Committee can "stimulate" the Machinery Industry in Natal to provide the machinery and implements we require. It can try to do this by endeavouring to pioneer some research itself in the hope that it might turn up something which will be taken over by private enterprise. There is a great risk in this policy, however, of entering into a field which will undoubtedly be a heavy drain on the resources of the Committee with the probable chance of it not meeting with any success.

The question must also be asked as to how far the Sugar Industry is prepared to commit itself. Many attempts have been made to develop a cane harvester, for instance, and the costs of a local effort have been estimated to run as high as £10,000 so far, and another £10,000 to take it to its next stage of development. It has been reported that up till the beginning of the 1959 season the Massey-Ferguson Company had spent over £60,000 in developing its cane-harvester with the chance of spending a total of £150,000 before it reaches the production stage. And this, I might add, is a world-wide organisation with a vast resource of engineering personnel and technical know-how, which is in the business to make money. Of course, I realise that I am now talking about a machine of major proportions and that these vast sums of money do not necessarily apply to the development of the less expensive forms of mechanisation. It is my opinion, however, that our local Engineering Industry is prepared to undertake the development of these smaller items with very little financial assistance from the Sugar Industry, if any at all. Is it advisable, therefore, to establish a research station to develop equipment which could quite easily be developed by private enterprise? I do not think so, I feel that the Sugar Industry should exploit the vast resources of

knowledge, equipment and finance of our local industry since it is they who are geared to this type of work, and it is they who will reap the ultimate profit once a machine or implement reaches the market. If any money is to be spent at all, I feel it should be spent to stimulate our local industry into doing this developing. This will be discussed further on.

At this stage, I would like to mention another aspect of Research for your consideration, viz. agronomic research in relation to mechanisation.

If we are to ask our local manufacturers to provide us with the machinery we need, it is going to be necessary for us to be able to provide them with details of the type of operation we wish to perform. At the present time there appears to be considerable diversity of opinion regarding certain basic agricultural practices and I would like to suggest that steps be taken to obtain reliable information based on experimental data. I am now referring to such operations, for example, as seed-bed preparation, planting and harvesting. I would personally like the Mechanisation Committee's present state of co-operation with the Experiment Station extended to include a series of experiments designed primarily to investigate the mechanical problems involved in performing the operation. I would like to see official recommendation based on experimental data provided to answer some of the many questions which at this stage cause controversy, among these are: how little seed-bed preparation can I get away with; how deep must I plant or how shallow can I plant; how close can I plant; where must I place the fertilizer; how much filter press should I apply and where? I believe that there is still much to be accomplished in this field if we are going to progress towards sound and economic mechanisation.

Machinery Development

As I have stated earlier, it is my opinion that the major portion of machinery development should be financed and carried out by private concerns. This can be greatly stimulated by the Mechanisation Committee being able to keep the manufacturers fully aware of the needs of the Industry, and well supplied with all pertinent experimental data which will result in the production of a more efficient and practical machine. A close contact should be kept with developments in overseas sugar-producing countries so that any new ideas developed there can be exploited by local manufacturers wherever possible.

Competition between manufacturers will always lead to a greater effort to meet the needs of the Sugar Industry. This can be achieved by growers becoming more aware of the merits of various makes through large scale demonstrations, field test reports

and extension work. Detailed investigations into the costs of performing various operations with various implements should be carried out and these made available to the growers. This will encourage the manufacturers to provide more economical and efficient machines especially at the present time when there is the threat of restricting cane production and growers are concentrating on raising the efficiency of their operation.

Although I have stated that the local companies should develop new machinery, I must agree that many worthwhile ideas originate from the growers themselves. These should be encouraged and where advisable financial assistance should be granted to either the grower or a local firm to proceed with the development as is done by the Industrial Committee at the present time.

Field Testing

It has been found in the past that many implements and machines have been marketed in the sugar belt without having undergone an adequate programme of field testing. This has resulted in some machines having to be scrapped at considerable financial loss to the grower, and a loss in reputation for the manufacturer.

It is because of this, that provision has been made in the constitution of the Committee to organise a field testing unit. The aim of this unit will be to carry out an impartial field test programme on any machine submitted by manufacturers to the Mechanisation Committee. It is felt that such an arrangement will promote the development of better machinery for the Industry and will result in more satisfied growers and machinery suppliers.

In order for such a programme to be a success, it is essential that the unit be correctly constituted and staffed with men of ability and integrity. It is because of this, and also because of the pressure of other work, that the development of this programme has been rather limited during the past year. The Committee recognises this need, however, and it is intended that more progress will be made during the coming months.

Education

Finally I would like to discuss the problem of education; a problem which I feel should receive serious consideration by all members of the Sugar Industry.

It is my personal opinion that there is a great lack of training and educational facilities throughout all levels of the mechanical side of the Sugar Industry. This includes training facilities not only for native labour but also for the youth of the Sugar Industry at the high school level as well as the College and University level. This especially surprises me when

I stop to consider the magnitude of our Industry and the vast amounts of capital which must certainly be invested in machinery.

In most forms of business, the staff and personnel have usually received some form of specialised training which allows them to perform their duties more efficiently. It is generally accepted that the firm which takes advantage of the new knowledge and skills resulting from research by various organisations, is more likely to progress further than the firm which retains the philosophy of "if it was good enough for my father then it's good enough for me". I say this with all due respect to the efforts of those who have pioneered all forms of development in the past. However, we are living in an age where the search for knowledge is advancing at an unprecedented rate. It is those persons who recognise this fact and gear themselves to this development who are going to come out on top in the long run.

Recognition of these facts has been accepted in many progressive countries such as the United Kingdom, Canada, the United States and Australia. It has been said in Canada that farming was a "way of life" and not an industry. In the days prior to the First World War it was the farmer's smart sons who obtained the higher education and went to the cities to work while his slower thinking brothers remained at home to walk behind the plough. With the surge of industrial development which resulted in competition for labour and ultimately mechanisation, however, it soon became apparent that the farmer and his workers would have to become highly skilled persons or otherwise be forced out of business. Consequently the Government and educational institutions of these countries have geared themselves to raise the standard of education of their agricultural workers. University degrees in agriculture have been extended to all branches of the profession and short and diploma courses have been increased to correctly train field workers for their jobs. This has been supplemented by large-scale extension services being organised to keep farmers informed of new developments.

One might ask where all this is leading to. Well, one hears many stories of men like Warren North of Indiana, who single-handedly operates an extensive feeding station handling 400 Herefords, and 500 Hampshire hogs from a single instrument panel in his barn. I personally know of a farmer outside Toronto who by himself handles over 20,000 broilers, and there are many other such cases. The day of automation in agriculture is fast approaching in these more progressive countries due to the increasing shortage of labour and the application of new skills developed through education and research. There is even talk of operating a fleet of tractors in the field by remote control from a central control tower. This might be looking well into the future and the

question might be asked, how does the South African Sugar Industry fit into this development?

I am not for one moment suggesting that our conditions are such that we should consider such drastic steps. But what I am suggesting is that farming is no longer a "way of life" but is an industry which should be geared for development and progress just like any other industry. This will be rejected by many traditionalists who would like to maintain the pleasures of the old way of life. However, I think I would be quite safe in saying that the changes which will be seen in South African agriculture during the next thirty years will be beyond our imagination. The point that troubles me is, are we preparing ourselves for these changes? Might I ask whether we are training enough South Africans to meet the demands for technicians and research workers in the future. At this stage I am probably sounding dramatic, but as an engineer engaged in promoting mechanisation in our Sugar Industry, I cannot help but feel that we are lacking so much basic know-how. In many cases we are taking raw natives, giving them very little training, and then expecting them to operate and maintain a highly engineered machine worth in many cases over £1,000. In the past, the abundance of native labour has tended to suppress the need or the desire on the part of the owner to increase his knowledge of mechanisation. So often I have heard on my journeys through the Sugar Belt, that equipment must be made "Pondo-proof". This is a statement which I feel is contrary to any mechanised principles, because it basically means that either the operator or the owner of the equipment is not sufficiently educated to make the proper or efficient use of the highly capitalised equipment.

You are probably wondering what all this is leading up to. Well I would like to propose a programme of education in Agricultural Engineering and Farm Mechanisation to this Congress. I am fully aware that the success of such a programme depends entirely upon the attitude of our individual growers and for this reason I hope that this address will stimulate more concern and thought on this matter.

The programme which I am proposing covers five basic fields, viz. native operator training; grower extension service; short courses; diploma courses and university degree courses.

Starting with the worker, I believe that there is a great need in the Industry for some sort of lead towards providing facilities for operator training. Individual schemes have been tried in the past but these have failed through lack of interest on the part of the growers. I am confident that the Mechanisation Committee has the co-operation of the larger tractor distributors in any training programme we might envisage. Such a programme must have the

support of the Industry as a whole if it is to be a success. I appreciate that there are many factors affecting such a development and I feel that it would be necessary for this matter to be discussed in full so that a suitable industrial-wide policy can be adopted. This is an urgent need, however, and it is for this reason that I would like this Congress to promote more thought and discussion on the matter.

I emphasise this point because at the moment mechanical equipment is basically in the hands of the non-European who, although adaptable and reasonably proficient, is far from being a trained or skilled operator capable of carrying out small adjustments as and when necessary. It stands to reason, that with properly trained operators, the equipment in the field will last longer, be better maintained and downtime will be reduced considerably which should naturally result in a lower cost of operation.

The second field of education I envisage is that of a grower extension service. At the present time I am the only trained technical person actively engaged in advising sugar growers on mechanisation, but owing to the pressure of all the other duties which I have to perform I am not achieving the result I should like to achieve. We must accept that this service is a necessity in order that growers be kept constantly aware of new developments and ways and means of making their operations more efficient. In the past growers have had to rely on their own resources to overcome their problems, however, I feel it is too much to expect one man to be an expert on mechanisation, irrigation, agronomy, entomology, plant pathology and finance. Once growers realise what such a service holds open to them I am confident they will demand that it be provided.

Not only will a mechanisation representative act in an advisory capacity but he will also organise discussion groups and field days in various areas where growers can get together to compare notes. This will have a great stimulating effect on the search for new knowledge. "Tractor Clubs" should also be organised for the younger members of the community wherever possible so that they will grow up with a sound practical knowledge of the operation and maintenance of their power units. The scope for this sort of service is extremely broad once the enthusiasm of the grower has been aroused. Of course such a service requires adequate staff and it is up to the Industry to decide whether the need warrants it.

Short courses held at suitable locations should be available to growers and their sons. These should be organised through the Natal University and the Cedara Agricultural College and should be

designed to provide those attending with the basic principles of mechanics and machinery as well as the more practical aspects of mechanisation. These courses could be held while the full-time students are taking their annual holidays and should run for a period of from two to six weeks. I might add that I have been informed that the S.A. Sugar Technologists' Association has already investigated this possibility and I was gratified to hear that plans are being drawn up for a course to be held next year. I feel that it is essential for ultimate financial gain that the owner of mechanised equipment be completely conversant with his tools.

Diploma courses and University Courses should be designed to provide training to equip students for two broad fields of the machinery business, viz. agricultural mechanics and agricultural engineering. These can be differentiated by saying that the agricultural mechanic is a more practical person who would probably be employed as an extension officer or a farm machinery salesman or service expert. The agricultural engineer on the other hand should be a professional man actively engaged in research and development work or executive matters. It is these people who will be the leaders of the future and since it takes years to build up an adequate supply of trained personnel the Sugar Industry should encourage its young men to enter this profession. This might even take the form of scholarships or bursaries which would be granted to deserving persons.

Summing up I would like to place four points of interest before you. Firstly, I maintain that any active research in which the Mechanisation Committee should engage itself, should be limited to agronomic and economic research done in conjunction with the Experiment Station.

Secondly, the development of new or improved machines should rest primarily with private enterprise which should look to the Mechanisation Committee for technical data and reliable information on the needs of the Industry. In extreme cases financial assistance might be granted.

Thirdly, the Mechanisation Committee should eventually establish a highly respected field testing unit to which manufacturers will send their machines for testing.

Finally, the Mechanisation Committee should actively encourage a programme of education in Agricultural Engineering and Farm Mechanisation aimed at ensuring that the Sugar Industry and the farm implement manufacturing industry, will be adequately supplied with trained engineers and technicians to meet the demands which will be placed on us in the years to come.

Mr. Wilson (Chairman) pointed out that since the Experiment Station had only one professional officer on its establishment for agronomic research and only four extension officers to cover the whole industry it was not surprising that there were serious gaps in our knowledge in the agronomic field nor that Mr. Bartlett found himself called upon to fill so many roles during the course of his duties. There seemed every possibility that the staff position would be considerably improved in the near future. Meanwhile steps had already been taken to initiate experiments designed to fill some of the more obvious gaps.

While agreeing entirely with Mr. Bartlett's analysis of requirements, he was disappointed that Mr. Bartlett had stopped short of what appeared to him the obvious conclusion, particularly with regard to research and extension, that mechanization should be part of the Experiment Station.

Apart from the loading and transport of cane after harvest which involved problems purely of a mechanical or engineering nature, all other operations involving mechanization, from land preparation to harvesting, were inseparable from agronomy and co-ordination of the work would be simplified if all came under unified direction.

He questioned whether any special implements other than those already available to the industry need in fact be required for any operation except possibly planting and cutting and even with these operations, a number of machines available elsewhere still remained to be tested here before the need to develop our own machines was proved essential. The problem seemed more one of knowing which machine or implement was most suitable for a particular operation under a given set of conditions, than of developing new machines specifically for this industry.

Mr. Frost, speaking as a machinery inspector, said it would be realised how much trouble was given to engineers in the factories by the inspections carried out and the requirements demanded. He noted with disappointment that the functions of the Committee did not include safe operation of the various machines used in the cane fields. Under the Machinery Act, as it was at present, a vehicle was excluded from the definition of machinery, so that machinery inspectors were powerless. The present Act was now being amended and under the definition of machinery it was proposed to include any device that the Minister might declare as machinery. He said he had been approached by medical superintendents and asked what could be done to stop people being mangled by agricultural machinery. He would recommend for a start, that the Bell trailer would have to be classified as

machinery and, as such, would have to be properly protected. The training of operators should be compulsory. He said that safety and production went together.

The Chairman said that the Mechanisation Committee was more than conscious of its responsibilities in respect of the safety of machinery. A good safety margin was always insisted upon by the Committee in the specifications of any implement or machine which it was called upon to consider. He agreed with Mr. Frost that more cognizance of the safety devices should be made.

Mr. Bartlett said that the need for a P.T.O. shield on the Bell Trailer was considered by the Committee some time ago. This resulted in the field testing of a shield with the co-operation of the Hulett Sugar Company at Darnall. He said he had publicized the need for a protective shield for this trailer and had informed growers where these were obtainable, but so far the demand had been very limited. The particular P.T.O. shield tested is called the 'Atko' shield, however, there are many other makes available in England and the United States which could be used in the Sugar Industry.

Dr. Van der Pol wished to associate himself with all the remarks made by the author under the heading of education. As Mr. Bartlett had pointed out the Technical Education Committee of this Association was engaged in trying to introduce a course of Agricultural studies. As Convenor of this Committee, he wanted to stress that this Association did not have the final say and that this matter was at present under discussion by the Technical Training Committee of the S.A. Sugar Association. He expressed the hope that Mr. Bartlett's paper would bring about a more sympathetic attitude towards Technical Education on a whole, which would assist greatly in establishing a Course which would satisfy the demands of the author and his Committee, as suggested in the paper. He asked whether the period of two to six weeks was intended to be devoted to Mechanisation only.

Mr. Bartlett said that six weeks could easily be devoted to only a section of mechanisation if the time and facilities were available. Under present circumstances, however, any period made available to mechanisation could be used to advantage. This, he considered, would lead to further development and encouragement of students interested in this field.

Mr. Pearson said in Australia, where the farmer was his own operator, tools attached to the tractor were more important than the tractor. He noticed that in this country the reverse seemed to be the case.