ity which is given through these meetings is of great importance and of great value.

Recently we had the Minister of Agriculture on the Coast. He paid special attention to cotton and sugar development, and I think that he was very much impressed as an individual. Now it rests with us not only to impress the Minister of Agriculture but the community generally as to the importance of our industry, and the necessity for encouraging not only sugar but all similar industries in the country. I now declare the meeting open.

QUESTIONS RELATING TO ENTOMOLOGY.

Replies by Mr. C. P. Van Der Merwe, Government Entomologist.

The Congress thereupon proceeded with its programme of questions and answers. The opening questions were read by the general secretary and replied to as shown below

No. 13.—What is the effect of the mealy bug on the yield and composition of sugar cane and what measures have been found effective for its control?

Reply.—It has been stated that in Egypt the effect of the mealy bug on cane is very serious, causing a great deterioration in the yield of sugar, and of the composition of the juice. In Louisiana another mealy bug that infects cane has been reported to cause a loss of about 30 per cent in the yield of sugar. In South Africa the mealy bug does not cause so much damage. Probably the Uba cane does not suffer so much from its attack as some other varieties. That the pest has some effect on the yield and quality of juice is, however, most likely; but the amount of loss can only be determined by carefully carried out experiments with clean and infected cane. Another point that may prove of importance is the amount of impurities introduced into the juice on account of the presence of the bug. One often sees canes almost black with a soot-like deposit. This is caused by a fungus that grows on the honey-dew excreted by the insect. All the impurities added to the juice must add to the cost of clarifying it.

In Egypt it has been recommended that the plant-cane be dipped in an insecticide to kill the bugs that are present thereon before planting. In Louisiana it was found possible to control the bug attacking cane there by destroying the Argentine Ant which protects the bug from its natural enemies. Neither of these remedies is recommended under our conditions. We have not got the Argentine Ant, and our mealy bug is not so dependent for its welfare on the protection of ants, being quite able to thrive without them.

As regards treating the setts for planting, in other countries cane is not kept without re-planting as long as here. After one or two crops the field is ploughed up again. By the time a field started with clean setts becomes badly infested it is also time to plough it again. Here the cane may remain for eight to ten years, and it is sure to have become infested from outside sources long before there is any intention of ploughing it up.

Mr. Patrick: I would like to know if you are carrying out any experiments at the present time with the object of finding out if the mealy bug has any effect on Uba cane?

Reply.—No, I am not.

Mr. Townsend: Are there any known cases where the mealy bug has attacked the Uba cane?

Reply.—The mealy bug is always found on cane; every planter almost has seen it. It is the white insect which gets on the cane. It is usually under the leaves when you strip them off. It attacks Uba but does not do so much damage to Uba as they say has been done in other countries. In Egypt it does very great damage.

No. 14.—"What insect pests for sugar cane from overseas would be the most dangerous to have admitted into this country? What measure is necessary to prevent such invasion?"

Reply: It is difficult to say just which cane pest would be the most undesirable introduction, as insects may behave altogether differently under new conditions. It is no rare experience for an insect hardly known as a pest in its native home, to become a most serious pest when transported to a new country where it is free from natural enemies which controlled it before. The only safe policy, therefore, is to exclude any insect that may feed on cane. There are pests that destroy the roots of cane, borers in the roots and stems, insect that suck the sap from the leaves and stems, others that devour the foliage, etc., and all those already known as pests, as well as those which may perhaps become pests, are to be excluded.

To prevent the introduction of insects that destroy the roots of cane, no plants are admitted growing in soil. To exclude the other pests, all setts imported are carefully scrutinised and then fumigated. Then the cane is grown for as long as may be considered necessary in quarantine; and frequently inspected to discover any insects that may have escaped detection at first.

The provision of a green-house is an additional precaution, as it prevents insects that may develop

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on the introduced plants from escaping. The greater the importations of cane from overseas the greater the chance of some pest being overlooked, therefore there is the necessity to restrict introductions as much as possible, and only permit those which are really required to get desirable new varieties.

No. 15.—"Are any of the existing cane pests in this country likely to become a serious menace?"

Reply: It is quite possible, in fact almost certain, that some of our Native insects will in time take to sugar cane more than they do now. If we find some soft cane to take the place of the Uba it is very likely to suffer more from borer attack than Uba. I do not think, however, that growers need lose any sleep about the possibility of some native insect wiping out their crops. Though we know of many bad pests of cane in other sugar producing countries, and have every reason not to want them introduced here, we do not find that they have stopped sugar growing in those countries. Methods of growing cane at a profit have been devised in spite of their presence, and we may expect to be able to adopt methods of control for any serious pest that may appear in our cane.

No. 16.—"Can outbreaks of the Mystery Army Worm be controlled?"

Reply.—"It is quite possible to confine an outbreak of the Army Worm at reasonable expenditure; but one must be prepared for the outbreak when it comes. Every day lost in seeking advice or obtaining the necessary materials means extra work and loss, as the insects are so voracious and spread so fast once they have reached a certain age. The outbreaks come at such erratic intervals, that it is very likely to find the grower unprepared, often coming when least expected. It is more likely to appear in dry years, when a set-back to the cane is of more consequence than in years of good rainfall, and there is therefore the more reason why outbreaks should be controlled when they occur.

As soon as an attack is noticed, steps should be taken to confine it. The best method is probably to draw one or more furrows round the infested area and scatter poisoned bait at the bottom. The caterpillars are detained by the furrow, find the poison, eat it and are killed. The furrows may be used without the poison. The more care must be taken with them to see that the sides of the furrows towards the ground it is desired to protect are steep so that the insects cannot crawl out on that side. Holes should be dug in the furrows at intervals and filled up with soil as they become too full of caterpillars, and others dug. When it is not practicable to make furrows the poison bait may be spread among and in front of the advancing armies. Great care must be taken to keep fowls and other livestock from the treated ground. When furrows have been poisoned they can be filled in, when the work is finished, by harrowing.

No. 17.—"What is the best method of dealing with the sugar-cane cut-worm?"

Reply.—This is an insect that appears when the young cane shoots are growing through the trash. The caterpillars hide under the trash by day and come up at night to feed. Apparently it is kept well under control by its natural enemies, and it is only where it finds the protection of the trash that it can survive in injurious numbers. The cane recovers after an attack, and it is still doubtful whether it will pay to adopt control measures against it. The caterpillars may be poisoned by scattering poison bait among the trash along the rows. Some relief may be obtained by removing the trash from certain rows and piling it at intervals between others. The caterpillars are afraid to go too far from their hiding places, and do not attack the shoots from which the trash has been removed.

Mr. Townsend: Is there any evidence to show that this cut worm has an injurious effect on young cane at that stage?

Reply.—I should say that is more for a practical cane farmer to answer. Speaking from a theoretical point of view it cannot be any good for the plant to lose its leaves; while the caterpillars are there it cannot make new growth as the leaves are eaten off, and that cannot be of any benefit to the plant. I cannot say just how great the effect is. It is an experiment that I hope to carry out some day to control it on a certain piece of ground and leave another piece of ground untreated and see what the difference in yield is between the two.

Mr. Townsend: Is the cane cut-worm the same as attacks the mealies?

Reply.—No, it is not. The cut-worm on mealies is of another species, although closely related. They are not really the same.

Mr. Townsend: You have found the cut-worm confine itself to trash, and that with burnt trash there is no cut-worm?

Reply.—No I would not say that. Trash is a protection to cut-worms. Birds eat them very readily and there are a lot of other parasites which go for them also. When they are in open ground these enemies make short work of them but under the trash they are protected to a certain extent. But of course even in open ground some are found protected under clods, leaves, etc.

Mr. Patrick: I take it that after the cane is cut and trashed a certain period of time elapses before you get any great number of cutworms; it takes a certain time to hatch out a great number of them. Supposing you lifted the trash from a row and pony ploughed that row and then put the trash

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back, would a process like that keep back the hatching of the eggs in the earth? Would that be a method of keeping it down to any extent?

Reply:—I don't think it would. The eggs are very likely laid in the mulch on the trash so that when you lift up the trash you lift the eggs with it. It would be too expensive to lift the trash and put it back again.

Mr. Townsend: This is a question which has been with us for the last forty years. I may say that from my own experience, I have had burnt cane alongside of trashed cane, and I have found no trace of cut worms in the burnt cane. But the trashed cane has eventually overtaken the burnt cane although at the time there was a difference probably of a foot, but eventually the trashed cane overtook the burnt cane, if not improved on the burnt cane. I am inclined to think, judging from my own observations, that there is really no deterrent effect on the cane when it is tackled at that young stage. Although my experience is that it does help to handle the trash in the way suggested, I doubt whether it would repay for the trouble taken.

Reply.—In a case where the one field is burnt and the other is not, you could not compare the two because there is sure to be a big difference in the field that is trashed. The field that is burnt does not get all the humus and organic matter that the other gets. The damage may be small but it is sure in some way to hold the cane back. Some think it is serious, and others do not.

No. 18.—"Is the Aphis on sugar cane a pest of importance?"

Reply.—The ordinary sugar cane aphis (aphis sacchari) often appears in enormous numbers in sugar cane fields, and by sucking the sap from the plants they do a certain amount of damage; but it cannot be considered as serious. Remedial measures are not advised.

A much more serious aphis on cane is one, which, strangely enough, is very seldom found on cane, and only occasionally is observed multiplying on it. This is the maize aphis (aphis maidis) which attacks maize and several other grain crops and grasses. Its importance lies in the fact that it is the carrier of the serious Mosaic disease. Although it does not permanently live on cane it may feed a little when it settles on it, and it has been definitely proved that it may carry Mosaic by first feeding on a diseased and then on a healthy plant. Unfortunately it is not possible to control it, but Mr. Storey can tell you more about that.

Note on the Preparation of the Poisoned Bait Referred to in Questions 16 and 17.

The bait may be prepared from bran or from fresh green grass, sugar cane tops, etc., sweetened with sugar or treacle and poisoned with arsenite of soda. Bran, if available, is the best thing to use, as it can be conveniently handled and is easily spread out thinly. One pound of arsenite of soda is thoroughly dissolved in sixteen gallons of water and also two pounds of sugar or two quarters of treacle. Where treacle is plentiful it may be used more liberally. The liquid is then used to moisten the bran or green stuff. The bait must be thoroughly moistened; but must not be sloppy, so that it can be readily distributed. Sixteen gallons of poison should be enough for 150 lbs of bran or 200 lbs. of green stuff.

In moistening bran with the poison it should be put in a heap on the floor, and the liquid slowly added, while the heap is being stirred, until the whole mass is thoroughly moist; but not so wet that it cannot be readily scattered. Green stuff is best dipped in the liquid and then allowed to drain, till all the surplus moisture has run off.

The Chairman expressed the thanks of the members to Mr. Van der Merwe for his interesting replies to the questions put to him.

QUESTIONS RELATING TO IRRIGATION.

(Replies by Mr. G. A. Ritchie, Circle Engineer, Natal.)

Question No. 19.—"What increase in crop can be expected from irrigation?"

Reply.—If we irrigate cane in this country we may look for an increase in the crop in two directions:—

(a) We may expect to cut a greater weight of cane per acre.

(b) The interval of time between cuttings will be shorter due to the quicker growth and ripening of the irrigated cane.

(a) At Mount Edgecombe in the 1923-24 season the Natal Estates cut from three irrigated fields a total of 3,006 tons of cane and as the area of these three fields totalled 56 acres the yield was at the rate of 53.7 tons per acre. When these same three fields were previously cut as not irrigated plant cane the same area gave a yield of 1362 tons or 24.3 tons per acre; so that in this case irrigation seems to have accounted for an increase of 29.4 tons per acre in spite of the fact that during the season these fields were cut as dry cane the annual rainfall was 52 inches where the rainfall for recent years was as follows:—

1923.—26.59 inches.

1924.—30.69 inches.

1925.—24.00 inches for first three months only.