VARIETY AND ENVIRONMENT

By P. G. C. BRETT

In any sub-tropical area, as the plant succession advances, the vegetation becomes more and more tropical.—(Bews, 1925)

Introduction

Within the genus Saccharum there exists great diversity of form. At one extreme are the so-called "noble" varieties, representatives of the species *S.officinarum*. These varieties are found only in cultivation; they are essentially equatorial in origin; they produce relatively few stalks, which are thick, soft and rich in sugar; their leaves are broad, with loosely-clinging sheaths; they do not flower freely, particularly when grown outside the tropics; they are susceptible to mosaic disease; generally they are weak ratooners. At the other extreme are the representatives of the species *S.spontaneum*. These are wild sugarcanes, some of which are found far from the tropics; usually they produce a large number of thin, hard stalks containing very little sugar; their leaves are thin, and usually have tightly-clasping sheaths; sub-tropical forms generally flower freely under the conditions to which they are adapted; they are resistant to mosaic disease; generally they are capable of ratooning strongly.

Nearly all the varieties in commercial cultivation today have been derived from hybridization between representatives of the above-mentioned species. From the "noble" ancestors the hybrids derive their ability to produce high yields of sugar under good conditions, and from their wild ancestors, their hardiness. The degrees to which different varieties possess these two characteristics is thought to play a large part in determining their relative value under different conditions.

Factors Influencing the Choice of Variety

It is obvious that the best variety to plant in a particular field is, in nearly all cases, the one that will give the most profitable returns over the whole crop cycle in that field. (That this does not apply in all cases is because a variety—superior in all other respects—may act as a carrier and spread a disease to surrounding fields of other, and less tolerant, varieties.) The returns given by a variety depend upon, firstly, its yield in terms of sucrose per acre per month and, secondly, upon the costs involved in its cultivation and handling. These costs in turn are affected by varietal characteristics such as the ability to produce a good canopy at an early stage of growth, the thickness and straightness of stalks, the tightness with which the trash clings, and—as a factor affecting particularly transport costs—sucrose content. Generally speaking, these characteristics are of less importance than yield in determining the choice of variety.

The yield of a variety depends largely on its growth rate under the particular environmental conditions. Less directly, the environment affects yield by its influence on flowering and the prevalence of pathogens. The more unfavourable the environment, the fewer will be the number of varieties capable of giving reasonable returns, and under very adverse conditions the choice of variety is inevitably very restricted. On the other hand, though under very favourable conditions a large number of varieties may be found capable of giving fair yields, cultivation usually becomes restricted to the one or two showing some superiority to the rest.

Basis for Assessing the Reaction of Varieties to Environment

The basis to be used here for assessing the reaction of varieties to environment rests on the assumptions set out below.

1. The optimum conditions for sugarcane growth are the same for all varieties. Under these optimum conditions, the yield of a variety depends solely upon its *production potential.*
2. As conditions depart from the optimum all varieties decline in yield. Some, however, react less intolerantly than others, and these are said to possess *hardiness.*
3. It is not necessary to consider separately all the factors which affect the growth of cane. Such factors as rainfall and nutrient status of the soil can be ignored if the sugarcane plant itself is used as the basis for assessing the general fertility of a particular field or area. The average yield over a period of years, in comparison with the average of the Industry, provides an indication whether *field-fertility* is high, medium or low. As field fertility is partly dependent upon agronomic practice, the status of a particular field may vary with time.

   The poorer the field, the greater is the necessity for hardiness in the varieties planted.
4. Though climate and soil type need not themselves be taken into account, they may, in addition to their effect upon field fertility, also exert an influence upon (i) *flowering*, (ii) the prevalence of *diseases such as red rot, smut and gumming*, and (iii) *sucrose content.*

Rating the Present Commercial Varieties

In Table I points are given to a number of varieties in accordance with the basis of assessment outlined above. The points system, while making possible a ready comparison of the varieties in regard to the characters considered of importance, introduces certain errors of simplification. Thus, by approximation, N.50/211 has been given a sucrose rating of 2, whereas its sucrose content appears in fact to lie somewhere between that of Co.331, given a rating of 1, and that of N:Co.376, given a rating of 2.

TABLE I

Estimated rating, on an arbitrary scale, of the more important commercial varieties with respect to certain characters.

VARIETY	*Production Potential*	*Hardiness*	*Sucrose Content*	*Resistance to the disease of*			*Freedom from Flowering Tendency*
				Smut	*Red Rot*	*Gumming*	
Co. 301	2	3	2	0	3	3	2
Co.331	2	3	1	3	3	3	3
N:Co.292... ...	1	2	2	3	3	3	3
N:Co.293... ...	3	1	2	1	3	3	1
N:Co.310... ...	3	1	3	2	3	2	2
N:Co.334... ...	1	1	2	3	3	3	3
N:Co.339... ...	3	3	2	3	1	3	2
N:Co.376... ...	3	2	2	3	3	3	2
N:Co.382... ...	2	3	2	3	3	3	2
N. 50/211 ...	3	2	2	3	3	3	1

The points for production potential are allotted to the varieties on the assumption that healthy seed cane is available and that they have not degenerated through virus infection or any other cause.

Resistance to mosaic has been omitted from consideration here. For this reason, a mosaic-susceptible variety such as N:Co.339 escapes a penalty that, by rights, it should incur.

In order to estimate the probable performance of a variety, it is first necessary to assess the expected demands of the environment for the area in which the variety is to be grown. A very poor field would demand a hardiness rating of 3, whereas in a very good field a hardiness rating of 1 would be sufficient.

It is the failure of a variety to satisfy some of the demands of the environment that is of importance in determining its adaptation. If a variety is able to meet these demands, it would derive no further benefit even if the ability to exceed them were conferred upon it. In a country where Fiji disease is a serious problem, a variety may succeed largely because of its resistance, but in South Africa, where this disease does not occur, such resistance would confer no added advantage upon a variety. Hence, in estimating the probable performance of a variety in a particular area, points should be deducted for failure to satisfy any of the assessed demands of the area, but no points should be awarded for surpassing these demands. For example, in a field having an assessed demand of 3 for freedom from the tendency to flower, N:Co.339—with a rating of 1—would lose two points, whereas Co.331—with a rating of 3—would lose none. In a field where the assessed demand is only 1, neither variety would be penalized.

Assessment of the Demands made by Different Regions upon Cane Varieties

The cane-growing areas of South Africa may conveniently be grouped into the four main regions described below. Though a particular field-fertility may be characteristic of a region, areas of high, medium or low fertility may be found in all regions.

1. *Mistbelt.* Within this region the diseases of red rot and gumming are particularly troublesome, and varieties must possess adequate resistance to prove successful. On the credit side, flowering does not present a problem, and smut disease is usually not quite so prevalent as at the lower altitudes. Field-fertility is favourably influenced by the good rainfall of the region.
2. *Main Coastal Belt.* This is by far the largest of the four regions. Within it, the demands made by the environment vary considerably from place to place, but do not normally reach the extremes to be found in other parts. As a rule, field-fertility is medium. In Table IV, a rating of 2 has been set as the demand of this region for freedom from the tendency to flower. However, in some parts—particularly the low-lying areas—a rating of 1 would be more accurate.
3. *Littoral region.* In this region flowering is usually profuse and smut disease very prevalent. Field-fertility over large portions is low.
4. *Deltas.* Typically the fertility of deltas is high and generally these areas show a close correspondence with the irrigated, high-fertility portions of the main coastal belt. The presence of a high water-table in the deltas, however, makes it particularly important that varieties grown there should have a good sucrose content.

For each of the above regions, the assessed importance of different varietal characters is given in Table II. The arbitrary scale of points used corresponds to that of Table I.

TABLE II

Estimated comparative demands—on an arbitrary scale—made in respect of certain varietal characters by the main regions of the Natal cane belt.

REGION	*Production Potential*	*Hardiness*	*Sucrose Content*	*Resistance to the disease of*			*Freedom from Flowering Tendency*
				Smut	*Red Rot*	*Gumming*	
Mist Belt ...	3	Varying from 1 to 3 according to field	2	1	3	3	1
Main Region ...	3		2	2	1	2	2
Littoral Region	3		2	3	1	1	3
Deltas	3		3	2	1	2	2

Estimated Degree of Adaptation of Certain Varieties to Particular Areas

From Tables I and II it is possible to calculate the number of points lost by the different varieties for lack of adaptation to areas of high, medium and low fertility in each of the four main regions. The results of these calculations are given in Table III.

TABLE III

Points lost by different varieties for lack of adaptation to the main regions of the Natal cane belt.

(H, M, and L represent respectively high, medium and low field fertilities).

VARIETY	*Mist Belt*			*Main Region*			*Littoral Region*			*Deltas*		
	H	M	L	H	M	L	H	M	L	H	M	L
Co.301	2	2	2	3	3	3	5	5	5	4	4	4
Co.331	2	2	2	2	2	2	2	2	2	3	3	3
N:Co.292	2	2	3	2	2	3	2	2	3	3	3	4
N:Co.293	0	1	2	2	3	4	4	5	6	3	4	5
N:Co.310	1	2	3	0	1	2	2	3	4	0	1	2
N:Co.334	2	3	4	2	3	4	2	3	4	3	4	5
N:Co.339	2	2	2	1	1	1	2	2	2	2	2	2
N:Co.376	0	0	1	0	0	1	1	1	2	1	1	2
N:Co.382	1	1	1	1	1	1	2	2	2	2	2	2
N. 50/211	0	0	1	1	1	2	2	2	3	2	2	3

From these results the varieties can be grouped, for each area, according to the number of points they have lost. A further sub-division can be made on the closeness of the correspondence between the hardiness rating of a variety and the hardiness requirement of the area. In the case of the medium fertility areas, varieties with a hardiness rating of 2 are given preference over others; then, as a convention, a rating of 1 is preferred to a rating of 3.

Thus determined, the relative values of the different varieties for each sub-division of the four main regions are given in Table IV. Solid lines are used to indicate point differences between varieties, dotted lines to indicate differences in hardiness. Where such differences are indicated, the higher-placed variety, or group of varieties, is considered better adapted than the lower.

TABLE IV

Theoretical relative values of certain varieties in different regions of the Natal cane belt.

(For explanation see text)

MIST BELT			*MAIN REGION*			*LITTORAL REGION*			*DELTAS*		
High	*Medium*	*Low*	*High*	*Medium*	*Low*	*High*	*Medium*	*Low*	*High*	*Medium*	*Low*
N:Co.293	N:Co.376	N:Co.382	N:Co.310	N:Co.376	N:Co.339	N:Co.376	N:Co.376	N:Co.339	N:Co.310	N:Co.376	N:Co.339
N:Co.376	N.50/211	N:Co.376	N:Co.376	N.50/211	N:Co.382	N:Co.310	N:Co.292	N:Co.382	N:Co.376	N:Co.310	N:Co.382
N.50/211	N:Co.293	N.50/211	N:50/211	N:Co.310	N:Co.376	N:Co.334	N.50/211	Co.331	N.50/211	N.50/211	N:Co.376
N:Co.310	N:Co.382	N:Co.339	N:Co.339	N:Co.339	Co.331	N:Co.292	N:Co.339	N:Co.376	N:Co.339	N:Co.339	N:Co.310
N:Co.382	N:Co.292	Co.301	N:Co.382	N:Co.382	N.50/211	N.50/211	N:Co.382	N:Co.292	N:Co.382	N:Co.382	Co.331
N:Co.334	N:Co.310	Co.331	N:Co.293	N:Co.292	N:Co.310	N:Co.339	Co.331	N.50/211	N:Co.293	N:Co.292	N.50/211
N:Co.292	N:Co.339	N:Co.293	N:Co.334	Co.331	Co.301	N:Co.382	N:Co.310	N:Co.310	N:Co.334	Co.331	Co.301
N:Co.339	Co.301	N:Co.292	N:Co.292	N:Co.293	N:Co.292	Co.331	N:Co.334	N:Co.334	N:Co.292	N:Co.293	N:Co.292
Co.301	Co.331	N:Co.310	Co.331	N.Co:334	N:Co.293	N:Co.293	N:Co.293	Co.301	Co.331	N:Co.334	N:Co.293
Co.331	N:Co.334	N:Co.334	Co.301	Co.301	N:Co.334	Co.301	Co.301	N:Co.293	Co.301	Co.301	N:Co.334

Discussion and Conclusions

The ranking of the varieties in Table IV appears to show general agreement with that found in experimental trials and field practice. However, the accuracy of the placing of N.50/211 must be in doubt until more is known about the characteristics of this recently-distributed variety. Some apparent discrepancies between the theoretical and actual values may occur in certain areas with some of the older varieties, if these have begun to decline in yield through infection with ratoon-stunting disease or other, unknown, causes. However, the fact that the agreement is generally good indicates that it is possible to obtain a reasonable guide to the performance of most varieties in most areas by considering only the characters of production potential, hardiness in relation to field fertility, sucrose content, resistance to certain diseases, and the tendency to flower; soil type and climate need not themselves be taken into consideration.

It is interesting to note that even under the highly artificial conditions of sugarcane agriculture there appears to exist a similar trend to that which occurs in natural vegetation, and referred to in the extract from Bew's "Plant Forms" at the beginning of this paper.

With good agronomic practices the fertility of a field may be raised. As this is brought about, the field's requirements for hardiness in a variety grow less. Now, hardy varieties in comparison with non-

hardy types, usually show greater resemblance in form to the "wild" canes—from which this characteristic appears to have been inherited—and less resemblance to the "noble", tropical varieties. It may therefore happen that, as the demands of the environment for hardiness are lessened, varieties showing more resemblance to the tropical, noble varieties may be grown. Will, then, varieties closely resembling the attractive-looking noble types finally come to be grown in South Africa? Probably not; the best conditions for growth are, inevitably, uniform conditions—for any departure from the optimum implies a change for the worse. In the sub-tropics, where greater climatic changes take place during the year than in the tropics, the demand for hardiness is likely to be correspondingly greater. If, as seems likely, this necessitates a larger proportion of "wild" characteristics in the varieties grown in the sub-tropics, the sight of varieties bred for the tropics, growing in the tropics, will always arouse feelings of envy in a South African planter.

Summary

It appears that a fairly reliable guide to the relative values of different varieties for a particular area can be obtained by:

(1) rating the varieties for the degree to which they possess the characteristics of (i) a high "production potential" (ii) hardiness, (iii) a high sucrose content, (iv) resistance to the diseases of smut, red rot and gumming, and (v) freedom from the tendency to flower,

(2) rating similarly the particular importance of each of the above characteristics in the area being considered.

(3) Comparing the ratings of (1) and (2) and finding the number of points lost by each variety for inability to satisfy the particular demands of the area.

REFERENCE

Bews, J. W. 1925: Plants forms and their evolution in South Africa. Longmans, Green & Co., London.

The Chairman, Mr. du Toit, said that the paper was involved and somewhat difficult to discuss on its merits as it had arrived so late. Dr. Brett had given numerical values to desirable and undesirable features of canes. He thought the system outlined was excellent although over-simplification might be a possible danger. The rating range of 1 to 3 seemed to be rather small, and Dr. Brett might find it necessary later on to have a wider range. If the *spontaneum* variety showed all desirable aspects except one, it would only lose a few points and yet might prove, because of one defect, unsuitable. Thus if smut was sufficiently bad in N:Co.293 it would be thrown out. He found it strange that the diseases mentioned were confined to red rot, ratoon stunting disease and gumming. He asked what would happen to a variety which was not tolerant to mosaic. On Dr. Brett's system on productivity and hardiness he asked if the potential should be determined only under very favourable conditions, would one or two experiments be sufficient, and on the other hand, how did he get his classification of hardiness? Was that done by comparing the variety under favourable and unfavourable conditions?

Dr. Brett said that the production potential of a particular variety should be estimated from its relative performance in a number of trials under very good conditions. A comparison of these results with those obtained under unfavourable conditions would then provide an indication of its hardiness. As far as N:Co.293 and smut disease was concerned, it was in fact susceptibility to smut disease that was largely responsible for this variety's low placing in the table, for areas where smut was prevalent. The reason why mosaic disease had been omitted from consideration was that the full implications of this disease were not universally agreed upon. Some might consider that a very susceptible variety like N:Co.339 should not be too severely penalized because it was capable of giving good yields even when infected; others would disagree because of the risk of mosaic spreading from N:Co.339 to other varieties.

Mr. W. J. G. Barnes said that, some years ago, he had pointed out that, as far as variety selection in respect of disease was concerned, the final decision lay with the grower. He considered the paper a very useful one in that it suggested a whole lot of factors which the grower could take into account when considering which varieties he was going to plant on his farm. However, according to Dr. Brett, N:Co.293 was one of the worst varieties to select; yet, in practice, on his farm it was one of the best. Its susceptibility to smut floored it badly in Dr. Brett's tables; yet the risk of smut was one which a grower could accept in the light of this variety's other strong points. Further, the item "sucrose content" was one of Dr. Brett's factors, whereas the grower was more concerned with production of tons of sucrose per acre per month as a variety selection factor.

Dr. McMartin said he was pleased Dr. Brett had emphasised the importance of environment but was unable to agree with the general statement that the optimum conditions were the same for all varieties. Some varieties might have optimum conditions in common, but he had formed the impression that some attempts to introduce varieties from other countries failed because varieties were geographically displaced. He knew that some canes which were poor in hardiness here, for example the

P.O.J. varieties, could crop very well under plentiful supply of water and nutrients, but on the other hand there were some varieties which would never do well here because of environmental unsuitability of other factors such as length of day.

Dr. Brett said that varieties such as N:Co.310 which do very well under our best conditions might give even higher yields under tropical conditions, but then be surpassed there by varieties having a high proportion of noble blood. It might be that there was an inverse relationship between production potential and hardiness, and that a greater amount of hardiness was always required under sub-tropical conditions. If this were so, the very best varieties for tropical conditions would inevitably lack sufficient hardiness to be of value under even the best of our own, sub-tropical, conditions. Referring to Mr. Barnes's remarks, he said that production potential was related to production in terms of tons sucrose per acre per month; however, sucrose content was also taken into account independently of production potential as, by influencing harvesting and transport costs, this factor had an effect upon the economic value of a variety.

Dr. Dodds said that Dr. Brett's efforts in recent years must have been of far reaching benefit to the industry. This paper was perhaps the best because it summarized all the work that he had done in recent years. He found a very important factor in the selection of varieties in his time was the personal preference of the planters. When the Experiment Station was first started, Uba was the only cane under cultivation and it was very difficult to get any growers to take up any other variety at all. It was then considered that a cure should be found for streak disease in Uba cane, rather than introduce other varieties. In East Africa he had found one estate which was wedded to one particular variety though it was not the best variety that could have been grown. It was with difficulty that he got them to experiment with N:Co.310 and N:Co.376, but they did find the change well worth while. With regard to the lack of permanency of these new varieties he wanted to know if further light could be thrown on the subject. Some of the older varieties could last for centuries without appreciable deterioration. The tendency of the modern hybrids was to run out, apparently due to unknown disease factors. He would like more information on the subject, if obtainable.

The Chairman thought that there was such a big demand for new varieties in this country that the conservatism mentioned by Dr. Dodds did no longer apply in this country.

Dr. Brett said that the running-out of varieties was a question for the pathologist. He was inclined to think that one could not explain everything on the basis of ratoon stunting disease; there were probably other diseases, as yet unidentified, which were also responsible for varietal deterioration.

Mr. du Toit felt that the variety classification given in the table should not be final as varieties changed with time. A variety may get more susceptible to disease. He further agreed with Dr. Brett's reply on the matter of the running out of varieties. He said that those who attended the International Conference in Hawaii, heard an interesting symposium on the subject of running out of varieties, but he doubted if there was anything really final in the symposium. Many things were suggested but nothing was definitely known. As Dr. Brett said, certainly ratoon stunting was playing a part in the running out of some varieties, but he did not think there was anyone bold enough to say that that was the whole story, and we in South Africa would certainly not subscribe to ratoon stunting being the only factor. We know that in the case of Co.281 this was not so, as the hot water treatment so far had been quite unable to get Co.281 back to its old position. One of the things suggested in Hawaii was that probably one of the reasons for a variety running out was the change in the amount of organisms in the soil. Certain micro-organisms will build up as a result of the continued planting of a certain variety and harmful organisms may be the downfall of that variety. Once a new variety was planted these may not affect that variety so much as it would take some time again before harmful organisms would build up.

Mr. Hempson said that he thought one subject which had not been considered in the running out of varieties was bad husbandry. He though in this industry with better treatment the varieties would last longer. In the case of poor farmers where bacteria in the soil caused reduction in yield it might even spread to other farms. He thought that seed selection was very important.

The Chairman could not see why husbandry methods other than seed selection should cause one variety to run out and not another.

Mr. Boulle said there were no two points which could be correlated that affected flowering. He asked Dr. Brett how in practice the assessment on flowering could be worked out. The aspects of the farm determined whether the variety would flower or not. He asked Dr. Brett where one should plant a variety which was susceptible to flowering.

Dr. Brett said that past experience was the best guide as to whether or not a particular field was prone to flowering. As a generalization, it could be said that flowering usually decreased with increasing distance from the sea and increasing altitude; however, within a particular area, flowering was usually more profuse on the hillsides than in the valleys.

Probably these effects resulted from low night temperatures discouraging flowering.

Dr. McMartin said that varietal deterioration was not confined to sugarcane varieties alone, but applied to all crops. The suggestion has been made that the sugarcane varieties which lasted longest were those most closely related to wild types. The breeder may be faced with the choice of producing high yielding, highly bred varieties which soon run out, or producing semi-wild types which last longer.

Mr. Tedder felt that usually one introduced a new variety in good soil and then compared it with the old varieties growing in poorer soil, and so he agreed with Mr. Hempson that all varieties should be looked after as well as possible. This process of always planting the older varieties on poorer fields he was sure was the reason for their speedy running out.

Mr. Turner asked Dr. Brett to enlarge upon the importance of the choice of variety in the case of mosaic, whether one should live with the variety which had mosaic or was it necessary to throw it out.

Dr. Brett said it was sometimes difficult to assess the importance of a particular disease in a particular variety. N:Co.339 could become 100 per cent infected with mosaic without apparently falling off in yield; nevertheless, it was to be expected that such a source of infection would constitute a danger to other varieties. It did not appear necessary nowadays to take the risk of growing N:Co.339—there were other varieties which grew as well and were far more resistant to mosaic disease.

Mr. J. Wilson agreed with Dr. Brett that we had now reached the situation where we have a substitute for N:Co.339 and we should now give serious consideration to withdrawing N:Co.339. There was a strong case for suspecting that N:Co.376 was being affected in areas where N:Co.339 was grown.

Mr. MacIver said that he was advised years ago not to plant mealies in cane fields because they were the host of mosaic disease and therefore he agreed that it would be a good idea to get rid of N:Co.339 which would also act as a host for mosaic.

Dr. Dick was surprised that Mr. Thompson had not mentioned another point in connection with mosaic in N:Co.339. It was said that N:Co.339 was tolerant and it did not suffer from mosaic disease, but there was a danger of this tolerance breaking down and that variety might also suffer.

Mr. Main asked for more information about the susceptibility of N:Co.376 to mosaic. He always understood it was resistant. There was a variety N:Co.349 which gave better results than N:Co.310 but which was not released because of its susceptibility to mosaic. When N:Co.376 was first released it was said to be tolerant and not very susceptible to mosaic.

Mr. King said a lot of blame seemed to be attached to N:Co.339 as a source of infection for N:Co.376. Was it not possible that the mosaic in N:Co.339 was due to its being planted in areas where mosaic was more prevalent? For instance in a field on the South Coast N:Co.339 was 100 per cent infected. He had also seen a field in Zululand where it was not affected at all. He felt that rather than being an indication of its being a danger to N:Co.376 it was more an indication of the susceptibility shown in a particular environment. On the South Coast where valleys were heavily wooded there were a number of grasses which were heavily infected with mosaic. The possibility was that the infection spread from these grasses to N:Co.376. Mosaic did not readily spread from one variety to another, but rather through grasses.

Mr. Hyde Palmer said that N:Co.339 was excellent as a yielder and he would like to know, because it flowered, what it should be replaced by?

Dr. Brett said that on the poorer soils N:Co.382, and on the better soils, N:Co.376 could be used to replace N:Co.339.

Dr. McMartin said that the planting of maize amongst sugarcane was not the same problem as whether N:Co.339 should be planted near other varieties. The insect that spread mosaic bred on maize but not on sugarcane. He thought the possibility might exist, as once suggested by Dr. Dick, that N:Co.339 was more attractive to the insect which carried the disease. The argument might thus be made that if N:Co.339 was more attractive to the insects, would it not be better to plant more of this variety so that the insects would not feed on the other varieties? However, if N:Co.382 was as good as N:Co.339 then the areas where the latter was affected could be planted to N:Co.382.

Dr. Dick said that he did not have any direct evidence that N:Co.339 was more attractive to the insects. He had tried to determine this by keeping different varieties in the same cage and releasing aphis maidis. He could find no significant difference in the relative attraction, although the insect lived longer on N:Co.339.

Dr. Cleasby said that the disease must be taken seriously. He confirmed the fact that mosaic was spreading fast, and he thought that the first essential was to remove the bulk of the infection which he considered was N:Co.339, and then to use seed from beds which were free from the disease. Furthermore it would be necessary to rogue out plants from young cane which were infected with mosaic.

Mr. Steyn said that he had grown excellent crops of N:Co.339 up to 5 or 6 ratoons where mosaic was rife. But seed cane apparently free from the disease planted in new areas now was found to be 80 per cent infected.

Mr. Borchards asked if mosaic was more, or less, prevalent in high altitudes. The cane inspector had inspected his fields just recently and found almost no mosaic infection on his farm in the N:Co.339 which was grown at a high altitude.

Mr. B. T. Wilson asked if N:Co.339 could throw off mosaic sufficiently to consider it absolutely free.

Dr. Dodds said that there was apparently only one vector, aphis maidis, known to convey mosaic in this country, as yet. On visiting other sugar-growing countries he had found that the tendency was to rely on cane varieties that were either tolerant or resistant to mosaic. He thought that the Experiment Station should be authorised to instruct planters to withdraw replanting of varieties that were infected with mosaic and were not tolerant to it.

Mr. J. Wilson replied that he considered the only thing the Experiment Station could do was to recommend that when the variety N:Co.339 was ploughed out it should not be replanted.