DISCUSSION

Q: *What were the varieties of turnips and ryegrass used in the investigations into hypothyroidism?*

D. P. SINCLAIR: New Zealand Green Globe turnips; either straight perennial ryegrass or mixed short-rotation and perennial ryegrass.

Q: *Does the deficiency in thyroid hormone prevent lambs from producing adequate heat, and in consequence are deaths in lambs with enlarged thyroids associated with periods of cold weather?*

E. D. ANDREWS: Probably; adverse weather appeared to increase death rates.

Q: *Were the birth weights of goitrous lambs markedly different from the non-goitrous ones?*

MR SINCLAIR: Birth weights were significantly different in years when goitre was severe.

Q: *Is the rate of gain of fattening sheep affected by the goitrogenic factor, in animals feeding on crops of known goitrogenic potency?*

MR ANDREWS: Our experiments failed to show any such effect.

Q: *Was consideration given, in planning the experiments involving Neohydriol as a source of iodine, to the possibility that Neohydriol might be carried over in the body tissues of the ewes from one year to the next?*

MR SINCLAIR: In our experiments different ewes were used each year.

Q: *Do the authors have any idea what the goitrogenic agency in perennial ryegrass might be?*

MR ANDREWS: The literature suggests several possibilities including low iodine, thiocyanate and nitrate. We hope to investigate some of these during the coming season.

DR D. S. FLUX: There remains the question, "Why do goitrous lambs die?" Low heat production has been suggested, though lambs with large thyroids can survive. This may be because the size of the thyroid is related more to the previous history of the lamb than to its present status of thyroid hormone production. Would the authors care to comment further on the possible causes of death?

MR ANDREWS: Deaths may be related to the degree of hypothyroidism of the foetus just before birth. The difficulty is to measure hypothyroidism.

DR FLUX AND DR JOHNS: Our knowledge of the causes of thyroid enlargement in stock grazing on pastures is very incomplete. In experiments conducted jointly by the staffs of Massey College, Plant Chemistry and Grasslands Divisions of D.S.I.R., thyroid enlargement of sheep attributable to white clover showed up in one year but not in another. Despite the fact that perennial ryegrass is considerably higher in iodine content than short-rotation ryegrass, it has caused thyroid enlargement in both sheep and guinea-pigs. The most spectacular cases of thyroid enlargement were,

however, in lambs of ewes grazing short-rotation ryegrass where the ewes had not been treated with iodine in the form of Neohydriol. Thyroid enlargement had not occurred in lambs of similar ewes on the same type of pasture in the previous round of the experiment. It is by no means certain that the causes of the relatively small increases in thyroid size which we have seen in our experiments are the same as those of the more severe outbreaks of clinical goitre which occur sporadically among farm animals in some areas.

In our latest work there has been an indication that lambs from ewes treated with Neohydriol have grown faster later in the season than those from ewes on the same pasture but not given Neohydriol.

Q: *Was Dr Edgar able to demonstrate an absence of flexure of the utero-tubal junction in those two-tooth ewes where dividing ova in an early stage of development were found in the uterus?*

Dr D. G. Edgar: Observations on the histology of the utero-tubal junction of these ewes were not made.

Q: *What was the state of the 16% of ova in the 5-year and two-tooth ewes classified as not dividing? Were any sperm residues visible in the* zona pellucida *to indicate what proportion of these ova might be fertilizable?*

Dr Edgar: Sperm were visible on or in the *zona pellucida* of some of these ova, but no attempt was made to decide which, if any, ova were not fertilizable.

Q: *Dr Edgar has pointed out that it is not possible to know the precise time of ovulation and, further, that two-tooth ewes have been observed to have shorter heat periods than older ewes. Could the earlier arrival of ova in the uterus in two-tooths be due to their having a shorter oestrus and thus an earlier ovulation time than older ewes?*

Dr Edgar: The conclusion that ova tend to reach the uterus sooner after ovulation in two-tooth ewes depends not only on their earlier arrival there, measured from the day of oestrus, but also on their earlier stage of development.

Dr Carter: Mr Shannon has emphasized that 50% of the variation between herds in conception rate can be attributed to chance. I would interpret the data rather to indicate that 33% of the variation is attributable to differences between herds. This is surely a highly significant proportion of the total variation. Can Mr Shannon say if there are consistent differences between herds over a number of seasons?

P. Shannon: The real problem is which is the best and quickest way of increasing conception rates. Because a large part of herd differences are due to chance it is extremely difficult to tell whether a herd is experiencing a poor run due to genuine infertility or simply to bad luck. On the other hand, worthwhile increases have been achieved by improvements in A.I. techniques. Moreover, a general increase in conception rates also reduces the number of herds experiencing poor conception rates. Thus, if we accept the common definition of a problem herd as one having a conception rate of 50% or less, then it can be shown that achievement of conception rates of 65 to 70% reduces the occurrence of such herds to practically zero.