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## THE INDUCTION OF OVULATION AND OESTRUS IN EWES DURING ANOESTRUS

D. G. Edgar\*

SEVERAL DIFFERENT TREATMENTS by injections of progesterone followed by pregnant mare serum (P.M.S.) have been tested for inducing ovulation and oestrus in anoestrous Romney ewes.

The simplest and most effective treatment was three injections of 30 mg progesterone followed by one of 1,000 i.u., P.M.S., all at two-day intervals. Of 25 anoestrous ewes, 17 (68 per cent.) were marked by a teaser ram, and 11 (44 per cent.) lambed to artificial insemination.

A small percentage (10 per cent.) of a group of ewes similarly treated shortly after lambing, lambed again within six months.

Rectal electrical stimulation caused ovulation and oestrus in five of six Romney ewes early in anoestrus. The effect of this treatment was progressively reduced in other ewes with the advance of the non-breeding season.

### DISCUSSION

Q: : *If as Dr. Edgar suggests the electrical stimulation of the cervix acts through the pituitary what about trying cerebral stimulation?*

A: : *If the effect of rectal electrical stimulation on ewes proves to be real, other stimulation sites will be tried.*

D. S. HART: : *A very low proportion of eggs resulting from stimulation of ovulation appear to be fertilized. Furthermore, in conjunction with Dutt, we found that 40% of the eggs liberated at the silent pre-breeding season ovulation were abnormal and they also moved down the fallopian tubes at about three times the normal rate.*

A: : *No study of eggs was made in this experiment. Abnormally fast passage of eggs down the fallopian tubes suggests a hormonal imbalance.*

DR. JOHN HAMMOND: : *Gordon has been working on hormone treatment in Britain employing animals from a number of breeds. His results are essentially similar to those reported by Dr. Edgar in that he has obtained only a low percentage of pregnancies. However I do not agree with Hart's thesis as regards the proportion of bad eggs. I feel rather that the low level of pregnancies achieved is brought about by early deaths of the embryos owing to insufficient levels of some nutrient required for development.*

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Q : : *Has Dr. Edgar any idea of the optimum time of pre-treatment with progesterone.*

A : : The simplest and most effective treatment for inducing oestrus and ovulation was three injections of 30 mg progesterone followed by one of 1,000 i.u. P.M.S., all at two-day intervals.

DR. JOHN HAMMOND : : On theoretical grounds anoestrus can be regarded as a curve and at the depths of anoestrus you would expect a greater period of treatment with progesterone to condition the uterus to the effects of the ovarian reaction to P.M.S. Also it has been shown that the number of follicles ovulated by a given dose of P.M.S. depends on the stage of anoestrus.

DR. R. W. AVERILL : : A group of nondescript ewes were induced to ovulate at Cambridge by treatment with progesterone and P.M.S. The eggs or embryos were recovered in some of these animals at slaughter and some of the fertilized eggs were successfully transferred. Normal embryos were found in 15 or 20 ewes slaughtered at day 17 when oestrus recurred in the non-pregnant animals. Our impression was that the eggs had a reasonable chance of developing provided they were fertilized; however, in a proportion of ewes it seemed that these had "packed up" before 17 days.

Q : : *What delay was there between electrical stimulation and ovulation?*

A : : The time of ovulation was estimated by subjectively ageing the corpora lutea and seemed to be about two to six days after stimulation.

DR. J. W. McLEAN : : Dr. Hammond referred to anoestrus as being curved; the same sort of situation applies with the breeding season. We have followed the change in the dilation of the vagina by a balloon technique and find that this increases from anoestrus to about the middle of the breeding season and then decreases towards anoestrus. This would seem to provide a method of determining the depth of anoestrus.

DR. JOHN HAMMOND : : The number of ovulations per oestrus rises from the beginning of the breeding season to a peak at the sixth week of the breeding season.

DR. L. R. WALLACE : : Might not this rise in ovulation rate be an effect of feed, *i.e.*, 'flushing'. In a group of 900 ewes run with teaser rams up to a certain date, and these were later replaced by fertile rams, it was found that the lambing percentages of ewes mated at first and second heats did not differ provided these matings occurred at the same calendar date. This suggests the effects are due rather to seasonal feed changes and not to changes in the breeding season.

DR. J. W. McLEAN : : There does seem to be some change in the intensity of the breeding season since the vaginal dilation changes mentioned earlier were obtained with ewes on a constant diet.

DR. R. W. AVERILL : : Fortnightly collections of genitalia from a freezing works this last season revealed that ovulation rate did show a seasonal change.