to be made, though the labour involved in obtaining adequate figures might prove prohibitive.

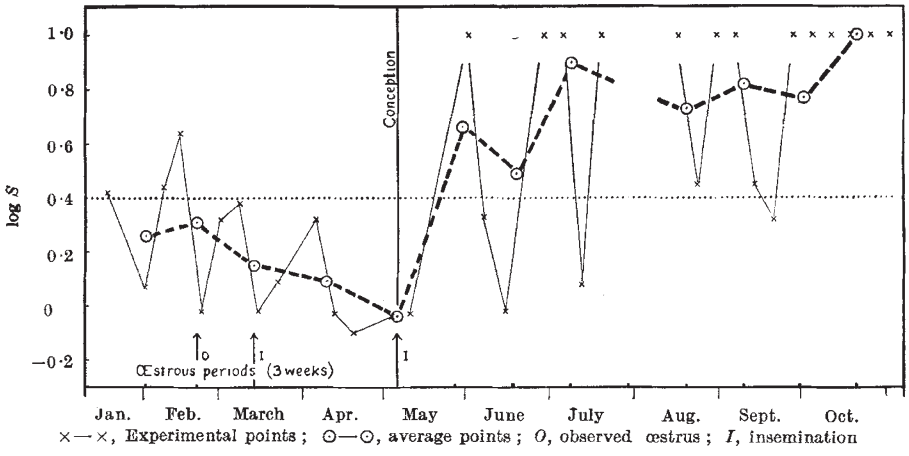
It is hoped in the future to discover and sample the sublittoral group, and by equating the curves of both groups to the exponential curve to obtain an estimate of population which is independent of the exact nature of the beach distribution.

R. Morrison Cassie

Fisheries Laboratory,
Wellington, N.Z. Sept. 29.

Bovine Sterility and Pregnancy in Relation to the Rheological Properties of Cervical Secretions

Scott Blair, Cowie and Coppen[1] found that when uterine cervical secretions from the cow were examined in an emptying capillary viscometer the shape of the flow curve changed during pregnancy; but Scott Blair, Cowie and Folley[2] showed that a parameter derived from such curves gave a reliable test for pregnancy only about sixteen weeks after conception. It seemed likely that the test could be improved in four ways: (1) by ensuring that all samples were taken directly from the cervix without vaginal contamination; (2) by using unmixed samples, thereby avoiding disturbance to the structure; (3) by measuring changes in pressure at constant rate of flow rather than extruding at constant pressure and measuring rates, thus largely eliminating accelerations; and (4) by averaging the results of two or three tests.



×—×, Experimental points; ⊙—⊙, average points; *O*, observed œstrus; *I*, insemination

In a recent note on experiments on human cervical secretions over the course of a short time, incorporating the first three of these improvements, Clift, Glover and Scott Blair[3] have shown that the slope (S) of such curves plotted logarithmically against time gives two maxima and two minima during the menstrual cycle of normal women, the minima corresponding to ovulation and menstruation. Moreover, log S usually reaches values above the non-pregnant maxima quite early in pregnancy. (Data were from about 120 normal women.)

We have now examined secretions taken carefully from the mouth of the cervix from four heifers and two cows over a period of about nine months (242 tests in all) as well as those from four other cows over shorter periods (a further 169 tests). A larger-scale experiment using a more satisfactory viscometer is being started; but, since it will be at least a year before the results of this are available, we feel that the results obtained even on so small a number of animals should be placed on record.

A typical curve is shown in the accompanying graph. Those for four of the remaining animals in the main experiment are very similar. In the non-pregnant animal, sharp minima appear at œstrus. After conception there are still occasional dips, and in some few cases œstrus is actually known to occur. It is clear that a single test would tell us little about the condition of the animal except at œstrus. The broken curve joins points which are the mean of the two or three tests made in each three-week period.

In the case of the five fertile animals in the main experiment and three in the subsidiary experiment, the following points appear. (1) Where the broken line is high, insemination is by no means always successful and must be repeated. Conception generally occurs at the lowest point of this curve. Log S may serve as some indication of the degree of sub-fertility. (2) The broken line lies below the arbitrarily selected value log $S = 0{\cdot}4$ (shown dotted) until soon after conception. It crosses this line between two and about four weeks after conception, after which it remains above during the greater part of pregnancy.

On one occasion the value of log S rose sharply a few weeks after insemination, and an œstrus was missed. When the animal returned to normal œstrus six weeks after insemination, the value of log S had again fallen. This may possibly have corresponded to an early abortion.

The sixth animal in the main experiment and one in the subsidiary experiment were completely sterile heifers and have not conceived after repeated inseminations. They come into œstrus fairly regularly, and the value of log S is then normal for an œstrous secretion. At other times, values are very high: often well above the 0·4-level. The behaviour is quite unlike that of the fertile animals. (The present temporary instrument cannot measure values of log S greater than 1·0, thus introducing an artificial 'ceiling' for the results.)

Whether these preliminary results will lead to a reliable early test for bovine pregnancy (none at present exists), to a useful method for sterility or sub-fertility prognosis and/or to quantitative relationships with hormonal levels can be decided only with a more accurate instrument in a much larger experiment such as we are now planning.

One of us (F. A. G.) is indebted to the Agricultural Research Council for a grant.

F. A. Glover
G. W. Scott Blair

National Institute for Research in Dairying,
University of Reading, Shinfield, near Reading.

Nov. 13.

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[3] Clift, A. F., Glover, F. A., and Scott Blair, G. W., *Lancet*, **258**, 1154 (1950).