Br. vet. J. (1970), **126**, 495

PROCEEDINGS OF THE SOCIETY FOR VETERINARY ETHOLOGY

(EDINBURGH, JUNE 1969)

The Behaviour of Cattle Affected with Cystic Ovarian Disease

By F. L. M. Dawson, M.A.F.F., Cambridge

A previous speaker to the Society had mentioned that behaviour patterns could be the response to an internal (for instance, hormonal) stimulus. Such was exactly the case with this disease.

The basic pattern shown by affected cows was one of frequent and irregular oestrus, tending to progress into continuous oestrus. Continuous oestrus of low-intensity was sometimes overlooked. In the terminal stages behavioural symptoms abate to some extent.

A variety of evidence was quoted indicating that this behaviour was the result of the liberation of abnormal quantities of oestrogen into the blood-stream at abnormal times; some account was given of divergent views. There was, however, little evidence that "oversized follicles", developing and persisting and resumption of regular normal cycles, secreted excess oestrogen.

Excess oestrogen stimulated the function of the thyroid gland and this was probably the reason for the continuous "treading" behaviour and loss of flesh shown by some cases.

A survey of the literature suggested that about 5 per cent of cases showed purely "virile" behaviour and a further 20 per cent showed some exaggerated feminine, along with some masculine, behaviour; "digging" with the forefeet was the most consistent example.

Work with rats and on the corresponding human syndrome suggested that such patterns might be due to breakdown of the enzyme systems in the ovary, causing interference with the final stage of the synthesis from progesterone via androgen to oestrogen. Cows exhibiting any abnormally masculine behaviour patterns invariably showed some degrees of cyst luteinization.

Some Behavioural Factors Affecting the Absorption of Immune Lactoglobulin by Newborn Calves

By I. E. Selman, A. D. McEwan and E. W. Fisher, Department of Veterinary Medicine, Glasgow University

Observations were carried out on thirty cows and their calves for 8 hours following parturition in a large, quiet loose box. Ten mature beef cows (experi-

enced dams), ten Ayrshire heifers (inexperienced dams) and ten Ayrshire cows of unknown maternal experience were observed. The beef cows and their calves were of various breeds and crosses, and the dairy calves were either purebred Ayrshires or Freisian cross Ayrshires. All parturitions occurred without assistance.

A strikingly similar pattern of maternal behaviour became apparent in most instances. However, consideration of the position of the dam at parturition, the time taken to initiate and to continue calf grooming and the time taken for a dam to stand and accept its calf's teat-seeking advances, indicated that the beef cows (which were experienced dams) were the better mothers. Highly abnormal maternal behaviour (e.g. delayed grooming or failure to groom the calf and/or aggressive rejection of teat-seeking advances) occurred in two Ayrshire heifers and one Ayrshire cow. All of the thirty dams cleansed by 10 hours *post partum*, and all save three ate the placenta. (It is perhaps significant that two of these three dams were also abnormal in respect of calf grooming.)

Seven of the thirty calves did not suck their dams during the observation period (i.e. two beef, two heifers' and three Ayrshire cows' calves). Among those calves where suckling was observed to occur during the observation period, the times to first suckling (mean ± SD) were 81·4 ± 52·2 minutes (beef calves); 218·3 ± 113·8 minutes (heifers' calves); and 261·1 ± 129·1 minutes (Ayrshire cows' calves). The earliest calf to suck, a beef calf, did so at 35 minutes *post partum*. The number of suckling spells which occurred during the observation period varied from none to four. Several reasons for delayed suckling were defined.

The serum immune globulin concentrations of the twenty dairy calves in the series were estimated using the zinc sulphate turbidity test (McEwan, Fisher & Selman, 1970), and it was found that if a dairy calf sucked its dam during the 8-hour observation period, high serum immune globulin concentrations were usually attained. In addition to a highly significant difference ($P > 0{\cdot}001$) occurring between the serum immune globulin concentrations of those calves observed to suck during the first 8 hours of life and those not sucking during this time, there was also a significant negative correlation ($r = -0{\cdot}52$; $P < 0{\cdot}05$) between the serum immune globulin concentrations of fifteen dairy calves observed to suck and their times of first suckling after birth.

Eleven of the dairy calves were born from January to April and the remaining nine from May to July. No significant difference was demonstrable between the serum immune globulin concentrations of these two groups of dairy calves which were born in loose boxes and left with their dams for the first 2 days of life. It would therefore seem that the more traditional method of early calf management during the winter in the west of Scotland, which involves calving in the byre (a process which almost eliminates the possibility of calf undergoing prolonged grooming or sucking its dam), is responsible for the low mean serum immune globulin concentrations found in colostrum-fed calves at this time of the year (Gay, Fisher & McEwan, 1965).

Further experiments using twenty dairy calves allowed to suck their dams to

satiation at fixed times (i.e. 6 and 12 hours *post partum*) revealed significantly higher ($P < 0.001$) serum immune globulin concentration in ten calves muzzled and left with their dams between sucklings than in control calves fed at the same time but separated from their dams between sucklings. Although the mothered calves were brighter and easier to induce to suck than the unmothered calves, there was no significant difference in the mean total colostrum intakes of the two groups of calves nor in the mean birthweights. A similar result was later obtained with a further two groups each of ten calves fed standardized amounts of colostrum by teat bucket at similar times after birth and maintained under carefully controlled conditions. The possible reasons for this difference between mothered and unmothered newborn calves were discussed.

REFERENCES

GAY, C. C., FISHER, E. W. & MCEWAN, A. D. (1965). *Vet. Rec.*, 77, 994.
MCEWAN, A. D., FISHER, E. W. & SELMAN, I. E. (1970). In press.

Abnormal Behaviour as an Aid to Diagnosis

By J. R. Baillie, Kirriemuir

This short communication is intended solely as a brief look at a subject which is of interest to the clinician and one which I have studied for many years without regarding it from the ethology viewpoint. Clinical diagnosis is usually based on a catalogue of signs but I believe that a study of abnormal behaviour *per se* can lead to rapid and accurate diagnosis in many cases.

I thought it would be of interest to consider a few clinical cases where diagnosis can be established from an animal's behaviour; this, of course, presumes an accurate knowledge of what is normal in the various species.

Cattle

I have found that the following conditions can be diagnosed on abnormal behaviour:

Cerebral cortical necrosis causes blindness, incoordination, and recumbency in circumstances where lead poisoning can be eliminated.

A lameness occurs in transit cattle from Ireland and is caused by abscess formation on the solar matrix. Whether the limb is cast inwards or outwards determines which digit is affected, and this is quite a different pattern from that seen in laminitis. Very rarely one may find abscess formation in one of the digits on each hind leg. This produces a "creeping" gait and is more easily confused with laminitis but is still distinctive.

Tetanus produces the distinctive behaviour of rigid or stilted gait in association with rumenal bloat.

Muscular dystrophy. Affected calves are in recumbency or walk with the scapulae rising as much as 4 inches above the vertebrae, giving a "broken front spring" appearance.

Milk fever. The features included recumbent posture, *S*-/bend on neck, sleepy look on face. The cows are not necessarily newly calved, since I have seen cases as long as 3 months after calving.

Hypomagnesaemia greatly increases excitability, especially when something unusual is taking place. There is an unusual walk, and flicking ears and eyes.

Many cases of sudden death reported as suspected anthrax are in fact due to hypomagnesaemia and I consider as diagnostic the tell-tale marks left on the ground by an animal in tetany. A thorough post-mortem examination, including the Ca/Mg bone ratio, can be lengthy and futile. I know of no disease where such a "trade mark" of the animal's last activities could be interpreted in any other way.

Sheep

Rams. A common behaviour pattern in housed heavily fed rams prior to sale is grating of the teeth, straining and arching of the back, which in my experience, is certain to be urolithiasis.

A ewe looking dejected and lame on one hind led, or actually trailing the leg, is a sure indication of *Staph. aureus* mastitis.

Milk fever is characterized by a recumbent posture, disinterested expression, and salivation often 4–6 weeks before lambing.

Dogs

The stilted walk, opisthotonus and sardonic grin are typical of strychnine poisoning, although tetanus would have to be borne in mind.

The Reflexes in Health and Disease

By A. Brownlee, Edinburgh

Reflexes should not be studied as isolated phenomena, but as actions of the animal as a whole organism. An animal may lick its skin or scratch it with a hind foot in response to some irritations of the skin; this would be described as reflex action. If an animal seeks out in its environment a congener to participate in mutual grooming or seeks a fence-post against which to rub its skin, this could be described as instinctive behaviour. An emotion component is shown by the lowering of the head in cattle when being groomed by a congener, even though it may be the hind quarters which are receiving the attention. There is also a mood component as shown by many animals in a herd of cattle grooming at one interval of time; this is often shown at the close of a feeding period

Reflex contraction of many groups of muscles ("stretch" reflex), most commonly observed in animals on their rising after a long period of recumbency, was also illustrated.

Factors which inhibit grooming and stretch reflexes are sickness, fear and pain. The reflex movements of the lips and tongue of cattle, elicited by nibbling an itchy rump region can be inhibited by quite gently pricking the animal's skin with a pin.

The suggestion was advanced that the cessation of the eructation reflex in the later stages of pasture bloat may be due to foaming rumen contents preventing free eructation in the early stages; the pain resulting from the consequent distention of the rumen may inhibit the eructation reflex so that even free gas cannot escape.

Observations on the Handling of Loose Cattle

By D. Moodie, Ayr

The catching and control of calves in loose boxes leaves much to be desired on the average farm, largely because of fear of injury on the part of stockmen. Some handlers acquire considerable expertise in this; others find the exercise time-consuming, noisy and sometimes injurious, despite their supposedly higher human intelligence.

On the approach of an observer, calves in a loose box will show fear, manoeuvre, and herd, i.e. seek companions for safety.

The social atmosphere under normal conditions is one of tranquility.

On the approach of danger in the form of a human being the calves become alert, alarmed, and panicky.

Calves may pass from a state of tranquility to one of panic very rapidly or very gradually, depending presumably on the prior experiences associated with a particular person, and also, on previous handling.

The approach to a loose calf should be quiet, even-paced and cautious. Movements of the calf to left or right are controlled by quiet and timely positive movements of the handler's hands and/or feet in the same direction as the calf, until it moves towards a corner of the box where it is easiest to catch. Negative movements, i.e. a withdrawal of hand or foot on one side, have a similar effect to positive movements on the other side. By this means one can bring a calf to a standstill in a corner of a box without touching it.

Catching must be decisive. The author prefers to induce the calf to move to the left towards a corner, then approach the calf to prompt right hand turning, and complete the cornering movement, then catch lower jaw with left hand and right ear with right hand. Control is easily accomplished by this technique, which could be the basis for an introduction to animal behaviour for veterinary students.

Behaviour Patterns of Cows with Milk Fever

By J. H. Penman, Edinburgh

Parturition in the cow is normally associated with a decrease of plasma calcium and inorganic phosphorus, and perhaps also of magnesium. In the pathological extension of this picture known as milk fever, plasma levels of calcium and phosphorus are greatly depressed, while magnesium levels are slightly elevated. The Ca : P ratio approaches 2 : 1 from the normal 5 : 1. Since hypocalcaemia

increases the excitability of cell membrane, this explains to some extent the abnormal behaviour patterns recognized by clinicians as increased nervous excitability, incoordination and finally paresis followed by coma. However, many variations or degrees of behaviour are seen in cows with the same plasma mineral concentrations.

Behaviour patterns

Initial stage. The cow appears unwilling to move in the early stages. The facial expression appears altered, perhaps because of the staring effect of dilated pupils. Grinding of the teeth and intermittent paddling movements of the hind limbs are often shown, and attempts to urinate and defaecate are futile.

Excitable stage. As the condition progresses the behaviour varies greatly but appears to be influenced to a large extent by the environment. At pasture, a cow generally wanders stiff-legged and swaying to a quiet corner of the field where she subsides into sternal recumbency.

In the byre, however, a cow appears to be hypersensitive to noise, as evidenced by sweating and continuous movements of the ears, and appears unwilling to lie down, although exaggerated attempts are made to remain standing and maintain balance. If she falls, repeated and unsuccessful attempts are made to rise.

In a loose box, a cow often displays aggressive behaviour when approached.

Paretic stage. When the cow is recumbent and unable to rise, she may only show hyperexcitability by sweating and perhaps by movements of the head and fore-limbs. In general, cows in this stage are more placid than in earlier stages.

Discussion

The response of the individual cow to adrenaline released by fear of falling or of noise, strangers, or other exteroceptive stimuli, may partly explain the great variations in the behaviour of cows with milk fever in different environments. However, although the behavioural response of the individual cow to milk fever may be infinitely variable in the second stage, the general behavioural pattern in the initial stage should warn a vigilant stockman immediately to remove the cow from the byre to less stressful surroundings.

(*Accepted for publication* 22 *April*, 1970).

Printed by Bournehall Press Ltd., Welwyn Garden City and London