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GRAZING BEHAVIOUR OF DWARF CATTLE IN NIGERIA WITH SOME HUSBANDRY IMPLICATIONS

W. Ferguson

Synopsis.

The main characteristics of the indigenous West African Dwarf Shorthorn or "Muturu" breed of cattle are its small size, its very high susceptibility to rinderpest, its high tolerance to trypanosome infections, and, contrary to popular belief, its superior potential in terms of generation interval and rate of attaining mature weight relative to that of zebu breeds.

Distribution of the breed in the main ecological zones and the husbandry system applied to village herds was described. Government policy was aimed at extending the adoption of a simple herding and kraaling system to as many village herds as possible. In the Savannah areas the night kraaling system operated satisfactorily but in the rain forest it did not. Of 97 herds studied, 70 were husbanded and the 27 which were not husbanded were located mainly in the rain forest zone, with a few in the fresh water swamp area. The unhusbanded herds were invariably in much better condition than the husbanded herds. The husbanded herds in the Savannah were in much better condition than those in the rain forest areas.

In the husbanded herds the observable behaviour of herds was largely compensatory, the pattern and place chosen for many major herd activities being determined by the herdsmen and not by the cattle.

In the unhusbanded herds, the herd instinct was well developed but was least discernable during grazing when animals tended to disperse. This was attributed to fragmentation of available grazing which constituted an important factor influencing the utilisation of pasture, which was confined to isolated areas around village schools, churches, playing fields and where roadside verges had been clear-felled. Unhusbanded herds, by dispersing, could utilise all the grass efficiently. Unhusbanded herds were confined to the few areas large enough to accommodate the intact herd, so that overgrazing of these areas was common and the herds rapidly lost condition. Unhusbanded herds had a predilection for young roadside grass and this brought them into close contact with hazard from vehicular traffic, particularly on timber-extraction routes.

Although often preferring the shade of the forest during the hottest part of the day, herds would congregate in the village in the evening and were often active during the hours of darkness when they were frequently found grazing the roadside verges.

More critical study of an experimental herd included 24 hour observations which showed that animals might spend as long as $4\frac{1}{2}$ hours resting and ruminating in the shade during the heat of the day. Continuous observations in 6 - hourly shifts were carried out on 3 apparently healthy mature cows under conditions of cloudless skies, minimal wind movement, maximum and minimum shade temperatures of 84.6°F and 69.1°F respectively, and recorded relative humidity of 79% and 48% at 9 a.m. and 3 p.m. respectively. The animals, with free access to young Pennisetum pedicellatum pasture, water and shade/shelter, grazed for approximately 9 hours and spent approximately $5\frac{1}{2}$ hours ruminating in the 24 hours. This ruminating activity involved approximately 246 regurgitations with approximately 53 masticatory movements applied to each regurgitated bolus. Defaecation and urination occurred approximately 8.33 and 7.33 times respectively per animal. Ambulatory activity amounted to approximately 1772 yards from 7 a.m. to 7 p.m. and approximately 2116 yards from 7 p.m. to 7 a.m.

The heat tolerance of the herd was assessed using the Iberia Test for Heat Tolerance (Rhoad 1944) and results yielded the surprisingly low mean coefficient of 65% with a coefficient as low as 51% for one apparently healthy animal. This result tended to substantiate other information based on coat characteristics, which suggested that Muturu cattle, whilst highly tolerant to high ambient temperatures per se, were particularly susceptible to high levels of solar radiation and were in this respect adapted to the rain forest environment more satisfactorily than to the open Savannahs.

The overnight kraaling system seemed likely to result in impaired grazing efficiency since it did not cater adequately for the breed's dependence on shade during the hottest hours of the

day and its normal distribution of grazing activity throughout the cooler hours.

The predilection for shade must bring these cattle into closer contact with tsetse flies which avoid lethal daytime temperatures by seeking resting places in deep shade. This may help ensure the regular exposure to trypanosome infection on which their tolerance or premunition appears to depend.

A marked path-forming tendecy was observed in unhusbanded Muturu cattle, persisting when herds were transferred to improved pasture. It persisted also in calves, but it was not determined whether this aspect of behaviour was inherited or was merely an acquired habit. This applied also to a seemingly related aspect of behaviour, i.e. a marked reluctance to lie down on grass, the animals preferring to seek or to make a bare patch of ground for this purpose.

Discussion

Mr. BEATON spoke of his 'nodding acquaintance' with this kind of cattle and expressed pleasure that Mr. Ferguson had been able to study their behaviour. He pointed out that the term 'Muturu' was an omnibus term for the humpless Shorthorn cattle of that region. Some were undoubtedly indigenous to Nigeria. The Falani invasion into Nigeria drove Nigerian peasants and their Muturu cattle into the more remote parts of the country; heavily treed areas, offering shade to the animals, were particularly attractive to them. The cattle are now mainly concentrated around areas of lagoons and swamps and high forest regions inland. They could now be taken as a pure breed well worth further study. The improved husbandry which was evidently being introduced would undoubtedly go a long way in increasing their numbers.

Mr. BROWNLEE congratulated Mr. Ferguson, and considered that this paper, being the first presented to the Society for Veterinary Ethology, was an admirable introduction to the study, because it introduced so many different aspects of animal behaviour. He wished to raise two points. Firstly, the matter of cattle lying on the bare ground. He observed that cattle in this country would lie on bare ground in preference to lying on pasture. Cattle do not like to lie down on a wet surface.

Mr. FERGUSON did not consider that the pasture in the dry months of the year could be considered damp.

Mr. BROWNLEE's second point was the small stature of these cattle, which possibly allowed them to lose more heat than would be the case in larger animals, but he wondered why they had not performed better in the Iberian Heat Tolerance Test.

Mr. FERGUSON pointed out that the animals had a very good tolerance to heat, but not to direct solar radiation. High ambient temperature did not worry them a great deal. Given solar radiation as an additional component to the heat load, they then seemed to gain more heat than they dissipated.

Mr. SWANNEY wondered about the connection between small stature in this case and in Shetland stock, for example.

Mr. FERGUSON pointed out that reduction in stature could be an adaptation to factors other than climate - for example, nutrition.

THE PHYSIOLOGICAL BASIS OF THE HUNGER DRIVE

B.R. Howard

Synopsis.

If one accepts the data presented by Maynard and Loosli ('Animal Nutrition' - IVth Ed.) then, on a total body basis, a 1000 lb steer consists of 26% fat. This represents a total energy of over a million K cals, or enough energy to last the animal for 75 days. It is true, of course, that much of this fat is not available for utilisation in energy balance processes, but even a very conservative estimate would admit that this represents sufficient energy to supply the animal's needs for a month. There is evidently no need for a day by day energy balance, although on a long term basis it is apparent that the body-weight of adult animals remains sensibly constant. This requires the existence of some control or regulating process, which could act on intake, output or both of these.

In the adult animal, energy output consists of basal and non-basal components, the latter including factors such as physical activity and the maintenance of body temperature. Although theoretically the non-basal energy requirements could be expected to be controlled by the animal's circumstances (and indeed, it is true that in severe deficiency of energy intake, expenditure is cut down), there is no evidence that this occurs normally, nor that excessive intake is accompanied by greater energy expenditure. There is some variation between animals in the efficiency of absorption from the digestive tract, but under normal conditions this is insufficient to account for differences in intake. In conclusion then, there seems to be no regulation of energy balance at the output level.

One is forced to the conclusion that regulation is applied at the intake stage, and there is much evidence that this is so. Even non-cellular animals show increased motility after a period of deprivation, whereas activity falls after feeding. Rats fed on a diet which has been diluted up to 75% with 'metabolically inert' material such as cellulose and agar will increase the food intake sufficiently to maintain an energy input similar to that on a normal diet. Adulteration of the food above 75% does not cause intake to rise further; it seems that the capacity of the gastro-intestinal tract is a limiting factor here.

At the beginning of this century three principal theories were advanced to explain the mechanism of regulation. About the middle of the 16th century, Haller had proposed that various organs of the body, principally the stomach, indicated food requirements to the animal, whereas early in the following century Magendie had argued that the drive originated in the central nervous system. A third theory placed emphasis on the whole body rather than any particular part of it.

When Cannon and Washburn (1912), and later Carlson (1916) demonstrated the temporal association of hunger contractions with starvation, the theory advanced by Haller gained much ground, in spite of the observation that gastrectomy, or denervation of the digestive tract does not markedly alter food intake. More recently Paintal (1954), has demonstrated the existence of receptors which are sensitive to distension of the stomach and which could therefore modify food intake.

About 1900, evidence was beginning to accumulate that pathological lesions in the region of the hypothalamus led to hyperphagia and obesity. At first, it was assumed that the effect depended on damage to the pituitary, but closer examination revealed that the only region consistently damaged in people showing this syndrome was the paramedian nucleus. Early attempts to reproduce the condition by making experimental lesions in this part of the brain stem in animals proved unsuccessful, but with introduction of the Horsley-Clarke apparatus much more precise destruction was possible, and it was confirmed that destruction of the paramedian nucleus caused a hyperphagia which persisted for a few weeks; following this, appetite dropped toward normal, although the body weight remained at its new, higher level. During the period of hyperphagia, it has been noted that rats take food at normal intervals, although greater meals are taken on each occasion.

Lesions just lateral to this nucleus cause a persistent hypophagia, or aphagia, leading to death. However, if animals are force-fed for a period, it is noted that more normal food-intake may be resumed.

Electrical stimulation of the paramedian nucleus on a chronic basis causes a slight drop in food intake and it significantly reduces the work which rats are prepared to do to obtain food. Olds has shown that if rats are permitted to electrically stimulate their own 'satiety centre' by way of chronically implanted electrodes and the usual 'bar' arrangement, they do so much more frequently when deprived of food than when fed adequately. Electrical stimulation of the lateral parts of the hypthalamus in conscious animals causes an immediate interest in food. Because the effects of damage to both 'feeding' and 'satiety' centres are only temporary, it does appear that other parts of the central nervous system may be involved in the regulation of food intake. Larsson, for example, has demonstrated that stimulation of the dorsal part of the medulla oblongata of goats may lead to feeding and rumination. Destruction of the frontal and temporal lobes of the cerebrum is followed by modifications in appetite and food intake, although it seems likely that discriminatory behaviour is primarily affected in such cases. In any case, it is found that totally decerebrate cats are still capable of demonstrating quite complex patterns of feeding behaviour, including recognition, discrimination and acceptance or rejection of food; following feeding, such animals may even purr, perhaps suggesting the integrity of 'emotions' associated with satiety.

The evidence suggests that the centres concerned with hunger determine the requirements of the body (by a mechanism which is not yet established) and activate a drive appropriate to these. Short-term factors including environmental temperature, exercise status and general 'emotional' influences can cause rapid but non-quantitative modifications of the hunger drive. Attempts have also been made to correlate the desire for food with fluctuations in the level of blood glucose and while there is not an absolute correlation the two often appear to be related. Thus, the intravenous infusion of glucose saline appears to increase electrical activity recorded from the 'satiety centre', whereas falls in blood glucose are often associated with increased activity in the 'feeding centre' and a simultaneous reduction in that recorded from the 'satiety centre'. Following the intravenous admininstration of gold thio-glucose to rats, toxic changes appear in cells of the 'satiety centre', and hyperphagia may follow. It is clear, therefore, that this part of the brain could be in a position to detect levels of circulating glucose, and it would be possible to use this information to provide an appropriate 'hunger drive'. Gastric hunger contractions which have been induced in dogs by witholding food, can be suppressed by intravenous administration of glucose. Behavioural activity associated with hunger becomes much less pronounced at the same time.

In conclusion, then, it seems that the hunger drive is derived largely from opposing 'hunger' and 'satiety' centres in the hypothalamus, although these may be influenced, and may influence, other parts of the brain. The overall result is that over short periods of time, body weight may show appreciable variation, but on a long-term basis only minimal fluctuations occur. An excellent review of the literature in this field is provided by Bal K. Anand, (Physiol. Rev., 1961, 41, p. 677)

Discussion

Mr. EWBANK asked whether the stimulus of gut distension could be communicated up to the hypothalamus.

Mr. HOWARD agreed that this was a theory that was held, but he pointed out that when large parts of the gut were removed, hunger could still be evident. For example, the whole of the stomach could be removed, and hunger could still be shown. He agreed that distension could be a factor, a minor one, in hunger and satiety.

Dr. BARDEN asked whether an animal with a lesion in the satiety centre increasing its hunger so that it gained in weight and stabilized at this new weight, would have a similar adjustment in its blood glucose.

Mr. HOWARD stated that this was something which had not really been studied to any extent, but that there was a little evidence that it might be so.

SOME ASPECTS OF BEHAVIOUR IN THE PRODUCTION AND TRAINING OF GUIDE DOGS

D.R. Lane

Synopsis

Production

Dogs suitable for training by the Guide Dogs for the Blind Association (G.D.B.A.) are obtained from one of two sources.

Some adult dogs are brought in on approval and, after testing, a few are found suitable for training. The majority of dogs are obtained through a puppy-walking scheme, in which puppies are obtained when only six or seven weeks old. Some puppies are G.D.B.A. bred, and it would appear that there are hereditary factors which make puppies resulting from certain matings more likely to qualify as trained guide dogs than puppies chosen at random and placed in the puppy walk scheme.

The early socialization of puppies is considered of great importance in the production of dogs that will train well when adult. The puppies are placed in homes as soon after six weeks as possible. This process of socializing puppies in private houses gives the animal a wide experience of adults, children and pets as physical contacts, whilst social contacts with strangers' pets outside the house are made as soon as possible. Puppy-walkers are instructed to carry young puppies in their arms in the street and to put them down for short walks when only 7 to 8 weeks old. This is in contrast to the current veterinary advice to pet-owners that the puppy should be isolated in the home until 14 weeks old, whilst undergoing immunisation against distemper.

Pfaffenburger & Scott (1959) kept puppies in kennels until 12 weeks or older; they reported that the highest rate of failures in guide dog training occured in the group that were kept in kennels after they were 14 weeks old. A refusal to "take responsibility" was reported in this group when taken for training and it appeared that this was primarily the result of the long retention in kennels before being placed in homes.

The puppy-walking scheme is supervised by the G.D.B.A. staff, but no more than house-training and walking on the lead is required at this stage.

Training

Bitches are mainly used for training as guide dogs by the G.D.B.A. in Britain; the Labrador and Alsatian are the two most commonly used breeds. Puppies are brought into one of the training centres when 12 or 14 months old, and after a few weeks of conditioning to kennel life they are taken out for walks by a girl training-assistant. At this stage, dogs are trained on a choke chain and leather leash with frequent use of the trainer's voice to concentrate the dog's attention on its handler.

After 3 to 4 weeks, the dog should be able to walk in the correct position and to sit or stand straight at every pavement curb. Dogs are trained to walk forward when a signal with the right arm and a vocal command are given.

Fox (1965) in "Canine Behaviour", states that most training techniques apply Pavlovian conditioning. An unconditional stimulus such as a jerk with the choke chain is preceded by the command "sit". After repeating these signals, an association between the conditional and unconditional stimuli occurs so that after the conditioning stimulus (voice), the dog anticipates the unconditional stimulus. Eventually there is no need for the unconditional stimulus and the dog will sit on the word of command alone. A further conditional stimulus is added to this when the dog sits as soon as it reaches a pavement edge.

Bitches are spayed, followed by a fortnight in a hospital kennel, before being handed over to a fully-qualified trainer. Only rarely are changes in temperament seen after ovarohysterectomy: one bitch showed marked "scraping" behaviour after spaying, but the intensity of scraping with all four feet waned after a few weeks in training, eventually disappearing.

An experienced trainer has the dog for the last three months or longer for training in traffic, until it reaches a standard where it can go into a class with a blind student. After a few weeks with this trainer the dog is put into a guide dog harness for the first time, but the choke chain is always used to provide an extra aid.

Traffic training takes place in quiet streets at first, and the dog is taught to stop on the approach of all moving vehicles. It is taught to move forward when the trainer indicates with his voice and arm, but only if the street is safe to cross.

The dog completes the first stage of its training in a class with the blind student who will eventually own the dog. These classes usually last four weeks, and after the dog goes to the home of the new owner its work is supervised by the G.D.B.A.

It is at this stage that a remarkable bond is built up between dog and owner. Once the route has been learnt the dog can often negotiate a complicated journey to the place of work, or to bank or post office, on a word of command. The most skilled guide dogs can follow a route involving bus changes, say to a hospital, even if the journey has been made only once before with help from sighted persons. Some guide dogs will cross a city the size of Birmingham, using pedestrian subways when available to avoid crossing busy roads.

References:

Pfaffenburger C.J., Scott J.P., (1959) J. Genet. Psychol. 95
Fox M. 149. "Canine Behaviour" p. 118 1965 - Thomas, Illinois, U.S.A.

Discussion

Mr. BAILLIE congratulated Mr. Lane on the presentation of the subject. He spoke of the Guide Dog Training Scheme in Scotland, and reported that his Centre had taken in 89 dogs. Of these, 14 had so far qualified as guide dogs and 33 have been rejected before acceptance for training, on the grounds of unsuitable temperament. Almost all the remaining dogs were in the 'pipe-line' of training. In his scheme volunteers were required who would provide full domestication up to a year old. It was the policy for the time being to acquire apparently suitable pups, freshly weaned at 5,6 or 7 weeks of age. He saw the need to eliminate this method of utilising pups at random on account of the high rejection rate to which he had referred. Occasionally older dogs could show sudden deterioration in behaviour, which he was obliged to describe as a 'mental breakdown' for the lack of a more specific term.

Mr. EWBANK questioned the speaker on whether some strains of Labradors supplied more suitable stock than others, and whether the submissive posture which had been illustrated could be taken as evidence of the animal being particularly amenable to training.

Mr. LANE stated that there were very definitely some strains of Labrador whose progeny were particularly suitable for training as guide dogs. Bitches were not assessed on posture but entirely on their responses to handling by trainers. He considered that all dogs displayed the posture, but that it was more evident in dogs that had completed training successfully.

Mr. EAGLESOME inquired whether the hunger drive in Labradors was a disadvantage.

Mr. LANE replied that the overweight dog was undesirable and that although Alsatians were preferred, they could not get enough good Alsatians.

Mr. McCrea asked why Labradors were suitable and whether it was related to their training as gun-dogs.

Mr. LANE replied that this was probably the case and possibly related to their more placid temperament, but also stated that Alsatians, which will take training, make very good guide dogs.

In reply to a query from Mr. EAGLESOME, who asked whether the best policy would not be to breed from guide dogs, Mr. LANE said that the majority of their guide dogs were spayed or castrated, and considered that a bitch in oestrus was unreliable. For this reason bitches in oestrus were not worked for a week or more. He also considered that there was very little change in the temperament of a spayed or castrated dog, and that all their dogs were, in fact, castrated.

Mr. EWBANK asked if castration was done to cut down the sex drive.

Mr. Lane replied that this was the intention.

Dr IMLAH asked whether the socialization during the first few weeks of life was most important as far as further training was concerned. Mr. LANE replied that he thought the critical time was five to seven weeks. Dr. IMLAH said that if puppies were left running wild for the first eight weeks there was very little one could do with them. Mr. Lane replied that this was definitely so and that this was also the reason for pups being accepted at six weeks instead of eight weeks. He noticed that in practice he encountered a lot of "ill-behaved" dogs, which obviously had been in kennels until three or four months of age, and that socialization had not taken place.

Dr. BARDEN remarked that shepherds seldom attempted to teach their dogs anything until they were a year or eighteen months old. Mr. LANE replied that they must socialize the dogs at some stage. Mr. MARR asked how long the training period usually took. Mr. LANE replied that the period of training was usually about three months. Mr. BAILLIE said that he had encountered a Boxer, an unusual breed for this work, which required five months for its training.

THE BEHAVIOUR OF BOARS IN RELATION TO THEIR REPRODUCTIVE EFFICIENCY

H.C.B. Reed

Synopsis

The efficiency of a pig artificial insemination service depends very much on the sexual behaviour of the boars. The assessment of reproductive performance in the boar can be made in the following way:-

1. Ease with which a boar can be trained for artificial insemination.
2. Interval between introduction to dummy and ejaculation.
3. Total number of spermatozoa produced per ejaculate.
4. Frequency of number of ejaculations.

The first two points are of vital importance and have raised serious problems in the running of an artificial insemination centre, and they form the subject matter of this contribution.

Procedure for Boar Semen Collection

The boar is brought up to the collection shed in which is placed a dummy sow; it is not necessary to use a live sow. A fully trained boar will, after a short period of time, mount the dummy sow without any further assistance. The boar serves into an artificial vagina, similar to that used in bull collection, except that it has a metal spiral attached to the end. The tip of the penis locks into the spiral, after which ejaculation commences and the semen is collected in a vacuum flask.

In an attempt to make an objective assessment of the behaviour of boars in artificial insemination training, a number of details are recorded each time the boar is introduced to the dummy sow. These include details of the "sow substitute", site of collection, aids to collection, collection method employed, personnel present, and any general remarks.

Observations

Sixteen out of eighteen Large White boars have been successfully trained (89% success rate); eight out of twelve Landrace boars have been trained with success. Of the sixteen Large White boars successfully trained, fourteen worked at the first introduction to the dummy sow. A further boar worked at the second introduction and the remaining boar at the fifth. Large White boars have, therefore, not presented any great problem in training. In contrast, the Landrace boars have exhibited low sexual drive. Only one of the eight boars that were successfully trained worked at the first introduction to the dummy sow. Some of the others took as long as ten weeks before they would serve.

Age seems to be an important factor in determining whether a boar can be trained for use in artificial insemination. Three old progeny-tested boars were purchased, but none was successfully trained, so this policy was abandoned and only young boars are now purchased.

From the two years' experience gained there appears to be no single common factor which is responsible for inducing a boar to mount the dummy and commence ejaculation. Each boar that was successfully trained seemed to react best to different stimuli. A number of factors, however, are important, and these are listed.

1. Management of Boars - The boars should be handled quietly but firmly, with emphasis on the establishment of a set routine. It is preferable to introudce the boars to the dummy sow for a short period each day rather than for a longer period at wider or irregular intervals. Young boars will sometimes work successfully if they are allowed to see a trained boar serve the dummy sow.

2. Personnel - There is little doubt that boars become accustomed to certain personnel, and that a change in their attendant can influence the boar's ability to work satisfactorily. It has been found in isolated cases that the boar will only mount the dummy sow if the operators vacate the collection shed. The occasional boar has become aggressive when brought into the collection shed, and, in these circumstances, it has been found necessary for the operators' personal safety, to leave the collection shed until the boar has mounted the dummy sow.

3. Teaser Sow - All centres operating a pig artificial insemination service are agreed that a dummy sow is more suitable as a teaser than a live sow. Although the dummy sow does not have to resemble the shape of the live animal, certain features are important. It should be adjustable for height so that the dummy sow can be used successfully for both young Landrace boars and adult Large White boars. Boars appear to be sensitive to a change in height of the dummy sow; it is desireable, therefore, that a constant height should be maintained for each individual boar. The dummy needs to be strongly built with a good canvas cover so that it does not readily become torn. A damaged dummy will often deter a boar from mounting, for, if any loose ends can be found hanging, the boar will tend to chew and play with them. Olfactory stimuli appear to play a large part in the sexual stimulation of the boar. A boar is much more likely to show interest in the dummy if it is sprinkled with urine from an oestrous gilt or alternatively semen from another boar. This is probably the most important single factor in inducing a boar to mount the dummy.

In difficult cases an ovariectomised gilt, treated with stilboestrol dipropionate, has been used in place of a dummy sow. Some boars have been successfully trained by this method, but semen collection is not as hygienic.

4. Method of Semen Collection - There are two basic methods of collecting boar semen. It can be performed with a conventional artificial vagina as previously described or by the hand method using a cone or glove. The first method is the more preferable.

When a trained boar is in continual use his libido varies and can best be assessed by the time between introduction to the dummy and ejaculation. A considerable difference in libido has been found in different breeds. The Large Whites have averaged 7.0 minutes (based on 201 observations of six boars), and the Landrace have averaged 9.7 minutes (based on 140 observations of six boars). The quickest boars averaged only two to three minutes. It has also been noticed that the most difficult boars to train are the slowest to mount when in regular use.

Conclusion

It has been found amongst the boars that very wide behaviour variations occur in relation to reproductive performance. In many instances it is only through constant observation and patient experimentation of timing and method that individual characteristics are revealed. These individual needs can then be incorporated into a routine designed to obtain the maximum performance from each boar.

Discussion

Mr. ROWNTREE asked whether aggressive boars worked more readily than timid boars. His own subjective impression of this, based on some experience of pig artificial insemination, was that if a timid boar could be 'angered' its reaction time would be reduced.

Mr. REED replied that he had not found this to be so. Aggressive boars were not necessarily the best workers. He agreed, however, that sometimes 'chivvying' did help to get boars to work. Some boars, when aroused in the collection shed, would rush round it and in the course of doing so were likely to encounter the dummy sow and then mount it.

Mr. McCREA asked what influence staff had on the behaviour of these boars, since it would be virtually impossible to standardise the conduct of staff during collections from boars.

Mr. REED replied that during the three month period of training for these boars collections were taken mainly by one individual, but he agreed that variations could occure in the ways that boars were handled. For this purpose they entered, on standardised forms, a record of circumstances during each collection so that variations in methods could be checked.

Mr. MARR suggested that oestrous scent might improve boar responses and asked whether any work had been done on this.

Mr. REED replied that although his centre had not done any of this work, some had been done elsewhere. In Cambridge investigations had been made into the composition of boars' secretions. Less has been done on the secretions of the sow. The reason for this was that the greater problem was the determination of oestrus and some work had been concerned with the effect of the male secretions on the manifestation of heat in the female.

Dr. IMLAH speculated on the possibility that the lesser willingness of the Landrace to work, compared with the Large White, might be related to some morphological difference.

Mr. REED thought that this was an interesting point and remarked that the Piétrain breed with its unusual sloping shape of hind quarters was often found to be unable to mate naturally with some other breeds. He added that boars which took the longest time to train took the longest time to serve after training was completed. Such boars often took twenty to thirty minutes to mount. He questioned the advisability of perservering with such boars as the condition could be an inherited one which, if transmitted, might offset the merits of other genetic factors such as good food conversion.

Mr. FERGUSON asked whether the reluctance in some old boars to serve was due to their prior experience of mating under natural conditions or due to an age factor. For instance, did service behaviour deteriorate after training as boars became older?

Mr. REED said he considered it true to say that boars became more difficult to collect from as they became older. They appeared to become more "selective" in their breeding behaviour, with age. It was also true that a mature boar with considerable experience in natural mating would be so accustomed to natural conditions that he would be likely to be difficult to train for artificial insemination. He was of the opinion that the factors of both age and prior experience contributed to slow service.

Mr. SWANNEY described a parallel state of affairs in beef bulls, in which it was common to find reduced sex drive. Beef bulls brought to an artificial insemination centre late in life were often found to be extraordinarily "selective", particularly if they have been free-ranging beforehand. In the normal pre-mating behaviour, the bull places his chin on the female's hindquarters, and some beef bulls will immediately cease to show attempts at mounting if the female makes the slightest movement at this point. He added that he could well imagine a similar condition occuring on aged boars which had become heavy and showed effort in mounting.

Mr. REED fully agreed and stated that it had been repeatedly observed that overweight animals suffered a loss of libido. He had found it vital to limit the food fed to working boars, to keep them fit. But he pointed out that, with increasing age, many other factors could contribute to unsatisfactory service behaviour arthritis, for example. Returning to the point raised earlier on aggression, he emphasised that boars undoubtedly become much more aggressive with age.