

Animal Welfare Related to Intensification*

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Introduction

May I briefly say that I am sensible of the honor done to me by the Congress committee in asking me to stand in for so distinguished an animal ethologist and conservationist as Sir Frank Fraser Darling. It is unlikely that I can present the wide-ranging view that is his. I will speak out of my own experience.

The subject chosen by your committee for this Plenary Session is, to my mind, of the greatest importance. I see that you are proposing to confront, during the forthcoming sessions, many of the factors that bear upon the problems now besetting intensive cattle production. This Congress is in a very real sense consistently concerned with animal welfare. Several papers deal with particular veterinary problems of intensive systems of management. There are those concerned with the infectious and parasitic diseases of calves, followed by the problem of getting nutrition right and the handling and housing of animals when they have to be indoors.

When disease is prevented, when nutrition and the animal's environment according to our present knowledge is optimal, then we can properly claim that we have attended to the welfare of each animal in our care. As veterinarians, as professional experts in animal production, our aim simply expressed is the welfare of animals.

I hope those of us who are teachers, and there must be few among us who are not to some degree in touch with students, will see our responsibility to transmit the wider view. These are times when all must acknowledge the supreme importance that most young people feel to express their individuality, to discard the dead hand of tradition and "to do their own thing." Some of the ideologists of our day would, I suspect, be startled

to see how groups of young men and women are still willing on an appropriate occasion to stand together and make a common solemn affirmation. Some of our visitors may not know that in this country every new veterinary graduate must promise to: "Pursue the work of my profession with uprightness of conduct and that my constant endeavor will be to ensure the welfare of animals committed to my care." before he may become a Member of the Royal College of Veterinary Surgeons and so practice veterinary medicine and surgery.

Changing Patterns of Intensivism

I have a deep suspicion about attempting definitions as a useful methodology, so am going to assume that you understand well enough what is meant by the title of this address. Intensification of animal husbandry is no new phenomenon. From the beginning of domestication, some of the species have been kept under what we call intensive methods. In the past, geese and ducks and pigs and in the northern parts of this country and of other European countries dairy cattle as well have been kept in pretty crowded conditions, tied up indoors for most of the year. Certainly they were in small numbers and were given close attention by stockmen of varying skills. The difference today is that we have greatly increased the scale on which we house our animals or crowd them on to our diminishing land space. Continually we try new techniques of housing, of feeding and of ways that one man can increase the number of animals under his care.

Incidentally, I have been intrigued to see that our Russian colleagues frankly use the description "industrial animal husbandry" for this development. Citizens of this country will perhaps remember the hue and cry that greeted a book published in 1964 purporting to describe intensive

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husbandry systems, and have the title “Animal Machines.” It provoked so great a stirring of the public conscience that the government was moved to appoint a committee of animal scientists and officials to consider the whole question of animal welfare. I will have to refer again to this starting point a little later.

What is not in doubt is the fact that there has been a phenomenal growth of intensive husbandry systems in all developed countries during the past decade. Economic pressures have been an important factor in this move through the erosion of profit margins partly as a result of increased labor costs. Shortage of skilled labor and its cost appears to be likely to increase in many countries. There is associated a shortage of land within convenient reach of the great conurbations leading to greatly inflated land values operating in some countries such as Great Britain. Another and more general reason for the growth of intensivism is the application of technology in terms of the farmer’s own capacity to deal with mechanical devices and the increased availability of expert knowledge about building, mechanization, rapid advances in animal nutrition and disease control. Additional reasons are associated with the availability of capital for investment in the new buildings and improved strains of livestock. There is, too, mounting pressure for a uniform product through the inexorable extension of supermarkets with their demand for pre-packaging and evenness of quality, with appearance and tenderness rather than maturity and taste as determining factors. Above all, there has been the attraction of the economies of scale which are said to flow from increased size of enterprise.

This has all come so quickly that we are still too frequently at the stage of empirical fumbling in terms of knowing what are many of the important side effects of this intensification of livestock husbandry, this great wave of “going big” with calf-rearing, with dairy cows and with the fattening of beef animals. For the past 10 years we have lurched from one system to another with our cattle, from covered straw yards to cow cubicles to kennels; from milking cows in herringbone bails, back to parlor milking or on to the milking roundabout. We have gone from cereal beef to straw and urea-fed animals, grass silage, maize silage and artificially dried grass, all are being used to produce our beef. And every increase in size of an intensive unit adds to the problems of dung and urine disposal, of animal comfort and contentment and of disease control and prevention.

Concern With Animal Welfare

The steady withdrawal of cattle from the fields into the large stark asbestos and metal buildings that steadily extend on the farms has provoked increasing concern amongst a vocal public about these systems of intensive animal production. The increasing pressure in western countries for protection of animals kept under these conditions has to be reckoned with.

It is a curious thing, but nevertheless true, that the public are not moved to censure the careless farmer in the uplands when winter storms overtake numbers of his sheep and cattle and they die in the snow, or lack of feed to his ewes causes much preventable loss at lambing. Miserable, parasite-ridden calves can eke out a dreary existence in rain-soaked fields without causing any reaction amongst the animal-loving public, so long as they are outside and visible. As soon as large numbers of animals are kept out-of-sight indoors, the worst is feared, and the protests from the welfare societies are quickly made.

What justification is there for this concern? Is it a fact that intensification is synonymous with cruelty or at least frustration of the animal’s natural, innate drives and desires?

Intensive Cattle Units

It is time that we considered particularities, to survey, however incompletely, our state of knowledge of animal reaction to the conditions we impose in our intensive cattle units. You will notice that I have deliberately limited myself to the discussion of intensive cattle units, although there is more information about intensive broiler and laying hens and pig units than of cattle kept in large numbers. It may limit my theme, but so too is my time. Welfare is concerned with the health and contentment of an animal.

Welfare is the concern of the animal behaviorist insofar as he seeks to understand the reactions of an animal or group to the conditions imposed by a production system. I think we can easily agree upon the basic facts of cattle ethology.

Cattle, like sheep and goats, are herd animals and because of their evolution, the development of the maternal bond of the calf is quickly established. Under wild conditions, the herbivora have to be, as Kilgour (1969) puts it, “a get up and go” species. The calf will suckle the dam within a short time of birth and as Selman’s (1969) work has clearly shown, the degree of protection against pathogens in its environment through the

absorption of immunoglobulins from its dam's colostrum depends upon being able to suckle for a sufficient length of time during the first six hours after birth to obtain the quantity of colostrum that is optimal for this protection, as well as its nutrition. If the calf is taken from its dam at birth or shortly afterwards, as we so frequently do, and given the small quantity of colostrum that has been thought to be sufficient, its degree of protection will be reduced, a stress factor to be added to the trauma of a changed environment.

Calves are reared either as dairy replacements, or for beef - apart, that is, for the relatively small number used to produce white veal, a restricted and specialized development to which I will refer shortly. If they are being reared for beef, they may have been taken from their dams soon after birth to be reared indoors on a milk replacer diet - usual when they are the male progeny of dairy cows often mated to a beef bull. Or, they may be left with their dams, the traditional system with pure beef breeds, to be raised on a more extensive system outside. In this country, the latter is known as the single suckler herd and is a feature of the upland areas.

The Suckler Herd

There has been a degree of intensification with the suckler herd by the incorporation of Friesian blood with the beef breeds. It has the result of increasing milk production and has led to the desirability of each cow rearing two or more calves rather than a single calf. This of course introduces a problem of mothering extra suckler calves. And it illustrates at once our extraordinary lack of knowledge of the various factors controlling the social bonds between cow and calf and the strength of the factors involved. We still fumble with primitive methods such as hooding cows to bamboozle them into accepting an extra calf or using oily fluids to confuse their sense of smell. Empirically we have found that they must be closely confined with any extra calf for several days if they are to accept them.

I may not be much overstating the situation when I say we know more about the factors involved with the mother-offspring situation of rats and mice, or even cockroaches and dolphins than we do with the common cow, upon whom western man depends more completely than upon any other domestic animal.

Studies in New Zealand (Kilgour, 1971) have shown that foster calves cannot be introduced until the fourth day if the development of a full

maternal response is desired. Furthermore, there is the fact that when the cows are released for grazing with other cows and their nurse calves, most of the cows permit stranger calves regularly to suckle them with of course the danger of cross-infection.

Indoor Rearing of Calves

But most calves reared for dairy replacements or for beef are kept inside and raised either in small groups or in individual pens. At once we are up against a welfare problem. Under extensive, outdoor conditions, groups of suckler calves will, throughout the day, graze and play together, satisfying a natural drive. When calves are kept together indoors, it is all but impossible to provide space to allow them to rush about after feeding. In the restricted space mostly provided there develop various undesirable habits such as navel sucking and excessive coat-licking. Certainly they are more liable to come affected with enteric and respiratory infections. The bigger the group of calves, the greater the difficulty in seeing that all are adequately fed and the faster the spread of any infection. We say that no more than five calves of similar weight, breed and sex should be kept together as a guess at a good system.

The size of rearing units is steadily increasing, with the calves coming from differing farms, inevitably carrying a greater variety of pathogenic organisms and the hazard to health that it infers. This, along with the need to economize in space, has led to the widespread adoption of individual calf pens, often with separation by a solid partition.

"White Veal" Production

For many years, the ultimate projection of this system has been that used by the producer of white veal. This implies the boxing of the calf within a few days of its birth and keeping it there until it is sold to the butcher at 12 or 13 weeks of age. Maximum growth rate is induced by continued liquid feeding of a high energy, high protein mixture, fortified with antibiotics and vitamins.

It is a system which those deeply concerned about animal welfare find hard to accept. It frankly denies the calf's innate drive for play, or at least free movement, since as it grows, it is impossible for it even to turn around in its narrow pen. The calf must be kept upon a slatted floor without bedding because eating roughage has to be prevented in order to maximize weight gains, apart from avoiding additional iron intake. Rumination does not occur. If ventilation, temperature, humidity and disease controls are satisfactory,

these animals make extremely high weight gains with very good efficiency of food utilization. May I say that in this type of production, with the calves kept in semi-darkness in a humid atmosphere without bedding in its latter days so restricted in its movements that it may not turn to groom itself, I say we have gone too far. To me it is a repugnant system. This I frankly admit is an ethical or aesthetic judgment, so far unsupported by objective measurements that might or might not show a stressful state in these veal calves.

Basic Requirements for Indoor Rearing of Calves

The vast majority of calves intended for beef are reared under a variety of conditions on milk replacers and are weaned from them at various ages between 3-6 weeks under most systems, being then often permitted to run together in small groups on high energy rations mainly based upon cereals and with varying quantities of roughage made available to them.

The welfare of calves reared either as dairy replacements or for beef, turns upon three matters: (1) The maintenance of a warm, well-ventilated environment. (2) A balanced diet in adequate quantities. (3) The control of disease.

I put them in that order since the first two contribute markedly to the incidence and the nature of the disease situation.

If you have been, as I have been for many years now, practically involved in the rearing of young calves on milk replacer diets, you will know how widely differing housing conditions can apparently be equally effective in permitting equally satisfactory rates of growth. Leaver and Yarrow (1969) and Swannack (1972) are two recent workers who have measured the response of calves in terms of growth rates to various current systems. What is important is to have recorded the effectiveness of any particular housing conditions over a succession of years, with varying seasonal conditions and batches of calves. So long as there can be a periodical emptying of the calf accommodation and a thorough cleaning and disinfection, then the only important factors to safeguard are a minimum warmth with very adequate ventilation and a complete absence of draughts leading to temperature fluctuations.

Many experiments in many countries over recent years have similarly shown that the method of feeding the calves kept wholly inside can vary widely in terms of whether a milk replacer is fed warm or cold, fed twice a day or once a day; indeed whether it is of high fat content or low fat

content. There are recurring problems of nutrition, especially in terms of keeping costs down and quality of proteins up. There are problems of when to wean and the nature of the concentrate mixture and the form in which it is fed. Should it be in loose form or pelleted or as cobs? These are details with which we are not now concerned. With the spring-born calf, the sooner it can be turned out to nutritious pasture the better.

Adult Dairy Cows

If we turn now to the problems of welfare with adult dairy cows and intensively housed fattening beef cattle, we are confronted with different problems.

Economic considerations, mainly in terms of labor costs, in dealing with feeding and the disposal of effluent, seem to have delayed if not banished the imposition of zero grazing for most of Europe's dairy cows. A few years ago, there was much publicity given to cotels, sometimes cooperative ventures where neighboring producers were to combine in large communal housing and milking for their cows.

Whether it is throughout the year, or only during the bad weather of winter months, welfare considerations must include the prevention of bullying by providing sufficient feeding space, "loafing" or ruminating space and a dry bed.

As size of enterprise rises, self-feeding silage tends to give way to manger feeding, increasingly accomplished by some mechanized process. Cow kennels are a cheaper form of cubicle, but the individual sleeping space allows the animal some respite from communal restlessness and certainly keeps her cleaner and freer from udder damage.

Prevention of metabolic disorders depends upon dietary adequacy; while the widely undertaken Reading routine for mastitis control will help to prevent the vast annual waste from this scourge.

If an optimal level of production is to be attained and held by any herd, and if conception rates and the calving index are to be acceptable, there must be careful attention to the amount of labor and its skill in relation to the cows that are in the unit. Many a farmer, during the last few years, in his anxiety to increase his herd size, may have been able to provide adequately in terms of buildings and equipment but has failed to relate his increased cow numbers to the capacity of the stockman to give the careful attention that is so necessary with the modern dairy cow. This is when the shy breeders and the shy feeders suffer.

Cattle Fattening for Beef

Whether it is the beast continuously housed and fed from 12 weeks of age upon a minimum roughage, high-cereal diet or the animal being fed more cheaply that spends two winters indoors and the summer at pasture, there are important welfare questions to be answered when they are inside.

1. Is the house draught-free but with plenty of ventilation?
2. What size are the groups?
3. What space allowance is made for each animal?
4. What flooring is used? Is it slats and is straw bedding used? Related to that of course is the system of drainage.
5. Is the diet balanced as well as sufficient in quantity and do the water points work?
6. Is there an isolation pen and a crush?

It is not enough to have some of these questions properly answered, they must all be correct if unnecessary suffering is to be avoided.

The Legislative Framework for Animal Welfare in the U.K.

My purpose up to this point has been to bring together the matters of common concern that we all share over the welfare of cattle from calves to cows and beef. It would be splendid if all our farmers understood the importance of the points I have mentioned; or at least that we had sufficient well-trained, alert veterinarians within the government and in private practice going on to the farms to give the right advice—with owners and managers willing to accept it. This is not the situation. May I therefore tell you what the government of this country has done to try to prevent unnecessary suffering amongst our cattle.

For more than a century there have been many attempts to pass laws that would safeguard the well-being of farm livestock. Many of them were unsuccessful. We have had a valuable piece of legislation called the Animal Protection Act of 1911, whose purpose was to prevent the worst forms of cruelty to all animals. And this it has been fairly well able to do because of an alert public, willing to lay complaints when they witnessed horses, dogs and cats being ill-used, often with the help of such animal welfare societies as the Royal Society for the Prevention of Cruelty to Animals. The difficulty with this law was that cruelty had to be witnessed. It gave no power to officials such as government veterinarians to enter farms and inspect the way that stock were being kept.

Partly as a result of the furor that followed the publication of that book I earlier referred to, "Animal Machines," the government appointed an Interdepartmental Committee of Enquiry in 1964 told "to examine the conditions in which livestock are kept under systems of intensive husbandry and to advise whether standards ought to be set in the interests of their welfare, and if so what they should be." It reported in the following year, in the meantime becoming known as the Brambell Committee, after its Chairman Professor Rogers Brambell, a distinguished zoologist. From that report came further legislation of the greatest importance to the welfare of farm animals. But not until 1968, for the government was very cautious in this matter.

Apart from the fact that it happens to be, unlike many other reports of official committees, a very readable one, the document has continued to have a good deal of relevance to our theme today for several quite different reasons.

It was the first public inquiry into intensive husbandry methods. It surveyed the methods then being used with different classes of farm animals, and went on to show how serious was the absence of scientific data in terms of being able to measure the degree of stress to which different species were submitted in these new systems. It also devoted a chapter of its report to the problem of stockmanship, recognizing that at the very heart of this matter is the skill and devotion of the animal attendant. It made a very important statement on what should be the minimum objectives in any intensive farm animal husbandry system. Finally, it proposed two things: firstly that there should be a Farm Animal Welfare Advisory Committee to continue surveillance of this field, able on a continuing basis to advise the Minister of Agriculture. Secondly, that there was need for specific legislation, a new Act of Parliament, to make it an offense to cause suffering to farm livestock.

By the time the report was issued in 1965, there had been a change of government and a large amount of legislation was before Parliament. This, amongst other reasons, was why there was a considerable delay before the setting-up of the Farm Animal Welfare Advisory Committee, and a further delay before the Act was passed by Parliament which gives protection to farm animals. It is known as the Agriculture (Miscellaneous Provisions) Act of 1968. This, in its first provision, states that, "Any person who causes unnecessary pain or unnecessary distress to any

livestock for the time being situated on agricultural land and under his control or permits any such livestock to suffer any such pain or distress of which he knows or may reasonably be expected to know shall be guilty of an offense under this section.”

There are two ways in which farmers are to be encouraged not to be liable to any charge under the Act. The first of these is by the making of regulations which become binding upon a farmer and spell out precisely how he can house his stock or feed them and could be a very precise series of requirements. So far, no regulations have been made.

The other method of helping farmers not to fall foul of this law is the publishing of Codes of Practice for each of the farm animals. Although these do not have the force of law, they are a means of directing farmers' attention to the important points of housing, feeding and management which should avoid suffering in its most obvious forms.

It has been the task of the Farm Animal Welfare Advisory Committee to produce these Codes of Practice and the first of them were published and approved in 1969.

Following a good deal of public agitation, the government ordered an inquiry into the operations of the Act by the Government Veterinary Service in 1970. With publication of their report in August of that year, the Farm Animal Welfare Advisory Committee revised the codes that had so far been published, which covered cattle, pigs, domestic fowls and turkeys. There were a number of improvements in this second edition of the codes.

The fact that they are merely recommendations made to farmers is emphasized by the curiously clumsy title given to each of them. Here is the current code for cattle, Code No. 1 and its title runs: “The Codes of Recommendations for the Welfare of Livestock.”

It contains 35 paragraphs, each of them in itself containing good advice about such things as housing, ventilation, temperature, lighting, general management, the provision of food and water and a section on space allowances.

The criticism that has been leveled at all the codes, including the cattle code, is that there is an unwillingness shown in each of them to give specific advice even when this is generally agreed by competent authorities. Much of what appears in each Code tends to fall into the category of

“teaching your grandmother to suck eggs.” Perhaps this was inevitable, bearing in mind the fact that they had to satisfy the drafting officials of a government department. Many farmers, for instance, would welcome a statement on the space allowance that should be given to calves and older cattle kept indoors all the time, yet there are only generalities with the use of words like “seeking appropriate advice” or “sufficient trough space or feeding points to avoid undue competition for food.”

Although they do not form a part of the recommendations in the Codes as they are issued today, it is a fact that public pressure was able to induce the government to include as a preface before each of the codes a statement upon basic requirements for the welfare of livestock which are a paraphrase of the minimum welfare requirements which were formulated first in the Brambell Report. They embody what may be called the basic freedoms of an animal or bird under restraint.

These are: that there must be adequate readily available fresh water and nutritionally adequate food as is necessary for the animal in question; there must be the provision of adequate ventilation and a suitable environmental temperature; there should be adequate freedom of movement and ability for the animal to stretch its limbs; that the light is sufficient to allow inspection by stockmen or veterinarian; that there should be veterinary attention whenever there is any sign of sickness or injury; that there should be some emergency provision in the event of a breakdown of mechanical equipment; that flooring should neither harm nor cause undue strain and that there should be the avoidance of unnecessary mutilation.

The Basic Dilemma

We have in this country powerful legislation designed to prevent unnecessary suffering in farm livestock. While, as I have said, we do not in our codes of recommendations specify particular requirements of housing, feeding and general husbandry, we have to depend upon the judgment of those authorized to enter and inspect intensive husbandry units to say whether unnecessary suffering is being caused in a particular instance.

The problem that I pose to you today is this. Are there scientifically acceptable criteria to determine this fact? At the moment we have to say “No.” There is still altogether too little research proceeding to discover objective measures of stress in farm animals. Howard (1971) reported last year

that there has been since 1965 a reduction by over one half of the number of full papers published dealing with veterinary ethology appearing in the British scientific literature each year. Universities have difficulty in getting funds for this research and the A.R.C.'s Institutes have devoted little attention to this subject. It is difficult and expensive research but it needs to be pursued vigorously and urgently.

In the meantime we have to depend upon the good sense and judgment of farmers themselves, remembering that they are activated by the same abhorrence of causing unnecessary suffering as are other members of the public. One has the hope that even the more careless stockowners are operating in a community context in which there is this sharply increased public awareness of the dangers that can follow the housing of large numbers of livestock continuously.

It is easy to say that these waves of public concern, often provoked by extremist groups of opponents of intensive husbandry systems, are largely the result of lack of knowledge of how animals are actually kept in well-run units. Yet, if we are frank, should we not admit that the step from a tolerable regime to one that is intolerable is often a very short one indeed? It is hard to resist the economic pressure to reduce space allowances, to cut down the number of animal attendants and consequently the frequency of inspection that permits us to discover quickly the animal in difficulty or showing the first sign of illness. The dangers are always there. Our vigilance and aid should also be quickly available.

Perhaps there is comfort in the fact that when, in 1970, the veterinarians of the State Veterinary Service made 4,154 visits to intensive husbandry units and made some 1,751 reports on cattle and calves, there were only in the whole series covering all species, some 36 instances of unnecessary suffering found. In these instances the veterinarians gave advice and they were able to state that before their report was written this was being followed.

In one sense, in a formal sense, we could fairly say that we have achieved much during recent years towards safeguarding the welfare of the intensive animal units of the U.K. The legislative framework is there, certainly, and that is of importance.

It is good news that the Council of Europe meeting in Strasbourg is following its successful directive on the transport of animals with

preliminary work through an expert committee on intensive husbandry systems.

Perhaps as this country becomes a full member of the European Economic Community, other members will in time be willing to adopt a similar legislative framework. But laws are like old-fashioned forts, they have to be properly manned. Knowledgeable and humane farmers, advised by an informed veterinary service, are necessary to keep avoidable distress and illness at a minimum in the intensive husbandry units of the future.

Summary

The argument runs that only by intensive methods of husbandry can the rich nations produce the abundance of animal products that our society demands, at prices that most people can afford to pay. In other words, large intensive units are going to be with us during the foreseeable future. I accept this.

Applying the crude criteria of production efficiency, of growth rate, milk production, feed conversion and the rest, stock kept closely and continuously confined do not suffer unnecessarily. Metabolic measurements so far used confirm normality. All is well. The Farm Animal Welfare Advisory Committee published in September 1970 under what is called the scientific point of view a general approval of the state of affairs as they are in these units, basing this largely on the normality of protein metabolism, a vague phrase that covers vastly different physiological processes in fowl, pig and ruminant, where what we think of as normal values can be within a great range according to feeding system, breed and strain within breed.

The counter argument on ethical grounds points out that these systems mean a greater or lesser degree of frustration to confined animals, that since young animals in particular are "intelligent, playful and very much aware of their environment, they deserve more than just the barest existence." Since they have limbs they have the right to use them - all should at least have space to turn around and lie down. That having eyes gives them the right to see.

We can agree, I hope, that we must have more sensitive means to measure stress in each species, including cattle of all ages.

Then it becomes a matter of judgment - of how far we are moved by ethical and aesthetic considerations.

Most veterinarians, I hope, would give the animal the benefit of any doubt.

New Publications

AABP Publications

The following publication is available from the executive secretary-treasurer or the editor:

Proceedings of the American Association of Bovine Practitioners' Fourth Annual Convention, Denver, Colorado. December 1971. Price: \$15.00 (fifteen dollars).

Copies of the Proceedings of the 6th International Congress on Cattle Diseases, Philadelphia, August 1970, may be obtained from:

Zwetz and Zeitlinger, N.V.

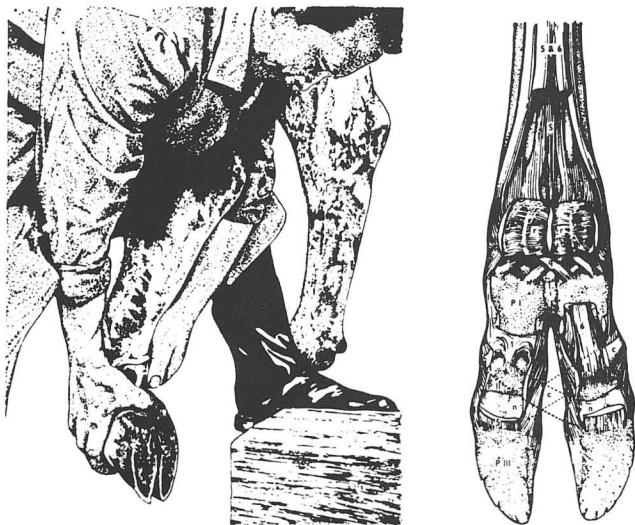
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This publication is the Proceedings of a Special Symposium organized by the British Cattle Veterinary Association and the Agricultural Development Association which was held at Reading University, England, on January 5-6, 1971. Papers were presented on the prevention and elimination of infection; evaluation of a mastitis control system; hygiene, machine milking and therapy in mastitis control; monitoring control schemes, and the application of control schemes.

Copies of the Proceedings may be obtained for \$3.50 (including surface mail) from:

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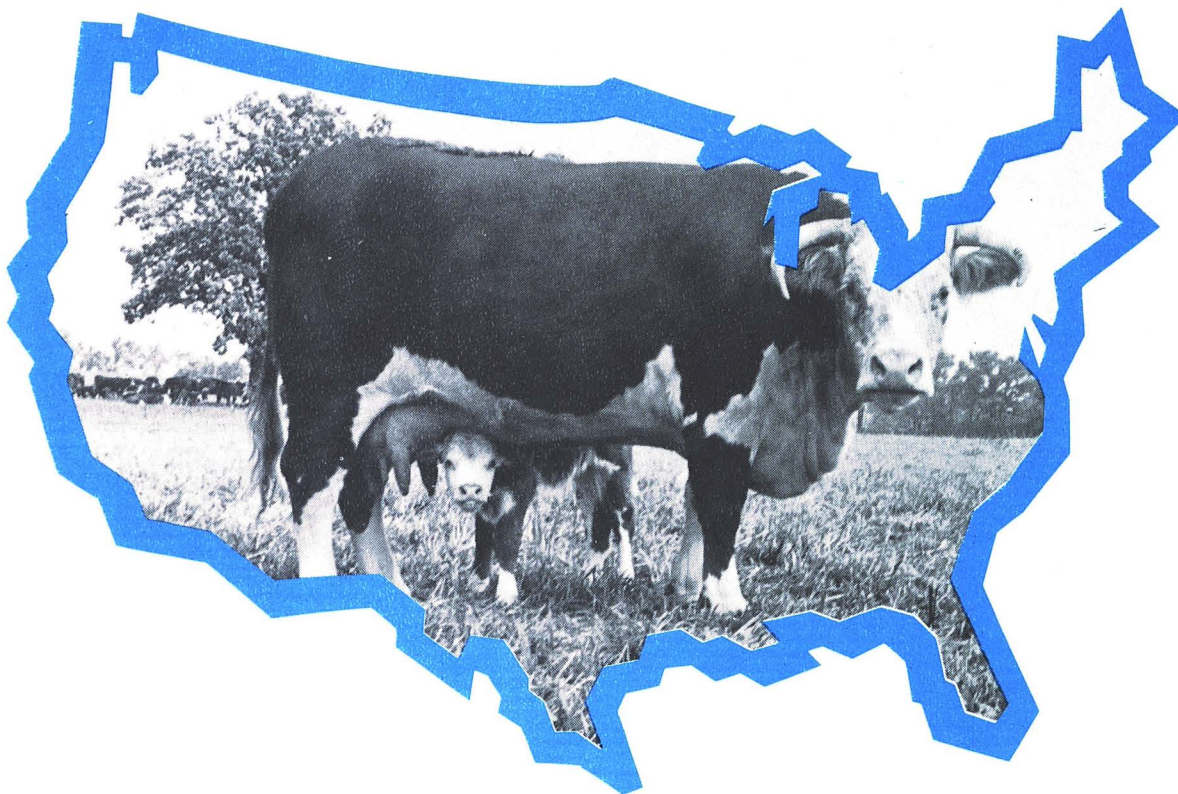
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- * Freedom from long-lasting granulomas at injection site
- * Only 21 day withdrawal period prior to slaughter
- * Easier to administer and clean from equipment in all seasons than oily bacterins.

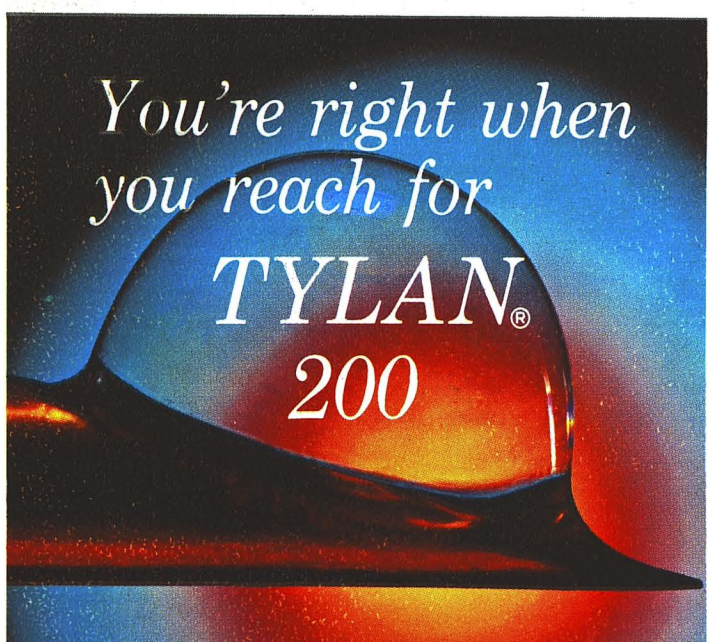
Available in 10 dose (20cc) and 50 dose (100cc)



Box 390 Shawnee, Kansas 66201



When you come to pneumonia and diphtheria cases...



Pneumonia and diphtheria are probably to blame for a good deal of the respiratory problems in your feedlot. And Tylan 200 for Injection is especially effective against these respiratory infections. Tylan 200 fights pneumonia and diphtheria. So when these problems take cattle off feed, think Tylan 200. You're right when you reach for Tylan 200.



(Tylosin)
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