

*PUBLIKASIES VAN DIE UNIVERSITEIT VAN PRETORIA
NUWE REEKS.*

Nr. 5

LIVESTOCK PHILOSOPHY

(English summary on page 13)
(Afrikaans summary on page 14)
(German summary on page 15)
(French summary on page 16)

by

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University of Pretoria.



**PRETORIA
UNIVERSITEIT VAN PRETORIA**

1958



FIG. 1.

PSALM 8: Verses 5, 6, 7 and 8.

For thou hast made him a little lower than the angels and hast crowned him with glory and honour. Thou madest him to have dominion over the works of thy hands; thou hast put all things under his feet: *All the sheep and the oxen*, yea, and the beasts of the field; The fowl of the air and the fish of the sea, and whatsoever passeth through the paths of the seas.

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After studying livestock production in various parts of the world, especially among the Bantu tribes, one cannot but come to the conclusion that this type of agriculture is influenced mainly by the cultural background of the people who practise it. Throughout the world one finds that those races who are superstitious, who have no real cultural background of the kind known to the Western Civilization, have made little worthwhile contribution to livestock betterment.

Considering Bantu agriculture as an example, it is apparent that, to the Bantu, the animal is a token of wealth, a means of acquiring a wife and, therefore, a necessity under the Lobolo system. The native has never regarded livestock production as a means of benefitting mankind,

since he has never practised it with the object of producing more and better food for his people. Likewise the Hindu, whose whole outlook on the animal is that it is holy. As a result he is not permitted to castrate those bulls which are useless, or carry out selection to improve his herds.

The people of the Western Civilization have both a cultural and a religious background. It is worthy to note that in the Bible in Psalm 8, David sang to the Lord: "For thou has made him a little lower than the angels and hast crowned him with glory and honour. Thou madest him to have dominion over the works of thy hands; thou hast put all things under his feet: All the sheep and the oxen, yea, and the beasts of the field; The fowl of the air, and the

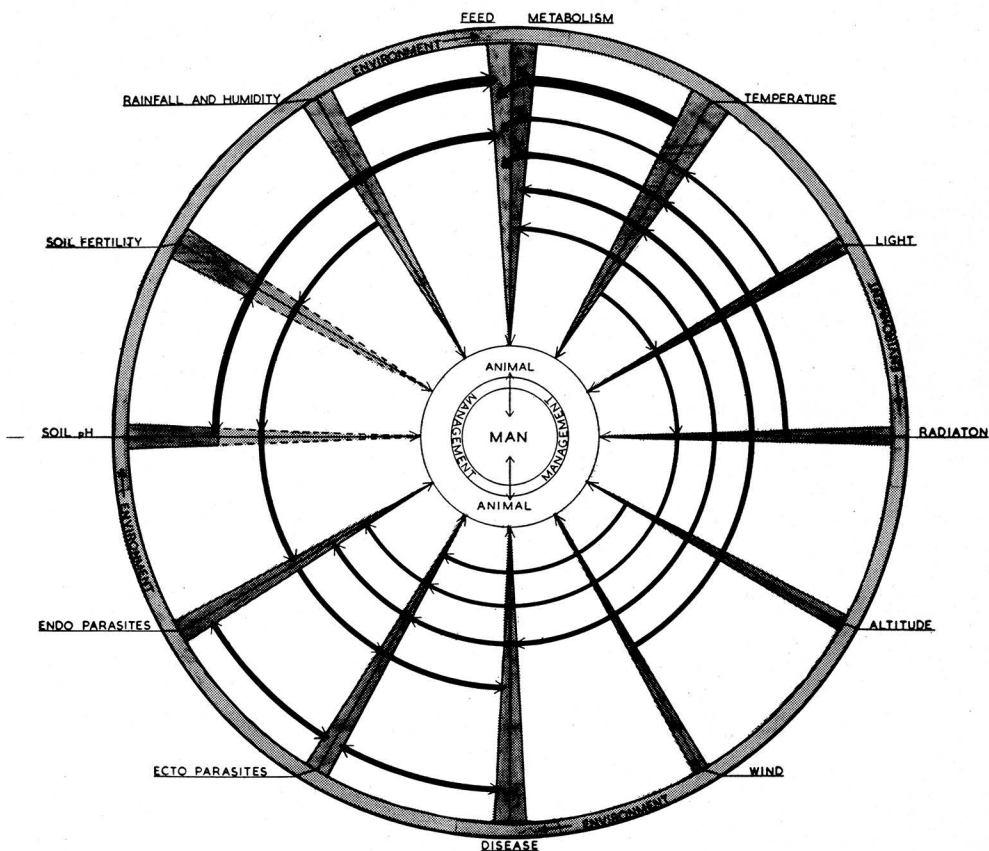


FIG. 2.

The wheel which is the schematic illustration of our livestock philosophy.

"Man" is the axle of the wheel. The Animal which is kept in close symbiosis with man is the nave of the wheel. The lubricant which reduces friction between man and beast is management. The running surface of the wheel is the total environment and each spoke of the wheel is an environmental factor interacting on the nave of the wheel. The spokes also interact one upon the other.

fish of the sea, and whatsoever passeth through the paths of the seas." On those who practise livestock husbandry, these few verses place a tremendous responsibility, as is illustrated in the words "They are put under man's feet." They imply that it is the duty of Westerners and Christians to improve that which has been given them, if they fail to do so, they are failing in their responsibilities.

Thus man may be regarded as the axis about which the wheel of livestock production revolves.

MANAGEMENT

Man has tamed and domesticated animals for thousands of years and as a result they have become dependent on him. "They have been put under his feet", as the Bible says and over the generations have become his close complement. Should some catastrophe eradicate human life on earth and the domestic animals be left to themselves, it is most probable that within a very short time none of these animals would manage to survive with the possible exception of a few breeds, indigenous to that particular locality; certainly the better-bred animals would soon become extinct.

As illustrated, the nave of the wheel is the animal, but to have the nave rotate round the axle without friction, there is need of a lubricant, supplied in this case by management. We often hear the saying, "The eye of the master fatteneth the beast", this is management.

Those who are disinterested in animals, will never make a success of animal husbandry. The successful livestock producer is one who knows his animals and who treats them with care and love. Only then, will the nave be lubricated and move with ease round the axle of the wheel.

ENVIRONMENT

In this livestock philosophy the environment is the running surface of the wheel, a large concentric circle immediately round the axle of that wheel. As in every wheel, this running surface is attached to the nave by spokes each of which has a direct action on the nave. Each environmental factor having a direct influence on the animal, is indicated as a spoke directed from the running surface of the wheel to the nave.

Nutrition together with metabolism, which affects the transformation of food into products, such as meat, milk and eggs, form the mightiest spoke in the wheel.

TEMPERATURE

The next spoke is temperature. Temperature if it is excessively high is a tremendous problem in animal production. Low temperatures on the other hand do not constitute the same problem, provided the animal is supplied with sufficient food. In hot rooms at the Missouri University, the late Dr. Samuel Brody carried out some remarkable experiments in which Friesland, Jersey and Zebu cattle were kept in rooms where the temperature varied from 5° to 105°F. The fact must be noted here that the Zebu can withstand high temperatures very well and low temperatures less well than the European breeds of cattle.

In Brody's experiment the animals were kept in chambers at a temperature of 65°F. and their food intake was measured. When the temperature was raised to 105°F. these animals all showed acute symptoms of distress, even the Zebus. Later when the temperature was lowered to 5°F. (27° below freezing), the men working in the rooms, although dressed in furlined boots and clothing fit for the Arctic, were most uncomfortable. The cattle however, even the Zebus, showed no signs of real distress. The results of this experiment showed that at 5°F. the Frieslands consumed 8 per cent more food, the Jerseys 26 per cent more and the Zebus 36 per cent more than they did at a temperature of 65°F. Although the smoothcoated Zebu types could withstand the cold and were not uncomfortable, they had to consume relatively much more food than had the other breeds in order to maintain their heat balance at a temperature of 5°F. At 105°F. the appetites of all the animals were greatly reduced and all showed symptoms of distress. In this case the fact must be noted that the Friesland being a large animal would require more food for maintenance than would the Jersey, for instance.

Since temperature plays such an important role, an attempt has been made to develop a new type of animal adapted to the hot climate such as prevails at Mara. The point realized was that animals should be bred in such a way as to promote their adaptability to high temperatures. For this reason the Bonsmara cattle have more indigenous blood than that derived from the exotic breed.

If an animal cannot withstand high temperatures, various complications arise. The first is that the animal does not grow out properly. It experiences a rise in the body temperature on a hot day, which, if sufficiently high, will cause damage to the pituitary gland. The pituitary is a small gland attached to the brain

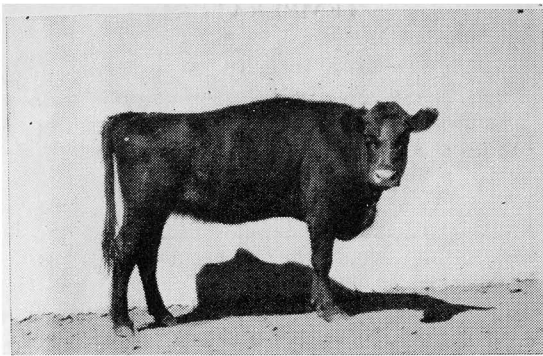


FIG. 3.

A typical tropical degenerate. Note the early maturing parts of the body are large, for example the head and forequarters. The late maturing parts such as the loin, and rump are relatively small. The degenerate animal always has a small pelvis.

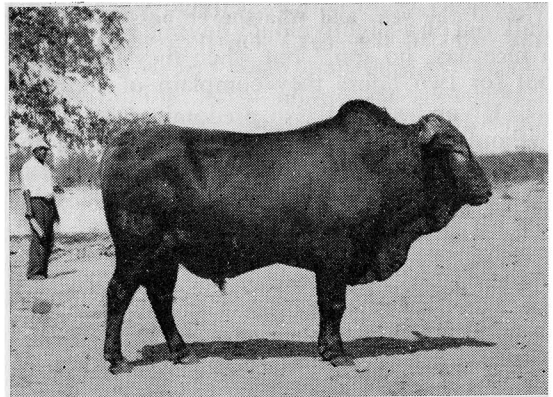


FIG. 5.

The woolly coated Africander bull which was used in many cross and pure breeding experiments to prove how important coat cover is in connection with adaptability to tropical and sub-tropical regions. The woolly coated Africander X Shorthorn cross bred calves which were born woolly coated became tropical degenerates and showed no hybrid vigour. The smooth coated ones developed into normal cattle and showed hybrid vigour.

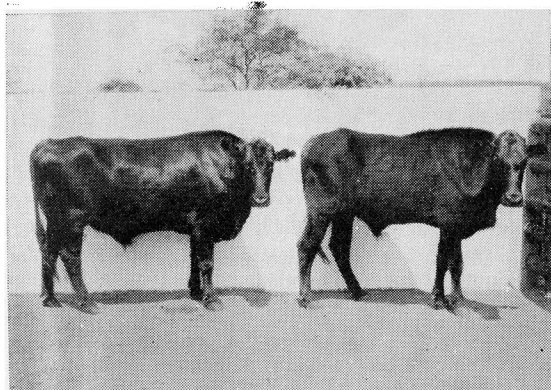


FIG. 4.

Africander X Aberdeen Angus crossbred steers which are full brothers, both were produced by mating a woolly coated Africander bull with an Aberdeen Angus cow.

The woolly Africander X Aberdeen Angus crossbred ox is a year older than the smooth coated one.

The weights are for the smooth coated ox 1325 pounds at seven years and for the woolly coated ox 865 pounds at eight years.

and controls growth and sexual activity. If this gland is damaged, to all intents and purposes the animal has been ruined, and will never grow or reproduce normally. These observations indicate why an animal must be bred smooth-coated to overcome problems associated with high temperatures.

RADIATION

The next spoke in the wheel is radiation, that is to say, the rays from the sun. Sunlight comprises a series of rays differing in wavelength, composition and action. If sunlight is split into the spectrum, thermometers will indicate that temperatures become progressively higher from violet to red, the hottest part of the spectrum being the invisible section just beyond the red, namely the infra-red region. Red rays are heat rays and when they impinge on the animal's hide they make it warm, so warm on a hot day in the case of some black cattle that one cannot touch them. During the hottest part of the day most animals require shade, which is one of the limiting factors on many ranches. More trees should be planted or shelter provided for animals, to enable them to find shade and avoid the problem of infra-red radiation. In a hot climate, radiant heat energy absorbed by the body must be dissipated before the animal can consume sufficient food for maximum growth.

Light waves also cause chemical reactions and of these waves the ultra-violet beam has the strongest oxidising action. The effect of the

ultra-violet beam is demonstrated when people walk out on a slightly cloudy day and say, "What a nice day, no sun," but when they have been out for two hours they complain of sunburn.

If an animal is predominantly white without, or with areas lacking, pigment in the hide, as is the case in some Ayrshires, ultra-violet rays cause hyperkeratosis of the hide and the animal suffers.

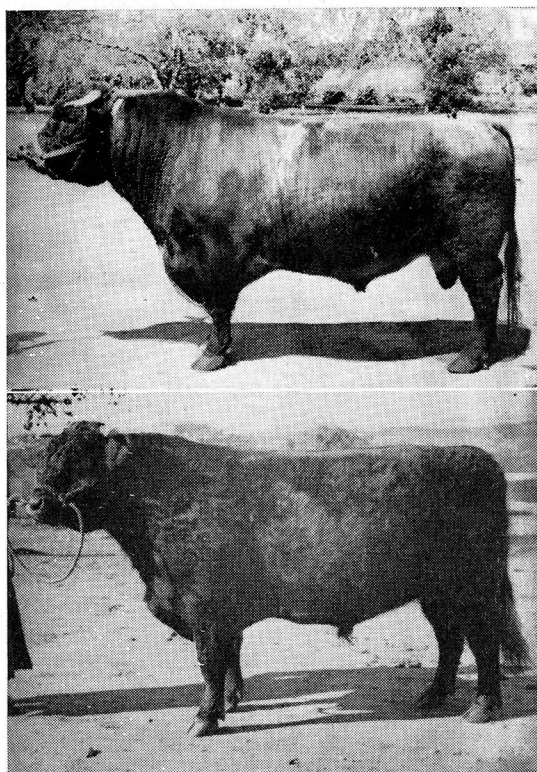
In livestock breeding, temperature and radiation play an important role. This is where the hide, that amazing organ, comes into play. In addition to its other functions, the hide is a temperature regulating organ containing a thermostat so efficient that it can control to a very marked degree the body temperature of an animal. If the animal were not protected by a hide, which controls its body temperature to a certain degree and which enables it to overcome the hazards of certain infections, it would certainly die prematurely. From observations, it seems that smooth-coated, thick skinned animals do not die so readily from heart water, as the unadapted, thin skinned animals.

LIGHT

The next spoke in the wheel to consider is the influence of light on the animal. Light rays cause an impulse or stimulus on the pituitary gland and hence a reaction in which the animal sheds its hair. As the days become shorter and the nights longer, cattle begin growing longer hair and develop their winter coats. Conversely, as the nights shorten and the days lengthen, they shed their winter coats and become smooth-coated. In Britain, whence so many of our breeds come, the difference between the longest day in summer and the shortest day in winter is at least twelve hours, whereas, in South Africa, it is two hours and on the equator only two minutes. Those animals which shed their winter coats and become smooth-coated, are the ones which can adapt themselves and breed more regularly in a hot climate.

A smooth-coated Hereford herd was bred at Mara in the Northern Transvaal by using only those individuals which reacted to a stimulus of only three hours difference in daylight between the longest and the shortest days of the year. Four smooth coated Hereford heifers were transferred from Mara research station to Mpapwa research station in Tanganyika on the equator. These heifers never shed their hair there.

To investigate the marked influence of light on animals, two pigeons were taken,



FIGS. 6 AND 7.

These illustrations are of two Shorthorn bulls imported into South Africa from Scotland. The photographs were taken in the summer when the bulls had been in South Africa for approximately two years. It was indicated to the prospective buyers at the time that the one would become smooth coated and the other not.

The smooth-coated bull produced progeny that did well in the sub-tropics while the other bull's progeny were very disappointing from an adaptability point of view.

one placed in a light bell jar and the other in a dark coloured bell jar. Both were starved. The pigeon in the light bell jar died after 12 days, while the one in the dark bell jar survived for 24 days. This illustrates the influence of light on the metabolic activity of the animal.

Light has a direct influence on metabolism. For this reason extra light is used in chicken runs to facilitate rapid feathering and earlier egg production in winter.

ALTITUDE

The next environmental factor, altitude, has a direct influence on man and animals. In the Andes, several Europeans have attempted to mine silver at altitudes of 11,000 ft. and higher. However, when they settled Europeans there, they found that the men could work for

a while but the women could not work at all as they could not stand the rarified atmosphere. However a tribe of small Indians live in this region, the men weighing on the average 114 lbs. At these high altitudes where the soils are acid, they grow potatoes of comparatively low nutritional value. In general crops are very low in calcium, hence the small stature of the people. It is interesting to note that members of this small tribe have huge chest capacities. This is because in breathing they have to inhale a tremendous volume of air to obtain sufficient oxygen to feed their tissues. All the cats the Europeans took up with them died at 15,000 ft. There are some animals which can live in this area, the most important being the llama, which has a blood count twice as high as that of man. Their blood also has twice the power of absorbing oxygen from the rarified atmosphere.

One might ask what this has to do with animal breeding. These facts are however extremely important. The Germans have carried out blood tests on various breeds of cattle in Europe. Their results show that high-altitude cattle such as the Brown Swiss, have by far the highest blood count of all breeds. The tropical adaptability of the Brown Swiss breed centres round this point, since both at high altitudes and at high temperatures the animal must contend with rarified air.

A number of tests conducted on the cattle at Messina showed that the Afrikaner had the highest blood count of the breeds there.

At high altitudes ultra-violet impingement is tremendous as it is in the tropical regions. At the same time infra-red radiation is intense and a dark coloured rather than a light coloured animal is preferable especially at the higher altitudes where infra-red radiation is required as a source of energy. In the tropics, however, infra-red radiation is not required as a source of energy and is therefore a problem.

Because of these common ultra-violet and infra-red radiation problems, there are many similarities between the animal adapted to the low altitude sub-tropics and the animal adapted to very high altitudes.

Another aspect worthy of consideration is that at high altitudes the soils are more acid, and it is certain that there under natural conditions one will never raise large animals. They will always be smaller than those bred on the plains, in regions where there are usually lime deposits in the soil.

WIND

The problem of wind is not nearly so severe in South Africa as it is, for instance, in New Zealand or in the north of Scotland. On the

eastern seaboard of New Zealand where the wind blows continuously, a herd of Angus cattle which has been bred for a period of 40 years in the area carries hair as long as that of Galloway cattle to withstand the wind. The Highland cattle in Scotland must also endure moist cold winds and as a result grow very long hair.

In high altitude areas such as the Highveld of the Transvaal, animals lose weight rapidly the moment they are exposed to severe cold winds during the winter. If these animals are to overcome the cold, they must be provided with more heat, in other words with extra feed. If this is not available, they rapidly lose condition. To reduce feed intake at these cold, high altitudes, shelter must be provided, a factor the importance of which few people realize.

DISEASE

Professor Brock, the Professor of Internal Medicine at the Cape Town University, once said at a medical conference, "Gentlemen, what we require is that more work should be done on nutrition and housing". He maintained that if nutrition was adequate and housing correct, the disease factor would be relegated into the background. This should be stressed in livestock production too, since if the environmental complex is favourable, the animal will not readily become diseased.

In a memorable series of experiments at Onderstepoort, some badly worm-infested sheep were obtained from the Free State. One half of this group was fed properly, while the other half was poorly nourished, but treated with worm-remedies. Results showed that those sheep which were properly fed were free of internal parasites long before the others.

The malnourished animal is the first to become the prey of internal and external parasites. As early as 1940 and the following two years as many as 30,000 ticks on different animals were counted to find out which animals were tick repellent. The good doers were found to be relatively free from ticks in comparison with the bad doers.

Disease has been relegated into the background in this philosophy as it is not a major problem if management is correct with regard to nutrition and prophylactic immunization, and if animals are bred which are adapted to their environment.

PARASITES

A factor having a marked influence on animals is that of external and internal parasites. These can cause disease, but more often are

the results of disease. Note that not one of the spokes of the livestock wheel stands free and alone as they do on the sketch shown on page 5. Each spoke interacts on the rest. If the animal is well nourished it is usually healthy, but if undernourished it falls prey to internal and external parasites. If the animal lacks adaptability, it likewise becomes a prey to these parasites, and hence becomes susceptible to tick-borne disease.

Internal and external parasites can be partially overcome in one of two ways. The first, which is preferable, is to breed adapted animals with short hair, smooth coats and thick movable hides to make them tick repellent. It would, however, be foolish not to use the protective measures science has provided in the form of dips, deworming remedies, and therapeutic treatment against internal and external parasites. If there are successful methods of combating disease by immunisation or by therapeutic treatment, they should be employed but these methods should not become the major issue in cattle breeding operations. They must be used only to overcome certain problems.

RAINFALL AND HUMIDITY

Rainfall and humidity play a very marked role in cattle production. In all the very humid areas of high rainfall, small cattle are found. In Zululand for instance, cattle are small

because they must rid themselves of excess heat by evaporation of moisture from the lungs, and in this hot humid climate the problem becomes acute. Animals living under these conditions have a large skin area per unit of weight. The Mashonaland cattle are a typical example. In Swaziland, the indigenous cattle all seek shade under the trees from ten o'clock in the morning and earlier. They grasp every possible opportunity of avoiding or getting rid of excess heat.

In areas of high temperature and rainfall, cattle are also small, since there, though the pastures grow very rapidly, they contain little protein and much fibre and are of low nutritional value. Under these conditions fast growing cattle do not thrive.

SOIL

Soil fertility has an indirect influence on cattle welfare through nutrition. Better cattle can be produced on fertile than on infertile soil by virtue of the better crops which provide feed of a higher nutritional value.

Another factor is the pH of the soil or its degree of acidity or alkalinity. No large cattle have been bred on acid soil country, which explains why the Zebu cattle of the high Himalayan mountains, the Welsh Black cattle, most of the cattle on the higher slopes of the Drakensberg and the indigenous Masho-

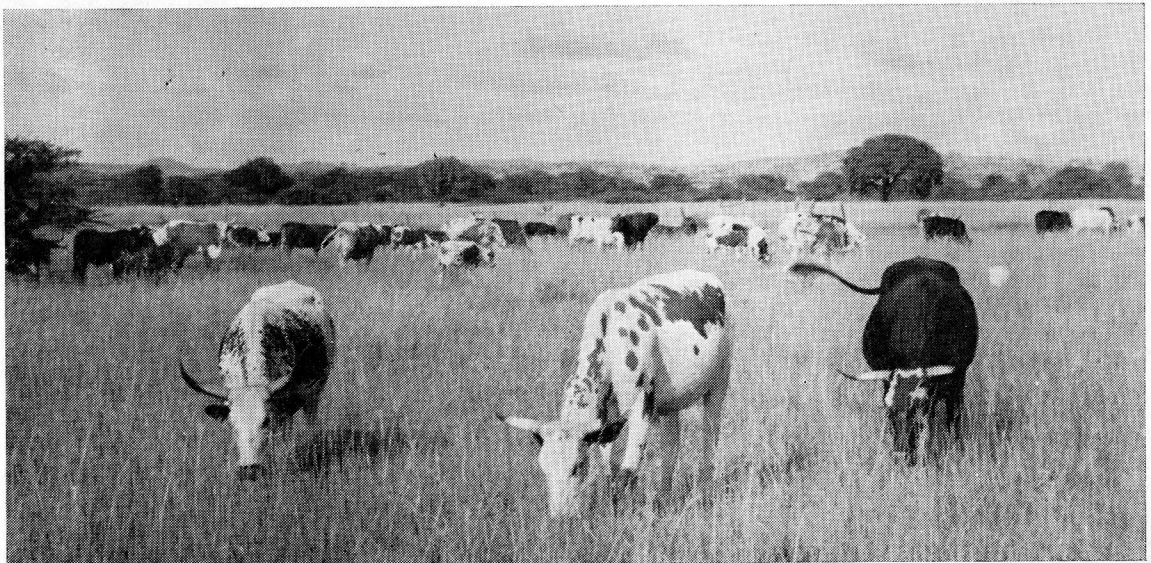


FIG. 8.

Swazi cattle . . . these cattle are well adapted to the environmental conditions of that environment. In areas of high temperature and rainfall where the pH of the soil is low (below 6.5—7) cattle are small. These cattle have not been selected for efficiency of food utilization, for milk or beef production, to the Bantu, the animal is a token of wealth.

nal and cattle are all small. Mashonaland is fertile, but lacks lime and the resulting cattle have small frames.

INTERACTION

The influence of the different spokes on the nave of the wheel have been discussed. It is now necessary to indicate how the spokes influence one another. Only the first two spokes will be considered, namely the interaction of rainfall, humidity and temperature on nutrition.

In an area of high rainfall and high temperature, active plant growth takes place but the resulting rapidly growing plants comprise mainly crude fibre, called lignin, and their stems are hard, enabling them to stand upright. This is why thatch grass which is four feet high, does not fall over. Because crude fibre is almost indigestible, during the winter, animals in the tall-grass areas do not obtain sufficient nourishment from the natural herbage.

Another combination is that of efficient rainfall and low temperature, as in Britain. Although the rainfall there is not high, it is relatively effective since evaporation is much lower than in South Africa and temperatures are low, causing the grass to grow slowly. Under these conditions, the grass has a low crude fibre content, hence the cattle grow faster in Britain than in South Africa.

If both temperature and rainfall are low, virtually nothing exists. In the true Arctic regions, the only animals which survive are the Moose and the Reindeer, which live on lichens and mosses. Very little animal husbandry exists in this area.

High temperatures and low rainfall are encountered in the Bushveld country, of which the open savanna country at Mara is typical. Although in these areas there is very little vegetative growth, it is usually of a high nutritional value; many grasses cure on the stalk as the pastures dry off, providing natural hay. On a farm like Mara the cattle come through the winter better than off many other farms where there is more material but of a lower nutritional value.

Atmospheric temperature affects an animal's appetite, which is reduced during the hot weather. When feeding, steers must be fat when the summer starts, otherwise they will not have the appetite to fatten properly on summer feeding. Feeding must be carried out throughout the colder months if it is to be effective. Feeding should start in April and the cattle should be fat in September. If they are

carried through those other months, there should be no further difficulty.

The influence of radiation on cattle is a marked one and in areas where it becomes a limiting factor, cattle should be protected in some way or other. Aberdeen Angus cattle, if exposed to the direct rays of the sun on hot days, will not eat properly and will not thrive nearly as well as when shade is provided.

Light as such cannot be readily controlled. However when fattening cattle, it is advisable to keep their stables as dark as possible, because this facilitates an even distribution of fat over the body and reduces the incidence of flies and ticks, which in turn will influence the amount of feed the cattle consume. Restricted movement will also result in more efficient feed utilization.

ADAPTABILITY

Every spoke has a marked influence on the animal. If it is known how to reduce the leverage of each spoke on the nave, it is possible to shape the nave so that the spokes cannot, through leverage, break it.

How can the problems of low nutritional value of the veld be overcome, or how can cattle be made to utilize feed more efficiently? This is a significant if not the most important single problem that has to be overcome in feeding cattle. Little thought has been given to the breeding of cattle which can utilize feed more efficiently, since it has always been taken for granted that all cattle are equally efficient in this regard. This is not true.

It is commonly held that the animal which loses weight on the veld when nursing a calf, is a good cow because she has a lot of milk. This is a point of view so many people hold. A few years ago a check was made on data collected from the Mara Research Station to test the validity of this contention. It was decided to study all those cows which had produced heavy calves, weighing at weaning between 450 and 600 lbs. These animals were divided into two groups, namely those which lost only a little weight and those which lost considerable weight while suckling a calf. There were equal numbers of each group. As a result of this study it is now deemed advisable to breed only from those cows which show a small weight loss at weaning. It can be argued that to raise a heavy calf, these cows must have milk and at the same time they must be more adaptable than the others to maintain their weight in so doing.

If it is known how to select animals which utilize feed efficiently, these will be the ones

which will survive when food becomes scarce. These animals have certain common characteristics, such as good stomach capacity and the ability to walk easily. They are always smooth coated and have no difficulty in overcoming high temperatures. They also have good, broad, strong muzzles.

When selecting young heifers to go to the bull, only those that are well grown are chosen, that is, those that weigh 700 to 900 lbs., at two years. These are mated to bulls from cows which wean heavy calves regularly.

SELECTION

Cattle must be bred for adaptability, which implies that they should be able to utilize the veld grazing efficiently. Without adaptability selection of cattle on a weight for age basis has little purpose.

For the animal to overcome high atmospheric temperatures, it must be smooth coated. It is advisable to select those animals which become smooth coated early in spring. An animal with a low nutritional status comes through the winter with difficulty, and has only a small reserve of Vitamin A in its liver. Even when daylight lengthens, it will not possess the Vitamin A required to assist in shedding its winter coat.

If an animal can shed its winter coat early in spring, it should have little difficulty in overcoming the problems of Vitamin A deficiency. Every heifer that sheds her hair the first year after birth and becomes smooth coated in September and October, is a good one. No degenerate animal is able to do this. If one cannot carry out all these tests of adaptability, it is best to select the early hair shedders, since they are the ones possessing a nutritional reserve at the end of the winter.

Furthermore, it is important to select for smooth coatedness, which should persist from October until the end of March. It is also necessary to select those cattle with thick hides, since they are the ones which will be more disease resistant.

On the subject of disease, the view has been advanced that if animals are bred for adaptability, they can overcome disease. It would nevertheless be unwise not to inoculate cattle against enzootic diseases such as anthrax and quarter evil. A rancher who neglects to do this is foolhardy. Veterinarians have produced vaccines which are efficient and should be used. After all, livestock production and successful ranching depend on calving percentages, in

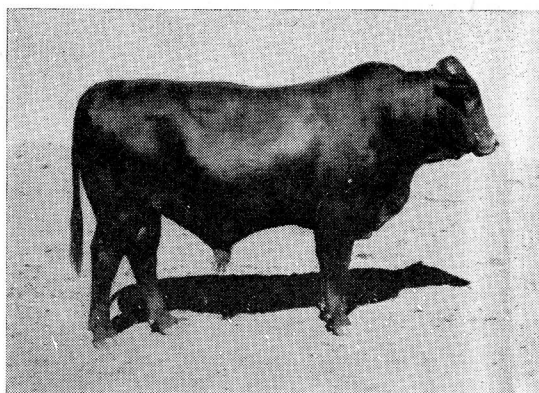


FIG. 9.

Edelheer, . . . a young Bonsmara bull. The Bonsmara breed was produced by taking into consideration the interaction of the various "spokes" on the "nave" of the "wheel" depicted in Fig. 2.

Selection was based on efficiency of feed utilization, adaptability to high temperatures, adaptability to intense radiation and on insect repellent hide properties. Once adaptability was achieved, factors such as growthiness, fertility and longevity were selected for.

other words the number of calves produced and raised. The lower the mortality the better.

The next factor to consider is growth rate, reflected by the weight that can be attained at two years, or whatever age the cattle are to be marketed. The aim is to produce the maximum amount of beef per unit area.

Every rancher can breed better cattle than he does at present, and it is essential that he appreciates his responsibility. The rancher must realize that selection is his mightiest tool. God has given him the brain power and if he utilizes all his facilities to observe his cattle and tries to appreciate them, he will be able to produce good cattle.

Everyone has the urge to create something. God has created much while we have created little. The livestock breeder feels the satisfaction of a real creator the moment he has produced an animal which is superior to anything he has ever produced before.

Loyalty is another aspect. One ounce of loyalty is worth more than a pound of cleverness. It is the duty of ranchers and ranch folk to be loyal towards those people who have put them in charge. On them have been placed the same responsibility that we find in the Bible in Psalm 8. Ranch stock have been put under the ranchers feet and if he fails to be loyal, he has failed as a man.

SUMMARY

Livestock husbandry practices among the uncultured peoples of the world, as compared to those of the Western Civilization, have improved little during recent generations.

Today, rapid advances towards improved animal production make it imperative that animal husbandrymen possess a sound knowledge of stockmanship, management, animal function and the influence of the factors comprising the environment on the animal.

The relation between man, the animal and the environment is diagrammatically illustrated in the form of a wheel in which man is the axle, the animal the nave, the total environment the running surface and the various climatic factors the spokes of the wheel.

The effect of environmental stress on the animal is discussed separately for each factor making up the climatic complex, namely, temperature, light, radiation, altitude, wind, soil pH, soil fertility, rainfall and humidity. Particular attention is paid to such factors as

high temperature, excessive radiation, altitude and light, which directly and indirectly cause tropical degeneration among the unadapted exotic breeds of livestock in the hot, low lying, subtropical and semi-arid regions of South Africa. The limiting effects of non-climatic factors such as disease, ecto- and endoparasites on efficient animal production are also mentioned.

Portion of the discussion is devoted to a description of interactions between various combinations of rainfall and temperature, which indirectly effect animal production via nutrition.

The importance of breeding cattle which are fully adapted to subtropical and semi-arid climatic conditions is stressed. Judicious selection for thick hides, smooth coats, disease resistance and walking ability will achieve this aim. Furthermore, selection for high fertility and efficient food utilization are essential for increased production.

Throughout, the discussion is well illustrated by photographs and information derived from research into tropical animal husbandry.

OPSOMMING

Die kultuur van volkere oefen 'n groot invloed uit op die tipe dier wat aangehou word vir veeboerdery, asook die doel waarvoor die dier aangewend word. So bv. word gevind dat bevolkingsgroepe wat baie bygelowig is, feitlik geen bydrae gemaak het tot 'n produktiewe veeteelbedryf nie en wel omrede geen seleksie vir verhoogde produktiwiteit uitgevoer is nie.

Die mens is oor die dier geplaas om dit deur middel van seleksie in versikllende rigtings te stuur. Die magte van die mens is egter nie onbeperk nie en die invloed van sekere omgewingsfaktore moet wel deeglik in aanmerking geneem word by die keuse van die tipe boerdery in die algemeen en die tipe bees in die besonder wat aangehou sal word.

Die mens-dier verhouding kan gesimboleer word in die vorm van 'n wiel. In hierdie voorstelling is die mens die as waarom alles draai terwyl die dier die naaf van die wiel vorm. Bestuur kan beskou word as die smeermiddel wat die mens-dier verhouding glad laat verloop. Die omgewing vorm dan die velling van die wiel wat met die naaf (die dier) verbind is deur 'n aantal speke wat, op hulle beurt, die verskeie omgewingsfaktore voorstel.

Die mens het die diere onder kunsmatige toestande begin aanhou en sodoende hulle tot uiterstes in sekere produksierigtings gedwing. Die bestuur van die mens het dus noodsaaklik geword vir die voortbestaan van hoogs gespesialiseerde diere.

Voeding tesame met metabolisme, vorm die belangrikste speek in die wiel.

Temperatuur het 'n geweldige invloed op die dier. So bv. is gevind dat as Europese beesrasse blootgestel word aan baie hoë temperature, die hipofiese beskadig word wat veroorsaak dat hulle groei- en reproduksievermoë baie benadeel word. Egter is gevind dat beeste wat 'n kort glansende haarbedekking het, beter aangepas is by tropiese en subtropiese toestande as beeste met 'n lang wolkryge haarbedekking.

Bestraling deur sonlig kan hiperkeratosis van die vel veroorsaak by diere met 'n ongepigmenteerde vel. 'n Dik gepigmenteerde vel is dus noodsaaklik waar diere baie aan sonlig blootgestel is.

Veranderinge in die lengte van daglig dien as prikkel vir die verhaarproses. As 'n dier

vroeg in die voorjaar verhaar, dui dit op 'n goeie voedingstoestand en 'n aktiewe endokriestelsel en so 'n dier behoort dan 'n doeltreffende produseerder te wees.

Vanweë die lae konsentrasie van suurstof op hoë hoogtes, word daar diere aangetref met 'n relatief hoë rooibloedsel-telling wat 'n vinniger absorpsie van suurstof moontlik maak.

Daar is gevind dat diere wat op 'n hoë voedingspeil gehou word, beter bestand is teen interne-parasiete as diere op 'n lae voedingspeil ofskoon behandel met wurm-middels. Hier wil nie te kenne gegee word dat die gebruik van middels deur die wetenskap beskikbaar gestel, verkeerd is of nie aan hulle doel beantwoord nie, maar wel dat daar ander ewe belangrike metodes is vir die bestryding van siektes.

Observasies op beeste toon dat in omgewings met 'n hoë reënval en humiditeit, relatief klein diere aangetref word met 'n groot veloppervlakte.

Grondvrugbaarheid en die suurtegraad (pH) van die grond het 'n groot invloed op die plantegroei en aangesien herkouters afhanklik is van die plantegroei vir hulle kos, het dit dus 'n groot invloed ook op die dier. So bv. word gevind dat in dele met hoë reënval, die grond gewoonlik min kalsium bevat en so ook die plante. Die dier in so 'n omgewing is gewoonlik relatief klein omdat daar nie voldoende essensiële minerale is om 'n groot skelet te ontwikkel nie.

Dit moet beklemtoon word dat hierdie omgewingsfaktore nie alleen staan nie, maar dat daar 'n definitiewe wisselwerking tussen hulle bestaan, en hulle mekaar dus in 'n baie groot mate beïnvloed. In die natuur beïnvloed hierdie faktore mekaar om 'n uiteindelige balans te vorm. Die dier wat ons in 'n spesifieke omgewing wil aanhou, moet aangepas wees by hierdie balans van faktore. Ten einde 'n goeie produksie te verkry, moet ons dus selekteer vir aanpasbaarheid en faktore wat aanpasbaarheid beïnvloed. Met vleisbeesboerdery in die sub-trope is dit dus noodsaaklik dat selekteer word vir:

1. Aanpasbaarheid.
2. Kort glansende hare.
3. 'n Dik vel.
4. Vroeë verhaarders.
5. Vinnige groei.
6. Doeltreffende voerverbruik.
7. Vrugbaarheid.

ZUSAMMENFASSUNG

Der Typ eines Tieres, sowohl wie der Zweck der Haltung, wird bedingt von den Kulturen der verschiedenen Voelker. Dies geht hervor aus der Feststellung, dass aberglaebige Voelker sehr wenig zum Aufbau einer leistungsfahigen Viehwirtschaft beigetragen haben, weil keine Auslese fuer eine bessere Leistungsfahigkeit angestrebt wurde.

Der Mensch kann den Typ eines Tieres durch eine zielbewusste Auslese (Zuchtwahl) umformen. Das sagt aber nicht, dass der Mensch unbeschraenkt mit seiner Auslese fortfahren kann. Der Einfluss der einzelnen Umweltfaktoren auf das Tier selbst darf nicht ausser Acht gelassen werden bei der Wahl der Viehwirtschaftsart und des Zuchtrindes.

Das Mensch-Tier Verhaeltnis kann verglichen werden mit einem Speichenrad. Der Mensch ist die Axe, um die sich alles dreht. Das Tier stellt die Nabe vor, die Verhaeltnis glatt funktionieren laesst. Die Umwelt wird dargestellt von der Felge, die mit der Nabe durch eine Anzahl Speichen, die wiederum die einzelnen Umweltfaktoren darstellen, verbunden ist.

Durch das Zaehmen wilder Tiere sind die sog. Kulturrasen entstanden, die der Mensch durch erhoelte Ansprueche in gewisse Leistungs extreme getrieben hat. Diese Entwicklung hat die Fuehrung des Menschen noetig gemacht, um das Fortbestehen der hochstspezialisierten Rassen zu sichern.

Fuetterung, zusammen mit Metabolismus, ist die wichtigste Speiche an dem Rad.

Die Temperatur hat eine umfangreiche Auswirkung auf den Tier-koerper. Diese kommt bei den europaeischen Rinderrassen, die einer hohen Temperatur ausgesetzt sind, zum Ausdruck. Die Hypophyse wird beschaedigt, welches einen Rueckgang in der Wachstum- und Leistungsfahigkeit zur Folge hat. Tiere mit einem kurzen, glaenzenden Haarwuchs sind einem Tropischen- oder Subtropischem Klima besser angepasst, als Tiere mit struppiger Haarbedeckung.

Starke Sonnenbestrahlung verursacht Hyperkeratosis bei Tieren mit pigmentlosen Fell. Daher ist ein dickes pigmentiertes Fell vorteilhaft bei Tieren, die der direkten Sonnebestrahlung ausgesetzt sind.

Der regelmaessige Haarausfall bei Tieren wird von der Tageslichtlaenge beeinflusst. Ein Tier welches zu Anfang des Fruehjahres sich haart, ist in einem guten Futterzustand und hat gesund-funktionierende inkretorische Drusen, welche auf eine hohe Leistungsfahigkeit schliessen laesst.

Tiere, die in hochgelegenen Gegenden vorkommen, haben eine relativ hohe rote Blutkoerperchenzahl, (Erythrozyten), welche eine schnelle Sauerstoffaufnahme ermoeglicht.

Man hat auch nachweisen koennen, dass Tiere in einem guten Futterzustand wieder standsfahiger gegen interne Parasiten sind, als solche, die in einem schlechten Futterzustand sind, obwohl beide gegen Wuermer behandelt worden sind. Dies soll aber nicht heissen, dass die wissenschaftliche vorgeschriebenen Heilmittel nicht angewandt werden sollen, oder nicht zweckmaessig sind, sondern, dass es andere ebenso wichtige Methoden zur Krankheitsbekaempfung gibt.

Rinder, die in einem regenreichen und feuchten Klima leben, haben einen verhaeltnismaessig kleinen Koerperbau mit einer grossen Felloberflaeche.

Die Fruchtbarkeit und der Sauregehalt (pH), des Bodens haben eine umfangreiche Auswirkung auf den Pflanzenwuchs. Da dieser aber lebenswichtig fuer alle Wiederkaeuer ist, haben obige Faktoren auch auf Letztgenannte eine Einfluss. Der Boden, sowohl wie der Pflanzenwuchs einer regenreichen Gegend, ist gewoehnlich arm an Kalzium. Die Tiere einer solchen Gegend haben deshalb einen relativ kleinen Koerperbau, weil ein Mangel an den wichtigen Mineralien, die notwendig sind fuer eine grosse Knochenstruktur, herrscht.

Es muss hier betont werden, dass die Umweltfaktoren einer staendigen und gegenseitigen Wechselwirkung und Beeinflussung ausgesetzt sind. Das Resultat ist eine empfindliche Balance der Faktoren in der Natur. Ein Tier, das in einer bestimmten Gegend gehalten werden soll, muss dieser Balance angepasst sein, oder sich ihr anpassen koennen. Wenn also eine hohe Leistungsfahigkeit angestrebt wird, muessen Anpassungsfahigkeit und die Faktoren, die sie beeinflussen, bei der Auslese zuerst beachtet werden.

Zusammenfassend kann gesagt werden, dass bei einer Fleischrindzucht Folgende Eigenschaften die wichtigsten sind:

1. Anpassungsfahigkeit.
2. Eine kurze glaenzende Haarbedeckung.
3. Eine dickes Fell.
4. Die Fahigkeit, sich frueh zu haaren.
5. Schnelles Wachstum.
6. Zweckmaessigkeit im Futterverbrauch.
7. Fruchtbarkeit.

RESUMÉ

Le niveau culturel d'un peuple exerce une grande influence sur le type d'animal élevé sur les fermes à détail, ainsi aussi le but pour lequel l'animal est élevé. Ainsi p. ex. trouve-t-on que chez les peuples fort *superstitieux*, peu de progrès a été fait vers une industrie animale productive, et ce parcequ' aucune sélection en vue d'une plus haute productivité n'a été appliquée.

Grâce à la sélection, l'homme a le pouvoir de développer l'animal dans différentes directions. Ce pouvoir de l'homme n'est cependant pas illimité, et certaines influences du milieu doivent être soigneusement prises en considération, lorsqu'il s'agit du choix du type d'élevage en général, et du type d'animal en particulier.

La relation homme-animal peut être représentée par une roue. Dans cette représentation l'homme est l'essieu autour duquel tout tourne, cependant que l'animal est le moyeu de la roue.

La gestion peut être considérée comme le lubrifiant qui permet la relation homme-animal de se faire facilement. Le milieu où vit l'animal forme la jante de la roue qui est reliée au moyeu, par un certain nombre de rayons, qui à leur tour représentent les différents facteurs du milieu.

L'homme a commencé à élever des animaux dans des conditions artificielles. Ce faisant il les a forcés à l'extrême dans certains ordres de production. La gestion de l'homme est donc devenue nécessaire à la survie des animaux à haute production.

L'alimentation, ainsi que le métabolisme, forment le rayon le plus important de la roue.

La température exerce une influence énorme sur l'animal. Ainsi p. ex. a-t-on découvert que lorsque des races européennes de bétail sont exposées à de hautes températures, la glande hypophyse de ces animaux est endommagée, ce qui affecte sensiblement leur pouvoir de croissance et de reproduction. Il a cependant été découvert que les animaux à poils courts et brillants, sont mieux adaptés aux conditions tropicales et subtropicales que les animaux à poils longs et laineux.

L'irradiation par rayons solaires peut provoquer une hyperkératose de la peau chez des animaux à peau non pigmentée. Une peau épaisse et pigmentée est donc nécessaire là où les animaux sont soumis à une forte insolation.

Des variations dans la longueur de la lumière du jour agissent comme stimulant pour la mutation des poils. Lorsqu'un animal mue tôt, cela indique de bonnes conditions alimentaires, et un système endocrine actif; de tels

animaux sont alors supposés être des producteurs efficaces.

Du fait de la faible concentration en oxygène à de hautes altitudes, on trouve là des animaux dont le sang contient un nombre relativement plus grand d'érythrocytes; cette caractéristique permet une absorption plus rapide d'oxygène.

Il a été découvert que des animaux qui jouissent d'un niveau alimentaire élevé, manifestent une résistance aux parasites internes supérieure à celle d'animaux recevant une alimentation inférieure, nonobstant l'emploi d'antihelminthiques. On ne veut pas impliquer ici que l'emploi des antihelminthiques que nous donne la science est erronné ou inefficace, mais bien qu'il y a d'autres méthodes tout aussi importantes, de lutte contre les maladies.

Des observations sur du bétail montrent que dans milieux à hautes précipitations et à haute humidité, on recontre des animaux plutôt petits et avec une grande surface cutanée.

La fertilité du sol et le degré d'acidité (pH) du sol ont une grande influence sur la nature de la végétation, et aussi sur l'animal lui-même, si l'on considère que les ruminants sont dépendants de la végétation ambiante pour leur nourriture. Ainsi p. ex. remarque-t-on que dans les régions à hautes précipitations, le sol, et donc aussi la végétation, est généralement pauvre en calcium. Les animaux, dans de telles régions sont généralement plutôt petits, parcequ'ils n'y disposent pas d'une quantité suffisante de minéraux essentiels, pour pourvoir développer un grand squelette.

Il faut mettre l'accent sur le fait que ces facteurs du milieu n'agissent pas de façon individuelle, mais bien qu'il existe une interaction bien définie entre eux, et que par conséquent ils exercent une grande influence les uns sur les autres. Dans la nature, ces facteurs s'influencent les uns les autres pour former finalement un équilibre. L'animal que l'on veut détenir dans un milieu bien défini, doit être adapté par cet équilibre de facteurs.

En fin de compte, il faut, pour obtenir une bonne production, sélectionner en vue de l'adaptation et en vue des facteurs qui influencent l'adaptation.

Avec le bétail à viande, dans les régions subtropicales, il est donc nécessaire de sélectionner pour ce qui suit:

1. Adaptabilité.
2. Poils courts et brillants.
3. Peau épaisse.
4. Individus muant tôt.
5. Rapidité de croissance.
6. Efficacité dans l'emploi de la nourriture.
7. Fertilité.

