GENESIS OF THE BONSMARA

By the late Professor. Jan C. Bonsma

The main problem of Livestock production in the tropics and sub-tropics the world over was what was known as the tropical degeneration syndrome amongst the Bos Taurus breeds of cattle. The British breeds of cattle namely the Shorthorn, Hereford, Aberdeen Angus and to a lesser extent the Sussex, could not thrive under the sub-tropical conditions of the ranching areas of South Africa where the average isotherm is above 20° C.

Before 1940 it was considered that tropical degeneration of the British breeds was caused by malnutrition. The protein content of the natural pastures in the Southern hemisphere is low and during late summer and early winter it drops to a critical low level.

As a result of that fact that poor nutritional conditions were considered to be the cause of tropical degeneration, a large scale nutritional experiment was launched at the Messina Livestock Research Station in 1937.

Eighty-four head of beef cattle of the British beef breeds were divided into three groups of 28 heifers each. The first group (H) received a protein supplement of 24 percent digestible protein, the second group (L) received a 12 percent digestible protein supplement, both supplements had exactly the same energy value. The third group (K) received no supplement at all.

At the end of the first supplementary feeding period, which lasted from July 1 until December 1, there was no significant difference in weight among the three groups.

Each group consisted of 16 Herefords, 8 Shorthorn and 4 Aberdeen Angus heifers.

At that time Bonsma became well aware of the fact that tropical degeneration of the British breeds of livestock was not due to a nutritional deficiency.

In each group of heifers were individuals that thrived appreciably better than others. With the work Albert Rhaod did with livestock at Jeanerette Research Station, Louisanna, U.S.A. on mind, the author decided to do climatological tests on the 84 British breed heifers. Twelve Afrikaner heifers were included in this project.

Careful observation proved that the heifers, which showed least climatic stress thrived the best. Those animals which showed symptoms of stress on hot days had a very high respiration rate, they panted and their tongues hung out and they dribbled Professorusely.

From December 1937 onwards body temperatures were taken and respiration and pulse rates were counted once a week on various heifers, every two hours of the day from 06h00 to 18h00 and occasionally from 06h00 to 06h00 the next day. All animals in the experiment at Mara and Messina Research Stations were weighed at least once a month, and fourteen body measurements were taken on each animal, from birth throughout its productive life at the Research Station.
As a result of that, Bonsma wanted to MEASURE every aspect of the livestock that he worked with. He made numerous observations on his experimental animals, again from weight, body measurements, body temperatures, pulse and respiration rates, hair counts per square centimetre and tick counts.

The hair diameters were determined with a lanameter and the complete hair coats of different types of cattle was shorn off close to the body, weighed and put through a felting machine at a hat factory in Johannesburg.

These elaborate tests on the hide and hair of cattle proved beyond a doubt that the hide and coat cover plays a tremendous role in the process of heat dissipation.

The ease of heat dissipation is of the utmost importance in enabling the animal to maintain its thermal equilibrium in the hot environment of the tropics and sub-tropics.

At the time of the climatological research work at Messina Research Station, the breed creation work at Mara Research Station was also in progress.

The late Professor. A.M. Bosman instructed J.C. Bonsma who was in charge of the research work on both experimental stations, to create a breed similar to the Santa Gertrudis breed of cattle at King Ranch, Texas, namely 5/8 British beef breed (Exotic – E) and 3/8 Afrikaner (Bos indicus – A)

Four hundred specially selected Afrikaner cows at the Mara Research Station were divided into five groups of 80 cows each. Each group of 80 cows was sub-divided into two groups of 40 cows each. The ten groups of 40 cows were mated to five types of British beef breed bulls (Exotic – E) namely (1) Red Aberdeen Angus imported from Scotland (2) Hereford (3) Red poll (4) Shorthorn (5) Sussex

All the cow herds were placed with the different breeds of bulls, and each group was rotated annually so that all five breeds of bulls were mated to the respective Afrikaner cow herds.

As a result of that, Bonsma had cattle in all stages of up-grading from Afrikaner and Sanga (native cattle) to Aberdeen Angus, Hereford, Shorthorn and Sussex, animals of these types were incorporated in the climatological test. As a result of the tests on these animals with varying percentages of Bos indicus (A) and Bos taurus (Exotic – E) blood, it became obvious that tropical degeneration was nothing else but chronicl e malfunction caused by hyperthermia in those animals that would not dissipate excessive metabolic heat readily.

Animals that suffer from hyperthermia have an increased respiratory and pulse rate with concomitant metabolic, physiological and endocrinological disturbances.

In an effort to maintain a normal body temperature the animal takes voluntary reactions such as standing in the shade, standing up to the belly in water and reducing its appetite, with the result that the animal is chronically malnourished. This condition suppresses the normal reproductive function.
The climatological research work carried out at the Messina Research Station proved beyond any
doubt that the hair and hide of the bovine plays a tremendous role in the animals ability to
dissipate excess body heat readily. Animals with a respiratory type of body conformation, a wide
forehead and convex Profile are much better adapted to the tropics and sub-tropics than animals
with a digestive type of body conformation and a dished forehead and Profile.

Comparative physiologists have shown the desert-adapted ruminants such as the Gemsbok cease
to sweat when deprived of water but pant rhythmically for many hours. This panting results in
evaporative cooling of the mucous membranes which line the nasal sinuses and consequently,
cool the venous blood which drains from these areas.

The cooled venous blood in turn, flows past the hot arterial blood from the core of the body in a
net-work of blood vessels, the carotid rete, just beneath the brain. The net result of this intricate
arrangement is that flowing past the cooled venous blood cools the hot arterial blood before it
enters the brain and the temperature of the brain remains well below the critical maximum.

If we accept this explanation and it has been convincingly shown in several critical experiments,
then it is only logical that the larger the surface area of the nasal sinuses, the greater the surface
area available for evaporative cooling during panting.

It would seem reasonable therefore, to assume that cattle with broad heads and a convex Profile
(Roman nose) would be able to cool their brain tissue more effectively than those with narrow
heads and a concave Profile.

The fact then that Afrikaner cattle, which are extremely well-adapted to hot and arid conditions,
also possess relatively large, broad heads with a convex Roman Profile, appears to be of great
importance to their physiological adaptation, and not merely a fancy point dreamed up by cattle
breeders.

Similarly, among wild ruminants one finds the example that the Wildebeest, which never sweats
and relies solely on panting to keep its brain temperature below critical limits has an extremely
large head with greatly enlarged nasal sinuses and a convex Profile.

In assessing the importance of the above phenomenon it should be borne in mind that brain tissue
is particularly sensitive to high temperatures and only a slight rise in temperature above the
critical maximum results in impaired function. Moreover, the importance of the brain co-
ordinating in so many functions, including reproduction, appetite, metabolism, growth and milk
production, cannot be overemphasized.

Only after the climatological data on various types of cattle were submitted to the late Professor.
A.M. Bosman, could the author convince him that the proportion of blood in the new breed to be
established should be just the opposite of the Santa Gertrudis namely, 5/8 Afrikaner (Bos
indicus A) and 3/8 British beef breed (Bos Taurus Exotic E).

At this stage of the breed creation project it was not possible to decide which of the British beef
breeds gave the best results when cross-bred to Afrikaner cows.
The reason why it was decided that the proportion blood in the new breed should be 5/8 Afrikaner (A) and 3/8 British beef breed (Bos Taurus – Exotic E) was that the climatological data presented to the late Professor. A.M. Bosman showed that most of the cross-bred animals at Messina Research Station graded up from Bos indicus to Bos taurus showed symptoms of tropical degeneration due to hyperthermie and the result chronicle malnutrition, as soon as they were upgraded to beyond F1. Most of the cattle that went beyond the (½ + ½) stage towards the British beef breed exhibited symptoms of distress on hot days.

The Breed Creation Work at the Mara Research Station:

The breed creation research work at Mara commenced in 1937, before Bonsma was really aware of which factors were involved in making an animal adapted to the tropics and sub-tropics. Fortunately it was decided before 1940 that the “new” breed should be 5/8 Afrikaner, 3/8 Exotic. The decision was not based on imaginary or hypothetical ideas, but on accurate climatological data taken on numerous animals.

Fortune smiled on us in the selection of our first two Shorthorn bulls, “Imvani Ferule” and “Imvani Footprint”, both bulls were roomy bulls of tremendous length with the smoothest hair and thick, vascular hides. The Hereford bulls used in the original cross-breeding “Bromfield Gower” “Vaalbosch Renown” and the sons of “Freetown Virginian” bought from the late Mr. Hamilton at Val. Transvaal, were also very smooth-coated, roomy bulls with long bodies of a more modern type than the present day American and British Hereford bulls.

During 1938 Bonsma developed a method of scale photography of experimental animals which was far more accurate than that used by British and American research workers. Bonsma’s scale photography was based on the actual linear body measurements of cattle, while the British and American research workers placed the animals opposite a grid.

All the foundation animals used in the breed creation work were regularly photographed to scale, and this enabled the author to illustrate the complete genealogy of the “breed.”

It is a fact that the goddess of goof fortune smiled upon us in the selection of our original Hereford and Shorthorn foundation sires. These bulls had all the characteristics of hair and hide which enabled animals to overcome the problems of sub-tropical climatological conditions. These characteristics were later found to be of great importance in selecting animals for sub-tropical adaptability, and tick repellency.

This good fortune allowed us to explore the concept of additive gene effect, as a matter of fact we effected a situation superior to super-dominance by selecting the breeding animals in the parental breeds for the following characteristics :-

Smooth-coatedness, thickness of hide and well-developed subcutaneous muscling.

Outstanding beefiness in both parental breed.

Good milk producing cows.
Bulls were used from highly fertile dams.

Serious attention was given to temperament.

The F1 animals, that is the first-cross animals used for further breeding work were selected to resemble the sire-type animal with regard to body confirmation, beefiness and temperament. All the first cross animals were smooth-coated. The F1 Shorthorn cross Afrikaner bull No 98 illustrated in mating 3 was an exceptionally long bodied bull, well fleshed and had a strong broad masculine head. Since 1940 all the F1 bulls intended for future breeding work were performance tested.

Bull No 98 was the son of “Imvani Ferule” weighed 1790lbs at three years of age and 1970lbs at four years of age. He was of the E type (Exotic) and was mated to Afrikaner cows (A type ) to produce e/4 Afrikaner, ¼ Shorthorn cattle – mating 3. The Hereford cross Afrikaner bull No 67 of the E type was also mated to Afrikaner cows, A type mating 4, to produce 3/4 Afrikaner, ¼ Hereford progeny. This method of selection was adopted to maintain hybrid vigour in the subsequent crosses beyond F1.

To obtain large numbers of > Afrikaner, < Exotic (Bos Taurus) type cattle the carefully selected F1 Shorthorn cross Afrikaner and the F1 Hereford cross Afrikaner bulls were used on Afrikaner cows. The reciprocal crosses were all made mainly Afrikaner bulls of both Shorthorn and Hereford crosses, again selecting for A and E type cattle.

The Afrikaner bull – “Mara Deep Damascus” which was used on many F1 Shorthorn cross Afrikaner and Hereford cross Afrikaner cows was the son of “Marshall Bale Damascus” and “Leeubult Deep” a highly fertile cow with beautiful deep confirmation, a beautiful udder and good milk producer.

The bull, “Mara Deep Damascus”, was subsequently used in the Potchefstroom Agricultural College, Afrikaner stud herd. In performance tests his progeny outstripped the progeny of all other Afrikaner stud bulls used, with regard to A.D. G. and later with regard also to fertility.

Mating 7 was that of 75% Afrikaner, 25% Shorthorn bulls, A type, on F1 Hereford cross Afrikaner (E type) cows to produce in this case 5/8 Afrikaner and 3/8 Exotic (3/16 Shorthorn + 3/16 Hereford). It was decided to include both Hereford and Shorthorn blood in the 5/8 Afrikaner and 3/8 Exotic where possible, because Hereford is the best grazing animal of the British breed with a wonderful temperament and utilizes sour veld exceptionally well. The Shorthorn on the other hand is a better milk producer, earlier maturing and utilizes sweet veld exceptionally well.

The mating 7, that is, the 75% Afrikaner + 25% Shorthorn bull 170 (A type) mated to 50% Shorthorn + 50% Afrikaner cow H318 (E type) produced the famous foundation sire N406 (5/8 Afrikaner + 3/8 Shorthorn). The bull 170 was the half brother to No 171 see mating 7.

The mating No 8, that is, F1 Shorthorn cross Afrikaner No 98 (E type) was mated to 75% Afrikaner + 25% Shorthorn cow E306 (A type) to produce the most famous foundation dam L305 (5/8 Afrikaner + 3/8 Shorthorn).
The mating 7 and 8 produced the type of cattle, 5/8 Afrikaner + 3/8 Exotic.

Mating 14, that is N406 later known as “Edelvaar” (“Honourable Father or Sire”) to L305 produced the most famous foundation sire of the breed “Mara Edelheer” (“Mara Honourable Gentleman”) T342.

The dam of “Mara Edelheer” T342, L305 was a highly fertile cow; at the age of nineteen years she had produced 17 calves.

The sire of “Edelheer”, N406 was an astounding individual he had good size, exceptional length and capacity and was extremely well fleshed. He had four very sound legs, a beautiful hide and hair, was highly fertile and was still extensively used at the age of fourteen years.

“Mara Edelheer T342 is probably one of the best made bulls of any breed the author has ever seen. This bull was vigorous, he was his dam’s fifth calf and weighed 510lbs at weaning. He had tremendous libido, when he was four years old he settled 85 cows during a 2½ months service season.

From matings 9, 10 and 11 onwards we no longer speak of the resultant progeny as 5/8 Afrikaner 3/8 Exotic, but BONSMARA, a full-fledged breed.

The Bonsmara is the only breed in the world that can boast a pictorial genealogy from the very start of the breeding work until the full-fledged Bonsmara breed was established. It is also the only breed in the world where every mating was based on scientific date, where the concept MAN MUST MEASURE was always taken into consideration nothing was based on guesswork, or based on worthless antiquated show standards.

The scientific data used in the breeding work were based on climatological data and adaptability measured in terms of performance testing. The data included 14 body measurements taken quarterly, monthly weights and A.D.G. were determined.

Measurement of Growth by Monthly Mass Determination

Milk production was determined by measuring the calf’s growth and weaning weight and also by measuring the actual milk intake of the calf by weighing it before and after suckling. That is how we established that an average of 6kg milk production per day over a 205 day lactation period is the optimum for a ranch cow.

Fertility was measured by keeping a record sheet for every female kept in the herd and any cow that skipped two calves in 8 years was slaughtered.

Body confirmation is based on a subjective evaluation by candid observation, but in the case of our experimental animals fourteen body measurements were taken on each animals from birth to maturity or until it was eliminated from the herd. The records and data taken from point 4 and the handling and measuring of thousands of animals under point 5 enabled Bonsma to formulate the concept of judging livestock for Functional Efficiency.
Temperament was measured by doing tractability tests on free-grazing animals. Approaching animals between the individual and the grazing animal before it walks away did this. The behaviour of the animals in the measuring pen where they were intimately handled gave a very good indication of an animal’s temperament.

Longevity is a measurement very much neglected in the past. Most commercial cattle producers culled their brood-cows at the age of 8 or 10 years. In our breed creation work cows were kept in the herd as long as they could produce a good calf annually and did not lose too much condition, more than 20% of their weight at the time of calving. Our young cows often lost less than 10% of their weight during the suckling period. If an animal can satisfy our standards of longevity she cannot have a “locus minoris resistentia” and must be functionally efficient.