

PERFORMANCE REPORT

BEEF LOGIC

by Bob Long

How Cattle Grow — The Skeleton

The skeleton is composed of bone — a highly specialized form of connective tissue. It serves as a rigid framework to support the internal organs, as an attachment for the muscles, as a storage for minerals particularly calcium and phosphorus, and as a site for red blood cell formation.

Certain connective tissue cells form bone directly while others first form cartilage which changes to bone as the animal grows and matures.

The "long bones" which form the legs, both fore and rear, grow in both circumference and in length. The increase in length takes place at the epiphyseal plate or breakjoint at each end of the bone. As the animal matures sexually (puberty) the increased production of sex hormone, either male or female, causes the calcification or hardening of the epiphyseal plate and the bones stop increasing in length. Therefore, if we have identical twin bull calves and castrate one and not the other their leg bones grow differently. At puberty (8 to 12 months of age) the bull calf's legs stop increasing in length while the steer twin's long bones continue to grow for a period. This results in the steer twin being taller.

This growth pattern in the legs is not the same for the spinal column (backbone), which not only continues to grow after puberty but grows at an increased rate. This expanded growth rate at puberty is due to the increased production of the male sex hormone testosterone. Therefore, when we compare the identical twin steer and bull, after puberty of the bull, the steer is taller but the bull is longer.

This fact points out the inaccuracy of using height at the withers or hips as a measure of frame size. Further it dictates that in measuring frame size we must compare bulls with bulls and steers with steers.

Skeletons also grow proportionately. The entire spinal column, which extends from the base of the skull through the tail, grows in concert. Therefore, the various segments are a constant percentage of the total length of the spinal column. A small framed animal has a shorter spinal column than a larger framed one but the neck or any other segment of the backbone is a constant percentage of total length.

It is common in the cattle industry to hear people refer to differences in length of neck, back or rump as a method of evaluation. The implication is that a certain animal is superior because it has a greater or lessor percentage of its length in a certain segment or area. This is simply not true. Such opinions are the result of inaccurate observation resulting from illusions caused by difference in slope of shoulder, muscular development or fat deposition.

Invalidation of this commonly held belief should not be a disappointment. On the other hand, it is good news since we no

longer need to concern ourselves with such imagined differences.

Another often used measure of excellence in cattle is a visual appraisal of the amount of bone. We often hear the statement, "I like him because he has more bone," or, "He is more rugged in his bone." Such descriptions of live cattle fail to consider the following facts:

1. Circumference of the leg of live animals between the knee and the ankle or between the hock and the ankle is not a measure of bone but of hair, hide, connective tissue, tendon and bone.

2. Circumference of bone does not measure either thickness of the wall of the bone or the density.

3. Within a group of cattle of considerable difference in weight and very little difference in muscular development it is true that as total weight increases the weight of the bone increases. Also, the weight of the muscle increases. Therefore, in this case bone is positively correlated with muscle. However, so is the weight of every other portion of the body. It is a function of size. Big trucks have big tires. Big steers have big eyes and big feet. The fact is that muscular development is not necessarily associated with bone. Among slaughter steers of similar weight and wide differences in muscle: bone ratio the bone may be heavy or light, large or small and dense or porous throughout the group with no association with the amount of muscle.

4. The percentage of bone varies very little among beef cattle — only about 11 to 16 percent with a 5 percent range. The variation in fat or muscle is much greater.

In summary, if the percentage of bone varies only slightly and it cannot be measured without dissection of the carcass and it is not an indication of muscling it makes no real difference. It is not a trait to consider in the evaluation or selection of cattle for slaughter or breeding.

Keep these facts concerning the skeleton in mind. The next column will be devoted to how muscle grows. After we have established how bone, muscle and fat each develop we will put it all together as a basis for the visual evaluation of cattle composition and as a basis for USDA grades of feeder cattle.



Bob Long

We Welcome Your Input



Our Performance Report has been expanded to include more information for today's performance-minded breeder. Both "Beef Logic" by Bob Long and the "What's Your Beef?" columns serve as a forum for Angus breeders and industry experts to express their opinions on current issues and topics of breed improvement and performance programs.

Look for our "What's Your Beef?" column in July, where a breeder panel will tackle the question, "What is moderate cow size and how do you maintain it?"

If you have a topic or question you'd like to suggest for either column, please contact the editorial office at (800) 821-5478 or fax (816) 233-6575.