Webster defines type as being: "A particular kind, class or order," and "a model; standard." Anderson in his book "Introductory Animal Husbandry" defines type with reference to livestock as that which denotes a kind of form, shape, conformation, or general appearance which is related to utility, or a typical form common to a number of individuals of a kind or species. Vaughan in his book "Breeds of Livestock in America" defines type as an ideal or standard of perfection combining all the characters which contribute to the animal's value and efficiency for the purpose specified.

When we speak of cattle types we may refer to the ideal type of the various breeds, or we may refer to type within a breed, such as the "comprest" vs. the "regular" or "conventional" type.

Current show ring standards play a major role in shaping the type of beef cattle produced. Since 1941 the grand champion steer and champion carload lots have been of the comprest type, but in the last few years this type seems to be declining in popularity among breeders and feeders. However, small, refined cattle are still being raised, in spite of the fact that feeding trials and type studies have consistently shown that larger framed, roomier middled cattle make best use of roughage and forage. It appears that the trend in the future will be to produce more beef from green and cured roughage.

There has been considerable research done to determine the effect of type upon the carcass. Stonaker, Hazaleus et al., at Colorado A. & M., studied the comprest vs. the conventional type Hereford and found the conventional type was significantly higher at the .01% level in per cent of chuck, rib eye area and dressing per cent and significantly higher in per cent of rib at the .05% level. Willey, Butler, et al., at Texas A. & M. ran a similar experiment and found only the per cent of Shank to be significant at the .05% level. Matsushima and Anderson compared Hereford, Red Poll and Holstein steers in determining the variations in fattening performance of these three types and found the Hereford to have a thicker layer of fat over the rib eye muscle. The Red Poll had a very uniform layer of fat of less thickness over the rib eye, a higher increase of lean content in proportion to the other extract and a greater decrease in percentage of bone. The Holstein had the greatest increase in fat content and a more uneven covering of fat. Work done at Michigan State comparing beef type to dairy type showed the beef type carcasses to be highly significant in the per cent of fat and boneless meat, whereas the dairy type was highly significant in the per cent of lean. Patterson, Jones, et al., at the Texas Station have found that there is practically no relationship between type score and rate of gain, but the initial grade and final grade were fairly highly correlated (+.72%). This study included 1400 young breeding cattle.

Beef type varies from one section to another with climate playing an important role. In the South and Southwest, Brahman and Santa Gertrudis are quite popular because of their ability to withstand heat. There is no question
but that they are a distinct type from the British breeds which are very popular in the West, Midwest and East. The British breeds are popular in the South and Southwest, too, but I think we find more crossbreeding in these areas than other areas of the United States. In the North Central Region crossbreeding is being done but with a different idea in mind than we have in the Southwest. They are using the Scottish Highlander on Hereford and Angus cows to put more hair on the cattle so as to withstand the severe winters. I do not know of any carcass work that has been done of this beef type. In the South and Southwest the breeders are inclined to select for a light hair coat for which the Brahman and Santa Gertrudis are noted.

I would like to present some results we have obtained in our meats laboratory at Texas A. & M. last month on what I consider three distinct types of beef cattle. We slaughtered 44 steers from our Bluebonnet Farm at McGregor, Texas, that had been on a short feeding trial of 150 days. This was a part of the progeny testing program being conducted at that Station. These steers were all out of Hereford cows sired by Hereford, Brahman, and Santa Gertrudis bulls. They all received the same management treatment. We collected detailed slaughter and cutting data on these steers, and Table I summarizes some of the information obtained.

TABLE I

CARCASS CHARACTERISTICS OF THREE TYPES OF BEEF CATTLE

<table>
<thead>
<tr>
<th>Components</th>
<th>Hereford</th>
<th>Brahman x Hereford</th>
<th>Santa Gertrudis x Hereford</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (days)</td>
<td>435.00</td>
<td>427.00</td>
<td>437.00</td>
</tr>
<tr>
<td>Slaughter Wt. (lbs.)</td>
<td>740.78</td>
<td>795.05</td>
<td>801.00</td>
</tr>
<tr>
<td>Chilled Carcass Wt. (lbs.)</td>
<td>446.50</td>
<td>501.25</td>
<td>494.33</td>
</tr>
<tr>
<td>Dressing Per Cent</td>
<td>60.25</td>
<td>63.05</td>
<td>60.71</td>
</tr>
<tr>
<td>Chilled Wt. Per Day of Age (lbs.)</td>
<td>1.03</td>
<td>1.17</td>
<td>1.13</td>
</tr>
<tr>
<td>3rd Spinous Process (cm)</td>
<td>17.0</td>
<td>21.07</td>
<td>18.6</td>
</tr>
<tr>
<td>Forequarter %</td>
<td>50.25</td>
<td>49.86</td>
<td>50.82</td>
</tr>
<tr>
<td>Hindquarter %</td>
<td>49.75</td>
<td>50.14</td>
<td>49.18</td>
</tr>
<tr>
<td>Rib %</td>
<td>9.14</td>
<td>8.99</td>
<td>8.52</td>
</tr>
<tr>
<td>Chuck %</td>
<td>24.89</td>
<td>25.09</td>
<td>24.07</td>
</tr>
<tr>
<td>Short Loin %</td>
<td>7.47</td>
<td>7.32</td>
<td>7.39</td>
</tr>
<tr>
<td>Loin End %</td>
<td>8.19</td>
<td>8.06</td>
<td>8.01</td>
</tr>
<tr>
<td>Round, Rump Off %</td>
<td>20.31</td>
<td>20.90</td>
<td>20.55</td>
</tr>
<tr>
<td>Total Major Cuts %</td>
<td>70.00</td>
<td>70.36</td>
<td>68.54</td>
</tr>
</tbody>
</table>
Statistical treatment has not been given any of this data; therefore, reference to significance will not be made. I think it is obvious in Table I that percentage averages tend to cover up great differences one sees in the live animal. Standard cutting test was run on all these steers as approved by the Reciprocal Meats Conference. Percentage wise the differences are slight. The Brahman-Hereford cross seems to have the greatest advantage over the other two types, especially in slaughter weight, chilled carcass weight, and dressing per cent. The Santa Gertrudis-Hereford cross was also heavier and dressed higher than the Hereford. The cut-out percentages are very similar, but if the Brahman-Hereford cross and Santa Gertrudis-Hereford cross will cut the same percentage of cuts at an earlier age, with a higher dressing per cent and at a heavier weight, it will mean quite an asset to the South and Southwest. We made a measurement at the third spinous process, since the crossbreds seemed to have a deeper chuck and rib, and found the Brahman-Hereford crossbreds averaged 4 centimeters longer at this point. The Santa Gertrudis-Hereford crossbreds were 1.6 centimeters longer at the third spinous process. We do not know if this is of any significance, but by standard cutting methods it does cut a longer rib and chuck. There are some carcass characteristics not shown in Table I that are very obvious, such as length of body and length of leg, the Brahman-Hereford cross being longer of body and leg than either of the other two types. The Santa Gertrudis-Hereford cross falls in between the Hereford and Brahman-Hereford cross. Separation of the 9-10-11 rib of the 44 steers indicates the crossbreds have higher percentage of lean and a lower percentage of fat. The Santa Gertrudis-Hereford has a higher percentage of bone.

I would like to show a few slides, which I think will illustrate quite well the three types of cattle and the differences in their carcass characteristics. The Brahman and Santa Gertrudis have been criticized for having a sloping rump and being heavy in the forequarter. These crossbreds are level and long in the rump and equally balanced in the forequarter. They seem to distribute their weight quite well, which is apparent in Table 1 on the percentage of cuts.

In summary, previous work shows that type within a breed affects the per cent of chuck, per cent of rib eye area, per cent of rib, per cent of shank, length of body and length of leg. Type between breeds affects the fat covering over the rib eye muscle, fat content, per cent of lean, per cent of bone, length of body, length of leg, length of spinous process and dressing per cent. I would say that more research should be done before definite conclusions can be made as to the effect of type upon carcass characteristics.

References


---

MR. ADAMS: Thank you, Gene. That was a very nice paper on the importance of type and how it affects the carcass.

We planned to go all the way to Canada for a person to discuss the topic, but Mr. Stillwell wrote to me and sent his regret that he would not be able to be in attendance with us and he wanted to be remembered to all of you fellows here at the reciprocal meat conference.

In his place we have asked Mr. Bernard Haasl, of the University of Wisconsin, to lead the discussion on Mr. King's paper.

MR. HAASL: Thank you, Mr. Chairman.

Since I don't have anything to add to this paper, I think we will just open it for discussion, comments, and questions from the floor, and probably Mr. King can answer your questions. Are there any questions or comments?

MR. KEMP: I have a comment, not particularly on this paper, but generally. Mr. Acker mentioned some of the work that we have been doing. So I thought I would just throw out a comment or two about that work and this manual. Gene King did a little of it before he left, and there has been about three year's work done since he left.
We found by having these calves dropped in the winter and by leaving them on the cow, with good management so that we get them 600 pounds and above, they make a very acceptable carcass both from the consumer's standpoint and from the packer's standpoint. However, if they don't use good management they are not accepted too well.

Another point is the mention of possible correlation between marbling and vitamin A deficiency, and the possibility of marbling being due to improved feeding. With our newer knowledge of feeding is our grading standard keeping pace with our feeding? I have seen several cattle lately, not of these calf type that we have been talking about, but of properly bred cattle of the beef type that have excellent confirmation, plenty of outside finish, which looked as if they would cut beautifully, but having little or no marbling. They have a nice consumer acceptance because most of them are very palatable from what reports I get. We don't have any tests on them, but they haven't been turned down on that account. Yet they will not go into choice grade, and they have been discriminated against.

I am just wondering if there has been any thought on that with regard to our present grading standards.

MR. BRATZLIER: One or two questions. I believe that differential in hindquarter weight was the Santa Gertrudis. Was that characteristic of the lot and also did you apply prices to see how much more, with the big spread in the hindquarter, the price was? I am wondering whether you have any idea about that.

MR. KING: No, Lyman, we didn't apply prices, and that was true of this group of cattle. I might say that of the 44 head there were only six Santa Gertrudis Hereford crosses, and it was typical of the six.

MR. COLE: I notice that you have a pretty big difference in dressing percentage. Do you have any reason for that to throw out in this meeting?

MR. KING: Well, the Brahman-Hereford, Mr. Cole, had smaller G. I. tracts. I might say that the weights were taken at the DuPont station when they left McGregor. They were weighed in at our meats laboratory, and then they were reweighed the following morning before they were slaughtered. We have the shrink on them on the road or the in-transit shrink and the overnight shrink, and as someone mentioned earlier today that varies. Some of them shrunk very little coming down but had a terrific overnight shrink and vice versa.

MR. BUTLER: I should like to comment a little on both those things. We did empty the G. I. tract and weigh the contents and the main difference in yield is due to the weight of the G. I. tract. Also we weighed all the other dress-off items like you did on hogs. The main difference we noticed here compared with the hogs is that these cattle instead of being narrower in the chest for the lower weight of the G. I. tracts are deeper. That is, from the spinal column to the sternum they are deeper, and also they are deeper the other way, the dorsum.
Now with regard to Lyman's comment we have become a little disgusted with averages on these things, as averages have shown very little difference. I thought that it might be more fruitful for us to look for individuals and make a record of them. How does the carcass look and how does the individual look, and then try to select one that will be more consistent in the yield of heavier hindquarter or something like that.

The trouble with averages is that there is too much variability of type and confirmation within any breed selection. On vitamin A, we have been fortunate enough to have a good many vitamin A deficient cattle from the Spur substation. Perhaps many of you know that they pioneered a lot of vitamin A work with cattle and a considerable number of those cattle were slaughtered through our laboratory. We did not find any apparent correlation between marbling and vitamin A deficiency.

MR. ELLIS: There is a question about your rib-eye. You say that your area measurement is adequate for an indication of quality there. It may be that in the visual picture you are perhaps expressing something more than you got with measurements.

MR. KING: Would you restate that again, please?

MR. ELLIS: In connection with this rib-eye, do you consider that your measurement is an adequate expression of any differences that you really saw there in those rib-eyes? I raised the question because it looked to me like they were more desirable in some animals than in others.

MR. KING: To answer your question, no, I do not think that any one measurement is adequate for establishing quality.

MR. ELLIS: I am trying to differentiate between the measurement you got in terms of inches and what you thought of it as you looked at it.

MR. KING: The correlation between what we thought and area in length and width? Yes, I think the measurement as far as I was concerned would be highly correlated with visual inspection. What do you think, O.D.?

MR. BUTLER: Well, we ribbed the other side and traced that, too, and sometimes you get about as much difference between two sides of the same animal as two animals. That is with what skill we have managed to muster in ribbing these cattle, in following that twelfth rib I think we are inclined to place too much emphasis on the rib-eye of the one side. We found as much as two square inches difference -- is that right, Gene -- in the two sides of the same animal which, of course, was due to error in angle of the knife in following the rib or something like that. The areas given here were for the rib-eyes as shown there.

Are you suggesting that we measure length and width or something else?

MR. ELLIS: Well, I was just speculating as I saw the pictures there whether different contours had some meaning or not and showed up in the actual area measurement.
MR. BRATZLER: If you were measuring lean area of pork loin eye muscle, would you recommend measuring both pork loin muscles, that is, from both sides? Also lambs the same way? I am just wondering. It is very interesting that you have more difference between sides than you have between some of the cattle.

MR. KING: Well, Lyman, my experience is limited on that, with the exception of the work I did at Kentucky and this work I have done at Texas, but certainly from what we did at Texas, yes, because we found great variation. Well, as O.D. stated, as much as two square inches from side to side, and that must be an error in ribbing.

MR. BUTLER: Our data weren't all that bad. It was unusual for them to vary that much. In most cases the measurements were quite similar.

MR. BRATZLER: Is the extra work worth while?

MR. BUTLER: I will leave that up to you, Lyman. I think you get a better idea of the actual area of the longissimus dorsi at a certain point, but I think if you are doing large numbers your average error will be rather negligible. If you are doing a hundred immediately, I think it would average out.

MR. KING: I might mention here that the longissimus dorsi tracing was also made in the loin. Dr. Covert was taking so many steaks for cooking tests on these cattle, and I don't know -- some of them were traced from the table after the rib was removed. The right rib was traced from the table, but there was much less variation between the tracings done on the Shorthorn than there was in the rib-eye.

MR. HAASL: Mr. Adams says that we will have to dispense with further discussion, because we do have other papers scheduled on this program. Perhaps after the meeting is adjourned you gentlemen may get together and iron out your differences. So I will turn this back to Mr. Adams.

MR. ADAMS: Thank you, I know there are a lot of things that we could discuss, but we still have Dr. Clark to more or less wind up our discussion here today on beef carcass evaluation. I should like to call on him now to discuss, "Where Should Beef Carcass Research Go From Here?" (Applause)