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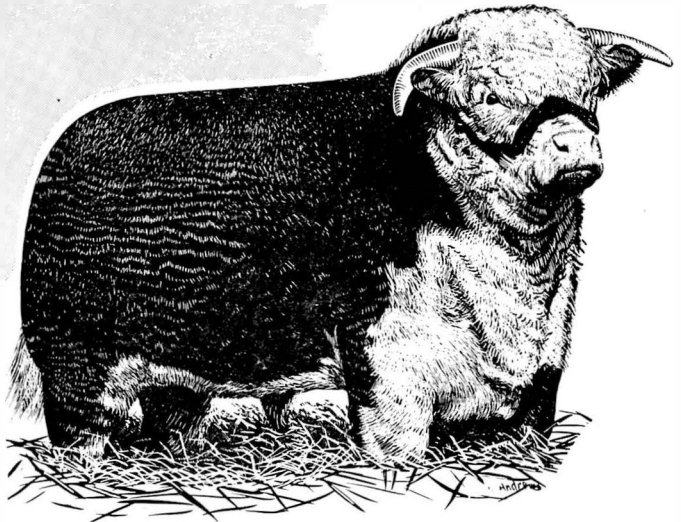
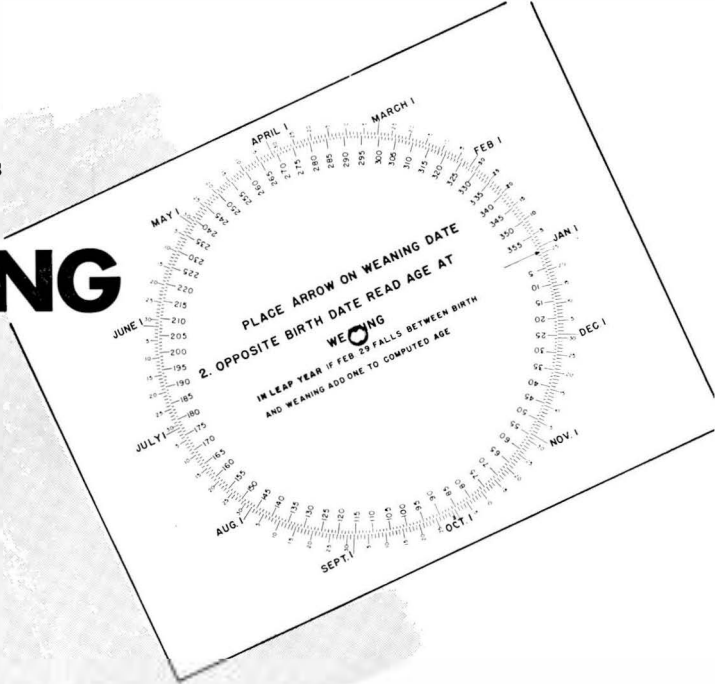
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INDEXING BEEF CATTLE



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Indexing Beef Cattle

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The primary purpose of this circular is to furnish some simplifications in the procedure presently in use in South Dakota for indexing beef cattle. As more data become available, these methods may change and in that event, supplements will be distributed. Such differences as exist between the short-cut methods presented here and those presently in use will be pointed out as they are taken up in the circular. The methods presented here are based on data taken in private herds in the state as well as in Experiment Station herds. Where there appeared to be a difference, data from private herds were used so that the results would be more widely applicable. This publication is not intended to replace the present Extension Service circular dealing with methods and procedures of performance testing. For details concerning methods, the reader should consult the circular available through the Extension Service.

1. WEANING WEIGHT INDEXES

Information Needed:

1. Birth date (within a week)
2. Weaning date
3. Weaning weight
4. Sex
5. Age of dam (not completely

necessary but strongly recommended for very young and very old cows)

Procedure: (Calculations should be made in the order given.)

1. Calculation of Age at Weaning

A circular computer is provided for this calculation. Set arrow in inner circle opposite weaning date and the age at weaning can then be read on the inner circle opposite the birth date on the outer circle.

Caution

In leap year if February 29 falls between birth and weaning, add one day to the calculated age. Caution is advised in using this computer if the period December 26-January 1 falls between birth and weaning. This computer was constructed on the basis of 360 degrees in a circle thus eliminating the last 5 days of the year. Any calculation involving this period will be in error by 5 days. This computer can be used for calculating the number of days between any two dates subject to the above limitations.

2. Calculation of Age-Adjusted Weaning Weight

A nomograph is provided for this calculation. Place a ruler on age at

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weaning on the left hand scale and on actual weaning weight on the right hand scale. Read adjusted weaning weight on the middle scale. The accuracy of these computations depends only on the accuracy in aligning the ruler and in reading the scales. For calves outside the age limits of this nomograph, the correction factors previously used are recommended. Copies of these factors can be obtained from the Agricultural Experiment Station.

3. Sex Adjustment

A. Adjusting to a bull basis (for purebred herds where bulls are kept)

(1) Add 45 pounds to heifer weights

(2) Add 30 pounds to steer weights

B. Adjusting to a steer basis (for herds not keeping bull calves)

(1) Add 15 pounds to heifer weights

4. Age of Dam Adjustment²

Age of dam	Amount to add to weaning weight (pounds)
2	60
3	40
4	20
5-8	0
9	10
10	25
11	35
12	50

The weights have now been adjusted for age, sex, and age of dam.

²The majority of these adjustment factors are taken from Koch and Clark, *Journal Animal Science* 14 (2):386-397, 1955.

These represent all the adjustments presently recommended, and comparison of these weights is more indicative of producing ability of the cow and genetic worth of the calf. To further simplify these comparisons, the following indexes may also be used.

5. Calculating Weaning Weight Index

1. First calculate the average adjusted weaning weight for the herd.

2. Determine how many pounds each calf is above or below the average adjusted weaning weight for the herd. This difference is the "deviation" listed in the first column of table 1. The second column gives the index for below average calves and the third column the index for above average calves.

Example: if a calf is 50 pounds above average, enter the table at 49-52 in the left hand or "deviation" column and under the heading "above average" read off the index of 87.

Discussion of Index

For most herds, this table yields an index value within 1 or 2 points of the value obtained by previously recommended procedures. In herds that are extremely uniform or extremely variable the difference will be greater; however, the calves will still be ranked the same under the two different methods.

Under this method the heaviest calf will not always index at exactly

100. For most herds it will be close to that figure but again in those extremely uniform or extremely variable herds it may be further off. This is not a disadvantage since all calves are ranked in the same order and the extremely good or bad animal is allowed to index according to his net value.

This type of indexing places the animal much like show ring judging places the animal, only in this particular case it is placed on weaning weight and given a number to indicate the placing. All placings are relative to 75 as average and in most herds the average index will be within rounding error of 75. This means that the net merit of a calf indexing 110 is further above the average than a calf indexing 95 to 100. It should also be indicated that the earlier method of indexing is similarly affected by the amount of variation in the herd; however, because the top animal is forced to fall at 100 regardless of his value with respect to the rest of the herd the effects of extreme variation may not be as apparent.

Type Score Index

The type score index can be obtained from table 2 in the same manner in which weaning weight indexes were obtained in table 1. Calculate the average type score for each calf after coding each score according to the following system:

Type Score :	Code Number
1+	15
1	14
1-	13
2+	12

2	11
2-	10
3+	9
3	8
3-	7
4+	6
4	5
4-	4
5+	3
5	2
5-	1

Then obtain the average type score of all calves in the herd. The deviation of each calf from the herd average will indicate his type score index. For example, if three judges scored two calves as follows:

Calf No.	Judge		
	1	2	3
1	3-	3-	4+
2	2	2+	2+

The coded scores would be:

Calf No.	Judge		
	1	2	3
1	7	7	6
2	11	12	12

The average score for calf 1 would be 20/3 or 6.67 and the average score for calf 2 would be 35/3 or 11.67. If the average score for all calves from this calf crop was 8.0, the deviation of calf 1 would be 1.33 below average and the deviation of calf 2 would be 3.67 above average. From table 2 the index for calf 1 is read as 65 and for calf 2 as 103.

Discussion

Selection of calves at weaning or culling of cows on the basis of the weaning performance of their calves can be based on any of the following methods:

Table 1. Weaning Weight Indexes

1. Weaning weight and type score of the calf
 2. Type score alone
 3. Weaning weight alone
- If the first method is used a simple average of the weaning weight and the type score indexes will rank the calves according to both weaning weight and type score.

This method of indexing type score differs from the previously used method in that each calf is ranked according to the average type score of the herd. Previously the score of the calf determined the index. There are advantages and disadvantages for both methods, but if the indexes obtained are to be used for improvement within the herd, the present method seems to hold the greatest advantage.

Rate of Gain Index

(For Purebred Herds Feeding Bull Calves on Performance Test)

Obtain the average rate of gain for all calves on test. Using the deviation of each calf from average, obtain the index from table 3.

Calculating Average Index for Performance Tested Bulls

Type scores given at the end of the performance test may be indexed as outlined under "Type Score Index" or according to previous recommendations. Previous indexing procedures have included weaning weight, rate of gain, and type score in the average index, and this average index is obtained by averaging the indexes for each characteristic. For example, a bull with a weaning weight index of 80, a rate of gain index of 85, and a type score index of 90 would have an average index of 85.

Deviation	Index	
	Below Average Calf	Above Average Calf
1-2	75	75
3-6	74	76
7-10	73	77
11-14	72	78
15-18	71	79
19-23	70	80
24-27	69	81
28-31	68	82
32-35	67	83
36-40	66	84
41-44	65	85
45-48	64	86
49-52	63	87
53-56	62	88
57-61	61	89
62-65	60	90
66-69	59	91
70-73	58	92
74-77	57	93
78-82	56	94
83-86	55	95
87-90	54	96
91-94	53	97
95-99	52	98
100-103	51	99
104-107	50	100
108-111	49	101
112-115	48	102
116-120	47	103
121-124	46	104
125-128	45	105
129-132	44	106
133-136	43	107
137-141	42	108
142-145	41	109
146-149	40	110
150-153	39	111
154-158	38	112
159-162	37	113
163-166	36	114
167-170	35	115

To calculate the index of calves with deviations larger than those listed above, multiply the deviation from average by .24 and add to 75 for calves above average or subtract from 75 for below average calves.

Table 2. Type Score Indexes

Deviation	Index	
	Below Average Calf	Above Average Calf
.0- .06	75	75
.07- .19	74	76
.20- .32	73	77
.33- .46	72	78
.47- .59	71	79
.60- .72	70	80
.73- .86	69	81
.87- .98	68	82
.99-1.12	67	83
1.13-1.25	66	84
1.26-1.38	65	85
1.39-1.51	64	86
1.52-1.64	63	87
1.65-1.78	62	88
1.79-1.91	61	89
1.92-2.04	60	90
2.05-2.17	59	91
2.18-2.30	58	92
2.31-2.44	57	93
2.45-2.57	56	94
2.58-2.70	55	95
2.71-2.83	54	96
2.84-2.96	53	97
2.97-3.10	52	98
3.11-3.23	51	99
3.24-3.36	50	100
3.37-3.49	49	101
3.50-3.62	48	102
3.63-3.76	47	103
3.77-3.89	46	104
3.90-4.02	45	105
4.03-4.15	44	106
4.16-4.28	43	107
4.29-4.42	42	108
4.43-4.55	41	109
4.56-4.68	40	110
4.69-4.81	39	111
4.82-4.94	38	112
4.95-5.08	37	113
5.09-5.21	36	114
5.22-5.34	35	115

To calculate the index of calves with deviations larger than those listed above, multiply the deviation from average by 7.58 and add to 75 for calves above average or subtract from 75 for below average calves.

Table 3. Rate of Gain Indexes

Deviation	Index	
	Below Average Calf	Above Average Calf
.0-.01	75	75
.01-.02	74	76
.03-.04	73	77
.05-.06	72	78
.07-.08	71	79
.09-.10	70	80
.11-.12	69	81
.13-.14	68	82
.15-.16	67	83
.17-.18	66	84
.19-.20	65	85
.21-.22	64	86
.23-.24	63	87
.25	62	88
.26-.27	61	89
.28-.29	60	90
.30-.31	59	91
.32-.33	58	92
.34-.35	57	93
.36-.37	56	94
.38-.39	55	95
.40-.41	54	96
.42-.43	53	97
.44-.45	52	98
.46-.47	51	99
.48	50	100
.49-.50	49	101
.51-.52	48	102
.53-.54	47	103
.55-.56	46	104
.57-.58	45	105
.59-.60	44	106
.61-.62	43	107
.63-.64	42	108
.65-.66	41	109
.67-.68	40	110
.69-.70	39	111
.71-.72	38	112
.73	37	113
.74-.75	36	114
.76-.77	35	115

To calculate the index of calves with deviations larger than those listed above, multiply the deviation from average by 52 and add to 75 for calves above average or subtract from 75 for below average calves.