Zollner

PROCEEDINGS

BEEF IMPROVEMENT FEDERATION

RESEARCH SYMPOSIUM & ANNUAL MEETING

May 5-6, 1983
Holiday Inn, Capitol Plaza
Sacramento, California

BEEF IMPROVEMENT FEDERATION
ANNUAL CONVENTION

May 5 and 6, 1983
Holiday Inn, Capitol Plaza
Sacramento, California

WEDNESDAY - MAY 4

6:00-
9:00 p.m.-REGISTRATION - Hotel registration area.
7:00 p.m.-Board of Directors Dinner Meeting.

THURSDAY - MAY 5

7:00-
9:00 a.m.- REGISTRATION - Hotel registration area.
8:30 a.m.-
12:00 noon- SYMPOSIUM, "SIRE EVALUATION AS A TOOL FOR CHANGE" - Roy Wallace, Chairman.
- "WHO HAS A STAKE IN SIRE EVALUATION?" -Max K. Herzog, Sleepy Hollow Cert. Milk Co., Petaluma, CA.
- GUIDELINES FOR SAMPLING YOUNG SIRES
- "HOW MANY BULLS SHOULD BE SAMPLED PER BREED" - Richard Willham, Iowa State Univ., Ames, IA

10:00 a.m.- Coffee Break - Sponsored by AI organizations.
- "THE BREEDER'S RESPONSIBILITY" - Henry Gardiner, Ashland, KS and Glenn Klippenstien, Maysville, MO.
- "THE BREED ASSOCIATION'S RESPONSIBILITY" - H. H. Dickenson, AHA, Kansas City, MO.
- "STACKING PEDIGREES" - Ancel Armstrong, New Breeds Industries, Manhattan, KS.

11:45 a.m.- CHARGE TO COMMITTEES - Steve Radakovich, BIF President.
12:00 NOON- LUNCHEON - Bill Borror, BIF V. Pres., Chairman. Welcome to Sacramento - State Senator Jim Nielsen. SEEDSTOCK AND COMMERCIAL NOMINEE INTRODUCTION - Jim Gibb and Roger McCraw.
1:30-
4:30 p.m.- COMMITTEE MEETINGS (Open meetings) - Attend the meeting of your choice.
- SIRE EVALUATION - Larry Cundiff, Chman
- LIVE ANIMAL EVALUATION - Dick Spader, Ch.
- CENTRAL TEST - Keith VanderVelde, Ch.
- SYSTEMS - Jim Gibb, Chairman.

2:30 p.m.- Coffee Break- Sponsored by AI organizations.
5:00 p.m.- Caucus for ELECTION OF DIRECTORS - Steve Radakovich in charge.
6:00 p.m.- HOSPITALITY HOUR - Sponsored by Red Bluff, Alturus, Sacramento, Reno and Phoenix, AZ Federal Land Bank Assns.
7:00 p.m.- AWARDS BANQUET: M.C.-Dave Nichols. Address: Steve Radakovich, BIF Pres. Entertainment: Jazz Beau's - sponsored by CEVA Labs, Inc.

FRIDAY - MAY 6

6:00 a.m.- BOARD MEETING.
7:00 a.m.- BREAKFAST - Sponsored by the Bank of America - Gailen Martin, V. Pres., Host. M.C. - Jim Gosey. "ARE WE MAKING ALL BREEDS THE SAME?"- Larry Cundiff, U.S. MARC, Clay Center, NE.
9:00 a.m.- COMMITTEE MEETINGS - Attend the meeting of your choice.
- REPRODUCTION - Roy Wallace, Chairman
- GROWTH - Gene Schroeder, Chairman
- UTILIZATION - Earl Peterson, Chairman

10:30 a.m.- Coffee Break - sponsored by AI organizations.
12:00 NOON- LUNCHEON - M.C. - Ken Ellis. "COWS & POLITICS" - Gordon Van Vleck, Director, California Natural Resources Agency.
1:30 p.m.- WINE COUNTRY TOUR - Tour the Beringer Bros. Winery at St. Helena, CA. (Register earlier @ $15.00)
5:30 p.m.- "BEEF & WINE" at the Winery, featuring California fed beef (complements of CA Cattleman's Assn. and Tehama County Cattleman's Assn.) and Beringer Bros. wine.
7:30 p.m.- Return to Sacramento.

PROCEEDINGS OF BEEF IMPROVEMENT FEDERATION

Table of Contents

TOPIC | PAGE

COMMITTEE REPORTS CONTINUED:

WHO HAS A STAKE IN SIRE EVALUATION

Max K. Herzog

The dairy industry has made tremendous genetic gains in the past 10-15 years and a lot of this gain is due to successful young sire proving programs which have enabled the dairymen to select their bulls from a much larger source at a much higher genetic level.

Before this time, many of the sires that went into A.I. for dairymen to use turned out to be disappointments when their daughters came into production. Many times this happened because these bulls were proven in a single herd or a small number of herds and the information was not accurate.

When A.I. purchased these proven bulls from their owners, they were purchased from the information known to them at that time, and it was very hard to determine if the high production of a bull's daughters was caused by the genetic merit of the bull or might it have been caused by management conditions or other biasis.

In the early 1960's, some A.I. organizations realized that accurate sire evaluations were not possible from a single or small number of herds and that the only way to get more accurate information on a bull's daughters was to start their own young sire programs. This allowed them to have daughters of these bulls freshen in a much larger number of herds where individual management could not have as much influence. Without doubt, widespread use of these young sires greatly improved the accuracy of the information available on the daughters of these bulls.

By the early 1970's, almost all the A.I. organizations realized the importance of having young sire programs and the number of young sires that went through these programs began increasing each year.

Chart #1

Year Sampled	Initial Summary Yr.	No. of Bulls	Average for: P.I.Milk	Average for: P.D.Milk	Average for: Difference
1955		55			
1960		105			
1965		206			
1970	1974	284	326	282	-44
1971	1975	281	412	313	-99
1972	1976	333	443	375	-68
1973	1977	471	507	445	-62
1974	1978	388	593	556	-37
1975	1979	574	631	558	-73
1976	1980	619	710	714	+ 4
1977	1981	632	813	772	-41
1978	1982	713	899	877	-22
1979		760			Ave. -49 lbs.
1980		900			
1981		950			
1982		975			

Looking at Chart #1, you will see that there is some information missing for the years 1955, 1960 and 1965, and although we know how many bulls went into young sire programs, I wasn't able to find the results. This information may be available but probably wasn't important enough to mention very much in those days.

The number of young sires sampled in the early 1970's increased dramatically and has more than tripled in the past 10 years. The pedigree index (P.I. = ½ P D of sire + ¼ P D of maternal grandsire) of these young sires continually increased each year and the resulting P D M increased correspondingly each year.

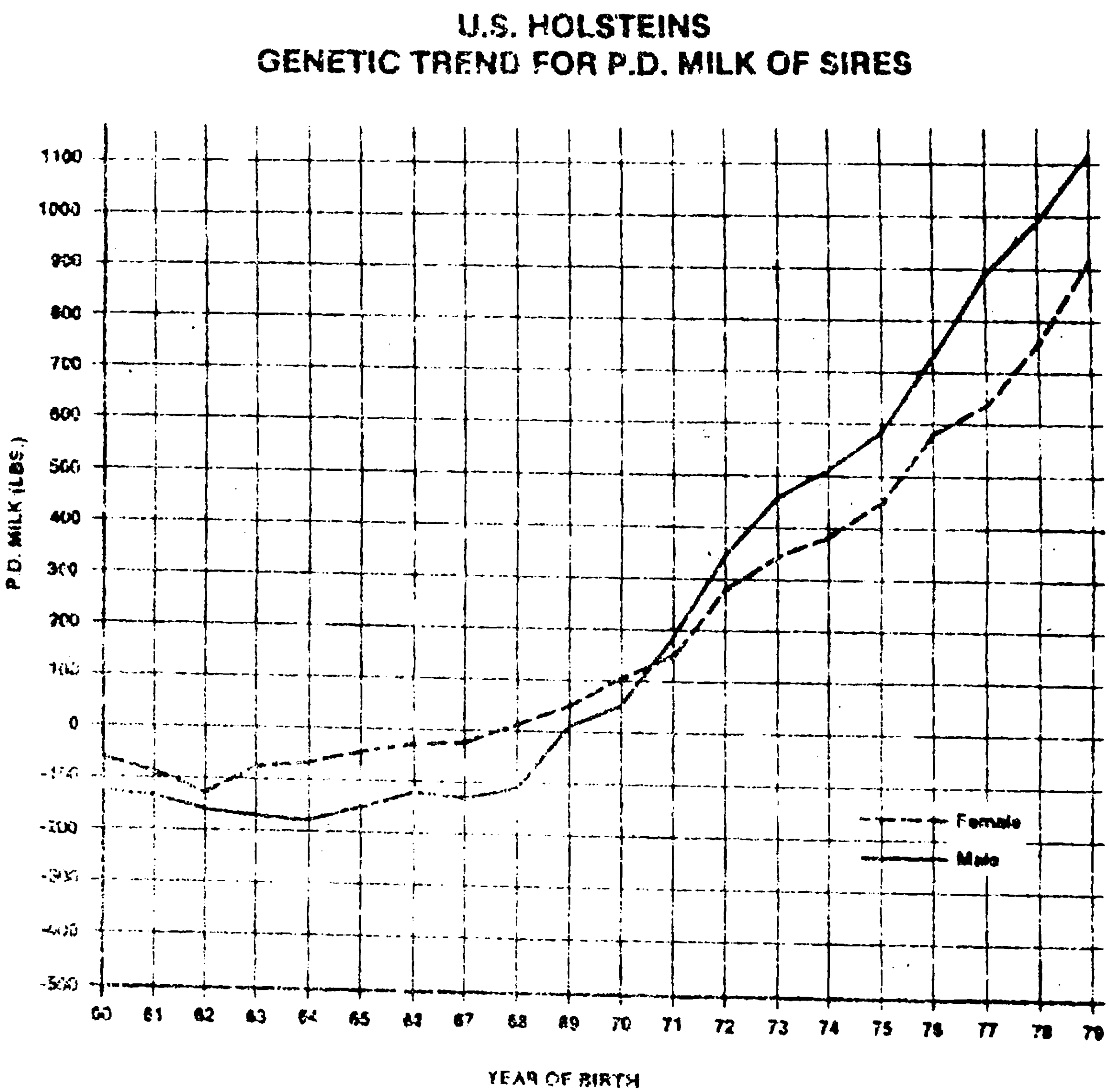
The average difference between P I Milk and P D Milk over 9 years is only -49 lbs. and the yearly difference never exceeded 100 lbs. This goes to show that when considering any group of bulls the pedigree index of a young sire can fairly accurately measure the amount of extra milk that their daughters will produce.

From the previous chart you can see that, on the average, each 100 lb. increase in pedigree index will produce approximately a 100 lbs. increase in P D Milk. We must remember to always talk in terms of groups of bulls and averages because, normally, an individual bull will not give you the same results. Individual young bulls may prove to have genetic merit far above or far below their own individual pedigree index.

It can be assumed that the number of bulls that went through young sire proving programs increased each year because the A.I. organizations felt that these programs had economical value for them and this is one of the major reasons for the rapid increase in our genetic base these past 10 years.

Each year the young sires going into these programs are getting better and better, and if we are making any genetic progress, which I am sure we are, then, on the average, the present crop of young sires should be a better group of bulls to use than the ones presently available from A. I.

Chart #2


U.S. HOLSTEINS
GENETIC TREND FOR P.D. MILK OF SIRES
P.D. MILK (LBS.)
1100
1000
900
800
700
600
500
400
300
200
0
Female
Male
60
61
62
63
65
67
68
69
70
71
72
73
74
75
77
79
YEAR OF BIRTH

Now, if we look at Chart #2, we can get a little different view of how young sire programs increase the genetic gain in the dairy industry.

The continuous black line shows the P D M of the sires of all the male calves that were registered by the Holstein Association during that year, while the dotted line shows the average P D M of the sires of all the female calves registered by the Holstein Association during that year.

As can be seen, the P D M's of the sires of both the male and female calves stayed fairly level between 1960-1968, with the P D's of the sires of the females being higher than the P D's of the sires of the males. This was probably so because some people considered other traits more important than milk production in those days. Then from about 1969 on, things started to change with the P D M's of the sires of the males increasing dramatically. This happened at about the same time that the number of young bulls going into young sire programs really started to increase.

Within a 2½ year period, the P D M's of the sires of the males passed the P D M's of the sires of the females. This was partly caused because our genetists realized that in young sire sampling they needed to keep as many odds in their favor as possible and that it helped the odds by having young sires, sired by a high P D M bull. From 1968-1979 the P D M's of the sires of the males increased at an average rate of over 100 lbs. of milk per year.

Young Sire Program

Now, I would like to discuss a little different subject, that being Organization of a Young Sire Program. This is a subject that I am very familiar with.

Since 1974 I have been involved in a Holstein Young Sire Program where we prove from 10-14 bulls per year.

This program is set up as a partnership where there are 3 partners who make all the decisions with one of the partners serving as the manager. We started out with approximately 40 cooperating dairymen and have presently increased this number to 84. Most of these cooperating dairymen have commercial cows and are located within 4 different counties adjoining where we live. These cooperating dairymen do not have any say in the management of the program and I, personally, think this is very important. They joined with us with this understanding and it has worked out very well.

I understand that one of the possible problems of organizing a beef Young Sire Program similar to this is that there are many different breeds of beef cattle and no one breed has enough cattle to have this kind of a program compared to our Holstein breed which has 80% of all the milking cows in the U. S.

I would venture to say that the Guernsey and Jersey breeds might be similar in size to some of your beef breeds, but they have been able to solve this problem by working in a much larger area, such as in a number of states rather than a certain area within a state. You might be able to consider a similar type proving program

Early on in our program, we made a decision that we only wanted to be involved in proving the bulls and didn't want to be involved with quarantine work, semen processing or the distribution of the semen. We felt that these kinds of things should be done by professionals in that field, if we wanted to have top quality semen. This is the reason that all of our young sires are tied up with A.I. organizations. They perform these kinds of jobs and for doing this, they get first refusal of that particular bull.

In selecting the young sires to purchase, we go about it in the same way that A.I. organizations select their bulls. We are looking for bulls with the highest possible pedigree index. In our program we also consider test a very important factor and generally won't buy a young bull unless his dam averages 3.5% test. We are also looking for young bulls that have two to three generations of good type on the maternal side. We believe that the deeper the pedigree behind a bull, the better his offspring will turn out. The more we know, the more we have the odds in our favor.

When working with commercial cooperating herds, you have to make sure that they know your objectives and goals and agree to carry them out. At the same time, these cooperating dairymen must feel that they are a part of your program and that they are accomplishing something for their own good. There has always seemed to be a division between registered and commercial dairymen, but this separation cannot occur in this kind of a program if it is going to be a successful program. Here the commercial dairyman must feel that he is equal to the registered breeder.

<u>Cooperator's Responsibility</u>

For this program to be successful, the cooperators must know what their responsibilities are and you need to have a signed contract spelling all these things out. The following things should be included in the contract.

1. Dairymen must be on official test.
2. We are allowed to get all his testing information from the testing center.
    a. Breeding dates
    b. Which bulls used
    c. Identification of resulting calf, if a female
    d. Is she properly identified when she freshens
3. Dairmen must buy the young sire semen at the going price.
4. Must use semen within 3 months. Let dairyman pick way he wants to use semen. Could be random, every 4th service, all 2nd service, next cows in heat, etc. It doesn't

matter how he does it, just so he has a plan so you can use a genetic cross section of his herd. The way this is obtained shouldn't make any difference.

5. Must keep record of which cows were bred and which semen was used.
6. Resulting calf must be identified, if a female.

   a. Ear tagged, branded, etc.

7. Must keep most of these heifers until fresh, or if he sells them, it is his responsibility to see that they get properly identified in the new herd.
8. Heifers must be properly identified when they freshen.
9. Dairymen must cooperate in teaching animal to lead if we want to take a picture of her. Most of them feel very proud if they have one good enough to picture and then they see her in the breed magazines.

Cooperator's Incentives

As I mentioned earlier, it is very important that the owners of the cooperating herds feel that they are part of this program and that they have a chance to make something by being a member. One way to do this is to pay them an incentive if they carry out their responsibilities in the contract. These incentives need to be large enough to mean something to them.

Our program is set up so that the cooperating dairymen will receive a certain % of the gross income if they carry out their responsibilities. We pay our incentive based on the amount of young sire semen that they purchase during a year. We are now changing this so that only ½ is based on the amount of young sire semen that they purchase, and the other half will be based on the number of daughters that show up on the USDA Form 1202 during the 1st or 2nd proof.

There are other possible incentives that people might want to consider, such as:

1. Discount on proven sire semen.
2. Reduced breeding fees.
3. Free or reduced rate on semen from bulls that cooperator uses in Y.S.Program after bull is proven out.

Other Recommendations

1. Only try to prove out the number of young sires that can be properly sampled to get a high enough repeatability to compete in the industry.
2. You need to have good personnel to make sure that the cooperating dairymen carry out their part in the program. One of the hardest parts of our program was to keep up the cooperator's interest and enthusiasm from years 2½-4.
3. You might want to let the cooperating herds house the bulls for a % of the semen sales, with the understanding

that the cooperator can use this bull naturally in his own herd.

Potential Problems

In discussing the possibility of having young sire proving programs in the Beef Industry, I see some differences between them and the dairy industry that would have to be overcome.

As I understand it, in most breeds you can't register offspring from a dead bull unless you are the owner of the bull. This could cause a problem of being able to sell enough semen from the better proven bulls to get enough income to pay for a young sire program.

In the dairy breeds, once a bull makes the top 10 or top 50, he has a good chance of remaining there for a time and this is when semen sales will help cover your expenses.

A concern that I know the beef industry has is how to deal with recessives. I think that this is a very important concern and the dairy industry tries to control this by saying that any bull who is going to have semen sold should be 87½% free of any recessive in his pedigree.

One of the biggest problems that you may encounter is how to collect all the information that is needed from the offspring of these young sires. In the dairy industry this is done by USDA through the extension people at a university. Of course, the dairymen pay to have this testing done. I think that it is important that all testing and collection of information should be done by some independent source which will certainly add to the credibility of the information.

One problem that may occur is the beef industry's involvement in embryo transplant work. I understand that this is very extensive. For this to be really effective, you must make sure it is being done with only the top genetics of each breed. When I was told about the amount of embryo transplant work that is done each year with the National Champion Female of each breed, I had a concern because this animal was named National Champion on one day by one judge and other than that, what do we know about her transmitting ability. Normally, in the dairy industry only those cows are flushed who have already had superior records and offspring. What you are doing is very similar to the dairy industry 10-15 years ago when many breeders bred to whatever animal was in front of their breed magazine that month, and many times he or she was there because they had just won some big show. From an earlier chart that I showed you, you saw that we didn't make any progress between 1960-1968. This was one of the reasons.
I can only say, that we in the dairy industry can be thankful that we didn't have any embryo transplant work in those days, or where might we be now. In your industry, make sure that you don't end up with too many offspring from too few dams. I'm sure that almost all these kind of problems can be overcome.

Summary

Regardless of what kind of a young sire program you might want to be involved in, you should always try and have it structured in such a way so that the resulting information will be as accurate as possible.

As the number of young sires that are sampled today in the dairy industry continues to grow, I'm sure that the results will benefit breeders and breed organizations for many years to come. This will be accomplished because it gives the breeders a much larger base at a much higher genetic level to select from. As the breeders continue to prosper, so will the organizations that they belong to.

HOW MANY BULLS SHOULD BE SAMPLED PER BREED

R. L. Willham
Iowa State University

Breeds, which are pedigree isolates within the national cow herd, are composed of herds, which are partially isolated sub groups. Breeders own these herds and long ago formed breed associations to protect the purity of the breed and to promote the interests of the members. Interests of late have been performance recording (1960), breeding value estimation (1971), and sire evaluation programs both structured (1974) and field data (1971 and 1980).

The several breeds are of importance to commercial beef production, since breed crosses can be used to produce hybrid vigor especially for the reproductive complex, to incorporate desirable germ plasm quickly, and to compliment each other to produce desirable market and maternal stock. Without breeders of breeds and their associations, the commercial producer could be denied the economic benefits. This was the reason for developing breed wide sire evaluation guidelines in 1971.

The long established loyalties of breed associations has been used to develop the free world's only example of beef sire evaluation. The records and programs belong to the associations. The breeders are proud of their efforts and are excited about new procedures that can help them breed cattle. The results are promoted making them important economically.

Breeders make a breed association not the stock. The use of available breeding technology is critical to the survival of the breeder and consequently to his breed association. A breeder is one who puts genetic gain on genetic gain over time in a well considered direction of relevance to commercial use. If current breeders fail to adopt breeding technology or fail to cooperate effectively with their fellow breeders, nature abhors a vacuum and the needs of the beef industry will be met.

The purpose of this paper is to examine the sampling of young sires of a breed such that the nebulous breed breeding program can have new evaluated inputs that will make the breed more relevant to the commercial producer. The flow of genetic material into the breeding program is the issue. The examination is couched in giving breeders the opportunity to be real breeders.

PERFORMANCE ANALYSIS

Consider first the new performance procedure that researchers in breeding have envisioned for the beef industry. Values from such procedures are what will be assumed in considering the problem of sampling young sires in the future.

To this point for several reasons, gross environment has been excluded from record analysis by dividing the contemporary group mean into each animal record in the group. This obviously beat comparing the record of an animal to a set standard. However, using ratios or percentage deviations from the contemporary group average, assumed that all differences among groups were non-genetic. No allowance could be made for genetic herd differences or for genetic trends over time either within herds or over the breed. Further, no account was taken of the competition among animals in a contemporary group. Besides these problems, the comparison of animals on percentage differences was never the method of choice statistically.

But using percentage deviations anyway, the concept of breeding value, the value of an animal as a parent, was introduced. At first, sib and progeny average ratio deviations along with the ratio deviation of the individual were combined to estimate breeding values using only within herd ratios. Then this procedure was extended to pick up relative information from across the breed. This was necessary to develop maternal breeding values since the grandsires were usually not from the herd for which values were being calculated. The estimated breeding values suffer from the ratio problem.

Simultaneously with the introduction of breeding values, the guidelines for breed wide national sire evaluation were developed. These included the use of sire progeny data to predict the future progeny performance using mixed model procedures that simultaneously adjusted for contemporary group effects while predicting sire expected progeny differences in which competition among sires was accounted for. This procedure produces a set of linear equations, one for each sire. If the sire equations belonging to sires born in the same birth year set are summed, restricted, and solved simultaneously with the sire equations augmented on the lead diagonal with a variance ratio which is a function of heritability, the sire set effects estimate the genetic trend of the breed and the sire set effect plus the regressed sire value within set becomes the expected progeny difference. When the inverse of the numerator relationship matrix of every sire with every other is added to the linear equations, relatives are used to better predict the expected progeny differences of the sires. Breeding researchers have a lot to learn yet on the use of this mixed model in sire evaluation for breeds of beef cattle. But the procedure does solve many of the problems of ratio deviations.

The same concepts can be applied to within herd evaluations. Rather than a sire model an animal model is used. A sire equation is the sum of the animal equations of his progeny. The basic difference in doing business is the manipulation of large systems of equations that must be solved simultaneously rather than the collection of relative information after ratio formation to estimate breeding values.

The procedure first is to construct linear equations adjusted for contemporary group effects. There is one equation for each animal in the herd. Then the inverse of the relationship matrix of each animal to every other is added to these equations both to tie the contemporary groups and to use relative information in the prediction process. These equations are summed by birth year of the animals to give genetic trend estimates within the herd when these equations are restricted and solved simultaneously with the augmented animal equations. This procedure will produce predicted breeding values expressed in the units of the trait that are adjusted for more strictly environmental effects not contemporary group means, are adjusted for competition among the animals, use all of the relative information available in the herd, and compare fairly all animals even though a genetic trend in the herd exists. This mixed model procedure has many advantages over the current method of breeding value estimation. Also using multiple trait analysis is possible.

Now it is time to dream a bit. The breed wide sire evaluation analysis contains all or the majority of the records from each herd in the breed. And since each contemporary group effect equation was absorbed into the sire equations it is possible to obtain the back solution to these fixed effects once the sire values have been obtained. A linear combination of these contemporary group effects will estimate the herd effect and with the inclusion of other herd information on the sires used in the particular herd, the within herd predicted breeding values can be adjusted to the breed average performance.

Thus, the predicted breeding values are comparable across herds even those using own performance records.

There is no longer need for collecting animals in one environment as has been done in central bull tests. There are still key problems to be solved to make the entire system function as proposed, but it can be done and soon. Determination of the connectedness of herds, through the use of common sires, to the breed sire evaluation is a problem as is what to do with the within herd values in disconnected herds of the breed. In essence, a breed becomes one large herd. All animals of a breed can be fairly compared with each other even when not the same amount of information is available. This really talks to stripping the time honored mystique right out of cattle breeding.

SAMPLING YOUNG SIRES

The assumption is made that predicted breeding values of the sort just described exist in further deliberations. Even if the animals of a breed can be fairly compared, ownership of the cattle will still be by herds owned by breeders that can use breeding technology to design and conduct truly creative breeding programs that relate to commercial production. The further assumption is made that the nebulous breed breeding program is but the collection of the many and sometimes very different breeding programs of the individual breeders. To cherish the nuts of a breed doing their thing is of prime importance to any breed wishing to survive in this time of rapid economic shifts. Utilization of migration from newly arisen elite herds to the rest of the herds of the breed may be more necessary in the future than it was when performance evaluation came into vogue a few years ago!

In general 50% of the cows of a breed are found in herds of over 100 cows. The remainder of the females reside in small herds. The breeding programs for these herds are primarily multiplier with some very notable exceptions over time. Assume that the average herd size of the herds over 100 cows is 200 head of breeding females including heifers to calve.

This average herd size will be used to consider the sampling of young sires for the breed. This has determined the division of the herd into cows to use in progeny testing and those to produce special mating bulls. The division was determined by achieving a given effective progeny number for progeny tested sires. Since for yearling weight the error to sire by contemporary group variance is 5 and no sire gets credit for calves over 5 per contemporary group, systems of testing giving only 5 calves by a sire per contemporary group were considered. Roughly, 5 calves per sire in each of two contemporary groups (male and female) with around 50 calves per group in 5 herds will give a sire an effective progeny number of 20 and a listing as a 3 year old with around 50 progeny total. This suggests that five breeders each contributing proportional test cows could progeny test and list some 10 sires per year or two per herd on the average. At 70% conception using 10 test bulls some 140 cows per herd are needed. This represents 70% of the cows. Therefore, the breeder could select the top 30% of his cows to produce bulls and heifers. At 80% conception the breeder would produce some 24 bulls and 24 heifers. The sires of these calves could be from the top 2% of the sires of the breed of the recent past. If the breeder selected the top 8 to 10% of the bulls on their performance to progeny test and then the group of 5 breeders selected the best 20% of the sires progeny tested and listed, a scheme of continued selection would develop. The real opportunity exists to use a segment of the commercial cow herd to do the progeny testing thus freeing more registered cows for breeding herd production. This aspect should be explored in the near future.

Two traits are considered that differ in heritability and time and sex in evaluation of the trait. Growth as measured by adjusted yearling weight is one. The other is milk production as reflected in weaning weight and expressed in the produce of female sibs and daughters. The heritabilities are 50% and 25%, respectively. Attention is called to the several tables (1 to 6) that contain the choice of parameters used in the calculations. Note that 3 year olds sires are evaluated on maternal ability by using their female paternal sibs first calves. One is struck by the low accuracy for maternal evaluation compared to growth. Also the extra gained by making special matings (sire and dam selected) is worthwhile.

In general, the cow use by a breed comes out to be 65% used on progeny tested sires considering that the small herds use such sires and 35% used to develop new genetic inputs to the system or act as the progeny test herd. Making several assumptions, some 18 pounds genetic gain in yearling weight could be made per year in the breed. Using the sib evaluation for maternal performance some 4 pounds per year could be made in weaning weight and if daughters were used some 5 pounds per year could be made.

Looking over the entire breed some 15% of the bulls produced per year would be the result of planned matings and with some 10% of these selected on their own performance 1.5% of the bulls would need to be adequately sampled in a progeny evaluation that uses some 35% of the cows of the breed. This would produce enough progeny tested sires that if used exclusively (no older sires saved) to average around 500 calves per bull. In breeds from 10,000 head to 250,000 head such would not appreciably increase the general level of inbreeding.

With the present level of accuracy required for listing a sire, the progeny test evaluation more than accounts for the increase in generation interval in terms of genetic gain per year in the breed. To assure that the continued progeny test of selected sires is not biased by mating to superior cows, herds dividing their cow herds should consider cow selection in their definition of contemporary group. If the 30% of the cows selected are placed in their own contemporary group and the 70% in theirs, fair comparisons among young and old progeny tested males could be made.

TABLE 1. ACCURACY (A)

Age	Sex	GROWTH Relatives	GROWTH ACC	MATERNAL Relatives	MATERNAL ACC
Pedigree	M	50p	.90		.80
	F	10 + 200phs	.75	1p + 100phs	.50
Yearling	M	10	.71		
3 Yr Old	M	50p	.90	25phs	.47
5 Yr Old	M			25d	.80

r_{GM} is assumed to equal zero.

TABLE 2. INTENSITY (I)

Age	Sex	GROWTH % Saved	GROWTH I	MATERNAL % Saved	MATERNAL I
Pedigree	M	2%	2.42	2%	2.42
	F	30%	1.16	30%	1.16
Yearling	M	10%	1.75		
3 Yr Old	M	20%	1.40	10%	1.75
5 Yr Old	M			20%	1.40

TABLE 3. GENETIC VARIATION (V)

Trait	Variance	V(G)	$\sqrt{V}$(G)	SELECTION 2nd	SELECTION 3rd
Growth	6400	3200	57	50	44
Maternal	2500	625	25	24	24

TABLE 4. BREEDING VALUES

Age	Sex	GROWTH A·I·V	GROWTH Value	MATERNAL A·I·V	MATERNAL Value
Pedigree	M	.90(2.42)57	124	.80(2.42)25	48
	F	.75(1.16)57	50	.50(1.16)25	14
BR Value			87		31
Yearling	M	.71(1.75)50	62		
3 Yr Old	M	.90(1.40)44	55	.47(1.75)24	20
5 Yr Old	M			.80(1.40)24	27

TABLE 5. USE OF COWS

50% cows on 2% sires plus (30% of 50% = 15%) gives 65%
70% of 50% = 35% on progeny test

GROWTH: $\frac{.35(149) + .65(204) + 0}{.35(2) + .65(4) + 7}$ = 18 pounds genetic change per year

MAT-SIBS: $\frac{.35(31) + .65(51) + 0}{.35(2) + .65(4) + 7}$ = 4 pounds genetic change per year

MAT-DAM: $\frac{.35(31) + .65(78) + 0}{.35(2) + .65(6) + 7}$ = 5 pounds genetic change per year

BREED SIZE:	10,000	50,000	250,000
MALES 80%C:	4,000	20,000	100,000
50%·30% COWS:	1,500	7,500	37,500
MALES 80%C: (1)	600	3,000	15,000
10% MALES SEL: (2)	60	300	1,500
20% MALES SEL: (3)	12	60	300

(1) 15% of MALE calf crop result of special mating
(2) 1.5% of MALE calf crop to be sampled in progeny test
(3) .3% of MALE calf crop selected by progeny test for use

SIRE EVALUATION - THE BREEDER'S RESPONSIBILITY

by
Henry C. Gardiner
Gardiner Angus Ranch
Ashland, Kansas

In the past several years the beef breeders of this country have had the opportunity to take advantage of many new techniques in breeding their cattle. These new methods and opportunities seem to be occurring ever more frequently. Those breeders and breed associations who can adopt and adapt to these changes are going to be our leading producers of seedstock tomorrow.

Many of these innovations have become the foundation for genetic improvement not thought possible a few years ago. In 1953 the first calf conceived with frozen semen was born. This made AI to any bull in the world possible. In 1972 the Angus Association changed their rules to permit open AI in the breed and started their sire evaluation program. About this time or a little later most other breed associations had similar programs. Computers were being built with the capacity to handle a huge volume of data. In the last decade heat synchronization has made AI much easier to utilize on almost any herd if the management of that herd want to use this useful tool.

In October of 1978 Jerry Morrow, who at that time was with Curtis Breeding Service, wrote his thoughts about sire evaluation to the Breed Improvement Committee of the American Angus Association. In part he said this: "Very few breeders understand the program even though it has been in existence for more than five years. Of the six top selling bulls in our stud, only one has completed his Sire Evaluation test and he is fourth in semen sales. In studying sales across the country, I would say that semen sales from show bulls is much higher than from tested bulls. This situation is wrong, but it is fact and what bothers me the most is that Sire Evaluation is meaning less and less to the breeders every year. Some breeders request that we not test their bull on Sire Evaluation if he is leased to Curtis." End of quote. I think this accurately describes the acceptance of sire evaluation by our breeders five years ago.

In 1980 something happened that began to change a lot of our breeders' thinking about sire evaluation. Up until that time breeders had not had a chance to see how a lot of the more popular bulls ranked in sire evaluation. The 1980 sire evaluation field data report scored 564 of the most widely used bulls of the breed. Some widely used highly promoted bulls scored well and some did not. However, sire evaluation could no longer be ignored by a large portion of breeders. Many had previously assumed that many of the "great bulls" had high genetic values even though they had not been evaluated. The 1980 report and those that have followed it have proven that a bull is not great until he proves it and more times than not he can not prove it.

A statistical analysis of the 1981 sire evaluation report can give us a valuable lesson in the frequency that a good bull occurs. There were 673 bulls evaluated in this report and the top bull for yearling weight had an EPD of +77. If we were to select only bulls with a +40 EPD for yearling weight or higher we would have only 53 bulls out of the 673 evaluated. These 673 bulls were the most widely used bulls from a group of 2 million bulls. If we assume that they were the best bulls out of that group then a bull with at least +40 EPD for yearling weight had occurred only about once in every 35,000 bulls in the Angus breed. If you wanted to select a bull with at least +40# EPD for yearling weight, at least 105 for maternal and not over +4 pounds for birth weight you would have only 4 bulls on your list from the original 673 bulls that were supposedly the best of two million.

When you consider that almost all Angus breeders have been trying for increased size and growth, then I think it becomes evident of how difficult it is to achieve significant genetic change. This is particularly difficult without the use of sire evaluation data to guide a breeder in making his genetic selections.

Let me illustrate this point. In the 12 years previous to using the sire evaluation data in our own breeding program we used 23 bulls that were later evaluated in the sire evaluation report. THe average genetic values for these 23 bulls were as follows:

Average Birth Weight:	+ .1#
Average Weaning Weight:	+ 3 #
Average Yearling Weight:	+ 9 #
Average Maternal Breeding Value:	99.5

This was almost no genetic progress in a 12 year period when we were trying as hard as we knew how to make genetic changes. This is probably not a lot different than a lot of other Angus breeders at that time. Then compare those figures to the genetic values of the 4 bulls used to sire our 1983 calves. These bulls were picked using the sire evaluation data.

Average Birth Weight:	+ 4.1#
Average Weaning Weight:	+ 34.1#
Average Yearling Weight:	+ 69.8#
Average Maternal Breeding Value:	104.7

It was not just breeders who were not making much genetic change in the early days of sire evaluation. Jerry Morrow of Curtis bull stud was mentioned earlier. In 1976 Curtis offered semen from 18 head of Angus bulls that had an average yearling weight EPD of only +17.5#. But bull studs have improved their selection of bulls also. In 1983 Select Sires is offering 13 head of Angus bulls with an average EPD for yearling of +48 pounds and ABS has 8 Angus bulls offered that average +59 pounds after offering 14 Angus bulls in 1981 that averaged a +39 pounds for yearling EPD.

Since 1970 at our ranch we have progeny tested 50 Angus bulls. These were all bulls owned by other breeders or bull studs. At the beginning of each progeny test we thought that most of these bulls had a chance to be one of the better Angus bulls of the breed. From the prices that were paid for some of these bulls some good cattlemen must have thought this also. After evaluating 20 to 40 progeny from each bull in our progeny test herd we were not too eager to breed that bull to our registered cows. In fact out of the 50 bulls we have used in our testing program I would say that only two of those bulls were good enough to merit further use, and one of those was a reference sire. Thus my advice to anyone wanting to make continuous and rapid genetic progress would be to use only proven bulls.

It is commonly said that if a good bull is a breeding bull he will have a son that will be better than his is in two years. Thus by the time a breeder has a hundred or so sons from his herd bull he should be able to identify this superior son and use him rather than his sire in his breeding program. In studying the sire summaries the good sons are not occurring this frequently. One of the top bulls in the Angus breed is now 12 years old and still widely used. He has sired 6,790 registered calves to date but he has yet to have a son identified that has a higher EPD for yearling weight or maternal breeding value than he has. Certainly a good bull should sire a superior son more frequently than a bull who is not as good in the traits for which we are selecting. Earlier I mentioned that bulls with at least a +40# EPD for yearling weight had been identified at a frequency of only once every 35,000 bulls. As we stack pedigrees with highly superior animals we should not have to cull through nearly as many animals to get our breed improvers but we may not ever get it down to one out of every 100 progeny. This is another illustration why the use of only proven bulls will give faster genetic change.

What is the breeder's responsibility in sire evaluation? <u>It is to use it</u>. His major responsibility is to incorporate all the relevant genetic information that is made available to him into his breeding program. The breeder of the future can not compete over a very long period by just using "the eye of the master." Even if you do well in your independent breeding selections for several years one or two mistakes and you will soon be looking at a +9# for 12 years as I did or you could do almost twice as well as I did and have Jerry Morrow's +17#. In the meantime your competition will be having calves by a +60 or +80 bull that will be out of a cow by a sire that is a +60 or a +80. You will soon be breeding cattle for a hobby while your competition is breeding for a purpose and a profit. I repeat the major responsibility of a breeder to sire evaluation is to use it.

I must clarify one point. Most of my illustrations about sire evaluation data have been expressed in yearling expected progeny difference. I do not in any way want this to mean that this is the only trait that I think is important. We can not breed cattle by single trait selection and I definitely do not want to give the impression that that is my thinking. Any good breeding program must have culling levels for birth weight, calving ease, yearling weight, maternal, and fertility. None of these traits can be ignored. I am using yearling EPD as a symbol to represent any relevant or combination of relevant performance traits.

Also if you followed my earlier advice you would only use proven bulls as your sires. If everyone did this we would never get any new bulls discovered. If you are a leading breeder you probably need to progeny test 5 to 10% of your top performance young bulls. If you are in the middle of the pack you need to progeny test the top 1 or 2% of your young bulls. If you are playing catch up you need all the help you can get and I would only use proven bulls.

If you can identify a superior bull, he could be sold for more in your back pasture than a bull sold in the lobby of the Brown Palace Hotel. I do not think we are failing to identify our good bulls now but if we go to using more proven bulls we may fail to identify some of the good ones. If we do not identify the good ones the breeder, the breed, and the breed association have suffered a serious loss. I believe each breed association should monitor the performance of its young bulls. A list of the higher performing bulls should be maintained and the breed association should make every effort possible to see that these bulls are progeny tested.

Field data sire evaluation is an excellent way to evaluate a large number of widely used bulls. However the designed sire evaluation should also be available as an alternate means of testing a bull. Good bulls are rare. Breeding values, progeny tests, vigilance of the breed association and alertness of the breeder all should be used to ensure that the good ones are not wasted.

When we test a bull in the designed sire evaluation test we like to AI him to 50 commercial cows through two heat periods. The first heat period will be synchronized. This will usually give us twice the progeny we need but it makes for a better test and still allows you to complete a test even if you have poor conception or a high death loss. Some breeders and bull studs are getting a bull tested by giving 10 breeders or more semen to use in their herd. A small breeder probably can not find that many breeders that will breed to his bull or bulls. But he can get his bull enrolled in a designed test. Young bulls can be sampled by using them as clean up bulls but this is not a very good way to get a bull tested. You can't get enough progeny in enough contemporary groups. But whatever method you use I think you should plan to have twice the amount of progeny that you need for a minimum test.

Another responsibility of the breeder that should never be neglected is the reporting of all performance data to the association. Without this information sire evaluation as we know it now could not exist. In some breed associations such reporting is mandatory before registrations but in most it is not. I have been very surprised that a few people who are known as performance advocates and are producing good performing cattle by using sire evaluation data are not reporting any performance data. These people are free loaders. They are sponging off other people and their performance data in order to assist them in producing good cattle but not contributing any data themselves. Can you believe that some of these people also criticize the program because they say that the figures are distorted?

In summary the breeder's responsibility in sire evaluation is:

1. To integrate all relevant data into his breeding program to help him achieve his goals. Use it.

2. If you are leading the pack progeny check the top 5-10% of your bulls. If you are in the middle progeny check 1-2% of your bulls. If you are playing catch up breed everything to the best bull you can find. (Don't even use a clean up bull but sparingly.)
3. Be alert and don't let the good ones go unchecked.
4. REPORT ALL DATA.

At the present time most breeders in the Angus breed are trying as hard as they know how to produce Angus that are just like Charolais or Chianina. The beef industry does not need another terminal sire but it does need a good maternal breed. The new Systems Committee of BIF may be able to convince a few more breeders of all breeds that no one breed can be all things to all people.

Sire evaluation will become the dominate force in beef cattle breeding in the next 10 years. Because of the need to use proven bulls the use of AI will continue to increase. In the Angus breed in 1982 AI produced 26% of the 201,000 head registered. This will probably increase to 40%.

In 1963 there were three breeds in the US Beef Breeds Council. They registered a total of 896,745 head. In the 1981 there were 19 breeds in the US Beef Breeds Council. They registered 846,560 head. In the year 2000 there will probably not be as many breeds as there are now in this Council. The ones who will survive will be the breeders and breed associations who best utilize their sire evaluation data.

SIRE EVALUATION - THE BREEDER'S RESPONSIBILITY

Glenn Klippenstein, Maysville, MO

I grew up with a fork in one hand and a bucket in the other. Livestock has always represented a friend to me and a way to make a living doing what I like doing. Thru the years I've even grown into a zeolot for the contributions livestock, land, grass and those people that husband it make to society.

When we were kids the men would normally sit around on a Sunday afternoon and brag about how fast their horses ran, how big a litter the sow had, how many eggs the chickens layed, how much the cow milked, how many bushels yield/acre and how big their bull was. We'd lead the cow or bull for miles to get the progeny to make the brag credible. I always liked the Yorkshire sow because she had so many young ones and was such a good mother. The Holstein cow never did have an equal in my mind and the Shorthorn out our way were the biggest.

As time went on I, like all of us became increasingly smarter. I joined the 4-H club and really got involved with judging teams, record books, shows, demonstrations, etc. My eyes and ears were always wide open. Reading about cattle became an insatiable urge. Someday I'd have the biggest and most and best and hard work would surely make the dream come true.

You all know the era of wise "counseling" we went thru in the fifties and sixties. One would speak the "truth" and the next would write the "truth" as he or she heard it and the other's out there would consider this to surely be the truth. Fortunately there are always some doubters.

Time elapsed and some began to question the "Priesthood" of our industry. They began to question themselves. Harlan Ritchie thru the use of the showring threw a skunk into the emperor's living room and major changes began. Fresh air was taking the place of the stale. The Scotsmen and the one's in control were loosing control. Their unwillingness to adapt and change allowed others to gain a foothold and then an unbeatable momentum. Research was beginning to bear out in many cases what good livestock and cattle people already thought they knew.

The late 60's were exciting and mind and energy engrossing. The early 70's were profitable and a time to build new ranches and redesign old out of date programs. Performance testing became an industry by-word (already old and well used by some). Growth and carcass and milk were industry passwords. More and more breeders professed not only to test for "Performance" but to even select for it. The "industry" was well on it's way to a long overdue healthy change for the better. The Exotics came in from the cowboys of Europe. We were determined to adapt the cow of the plow and the bell of the Alps to our environmental and management conditions. We knew they could adapt because the Sacred Cow of India with the ears was already being spoken of in a few inside circles in a reverent way. The muscle breed from France turned some breeders white, but really it was North Americans, after many years of adaptation and selection and a near wreck, before they have become a potentially contributory force in the beef business.

Now I must tell you if you don't already know that I'm not a trained researcher or scientist or statistician - a good observer though, I think.

Now here we are in 1983 - We're still on a headlong thrust for more and more and more whatever it is. Research (some good and some that's segmented, incomplete and impractical) are leading us on a binge of more and faster. We've been told over and over that you can't make progress when you select for more than one or two traits. Single trait selection, extremer, and crisis management are the cause of pendulum genetics. Could it be that numbers and "industry leaders" have replaced mystic and Scotsmen and now we're on the other end of the pendulum?

Why does business constantly look for and work on points of deminishing returns, return on investment, dividend return to stockholders, quality production per worker and input vs net income, etc.? Is the beef and seed-stock business really that different? Some of the responsible breeders are not, and it takes guts to engineer a biological product with slow generation turnover and sometimes low repeatability of chosen traits. What really takes guts is to select and call for traits that are difficult to document and verify with numbers, especially when pounds and inches of critter, carcass and milk are the only traits to select for, according to much of what we say and repeat and read.

A chain is as strong as the weakest link in it and just when the chain gets tugged on the hardest with a dry summer, a hard winter, a muddy spring or the various unavoidable stresses, the wheels fall off and we're in a wreck. It could be we're near one again! The dead calves, thin cows waiting at the gate with rough hair and open cows coming up with hollow sided calves with sunken eyes are the result of desperate deeds without a plan and we're going to pay.

How much better to have a large group of young cows with bloomy calves on each cow that has a shiny hair coat and cycling back - a cow with a snug udder and smooth pencil size teat and chewing her cud. Why are these good doing optimum cattle in the same pasture with cows that milk too little and others that milk too much, some are too fat and others act and look starved. Some are mothers of cattle that should be killed at 900 lbs. while others need to wait until 1400 lbs. It doesn't make sense to have that kind of variation under the same management and environmental conditions.

I see my responsibility as a seedstock producer today to produce "stabilizer" bulls that reproduce their traits as consistently as possible. We have all the variation of germ plasm in the world, but I believe many more of us need to produce bulls - balanced traits, free from problems that are optimum, consistent and surprise free, or we'll continue to be like a cork on the ocean.

Glenkirk Farms has sampled and used over 200 bulls over the years. We have owned and bred and used a large percent of the so called "trait leaders" in the breeds that make us our living. It must be noted that it's not easy to breed cattle like we've talked about and still be "trait leaders". There are bulls however whose progeny are born without undue problems, that grow rapidly and daughters milk well. When these bulls are super futile, when their calves jump up when they're born, when those calves have an ability to withstand stress, then we've got something even more special. Then when we get sound feet and structure and udders and teats without bad dispositions and prolapes and hard doer's, we've got a product we want and need.

The best way to get a young bull that breeds "completeness" consistently enough to become a truly valuable trait leader, is to sample the bulls that seem to be what you planned for them to be - beware of accidents. Obviously the numbers need to be "right" and so do the several other traits that have so much to do with keeping us happy and in business.

Large numbers really help when selecting for a balance of traits, but fortunately the more generations you've selected for these traits the less numbers it takes. Frankly I've always had a problem with prescribing weights, or ranks or ratios to bulls we sample. Obviously the numbers should be pluses and more obviously his dam better be great and his sire not a whole lot less. I won't use a bull either if he's inadequate in my judgement in frame size, or he's too fat or too one gutted or unlimber in his mobility.

I think it's more nearly the responsibility of the large and/or elite herds to sample young bulls. Somebody needs to or we'll fall into the trap of using only "trait leaders" that get a year older each year.

At Glenkirk we like to use yearling bulls on cows with a track record. We think the information we get in their way tells us a lot more about the genetic ability of the bull. Conversely we primarily use older bulls with outstanding progeny and daughter and calving ease data on our yearly heifers via artificial insemination.

It seemed forever before the beef seedstock business made use of sire summaries. Now hopefully the commercial cowmen will use them for guidance in bull selection too. The sire summaries are a very valuable tool, but fertility, early puberty, lethargy at birth, udders, maintenance requirements and genetic problems, still require intense observation and follow up.

I think grass, waste acres and products, low management and overhead must always to part of the beef industry and generally most people will pay only so much for beef. With that in mind breeders and researchers must design blueprints based on balanced judgement, good planning and up to date and credible arithmetic. To put the most profitable blueprint before multipliers and commercial cowmen is our responsibility. Yes we've got real challenges and responsibilities. Together we'll balance the load and right the ship.

SIRE EVALUATION - THE BREED ASSOCIATION'S RESPONSIBILITY

BY

H. H. Dickenson
Executive Vice President
American Hereford Association

My topic deals with the breed association's responsibility for sire evaluation. In speaking to this subject, I want to remind you that there are no set rules, no guidelines or no past history to draw on in determining the breed association's responsibility. Sire Evaluation in the beef industry is still too much in the infancy stage for any of us to be in a position to educate others as to what our responsibilities are in detail. But, for sure, we do have responsibilities, if for no other reason because we are producing the bull summaries.

I am reminded of an unrelated responsibility of breed association secretaries that falls in the same context of this issue. In 1976, the government issued a new set of rules regarding pension plans which was known as ERISA. All companies were required to conform to these new orders by restructuring their employee retirement plans. The big change was that the companies and their administrative officers became personally liable for the monies that were invested for employee retirement plans. This is known as fudicial responsibility. ERISA was quite complicated for those of us who had animal scientist degrees rather than CPA, Law, and Economics degrees all wrapped up in one. After wrestling with this plan for some time, I received a cartoon from one of the Insurance Companies which read, "Last year I didn't even know how to spell Fudiciary and now I am one."

Five years ago, I knew little about Sire Evaluation and today I, like other breed association officers, am responsible for:

1. Establishing the basic criteria for our report.

2. Selecting the right expert to analyze it and hope he knows what he's doing.

3. Paying the computer costs for producing it.

4. Assuming the responsibility that it is correct.

5. Making sure the secretary and the printer make no typo errors such as using a minus instead of a plus sign.

6. Publishing it on an annual basis and before breeding season.

7. Explaining in general terms in the booklet how the analysis was made and the difference one can expect from a +60 bull and a -30 bull.

8. Explaining in person and in detail to John Doe why his herd sire that he has spent $10,000 advertising in our magazine is -30.

9. Explaining to Bill Doe why sons of his +60 sire sell for $1,000 a head less than sons of John Doe's -30 sire.

The importance of sire evaluation as a genetic tool is directly correlated to how well it is understood and subsequently utilized by the beef cattle producers, both registered and commercial. It matters not how well you and I understand it, or the importance we attach to it, or how many new innovations we design for it. The success of beef cattle sire evaluation depends on its acceptance by the producers. Achieving this universal acceptance is perhaps the primary responsibility of the breed association. This won't happen overnight for the beef cattle industry is slow to adapt to new concepts. But I believe it will happen if we make it a priority item among breed association activities. But like any new concept in this industry -- it has to be sold. To sell it, we have to make it simple, exciting, reliable and profitable.

I have spent some 25 years involved in one aspect or another of breed association work. I think I have witnessed the influence of performance testing in beef cattle from its inception to its present status. I would categorize its history in this manner.

Beef cattle performance testing was conceived in the early 50's, born in the mid 50's, had several post natal setbacks but was weaned in the mid 60's, had a long post weaning period before approaching maturity in the late 70's. It's just now reached the breeding program stage.

We spent the first 10 years just trying to sell the concept of keeping records. Most breed associations didn't even sponsor a performance program until the mid 60's. As I recall, we actually fought the concept until we were forced to begin a program. The emphasis on size in the late 60's and early 70's gave performance testing a toe hold that let it become more influential in breeding programs. The addition of breeding values in the mid 70's gave rise to designed sire evaluation programs. Early field data projects were initiated by Simmental and others. Open A.I. policies by most breed associations provided the final ingredient for the publication of sire summaries that contained enough information on enough bulls to be a significant tool for genetic improvement.

So it has taken approximately 30 years to reach this stage in the performance movement. Why? There are multiple reasons for this slow acceptance. Not enough of us fully believed in it. Let's not let that happen with Sire Evaluation. It was too complicated requiring too much preparation and study. Let's not let that happen with Sire Evaluation. It was changed too often. Let's not let that happen with Sire Evaluation. It was not uniform in methodology from one breed association to another or from one state BCIA to another. Let's not let that happen with Sire Evaluation.

Let's remember some of these conditions that kept performance testing in the closet for 30 years and let's not make the same mistakes as we enter the Sire Evaluation era.

The Sire Summaries produced by breed associations have as their audience, three distinct segments -- the within breed seedstock sector, the commercial industry which utilizes multiple breed bulls, and the group known as advisors, consultants or legitimizers. This last group uses Sire Evaluation information to educate the first two groups and to design and draft programs for the breed associations.

If the breed association's only responsibility was to its own purebred breeders, we wouldn't need to worry about uniformity of breed programs. We could simply produce our summary in any way we chose since our breeders would only be making genetic improvement within the breed and our summary would contain all the information they needed to understand.

However, to truly sell Sire Evaluation and make it meaningful to the industry as a whole, we must design it for the commercial man. This requires the various breed summaries to have some uniformity in terminology and methodology. I think it becomes a breed responsibility to work with other breed officers to affect compatability among the reports.

By the same token, and if I may touch on responsibilities of others, I believe the legitimizers have a real responsibility in this context. The legitimizers should begin to stabilize their methodology in calculating sire summaries. Constant changing of ratios, standard deviations, EBV's or EPD's, accuracy, repeatability, or EPN's is confusing to everyone and is detrimental to efforts to sell sire evaluation to the producers. We need to pick one method and live with it long enough for producers to develop confidence and understanding. Experimenting with this bank of data is fine for research projects but when breed associations invest their money and reputation on programs as important as sire evaluation, it is absolutely necessary that we be dealing with a proven product that has enough consistency from year to year to get it off the ground.

I believe it is also a breed association responsibility to establish minimum standards before attempting to produce a sire summary. Perhaps more precisely, this is a responsibility of the breed groups working together and assisted by the legitimizers. Peer pressure is a motivating force for breed associations. For the most part, this competitive action is good for us. It makes us work harder to keep up. Occasionally, it causes us to begin a project before we are ready or before we have the necessary ingredients to produce a meaningful program. In the case of sire evaluation, moving too soon just to be a part of the action could be very detrimental to the overall concept. If we didn't have enough records to produce a summary without dropping back on minimum accuracy figures, we would do ourselves, the breeders, and the industry a disservice to attempt to produce one. But if there are no minimum standards, we might feel compelled to produce an inferior summary just to keep up. I'm sure there will be new innovations to the present summaries and I know some will be prepared to adopt them while others will not be. I think establishing some minimum standards will prevent each of us from cheapening the concept of sire evaluation.

Earlier I said it was the principal breed association responsibility to sell sire evaluation to our constituency. And to do this we had to make it simple, exciting, reliable and profitable. Let me comment on these four factors.

The first roadblock I find in selling sire evaluation is that it is a complicated concept to the layman. I'm reminded of this bit of philosophy from an anonymous author.

> Anything the human mind can conceive
> it can one day consider.
> Anything the mind can consider
> it can one day accept.
> Anything the mind can accept
> it can one day believe.
> Anything the mind can believe
> it can one day utilize.

As I see it with sire evaluation, we are presently somewhere between the accepting and the believing stage for the rank and file. It therefore becomes a breed responsibility to simplify this concept to rancher language so that it has widespread understanding. It appears to me that for better or worse, this responsibility has become a sole breed association responsibility. And I think we need help from the scientists, the extension service, and the media. Somehow, we have to simplify it for the producer.

How do you make Sire Evaluation exciting and why does it need to be exciting? It's been my experience that breed programs which are the most successful have a little glamour attached somewhere. Usually this means that competition is involved and that somebody wins. The show ring is the best example but there are others. One of the reasons behind the success of bull tests is that it brings about competition and prizes are usually awarded. In our association, we couldn't get carcass testing really off the ground until we started awarding points for superior carcass traits. This is the reason we name Trait Leaders in our summary, as do most other breeds. And to show you how well it works, most breeders are prouder of having a 10-year trait leader sire than in having an outstanding young bull in all traits that didn't have enough progeny to get some distinctive rating. So it is a breed responsibility to add some pizzaz to the program to whet the interest of our constituency. Of course, we must be careful about the criteria we use in making it exciting.

Breed associations have a great responsibility in guaranteeing the reliability of the data. To this end we are dependent on those of you who are writing the programs and analyzing the data. But I can't stress enough the responsibility that rests with breed associations regarding the reliability of this information. When a breeder considers, accepts, believes and utilizes this program, it must be reliable. Along this line, I think we need to take a hard look at our accuracy estimates and possibly stay on the high side to be on the safe side.

In the final analysis, the utilization of sire evaluation must be profitable for the breeder. Already we know that it can and will improve his product if correctly used and this in itself is profitable. But to be truly profitable, the superior animals in the sire evaluation summaries and their best progeny should command a premium. I think it becomes a breed association responsibility to encourage this in our merchandising schemes. History has shown that rewards for accomplishments in the seedstock industry is the real catalyst in obtaining widespread participation in programs. Again, the shows are a great example. Demand for the top bulls in the feed tests has been the real reason why breeders continue to test their bulls. In our breed, it was the success in the sale ring of some of our better performance people that really got our performance program off the ground. Sire Evaluation needs this economic factor to become evident if we are to see it become the important vehicle we think it should be.

I think we are seeing this happen but not to the degree it should nor as fast as we would like it to develop. Particularly, we need to see it become a more important part of the bull buying habits of commercial cattlemen. As breed association personnel, I think we need to do everything possible to encourage this use of sire evaluation in the sale ring. We can encourage breeders to advertise and promote on this basis. We can build sales around this premise. We can hold clinics, seminars or programs to better explain the value of these reports. But in the final analysis, the results of the sale ring will attest to its acceptance by the industry.

I believe breed associations also have an inherent responsibility in improving the current listings and by the same token have a responsibility in seeing that we do not move too fast in adding new innovations. We need to research our own records in an effort to clean up the data that goes into the summary analysis. What do we do about letting ET calves slip into the data? What about ratios that appear too high and could alter the real performance of a sire? How about dam effects? Do high priced A.I. certificates really get bred to the ultra performance cows? Should there be a minimum number of herds that a bull is used in to further assure his performance is not affected by environmental conditions in a single herd? How do we screen for human error such as a 400 lb. weaning weight getting into the analysis as a 4,000 lb. weaning weight? Most of these affects appear in the in-house data that goes into the analysis. We have a responsibility to screen our records and devise ways to prevent erroneous factors from finding their way into the analysis.

Along this line, we have a responsibility to work toward the addition of traits that go beyond the current factors. We need to find a means for evaluating the reproductive traits and including this aspect in the sire summaries of the future. I know that BIF is giving this issue a great deal of time and study. Once a system of identifying reproductive traits is developed, breed associations will have the responsibility of structuring their record keeping systems to include such. The biggest complaint I hear about Sire Evaluation is that it fails to measure and evaluate other important trait areas such as fertility and reproductive efficiency. These factors need to be included if Sire Evaluation is to become a complete program.

Is a classification system feasible for the beef industry along the lines of the dairy industry's linear classification program? Who can tell us what characteristics should be evaluated and if they are economically important and is this subjective appraisal repeatable? And if this is feasible, can it be included with the field data traits currently in the summaries? Dairymen tell me that many of these economic characteristics described by classification are just as meaningful as the EPD's on milk production. And that without a description of these factors, the dairy summaries could be very misleading for overall profitability.

Let me conclude by saying that I, and our association, really believe in Sire Evaluation. I think it is the most important development in the history of the cattle industry. For the purebred sector, it gives a new meaning to the registry certificate which is the backbone of the registered concept. We are going all out to sell the concept to our membership through clinics, seminars, magazine articles and personal visits. We definitely feel we have a responsibility to provide an annual report, to stand behind the accuracy of the report, and to bring about widespread understanding and interest in the report.

I believe that our primary responsibility lies with our own membership. Encouraging participation by breeders is step one. Providing programs for the testing of sires is step 2. Screening the data prior to analysis is step 3. Producing a report that is simplified is step 4. Explaining how it can be utilized is step 5.

Beyond this, and perhaps the most important aspect, is selling the concept to the commercial industry. This becomes a joint responsibility for breed associations, seedstock producers, university personnel, and the livestock press. When the commercial industry begins to utilize the information in its buying decisions, we'll have a universal winner.

SIRE EVALUATION - STACKING PEDIGREES

C. Ancel Armstrong, New Breeds Ind., Inc.--Manhattan, Kansas

The purpose of any genetically sound, long range breeding program should be to predict the performance of future progeny. If you agree with this and if you are a breeder of purebred cattle, you will be constantly challenged to search for and identify genetically superior, up-to-date, popular pedigreed cattle.

After you identify the genetically superior, up-to-date, popular pedigreed cattle and start stacking their pedigrees together, eventually you will be able to predict the performance of their progeny with a great deal of accuracy.

Now I would like to share my philosophy with you regarding the details of identifying genetically superior, performance pedigrees.

First, the bulls. To properly evaluate a bull, his progeny must be tested for the four important economic traits which include:

1. Direct calving ease
2. Growth--weaning and yearling weights
3. Maternal calving ease (or daughters 1st calf calving ease)
4. Milk production (or daughters 1st calf weaning weight)

Today, thanks to many of you in this room and to modern computers, bulls can be accurately evaluated providing we generate enough numbers in enough different environments.

The challenge is to identify superior females! It would be much easier if we could breed bulls to bulls. But since this is a biological impossibility, we have to figure out a way to identify females before they are ancient or out of date.

We know it takes hundreds of progeny records to properly identify bulls. Agreed! Then tell me why we try to make ourselves believe we can identify genetically superior females based on one, two, or even ten records when we really cannot! So we must figure out how to breed bulls to bulls using the female as a link between bulls.

If you buy this philosophy, then the challenge is to select individual females who's pedigrees fit the formula. If the female's pedigree does not fit the formula, forget it! (Even though she may have the best individual performance in the herd!)

Okay, we would all agree that genetically superior cattle can be attained providing cows and bulls can be accurately evaluated for their genetic merit, and only the best cows and bulls are allowed to become the parents of the next generation. If only the top animals are allowed to become parents, genetic progress is not compromised.

Furthermore, we would all agree the production of "genetically superior" seedstock is accomplished by stacking together pedigrees of elite progeny tested AI sires which complement each other. I also believe you must keep "up-to-date" by turning generations rapidly. This is difficult and expensive, but achievable by utilizing the modern techniques of embryo transfer and artificial insemination. (We learn more about a female in one year than most people ever know in a cow's lifetime.)

When we stack pedigrees, the first consideration is the genetic improvement that needs to be made maternally. We try to strike a balance between growth and direct calving ease. We feel you should always analyze the female's EBV's and the potential AI sire's actual data before ever considering a mating.

After you have analyzed the statistics of a mating, then be sure the mating is sound phenotypically. That is keeping in mind structural improvements that need to be made in both parents.

It is also a financial necessity, to produce "popular seedstock." "Popular seedstock" is the result of individual selection. That is picking the elite female, identifying her, and isolating her from the group of "up-to-date," "genetically superior" animals. This is the most difficult part of female selection and few people do this well.

Now that you understand our basic philosophy, I will explain the goals of our breeding program. First and foremost, our goal is to produce six to eight young sires annually that are genetically superior, up-to-date, and popular. Everything else produced is a by-product, which hopefully can be sold profitably so we can stay in business to produce the next set of young bulls for the following year.

I will personally consider our breeding program a success after we have bred and proven an adequate number of superior, summarized sires, and can predict the performance of future generations of summarized sires. Again, the real purpose of any sound, long range breeding program should be to predict the performance of future progeny with an acceptable degree of accuracy.

The basic fundamentals of our breeding program are:

1. Select the sires to produce sons that we consider up-to-date, genetically superior, and popular.

2. Select females that can be promoted because of their superior phenotypes which are sired by popular, genetically superior sires. Also, their dams should be sired by genetically superior, popular bulls.

3. Embryo transplant the female selected to a complementary sire previously selected.

4. After the litter is born, analyze it top to bottom and decide if it is superior. If not, forget it! If acceptable, select a young sire to sample from the litter, and then select a full sister to this bull for future transplanting. After these decisions are made, move this cow family into the next generation and merchandise everything else.

5. When sampling young sires, it should be done in a manner that is as free of environmental error as possible. We sample young sires the following way:

A. Three hundred to 500 units of semen are frozen with a special code and freeze date (no name or registration number).

B. This special coded semen is organized with special coded reference sires and shipped to cooperator herds.

C. Then cows are bred in cooperator herds located in all geographic areas of North America.

D. The cows in the cooperator herds are serviced randomly as they go down the breeding chutes.

E. The final field data is sent directly to the ASA by the cooperating herd members and the data is summarized by the ASA.

6. After you determine which young sires sampled are genetically superior, then sample the best embryo transfer sons of his full sister for the next generation and start over again.

Using the American Simmental Association data, I will show examples of the way we stack performance pedigrees together. Also a few examples of what can happen to the estimated breeding values and pedigrees when you put in the wrong ingredients when stacking pedigrees (using EBV's prepared for this purpose by Dr. R. R. Schalles, Kansas State University.)

Now in summary, I would like to remind you that the purpose of any genetically sound, long range breeding program should be to predict the performance of future progeny.

EXAMPLE - NBI SIRE - PROOF IN PROGRESS

	ESTIMATED BREEDING VALUES				
	Growth			Maternal	
	CEI	WW	YW	DCE	DWW
SIGNAL	99	101	102	108	102
USLAR	97	103	104	92	105
EXTRA	95	103	102	105	100
FORMULA 10	97	102	104	105	103
1983 NSSS Data	100	102			

EXAMPLE - NBI YOUNG SIRE PROSPECT TO BE SAMPLED IN 1983

	ESTIMATED BREEDING VALUES				
	Growth			Maternal	
	CEI	WW	YW	DCE	DW
CSV ACHILLES SUPERSTAR	102	101	100	99	101
SIGNAL	99	101	102	108	102
SUPERCHARGER	101	101	101	103	101

EXAMPLE - NBI YOUNG SIRE PROSPECT TO BE SAMPLED IN 1983

	ESTIMATED BREEDING VALUES				
	Growth			Maternal	
	CEI	WW	YW	DCE	DWW
SEBASTIEN	100	100	100	104	100
MILORD	103	99	101	105	102
IRAN	93	100	101	108	103
NuLOOK	101	100	101	107	101

EXAMPLE - NBI YOUNG SIRE PROSPECT TO BE SAMPLED IN 1983

	ESTIMATED BREEDING VALUES				
	Growth			Maternal	
	CEI	WW	YW	DCE	DWW
ABRICOT	100	101	101	100	102
EXTRA	95	103	102	105	100
ABRICOT	100	101	101	100	102
EXTRA	95	103	102	105	100
REDEEMER	98	101	101	102	102

EXAMPLE - PEDIGREE SIRE LINE PLUS PROVEN IN ALL CATEGORIES

ESTIMATED BREEDING VALUES

	Growth			Maternal	
	CEI	WW	YW	DCE	DWW
CD SIR GALANT 40E	102	101	101	103	100
ALPINE POLLED PROTO	100	102	104	101	101
ABRICOT	100	101	101	100	102

EXAMPLE - SIRE LINE PLUS FOR GROWTH MINUS FOR MATERNAL

ESTIMATED BREEDING VALUES

	Growth			Maternal	
	CEI	WW	YW	DCE	DWW
COTTONWOOD CASCADE	96	103	105	84	98
DONALD	100	99	100	98	99
EBRO	88	99	102	89	99

EXAMPLE - PEDIGREE SIRE LINE MINUS PROVEN ALL CATEGORIES

ESTIMATED BREEDING VALUES

	Growth			Maternal	
	CEI	WW	YW	DCE	DWW
BRL KONRAD 5C	97	97	97	89	98
EIGER 50	98	97	97	99	99
BISMARK	96	99	98	99	99

EXAMPLE - PEDIGREE SIRE LINE STRONG MATERNAL INFLUENCE

ESTIMATED BREEDING VALUES

	Growth			Maternal	
	CEI	WW	YW	DCE	DWW
MILORD	103	99	101	105	102
MONTBELI	102	100	101	100	103
BAR 11 UELI	98	101	101	110	101

ARE WE MAKING ALL BREEDS THE SAME?[1]

Larry V. Cundiff

U.S. Department of Agriculture
Agricultural Research Service
Roman L. Hruska U.S. Meat Animal Research Center
Clay Center, Nebraska 68933

INTRODUCTION

Are we making all breeds the same? In considering this question, I shall draw on the writings of the late Dr. Jay L. Lush, professor of many students in animal breeding, to discuss the nature of breed differences and the role that migration and selection can play as forces of genetic change. Applications of migration will be reviewed and then selection for common criteria to either ultimate limits or optimum levels of performance in beef cattle will be discussed. Finally, attention will be shifted to the question, should all breeds be made the same?

NATURE OF BREED DIFFERENCES

Lush (1958) pointed out that the basis of genetic differences between breeds may be of two kinds. In the first case, two breeds may be homozygous (both genes of each pair are alike) for different alleles (e.g., AA vs. aa). For a number of genes the Mendellian formulas for two breeds can be as follows:

Breed No. 1	AABBccddEE...NN
Breed No. 2	aabbCCddEE...nn
F_1 cross	AaBbCcddEE...Nn

These two breeds are homozygous for different alleles at the A, B, C and N locus or location on their respective chromosomes; they are alike for the d and E genes. If these two breeds are crossed, the F_1 will be heterozygous (genes of the pair are unlike, Aa) at the A, B, C and N locus and homozygous at the d and E locus.

In the second case, Lush (1958) pointed out that differences can exist between breeds, if they differ widely in the proportion of one gene relative to its allele (e.g., frequency of 80% A to 20% a in breed 1 versus 30% A to 70% a in breed 2). Blood groups in cattle offer many examples of this situation.

---

[1] Presented at Beef Improvement Federation Annual Convention, Sacramento, California, May 5-6, 1983.

The nature of breed differences is also impacted by the mode of gene action. Examples of additive and non additive gene effects are shown in figure 1. The first graph portrays a completely additive case. The heterozygous genotype (Aa) is intermediate in phenotypic value to homozygous genotypes (AA and aa). Coat color in Shorthorns is an example of completely additive inheritance. Red animals are homozygous for the red gene (RR), white animals are homozygous for the white gene (rr) and roan animals are heterozygous (Rr).

The second graph portrays a case of partial dominance and the third graph portrays a case of complete dominance. Many examples of complete or nearly complete dominance exist in cattle where heterozygous individuals (Aa) have the same or nearly the same appearance as individuals that are homozygous for the dominant gene (AA) but are quite different in appearance from individuals that are homozygous for the recessive gene (aa). For example, polledness is dominant to horns and black coat color is dominant to red. These are examples of qualitative traits whose inheritance is controlled by single pairs of genes. Quantitative traits such as growth rate and carcass composition are controlled by many pairs of genes, some of which may be additive or non additive. Research has demonstrated that both additive and non additive effects of genes have an important influence on genetic differences between breeds.

For effects of heterosis to be expressed for a given characteristic, the breeds crossed must differ in gene frequency and the genes influencing the characteristic must have non additive effects (e.g., dominance). Crossbreeding experiments with Bos taurus breeds (e.g., Angus, Herefords and Shorthorns) indicate that calf weaning weight per cow exposed to breeding can be increased about 23% by non additive effects of heterosis on growth (Gregory et al., 1965) and survival (Wiltbank et al., 1967) of F_1 calves and increased reproduction and maternal ability of F_1 cows (Cundiff et al., 1974a,b). More than half of this advantage is dependent on use of crossbred cows (figure 2). Crosses between Brahman (Bos indicus) and European breeds (Bos taurus) yield even higher levels of heterosis, presumably due to greater genetic diversity between Bos indicus and Bos taurus breeds (e.g., Cartwright et al., 1964; Koger et al., 1975) than among Bos taurus breeds.

Additive effects of genes also have an important influence on genetic differences among individuals within and between breeds. Average breed differences and differences between individuals within the same breed are reflected in the frequency curves shown in figure 3. Means and distributions are shown for seven breeds of cattle for weight of retail product in steers evaluated at 457 days of age (Koch et al., 1983). Retail product is closely trimmed-boneless steaks, roasts and lean trim. Genetic variation in retail product weight at a constant age is primarily due to additive gene effects. The effect of heterosis for this trait is only 1.4 percent (Koch et al., 1983) and heritability is high (Cundiff et al., 1969). For retail product weight, the heaviest Jersey steers are lighter than the lightest Charolais steers. The frequency curves for all other breeds overlap. Angus and Herefords have very similar means and their frequency curves overlap to a considerable degree; however, Angus and Herefords are significantly lighter than the South Devon, Limousin, Simmental and Charolais.

It is to be expected that breeds that have been kept separate from each other, either by pedigree barriers imposed by man or by geographic

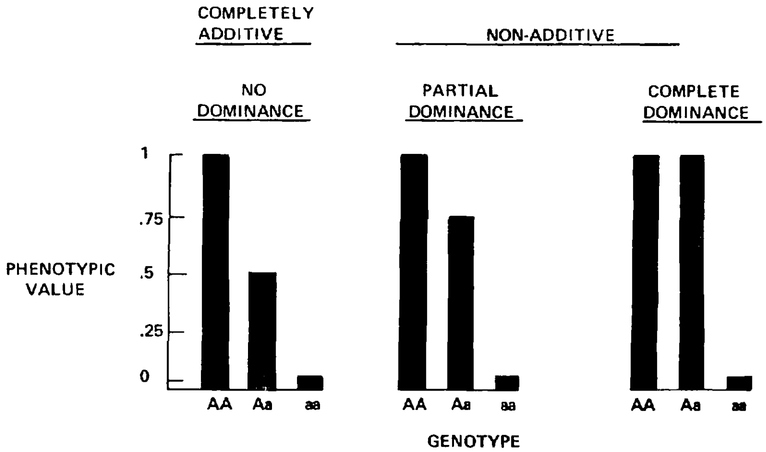


Figure 1. Effects of different degrees of dominance on phenotypic value.

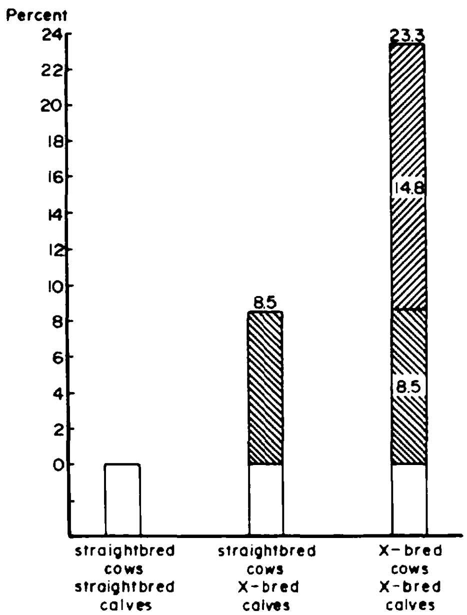


Figure 2. Cumulative effects of heterosis for weight of calf weaned per cow exposed to breeding.

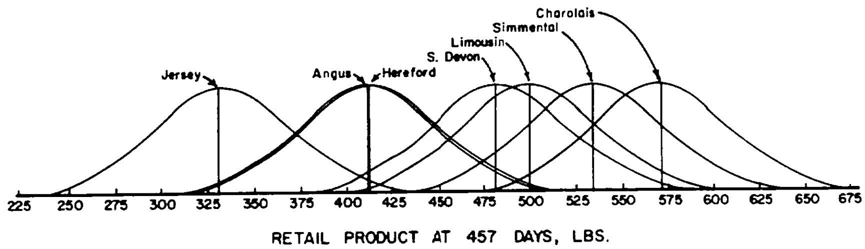


Figure 3. Distributions for breeds in retail product growth of steers to 457 days (From Koch et al., 1983).

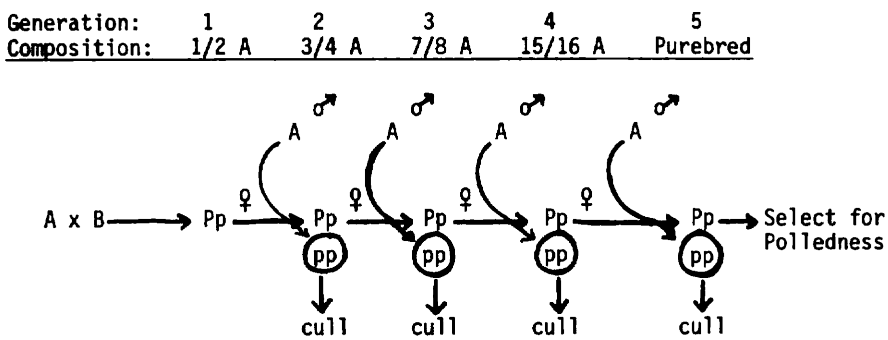


Figure 4. Selective backcrossing. Introducing polledness into a horned breed (pp, breed A) from a polled breed (PP, breed B) by selective backcrossing.

barriers, have drifted apart in frequency for specific genes and for phenotypic expression of many characteristics. The differences should be greatest for characteristics which have responded to many generations of selection directed to different goals.

FORCES OF GENETIC CHANGE

In considering the question "are we making all breeds the same?", it is also important to review the forces of genetic change that operate within and among breeds of cattle. Lush (1948) identified and discussed four forces which change gene frequency, namely, 1) migration, 2) selection, 3) mutation and 4) chance (associated with inbreeding). In the short run or next 50 years, migration and selection are the most likely of these four forces to have the greatest impact, provided the populations are of sufficient size to keep effects of genetic drift associated with inbreeding at reasonably low levels. Mutations probably play an important role only over the evolutionary time scale of many centuries.

Migration.

Applications of migration (only immigration will be considered) in cattle breeding include 1) selective backcrossing, 2) open herd books, and 3) errors in identity or pedigrees.

Polledness is being introduced into a number of breeds by selective backcrossing (Figure 4). Starting with an F_1 base involving horned bulls (pp) mated to foundation females of a polled breed (PP), it is possible to maintain the frequency of the polled gene at a reasonably visible frequency by repeatedly selecting for polledness in the females used in the grade up program. Even if only homozygous horned bulls (pp) are available, the gene frequency for polledness can at best approach 25% after five generations of backcrossing and the inheritance of the offspring is 31/32 of the sire breed employed (generally considered purebred). Once purebred polled bulls are available, the rate of change to polledness can be accelerated by selection of polled bulls used in the grade up program. In cases where selective backcrossing has been applied the genotypic likeness between the eventual graded up pure breed and the breed of the original foundation females may be slightly more similar than the original parental breed genotypes. However, the extra likeness would not be expected to be very great, having arisen from genes closely linked or occupying an adjacent space on the chromosome to the polled gene on only 1 chromosome out of 30 pairs of chromosomes (i.e., 1 out of 60 chromosomes).

Selective backcrossing can also be used to introduce genes affecting a quantitative trait. For example, it would be possible to introduce genes for growth from Charolais into the Jersey. Backcrossing from an F_1 cross base to Jersey bulls accompanied by intense selection for growth should introduce Charolais genes into the Jersey breed. Assuming a large number of genes influence growth, the frequency of specific Charolais genes would be very low after three generations of backcrossing to Jersey bulls (15/16 Jersey, 1/16 Charolais). Only few, if any, females (or males) produced in each backcross generation could be heterozygous or carry a Charolais gene at all loci affecting a trait if more than 2 or 3 loci were involved. However, once backcrossing ceased, selection for growth may increase the frequency of Charolais genes.

Open herd books provide greater opportunity for migration to increase the likeness among breeds than backcrossing. Going back about 10 or 12 years, I recall some discussions with representatives of a couple of breed associations concerning the pros and cons of opening their herd books to introductions from other breeds. Although it was considered, I am not aware of any instances where a decision was made to open herd books to introduction from another breed in the United States. In Canada, I understand that the Shorthorn herd book has been opened to South Devon cattle. There are of course many instances where herd books are open to introducing new individuals through grading up. Also, synthetic breeds such as Brangus, Simbrah, etc., are open to new introductions produced from following certain prescribed matings.

Dr. Lush made the following comments concerning errors in identity *or pedigrees* (Lush, 1948):

> "Some immigration doubtless does occur from errors in the identity or pedigrees of those which are registered or from deliberate fraud. For such cases to be undetected, the immigrant must already be a high grade. Therefore, the average gene frequencies in these immigrants will differ only a little from those of the breed into which they go. Hence, these erroneous registrations will not change the genetic composition of the breed rapidly. Their general effect is to keep the genetic composition of the breed from drifting or being pulled quite as far from the average composition of the species as it otherwise would."

We all would oppose fradulent migration on biological as well as ethical grounds. In an industry employing systematic crossbreeding to exploit heterosis, it is important to have accurate knowledge of breed composition.

Selection.

Most cattlemen have a good general understanding of how selection creates genetic change. Selection causes the possessors of some genes or combinations of genes to leave more offspring in the next generation than others. Thus, its primary effect is to increase the frequency of genes with desired effects.

Annual change from selection is expected to equal

$$\frac{\text{heritability X selection differential}}{\text{generation interval}}$$

In beef cattle, annual progress from selection for a single trait can be expected to range from about .2% to 1% per year, depending on the magnitude of heritability (ranging from 10 to 50%), selection differential (usually 8 to 10% of mean) and generation interval (about 5 years). In experiments, response to selection has generally been slightly less than our theoretical predictions (about .4 to .5% per year for growth traits) because realized heritability is slightly lower than estimates based on variation among and within sire progeny groups or because actual selection differentials are less than expected because of natural selection and attention to secondary traits (Koch et al., 1982).

ARE WE MAKING ALL BREEDS THE SAME BY SELECTION FOR COMMON CRITERIA?

Judging from the traits that have been included in record of performance programs for beef breeds, it would appear that there has been a high degree of similarity in selection criteria in most breeds with growth to weaning and yearling ages receiving primary emphasis during the past 15 to 20 years.

Common Selection Limit.

First let us examine the question are we selecting all breeds for a common criteria to a common selection limit? When response to selection has ceased, the population is said to have reached the selection limit. Experiments with laboratory species indicate that selection limits are approached gradually, with rate of response becoming progressively slower until response plateaus (Figure 5). If two breeds differing widely at the onset were selected for the same criteria for a long period of time, we would expect response to be parallel until the selection limit is reached. It is really only of academic interest whether the two populations would plateau at the same limit, or at parallel limits, or somewhere in between. In practice the limits would vary depending on population size (numbers), intensity of selection and other genetic characteristics of the initial populations (Falconer, 1960).

Falconer (1960) reported that results are fairly consistent concerning selection limits in laboratory species. The response continues 20 to 30 generations, and the total range is between 10 and 20 times the phenotypic-standard deviation in the initial population. Drawing on these results and considering the large number of animals and the relatively low intensity of selection in cattle relative to laboratory species, it seems conservative to estimate that selection limits would be at least 15 times the phenotypic standard deviation above the mean of present populations (Figure 6). It would appear possible to move the mean and frequency curve for retail product growth in Angus well beyond the present mean and frequency curve in Charolais. If Charolais are selected for the same criteria, it is expected that they would maintain their present 4.4 standard deviation difference for many years. It would appear conservative to estimate that at least 30 generations or about 150 years of selection would be required to move a highly heritable trait 15 phenotypic standard deviations above the present mean in breeds of cattle. Thus, we would conclude that so long as breeds of cattle are selected with equal intensity for a common criteria we are not likely to make them the same, at least not for a long period of time. On the contrary, under these circumstances it is likely that present breed differences would be maintained.

Common Optimum Levels of Performance.

Secondly, we can ask are we making all breeds the same by selection for common criteria to common optimum levels of performance? It is not appropriate to select breeds of cattle for maximum lean tissue growth rate to their ultimate selection limit. There are too many trade-offs involved. It is appropriate to select for optimum performance levels.

Neither maximum nor minimum levels of performance are optimum for many traits affecting economy of beef production. For example, French scientists (Menissier and Foulley, 1977) have suggested that calf mortality is lowest at intermediate birth weights (Figure 7). Calves that are too light at birth tend to be premature, weak and unable to cope with stresses that naturally

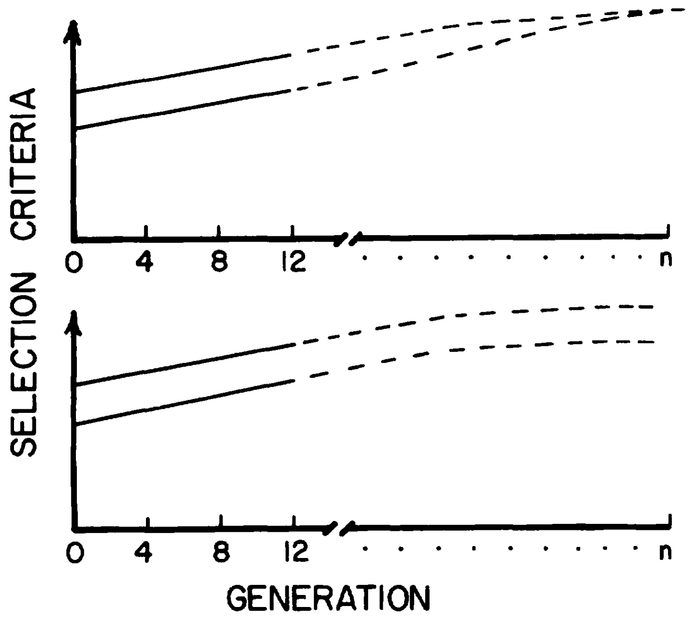


Figure 5. Long term effect of selection in two diverse breeds for a common criteria.

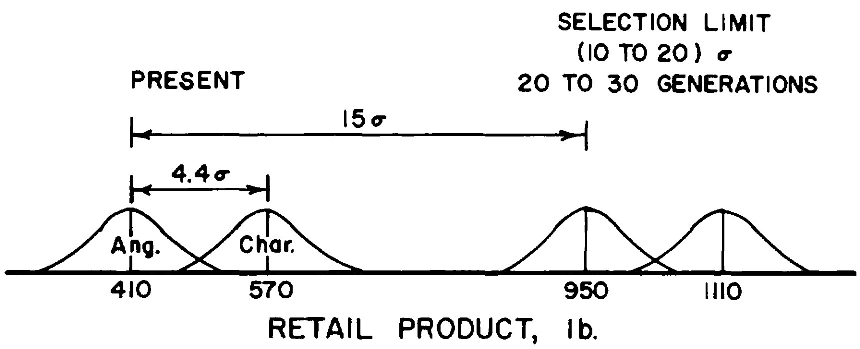


Figure 6. Frequency curves for weight of retail product in Angus and Charolais at the present and at possible selection limits. The possible selection limits are based on experiments with Drosophila and mice (Falconer, 1960).

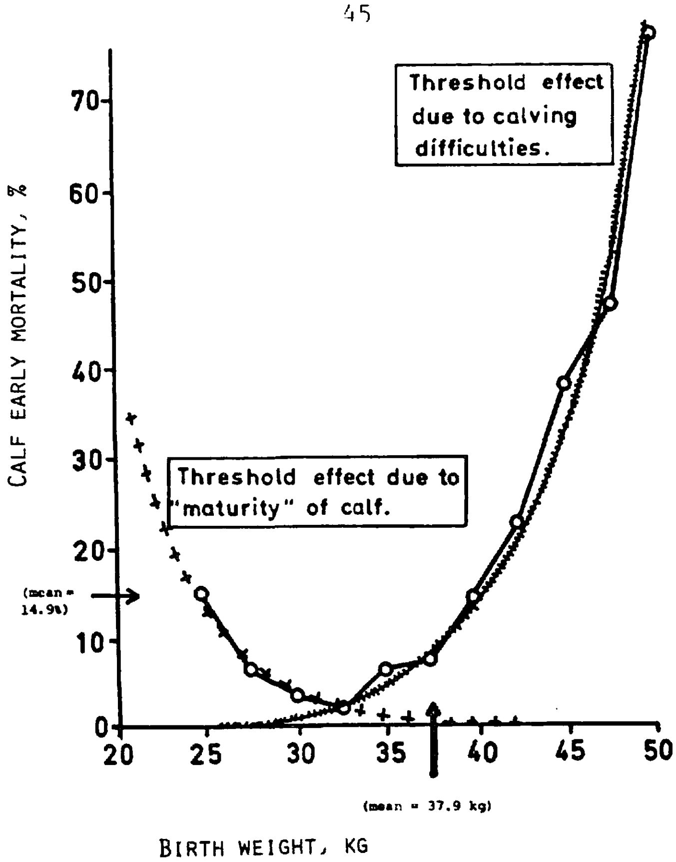


Figure 7. Relationship between early calf mortality and calf birth weight (Menissier and Foulley, 1977; citing Remmen).

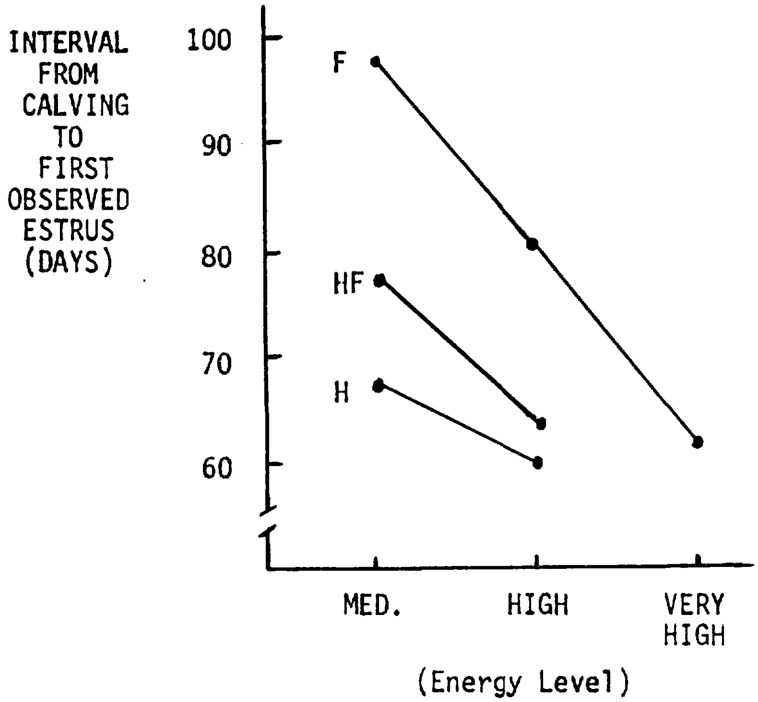


Figure 8. Postpartum interval of Hereford (H), Hereford-Holstein (HF) and Holstein (F) females on three levels of supplementation during lactation (Avg. 2-, 3-, and 4-year-olds; Kropp et al., 1972; Holloway et al., 1973: Lusby et al., 1974).

confront the newborn. High mortality in newborn young with light birth weight is most evident in calves born as twins or in sheep and swine born in large litters (Cundiff et al., 1982). On the other hand, calves that are too heavy experience difficult deliveries at birth. Calving difficulty is in turn associated with increased mortality. Calf mortality is about four times greater in calves experiencing difficult births than in calves experiencing no difficulty (Laster and Gregory, 1973).

We are more aware of the problem with heavy calves at birth because selection for higher growth rate has moved birth weights to the high side of their optimum range. This is not just a between breed phenomenon caused by mating females from breeds or crosses of small to intermediate size to sires of a different breed of larger size. Koch et al. (1982) have shown that calving difficulty and calf mortality has increased significantly in offspring of 2-year-old first calf heifers in three lines of Hereford cattle selected for 1) weaning weight, 2) yearling weight or 3) an index of yearling weight and muscling score relative to unselected controls. The optimum birth weight is not a single point, but rather a range. The optimum range for birth weight is probably not the same for all breeds. The optimum range for birth weight may be heavier for breeds with larger skeletal size and larger pelvic openings than for breeds with smaller size and pelvic openings. Thus, it is probably not appropriate to set specific culling levels on birth weight (e.g., 100 lb) for all breeds.

Amount and quality of feed resources for the cow herd and for finishing slaughter progeny play key roles in determining optimum levels of performance. For example, in studies with Angus, Angus-Holstein crosses and Hereford, Hereford-Holstein and Holstein cows, Oklahoma workers found that reproduction of larger higher lactating cows declined if additional nutrient requirements for maintenance and lactation were not met (Figure 8). Cow herds should be comprised of breeds that are well adapted to the climatic and feed environment provided by specific farms or ranches where the cows are carried.

Optimum performance is not a single trait phenomenon. Optimum performance is a multiple trait phenomenon. Optimum performance levels for any characteristic are in part determined by trade-offs resulting from genetic relationships with other characteristics. For example, optimum birth weight is a function of survival, calving difficulty and subsequent growth rate. Serious genetic antagonisms result from the high genetic correlations among weights at birth, weaning, yearling and mature ages (Brinks et al., 1964; Koch et al., 1973; Smith et al., 1976a). Heavier weaning and yearling weights are obviously favored in the market place. Also, cattle of larger size and heavier yearling weights require less feed per unit of gain to age and weight end points (Smith et al., 1976b, Cundiff et al., 1981, Koch et al., 1982) and yield carcasses with a higher percentage of retail product and less fat trim when compared to cattle of smaller size and yearling weight at the same weight end points (Koch et al., 1982). However, other consequences are that selection for growth at weaning or yearling ages increases birth weight and mature size. Increases in birth weight not only contribute to increased calving difficulty and reduced survival but also to less desirable rebreeding performance of dams (Laster et al., 1973). Heavier mature weight of cows increases output of the production system but it also increases nutrient requirements for maintenance of the cow herd, which at least partially offsets advantages of more rapid and efficient gains of the progeny slaughtered (Dickerson et al., 1974; Jenkins and Ferrell, 1983).

SHOULD WE MAKE ALL BREEDS THE SAME?

Because there are genetic antagonisms among fitness and growth traits, it is not possible for any one breed to excel in all characteristics of economic importance. Nor is it possible to expect simultaneous improvement in all characteristics from selection within breeds. Use of crossbreeding programs that exploit complementarity, heterosis, and opportunity to synchronize genetic resources with market requirements and feed resources provide the most effective means of managing trade-offs that result from genetic antagonisms.

Rotational systems of crossbreeding (Figure 9) maintain high levels of heterosis from one generation to the next, but use of large average genetic differences among breeds is restricted (Gregory and Cundiff, 1980). Breeds used in rotational crossbreeding systems should be relatively comparable as far as size and milk production are concerned in order to avoid calving difficulty and to stabilize nutritional requirements in the cow herd. In rotational systems, each breed contributes its strengths and weaknesses equally to the production system. For example, the rapid and efficient lean growth of a large mature size breed cannot be exploited without also taking their large mature size and higher feed requirements for maintenance of the cow herd. Thus, general purpose breeds that are similar in size and milk production and selected for optimum levels of performance are needed for rotational systems of crossbreeding. However, diversity among breeds should still be preserved to match characteristics of breeds to diverse feed resources used by cow herds, to diverse climatic environments and to respond to shifts in market requirements.

In addition to use of heterosis, crossbreeding systems can be used which increase production efficiency by exploiting complementarity (Cartwright, 1970). Complementarity is exploited in specialized crossbreeding systems when crossbred cows of small to medium size and optimum milk production (maternal breeds) are mated to sires of a different breed noted for rapid growth rate and carcass leanness (terminal sire breeds). For example, heterosis and complementarity are both exploited to their fullest by combined rotational-terminal-sire systems of crossbreeding (Figure 10). Notter et al. (1979) demonstrated that this type of system can reduce break even costs of production 4 to 5 percent relative to rotational crossbreeding alone. Diverse differences among breeds should be preserved if we are to employ specialized systems of crossbreeding which exploit complementarity as well as heterosis. Specialized terminal sire systems of crossbreeding provide greater opportunity to match characteristics of breeds to diverse feed resources and market requirements than rotational crossbreeding systems.

SELECTION EMPHASIS

Selection objectives for a breed, or subpopulations within a breed (e.g., maternal as well as general purpose subpopulations or paternal as well as general purpose subpopulations), should depend on the breeding system employed in the commercial herds being provided with seedstock (Table 1). General purpose breeds are needed if the commercial production systems served are straightbreeding or following a rotational crossbreeding program. More specialized maternal breeds and terminal-sire breeds are needed if the commercial production systems served are exploiting complementarity through terminal-sire crossbreeding systems.

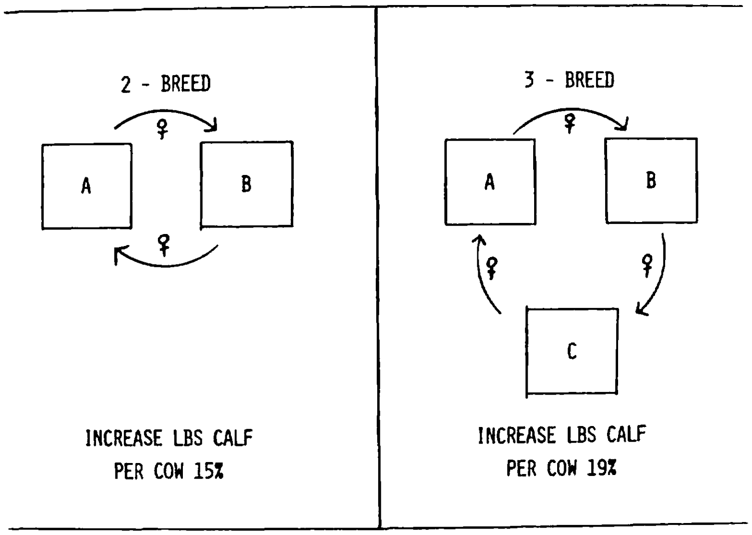


Figure 9. Rotational crossbreeding systems.

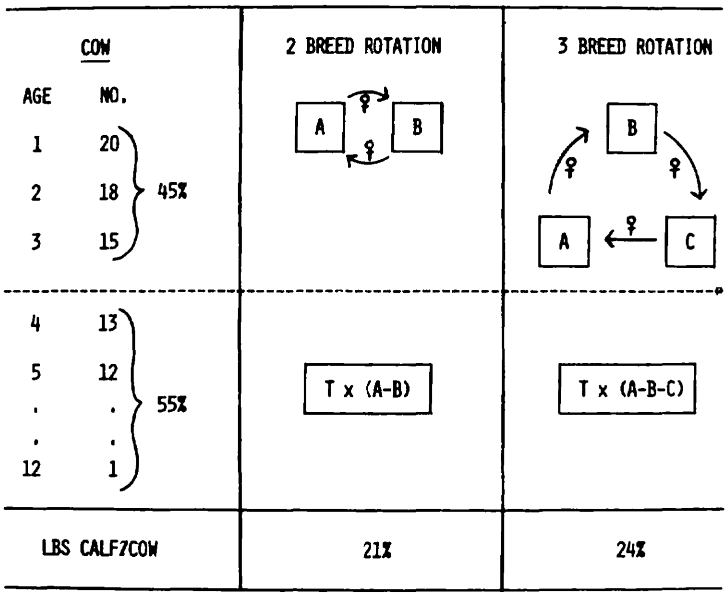


Figure 10. Rotational-terminal-sire crossbreeding systems.

TABLE 1. SELECTION EMPHASIS[a]

Item	Population: General purpose	Maternal	Paternal (terminal sire)
Components[b]	$G^i + G^m$	$1/2\ G^i + G^m$	G^i
Reproduction			
Fertility	+++	++++	+
Survival	+++	++	+++
Growth			
Birth weight	-	-	0
Weaning weight	+	++	++
Yearling weight	+	0	++
Mature weight	0	0	+
Carcass			
Cutability	0 or +	0	+
Marbling	0	+	0

[a] Increasing +'s or -'s indicate increasing positive or negative selection pressure.

[b] G^i denotes direct effects transmitted from parent to offspring, and G^m denotes maternal effects provided to offspring from the dam.

In general purpose breeds, both direct genetic effects (G^i) transmitted from parent to offspring and maternal effects (G^m) provided to the offspring by the dam should be emphasized in relation to available genetic variation. In breeds used for specialized crossbreeding systems, G^i should be emphasized in terminal sire strains and G^m should be emphasized twice as much as G^i in maternal strains because the dam provides all the maternal environment but only half of the direct genetic effects to their offspring.

The economic pressures to increase outputs, i.e., weight at weaning or yearling ages, are very compelling in the beef industry. It is efficient to produce progeny that are genetically superior to their dams for weight at market ages. However, once optimum levels of size and milk production have been achieved, either by selection between or within breeds, terminal-sire crossbreeding systems provide the only method available for exploiting genetic variation in size and growth to increase efficiency of production.

Thus, intensive selection for more rapid and efficient growth rate can only be justified in terminal-sire populations. Some restrictions should probably be placed on birth weight, even in terminal-sire breeds to prevent increases in calving difficulty. Correlated response in mature weight can be tolerated in terminal sire breeds, but direct selection for mature size does not seem indicated.

In maternal breeds, components of weaning weight per cow exposed to breeding including reproductive rate, calving ease, survival of progeny, lighter birth weight and heavier weaning weight from a maternal point of view should be emphasized.

It is more difficult to decide on selection objectives for general purpose populations because of the major genetic antagonisms among calving, growth and carcass traits. Assuming that the population is competitive in growth rate, weaning and yearling weight should only receive limited emphasis to avoid associated increases in birth weight and mature size. In general purpose populations, it is appropriate to stress reproduction more than any other trait in spite of its low heritability.

SUMMARY

Are we making all breeds the same? In considering this question, we have reviewed the roles of migration and selection. We have concluded that migration tends to make breeds more alike, but in practice its effects are small if it is merely used to introduce desired genes from another breed while maintaining a high level of relationship (i.e., 15/16 or more) to the original breed. Long term selection of breeds for a common criteria is not likely to make all breeds the same, at least not for a long period of time. Even selection for the same criteria to optimum levels of performance will not make breeds exactly the same. We would still expect to reap considerable benefits of heterosis in crosses among breeds with similar levels of performance for specific traits. It is desirable to use general purpose breeds with similar levels of performance in rotational systems of crossbreeding. However, if we wish to preserve the opportunity to match breeds to different climatic environments, to diverse feed resource situations, and to shifts in market requirements and if we wish to employ systems of crossbreeding which exploit complementarity as well as heterosis, then we should preserve breed differences.

LITERATURE CITED

Brinks, J. S., R. T. Clark, N. N. Kieffer and J. J. Urick. 1964. Estimates of genetic, environmental and phenotypic parameters in range Hereford females. J. Anim. Sci. 23:711.

Cartwright, T. C. 1970. Selection criteria for beef cattle for the future. J. Anim. Sci. 30:706.

Cartwright, T. C., G. F. Ellis, Jr., W. E. Kruse and E. K. Crouch. 1964. Hybrid vigor in Brahman-Hereford crosses. Texas Agr. Exp. Sta. Tech. Monogr. 1.

Cundiff, L. V., K. E. Gregory and R. M. Koch. 1974a. Effects of heterosis on reproduction in Hereford, Angus and Shorthorn cattle. J. Anim. Sci. 38:711.

Cundiff, L. V., K. E. Gregory, R. M. Koch and G. E. Dickerson. 1969. Genetic variation in total and differential growth of carcass components in beef cattle. J. Anim. Sci. 29:233.

Cundiff, L. V., K. E. Gregory, F. J. Schwulst and R. M. Koch. 1974b. Effects of heterosis on maternal performance and milk production in Hereford, Angus and Shorthorn cattle. J. Anim. Sci. 38:728.

Cundiff, L. V., R. M. Koch, K. E. Gregory and G. M. Smith. 1981. Characterization of biological types of cattle-Cycle II. IV. Postweaning growth and feed efficiency of steers. J. Anim. Sci. 53:332.

Cundiff, L. V., K. E. Gregory and R. M. Koch. 1982. Selection for increased survival from birth to weaning. Proceedings 2nd World Congress on Genetics Applied to Livestock Production. Vol. 5. Plenary Sessions. pp. 310-337.

Dickerson, G. E., N. Kunzi, L. V. Cundiff, R. M. Koch, V. H. Arthaud and K. E. Gregory. 1974. Selection criteria for efficient beef production. J. Anim. Sci. 39:659.

Falconer, D. S. 1960. Introduction to Quantitative Genetics. The Ronald Press Company, New York.

Gregory, K. E. and L. V. Cundiff. 1980. Crossbreeding in beef cattle: Evaluation of systems. J. Anim. Sci. 51:1224.

Gregory, K. E., L. A. Swiger, R. M. Koch, L. J. Sumption, W. W. Rowden and J. E. Ingalls. 1965. Heterosis in preweaning traits of beef cattle. J. Anim. Sci. 24:21.

Holloway, J. W., D. F. Stephens, L. Knori, K. Lusby, A. Dean, J. U. Whiteman and R. Totusek. 1973. Performance of three-year-old Hereford, Hereford x Holstein and Holstein females as influenced by level of winter supplementation under range conditions. Anim. Sci. and Industry Res. Rep. Agr. Exp. Sta., Oklahoma State Univer. and U.S.D.A., MP-90, pp. 31-40.

Jenkins, T. G. and C. L. Ferrell. 1983. Nutrient requirements to maintain weight of mature, nonlactating, nonpregnant cows of four diverse breed types. J. Anim. Sci. 56:761.

Koch, R. M., L. V. Cundiff, K. E. Gregory and G. E. Dickerson. 1973. Genetic and phenotypic relations associated with preweaning and postweaning growth of Hereford bulls and heifers. J. Anim. Sci. 36:235.

Koch, R. M., M. E. Dikeman, H. Grodzki, J. D. Crouse and L. V. Cundiff. 1983. Individual and maternal genetic effects on beef carcass traits of breeds representing diverse biological types (Cycle I). J. Anim. Sci. (In press).

Koch, R. M., K. E. Gregory and L. V. Cundiff. 1982. Critical analysis of selection methods and experiments in beef cattle and consequences upon selection programs applied. Proceedings 2nd World Congress on Genetics Applied to Livestock Production. Vol. 5. Plenary Sessions. pp. 514-526.

Koger, M., F. M. Peacock, W. G. Kirk and J. R. Crockett. 1975. Heterosis effects on weaning performance of Brahman-Shorthorn calves. J. Anim. Sci. 40:826.

Kropp, J. R., D. F. Stephens, J. W. Holloway, L. Knori, J. V. Whiteman and R. Totusek. 1972. The performance of two-year-old Hereford, Hereford x Holstein and Holstein females as influenced by level of winter supplementation under range conditions. Anim. Sci. and Ind. Res. Rep. Agr. Exp. Sta., Oklahoma State Univ. and U.S.D.A., MP-87. pp. 26-36.

Laster, D. B. and K. E. Gregory. 1973. Factors influencing peri- and early postnatal calf mortality. J. Anim. Sci. 37:1092.

Lusby, K. S., R. Totusek, L. Knori, D. F. Stephens, J. V. Whiteman, J. W. Holloway and R. A. Dean. 1970. Performance of four-year-old Hereford, Hereford x Holstein and Holstein females as influenced by level of winter supplementation under range conditions. Anim. Sci. and Ind. Res. Rep. Agr. Exp. Sta., Oklahoma State Univ. and U.S.D.A., MP-92. pp. 56-64.

Lush, Jay L. 1948. The Genetics of Populations. Mimeographed Notes.

Lush, Jay L. 1958. Animal Breeding Plans. Iowa State University. Press.

Notter, D. R., J. O. Sanders, G. E. Dickerson, G. M. Smith and T. C. Cartwright. 1979. Simulated efficiency of beef production for a cow-calf-feedlot management system. III. Crossbreeding systems. J. Anim. Sci. 49:92.

Menissier, F. and J. L. Foulley. 1977. Present situation of calving problems in the EEC: incidence of calving difficulties and early calf mortality in beef herds. In Current Topics in Veterinary Medicine and Animal Science. Vol. 4. (B. Hoffmann, I. L. Mason and J. Schmidt, Editors). Martin Niihoff Publisher. pp. 30-85.

Smith, G. M., H. A. Fitzhugh, Jr., L. V. Cundiff, T. C. Cartwright and K. E. Gregory. 1976a. A genetic analysis of maturing patterns in straightbred and crossbred Hereford, Angus and Shorthorn cattle. J. Anim. Sci. 43:389.

Smith, G. M., D. B. Laster, L. V. Cundiff and K. E. Gregory. 1976b. Characterization of biological types of cattle. II. Postweaning growth and feed efficiency of steers. J. Anim. Sci. 43:37.

Wiltbank, J. N., K. E. Gregory, J. A. Rothlisberger, J. E. Ingalls and C. W. Kasson. 1967. Fertility of beef cows bred to produce straightbred and crossbred calves. J. Anim. Sci. 26:1005.

COWS AND POLITICS*

by

Gordon K. Van Vleck
Secretary for Resources
California Resources Agency

Since assuming my duties as California's Secretary for Resources, I have been busy learning about my new job, and I have not been able to spend as much time as usual with old friends and some of the organizations in which I have been active in the past.

So it is a special pleasure for me to be here today to see some old acquaintances and to share some of my views on the topic that Ken Ellis assigned me, "Cows and Politics."

At first I was a little puzzled by that assignment. I have had some experience with cows, but with just four months as a State Official under my belt I certainly don't regard myself as an expert on politics.

It wasn't until I remembered that cows and bulls go together, and that most people think politics is at least 90 per cent bull that I understood why Ken felt a lifelong cattleman like me would be qualified to talk about cows and politics.

Since I have had more experience with cows than with politics, I'll take up that subject first.

All of you are interested in improving the well-being of the beef cattle industry in one way or another. If you weren't, you wouldn't be here today.

The cattle industry is one of the oldest and one of the most important industries in our country. Yet it is one of the least understood.

That's because there are so few of us in it, and because we operate in such rural and remote areas that urban dwellers seldom come in contact with a ranching operation. Also, television depicts ranching in a very unrealistic way, always emphasizing the romantic side and seldom showing it like it really is.

I don't mean to say that there isn't any romance in the business -- there is -- but there is a lot more than few people outside the business understand.

The cattle business, like everything else, is constantly changing. Hopefully, for the better, but I am sorry to say that maybe this has not always been the case.

*Presented at the National Beef Improvement Federation Convention May 6, 1983, Sacramento, California.

We have come a long way from the the early days of the "longhorns" to present-day, modern beef breeds. I think we can still go a long way toward improving cattle to better meet the demands of our customers. And you people are in the position and have the ability to do it.

The big question is, "Where do we go from here?"

Each of you has your own ideas, and they are not all the same. The truth is, we really don't know all the answers. I have seen our direction change drastically several times in my lifetime. Each time, we thought we were changing to meet the demands of our customers.

Over a long period of time the business has been good to us; we have had our ups and downs, but we have prospered. However, I believe there have been more fortunes made in the last 50 years from our land deals than from our cattle deals.

Let us take a brief look at what has happened during this century.

The population has continued to increase, and the per capita consumption of beef has also increased -- until recently. These two factors have combined to make it possible to increase our beef supplies and at the same time market our product at a reasonably good price.

I recall that the per capita consumption of beef in 1955 was 80 pounds, in 1975 it was 120 pounds -- an increase of 50 per cent. It increased to more than 130 pounds per person a year or so later when we reached the peak of our herd liquidations. It then dropped drastically to about 100 pounds, were it remains today. It was in August of 1973 that the market broke, and we have had only one or two decent years since.

Until a few years ago we thought of demand as being inelastic and believed all we had to do was reduce supply to get the demand ratio back in balance. We found this was no longer the case.

In the past, if we had reduced our supply by 30 pounds per person in a period of five years, the price would have gone through the roof. Yet we did that in the 1976-1980 period with practically no real change in prices. Why?

Obviously we lost some of the demand. Where did it go? I think there are several reasons for the lower demand.

First, we were just entering a period of recession. People didn't have the money to spend that they had previously.

Second, our customers were becoming aware of health problems that were allegedly associated with eating beef. The cholesterol syndrome was at its height. You would surely have a heart attack if your cholesterol level got too high!

Third, there was a belief that beef was not wholesome, that it was laced with hormones, chemicals and growth stimulants that would kill or injure you.

Fourth, people were becoming more diet-conscious. And every new diet put out recommended eating less red meat and suggested a shift to fish or poultry.

Fifth, the vegetarian fad was increasing. For reasons best known to themselves, many people gave up eating meat entirely. This is a small segment of society, but a significant one.

Last, but certainly not least, pork and poultry supplies were increasing at about the same rate that beef supplies were decreasing. Total meat supplies changed very little; our customers became somebody else's customers. While this was going on, beef producers continued to lose money.

So what has all this got to do with you?

Plenty! You will determine the size and shape of tomorrow's beef animal, as well as its efficiency. And that is the key -- efficiency. Producers must become more efficient and stay that way if they are to survive.

What are we talking about when we say "efficiency?" I think I know, and you think you know, but let's talk about it. We have a remarkable animal in the cow. She is a ruminant. With her four stomachs she can convert inedible roughages into high-quality, nutritious, delicious food. And she can do it cheaply, too; howewver, some cows can do it better than others. Those are the ones we must find and propagate. They are the cows of the future.

Reproduction is extremely important. The efficient beef cow will have a live calf every year and raise it to weaning time. Generally speaking, the bigger the calf is at weaning time the greater the return to the producer. However, it must be of decent quality and of the size and shape the buyer will want.

Gainability is important if and when the feeder animal goes to the feedlot. There is a tremendous difference between the top and bottom gainers of most pens of cattle on feed. It is possible to make vast improvement in this area.

You people with your improvement associations and your beef programs have done a fine job, but the commercial producer does not take advantage of what you have done for him. Some do, but most do not. He might buy your best-performing bulls, but that is about where it stops. He needs to have a program that will permit him to identify and eliminate the poorer- performing cows so he can upgrade his herd much faster.

He needs to know how his calves perform on feed so he can improve that aspect of his operations.

He should be able to follow his animals all the way through slaughter to see of they are the right kind of animal for the market.

Very few commercial cattlemen are interested in how their cattle perform after they pass over the scales to the first buyer. Perhaps you could help him get interested in doing more of this kind of work. It would surely be beneficial to you in the long run.

These are only some of the things that can be done to improve efficiency, and as we move further into the computer age, opportunities are unlimited. All it takes is a little imagination, innovation and lots of hard work.

So far I have been talking about "cows". I would like to spend some time now on the "politics" part of my assignment.

As California's Secretary for Resources I have two principal responsibilities. One is to serve as a member of the Governor's Cabinet. This 10-member group consists of the heads of the five major agencies in state government, principal advisors for food and agriculture, environmental issues, industrial relations, and key members of the Governor's immediate staff.

As a member of the Cabinet, I am responsible for presenting resource issues to the Governor and other Cabinet members. I am responsible for seeing that the Governor's policies and programs, as they relate to the Resources Agency, are carried out.

My other chief responsibility is to serve as the head of the Resources Agency, which consists of seven major departments, 19 boards and commissions and about 14,000 employees.

The total Agency budget for operations is about $623 million in General Fund money. While this may seem like a lot of money -- it's certainly more than pocket change -- it represents only 2.5 per cent of the total State budget of $25 billion. In addition to money from the General Fund, our budget also includes about $800 million that comes from local agencies that purchase water from the State Water Project.

The seven departments in the Agency include the departments of:

Water Resources,
Parks and Recreation,
Forestry,
Fish and Game,
Boating and Waterways,
Conservation, and the
California Conservation Corps.

The responsibilities of the boards and commissions range from maintaining the environmental quality of California's coastline to coordinating uses of Colorado River water and setting commercial fishing seasons.

The four months since my appointment have certainly been busy ones. One of my chief activities has been to work closely with the Governor and his staff on the appointment of department directors and board and commission members. That process has taken longer than I thought it would, partly because we have had two objectives in mind.

First, the best qualified person for the job, and second, a person who would be acceptable to the widest range of interested individuals and organizations. These two objectives have not always been compatible, and the resulting frustrations have contributed to my political education.

Though many of you are visitors to California, I am sure you are aware that the election of Governor Deukmejian has brought about substantial changes in official State policy in a number of areas.

One of the most widely recognized objectives of our new Governor is to restore a healthy economy in California and to enhance our business climate. To accomplish this, Governor Deukmejian has proposed a number of innovative and bold programs and strategies. Some will require legislation, but others can be, and are being, implemented through administrative direction in the agencies, departments, boards and commissions.

Agriculture is the Number One business of California. Last year it was valued at $14 billion. It was responsible for one of every three jobs in the State and it generated $4 billion in exports, an important factor in our international trade balance.

The Governor and I share a common commitment to assuring the future vitality of agriculture in California. In addition to being a political commitment, I regard this as a common sense commitment.

While the Department of Food and Agriculture -- which is not a part of the Resources Agency -- has the principal responsibility in most areas for working with growers, ranchers, processers, retailers, exporters and others in the agribusiness sector, the Resources Agency also has important responsibilities directly affecting agriculture.

Most agriculture in Califorina is irrigated agriculture, and growers rely on two sources of water. One source is ground water, a resource that has been severely overdrawn in recent years. In the San Joaquin Valley the annual overdraft is now 400,000 acre feet per year. Constantly-lowering water tables and constantly-increasing energy costs are serious problems for irrigators relying on ground water.

The other source is water from other areas, delivered by the federal government through the Central Valley Project and by the State through the State Water Project.

The State Water Project, constructed and operated by the Department of Water Resources, has been a key factor in the growth of California agriculture in the last 20 years. And the course of its future development will be a key factor in California's water future.

The importance of the State water Project in providing for our present water needs is indicated by several statistics:

o The project delivers 2.3 million acre feet of water annually from the San Joaquin-Sacramento Delta to the San Joaquin Valley and Southern California.

o Its pumps lift water to an elevation of 3,465 feet above sea level between Bakersfield and Los Angeles;

o To operate those pumps, the department is the largest single user of energy in the State -- consuming 3 per cent of all electrical power used in California.

Of course these are statistics for a normal rainfall year. This year with 200 per cent normal rainfall and more than 200 per cent snowpack in the Sierra, we are spending as much time and effort planning to get rid of water as we usually spend planning how to obtain water and deliver it.

This year, while it has created unusual problems for us, has served to remind us of the need to move ahead in expanding the State Water Project. While its present delivery capacity of 2.3 million acre feet annually may seem large, we have signed commitments with water users to deliver up to 4.2 million acre feet annually after the turn of the century.

Water will continue to be important to California, and the politics of water will help shape the destiny of our State. The question is, "What kind of politics will best serve our needs?"

Will it be the politics of contention and region vs. region, or can we achieve a politics of concensus and agreement?

Last year we saw the failure of two State initiatives offered by different interests as ways to solve present problems and provide for our future needs. Both issues failed because they became victims of the politics of contention. In the end, after the votes were counted and both issues defeated, little had occurred to resolve differences or to create the kind of understanding and concensus which I am convinced is necessary to any realistic solution to our water needs.

Governor Duekmejain has said that creating new and effective water policies and programs for California is among his highest objectives. He has asked me to assume a leadership role in that effort. I look forward to that challenge, and I am confident we can bring people and interests together to find the necessary common ground for real progress in meeting our future water needs.

Another matter of importance joining agriculture and politics is the so-called "ag land issue."

Last month I spoke before a statewide conference called on this issue. The views expressed there covered a wide range -- from "save it all," to "leave us alone, there isn't any problem."

At that conference I expressed my belief that the creation of an accurate data base which can provide information about the true condition of agricultural lands is a logical duty of state government. The decision-making responsibility, however, should rest with local agencies and local voters, acting on the accurate information provided by the State as well as their own knowledge and local experiences.

I also expressed my concern that regardless of my views and the views of others equally involved, the important decisions on this issue would be made in the political arena by people with no real understanding of the needs of farmers and ranchers. Those people will be the urban voters who, through sheer numbers, dominate politics today.

Earlier, I spoke about the misconceptions surrounding our business. Like it or not, we must accept the urban reality of modern politics. This means that any issue that goes to the ballot box or is decided by elected representative will reflect the views, accurate or not, of urban voters.

Thus, one of the political challenges we face is to get our message across to the urban residents and voters of Los Angeles, St. Louis, Houston and Chicago.

If we are successful, we will have the support and understanding of the largest bloc of voters in the country, along with the support of their elected State legislators, representatives and senators.

In closing I'd like to suggest a new formula for our future. That formula is, "Cows, Politics and People."

We can take care of the Cows. That's no problem.

If we have the support and understanding of the people who make the ballot box decisions affecting our success and welfare, the Politics will take care of themselves.

And that's no bull!

###

SIRE EVALUATION COMMITTEE MEETING
ANNUAL CONVENTION
1983

Two sessions were held. The first was from 8:10 PM to 10:00 PM on 4 May 1983 and the second from 2:30 PM to 3:30 PM on 5 May 1983. Dr. Larry Cundiff, chairman of the committee, chaired both sessions. The evening session was a series of reports given by various committee participants as follows:

1. Sire interaction variance component estimation. Keith Bertrand
2. Using the generation coefficient in accounting for genetic trend in national sire summary analysis. Eldin Leighton
3. Floating versus fixed base in sire evaluation. Jeff Berger
4. Within herd analysis coupled with the sire evaluation analysis. Brett Middleton
5. Importance of non-random mating in sire evaluation. Doyle Wilson
6. Using EPDs to help in evaluating the breeding value of yearling bulls. Brad Skaar

Some discussion followed each presentation as did informal discussion after the meeting closed at 10:00 PM.

The second meeting was called to order by Dr. Larry Cundiff at 2:30 PM on 5 May 1983. The first meeting was reviewed. Then Dr. Larry Corah made a report on the standardization of sire evaluation reporting meeting held on 28 March 1983. The summary of this meeting is included after these minutes. Other items of interest from this meeting concerned the terminology used for estimated breeding values, the listing of scrotal circumference on the sire summary, and the development of a reproductive index for females.

Excellent discussion followed. Concern for reporting estimated breeding values and expected progeny differences (half the former) both was voiced. Concern over reporting carcass data to a composition end point was related. The point that one estimate of genetic merit per trait needs to be reported rather than two was made. The suggestion that research be conducted on the development of reproduction measures was made.

Then Dr. Cundiff called on Hop Dickenson to make comments on what are the needs for national sire evaluation. Some uniformity of minimum standards to report sires is probably necessary. The issue of withholding information was raised. The need exists to develop reproductive measures and possibly these could be on first calf heifers only. This point was argued suggesting that lifetime reproductive information would include other aspects of importance. Hop suggested that possibly a linear classification program needs study. He indicated that there is breeder interest. Lastly help is needed by all BIF members to help publicize sire reports to the entire beef industry.

Excellent discussion followed. Longivity of females appears to be worth some study. Linear type might include udder, feet, condition, rear legs and stature. The meeting closed with informal discussion and coffee at 3:30 PM.

R. L. Willham, Secretary

BIF COMMITTEE REPORT - STANDARDIZATION OF SIRE SUMMARY DATA

On March 28, 1983, seven beef breeds met in Kansas City to discuss the standardization of sire summary and performance data.

Those attending and breeds represented were as follows:

Bob Scarth, Charolais Association
Craig Ludwig, Hereford Association
John Crouch, Angus Association
Alan Sears, Short Horn Association
Jim Gibb, Polled Hereford Association
Greg Martin, Limousin Association
Larry Corah, Simmental Association

The recommendations of this group were as follows:

1) Weaning and Yearling Weights. It was the recommendation of the group that weaning and yearling weights be expressed in units by all breeds.

2) Birth Weight. It was recommended that birth weight be expressed in units rather than ratios.

3) Accuracy Values. After considerable discussion, the recommendation was made that the commercial and purebred industry would best understand a system that would either use percentage or numerical expression of percentage in which the scale would go from 0-1. The final recommendation was that a numerical expression be utilized by breed associations.

4) Carcass Traits. The recommendation was that carcass data be reported in units in the sire summary and other publications listing carcass data. The group also felt that it was extremely important in order for valid carcass data to be collected that there should be some kind of standardized or designed test in which there is control over how the cattle are fed, and the end point for slaughter should either be weight or compositional end point.

5) Calving Difficulty. There is considerable variation in how the breeds currently report calving difficulty or in some cases whether calving ease is reported per se. No specific recommendations were made pertaining to the reporting of calving ease that would be uniform amongst all breeds.

6) Maternal Values. Unfortunately, there is considerable variation in how the maternal breeding values are expressed. Currently the Hereford, Angus, and Polled Hereford Associations are reporting maternal values which are estimated breeding values and do, in most cases, include progeny data when available. The Limousin and Simmental Associations are reporting maternal values as daughter's first-calf weaning weights, and in the case of the Simmental Association, maternal value includes daughter's first-calf calving ease. The committee recommends that reports that would come from BIF, universities, or other performance-related organizations would state how the various breeds determine maternal values, and at this time no attempt would be made to standardize the methods of reporting this genetic trait.

BIF SIRE EVALUATION DISCUSSION

H. H. Dickenson
Executive Vice President - American Hereford Association

Below are four of the most pressing needs currently for the industry to address with regard to Sire Evaluation.

1. Include some of the reproductive traits in the sire summaries.

   a. Scrotal circumference is perhaps available now for some breeds. What procedure do we use to include this trait? Can we relate this to puberty in daughters?

   b. Use of information on first calf heifers would be most meaningful. Can we design our on-farm records report to show such things as conception rate, calving percentage, early calving, calving ease, etc?

   c. Does classification of certain characteristics or traits have a place in the sire summaries? Perhaps along the lines of the dairy industry's linear classification program. What characteristics have economic importance? Are they heritable? Is the evaluation repeatable? Are there significant differences between sire lines?

2. Uniformity of terminology and methodology in the summaries across the breeds.

   a. The commercial industry utilizes multi-breed bulls. To make sire evaluation an influential and meaningful tool for the beef industry depends on its use by the commercial cattle industry. As such, it is important that all breeds produce reports that display the information in a consistent manner. Ratios or EPD's. Accuracy or EPN.

   b. Minimum standards across breeds would assure the commercial man that the reports were comparable to the extent that accuracy of the data met minimum standards. As an example, if only weaning weight was available on a sire, would it be best to raise the minimum accuracy to a much higher level and predict yearling EPD based on the correlation?

3. Promoting the concept of sire evaluation to the commercial industry.

   The future of sire evaluation as an important tool is dependent on its widespread use by the commercial industry. How can we address the problem of giving this concept more awareness through the livestock media? How can we address the problem of simplifying the reports so that they are readily understandable by the industry? I realize BIF is more directly concerned with the technical aspects of sire evaluation and not with merchandising it. However, it requires teamwork to sell it and we should address this issue.

4. Minimizing the environmental and management factors that give some bulls a competitive edge.

As sire evaluation becomes more widely used by the industry, the competition between breeders becomes more apparent. It is imperative that certain interactions between reported traits be analyzed and properly adjusted.

For example -- what is the interaction between MBV of daughters of a particular bull if those daughters are being bred to bulls with high EPD's for weaning weight? Is each parent contributing to the other's EPD in an artificial fashion? Do the top bulls get bred exclusively to the top cows?

SIRE INTERACTION

Keith Bertrand

Prediction of the performance of the future progeny of sires are made across the several breeds. How sires do on the average across dams of the breed located in all regions, herds within regions and contemporary groups within herds and regions is the issue. To assure that the reported sires were not used on only selected dams and/or that all their progeny were given preferential treatment, the sire by contemporary group interaction equations were absorbed after augmentation by the error to interaction variance ratio into the contemporary group equations which were then absorbed into the sire equations. In this way the distribution of progeny over contemporary groups was incorporated into the lead diagonal that is used to calculate the accuracy of the predictions. Depending on the importance of the interaction relative to error, the sires receive credit for only so many calves per contemporary group but all available data is still used. This procedure is used for field data but not for the designed data. In some reports sires to be listed, besides needing a given effective progeny number (lead diagonal reciprocal), were required to have progeny in two or more herds.

One purpose of this study was, using a Henderson III analysis, to obtain estimates of the sire by herd and sire by contemporary group within herd interaction such that more appropriate variance ratios could be used in future sire evaluations. Both these interactions are considered random and nothing can be done with them except account for them in the analysis. They could be caused by real biological interactions as well as by non-random mating and/or preferential treatment of the progeny. The results pooled over regions for the APHA data are given along with the degrees of freedom in the table for weaning weight. The over herd heritability is 16% with the within herd heritability being 26% which agrees well with the literature. A substantial extra correlation among paternal half sibs both within herds and within contemporary group within herds is suggested. The variance ratio adding the two interactions is 13.7 and the variance ratio for the sire equations is 22.7 as opposed to 7 and 12 used previously. Further study will look at birth and yearling gain. Also sire by region interaction will be studied using the least squares sire values correlated across regions.

Table. Pooled variance component estimates

VC	DF	EST
σ_s^2	463	104.6
σ_{sh}^2	580	60.9
$\sigma_{sc/h}^2$	2766	116.4
σ_e^2	13633	2373.0

1983 Beef Improvement Federation Annual Meeting

Using the Generation Coefficient to Account for Genetic Trend in National Sire Summary Analyses

Eldin A. Leighton
New Mexico State University

Accounting for genetic change while computing national sire summaries has been the concern of animal breeders and breed associations for several years. To date, most analyses have used a grouping of calves based on the sire's year of birth to provide some adjustment for genetic change in the population. Using the approximate generation coefficient of the calf is an alternative which should be examined. The approximate generation coefficient has been described by Brinks, et al. (1961) and by Pattie (1965). The coefficient is computed as:

$$GC_c = 1.0 + [\ (GC_s + GC_d)\ 0.5\ ]$$

where GC_c = generation coefficient of calf,
GC_s = generation coefficient of sire, and
GC_d = generation coefficient of dam.

Because generations are overlapping in beef populations, the coefficient should be stored as a real number. Routine updating could be accomplished by any breed association at the same time pedigree verification and registration is completed. When a new calf is added, calculating the generation coefficient only requires finding a record for the sire and dam. Since this look-up process already occurs, storing the coefficient as a part of each pedigree record would make routine updating fairly simple for a new calf.

Including the generation coefficient in a national sire summary model could be either as a fixed class variable or as a covariate. Classification would be accomplished by placing each calf in a generation class broken on a half- or a whole-generation boundary. The set of least-squares means or constants for generation class would be useful to any breed as a measure of genetic change occurring in the population for a particular trait. If generation coefficient were included as a covariate, no classification would be needed and the partial regression coefficient would measure genetic change for the trait.

Any reason for concern about sire grouping arises because, to date, the BIF recommended beef sire summary model includes incomplete information in the model structure by ignoring the dam contribution to calf performance. Under the current procedure, a bull is assumed to have been mated with a random selection of cows available in the breed at that point in time. A sire appears at a particular level on a summary list based on the average performance of his calves plus the average performance of all calves sired by other bulls born in the same year as the sire in question. Using the birth year of sire as a method for grouping calves appears to duplicate to some extent, the effect of contemporary group within herd because both effects are a grouping based on chronological time. In contrast, a grouping of calves to account for an average effect of genetic change would more reasonably be based on genetic time which is measured by the generation coefficient. The set of calves from a particular sire could span several generation classes depending upon the generation coefficient for each cow to which the bull was mated.

To examine the behavior of the generation coefficient, a pedigreed population of beef calves has been examined. A starting point was chosen by examining all available pedigrees and assigning a coefficient of 0.0 to each parent with an unknown pedigree. For these parents, the pedigree was usually unknown because breed records did not extend backward beyond the mid 1950's. Using this as a base, a coefficient was calculated for 127,197 calves born between 1960 and 1981 inclusive. The average generation coefficient for calves born in each year is shown in Figure 1. The point of inflection appearing in 1967 or 1968 was probably the result of having incomplete pedigree information prior to 1960. After 1967, the rate of change in generation coefficient per year was approximately 0.17 which implies that the generation interval is about 5.7 years.

To illustrate the difference between grouping calves based on the birth year of sire or by the generation coefficient, calves sired by bulls born in 1970 were examined. For a sire summary analysis, 4929 calves were in the group. Coefficients ranged from 1.0 to 4.6 generations. The average generation coefficient for all calves in the group was 2.56, and the standard deviation for the group was 0.666. These calves would have been grouped together by birth year of the sire, but in terms of genetic time, they represent at least four different groups.

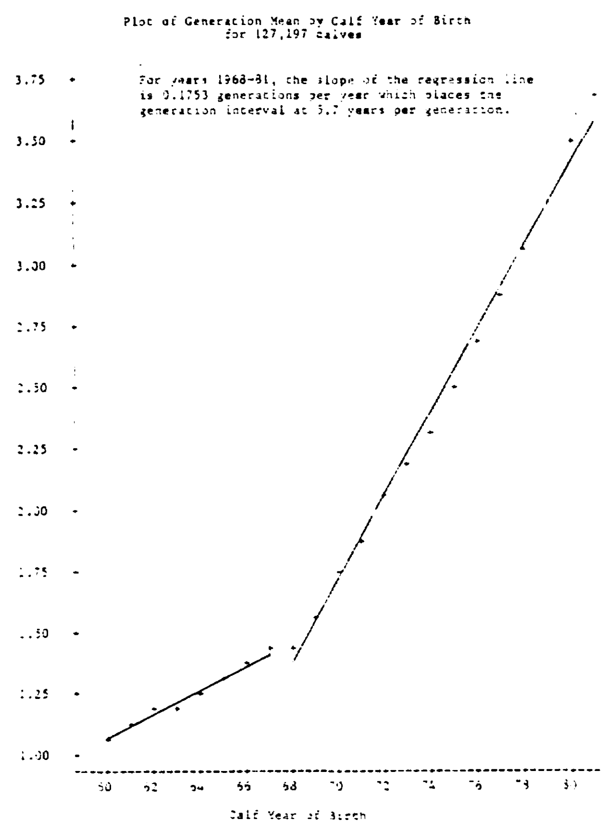


Figure 1.

Literature Cited

Brinks, J., R. Clark, and F. Rice. 1961. Estimation of Genetic Trends in Beef Cattle (abstr). J. Anim Sci 20: 903.

Pattie, W. 1965. Selection for weaning weight in Merino sheep. Aust J Exp Anim Husb 5: 353-360.

FLOATING VERSUS FIXED BASE IN SIRE EVALUATION

P. Jeffrey Berger
IOWA STATE UNIVERSITY

GENETIC BASE

Defined by four factors average genetic merit for a
- trait
- breed
- geographical location
- at a designated time

Types
- moving - the average breeding value of the most recent batch of bulls completing progeny test
- fixed - the average breeding value of one particular batch of bulls
- stepwise (some may argue this is merely a combination of other two)

Understanding Genetic Evaluations - BLUP sire evaluation
1. sire equations for a group were summed to give a group equation
2. sire group equations are solved simultaneously with the sire equations
3. this procedure regresses the Expected Progeny Difference of a sire back toward the average progeny performance of all sires belonging to the same group
4. recognize that a sire can have sons in one or more groups each son is regressed toward the average of all other sires introduced to the breed at the same time
5. the EPD of the sire and his sons are directly comparable since the respective group effect is added to the sire and son effect

Consider the way the birth year sire group effects were calculated. In the sire evaluation analysis procedure all that is ever compared are progeny within the same contemporary group. Only within contemporary group differences are used. Progeny of sire A are comparable with progeny of sire B within one contemporary group, but progeny of sire A are compared in another contemporary group with progeny of sire C. So two differences are available B-A and C-A. Comparison of sires C with B is the difference of the two parts. This is written as B-A-C+A=B-C. In this difference A is the common sire and is used as the reference sire. Now the birth year sire group effects are figured the same way. For example in one contemporary group suppose there are 5 sires with progeny, 3 sires were born in 1973 and 2 sires that were born in 1976. Then the difference within contemporary group between 1976 sires and 1973 sire contributes this weighted difference to all other 76 vs 73 comparisons found within other contemporary groups. This is not the same thing as looking at the average performance of all progeny from 1976 sires compared with the average performance of all progeny from 1973 sires. Doing this includes contemporary group effects which are large.

Figure 1. Schematic illustration of indirect sire comparisons.

		Contemporary Group 1	2
Sire	A	x	x
	B	x	-
	C	-	x

Fixed Base

1. Breeding value of every new batch of bulls improves in accordance with genetic trend
2. Bulls of older generations remain nearly the same throughout time
3. The steady change of the breeding value of every new batch of bulls might however, reduce the actual selection intensity
4. Genetic improvement should lead to more and more bulls with positive proofs which do not improve the present population
5. The level of the breeding value needed to improve the present population (updated population) must also be calculated for each year

Moving Base

1. Means the breeding value of a sire will fall with time if there is genetic improvement even if there are no additional daughter records
2. Breeding values of previous batches of bulls are changed every year depending on the average genetic level of latest batch of bulls
3. These figures can be used directly to predict the expected breeding value of any relatives
4. Breeding value of a particular bull indicates his genetic merit in the present population
5. This type of base would therefore encourage selection by both farmer and breeding organization (keep in mind that the European community does not keep old bulls or their semen around as long as the United States)

Justification for Moving Base

1. Should speed up the rate of genetic improvement in the population by discouraging the use of lower ranking bulls and encourage the use of higher ranking bulls
2. It is believed by some that educational programs for breeders explain genetic trend and the need to revise sire selection standards upward will keep the industry "on track" for nearly maximum genetic improvement
3. To date, it appears such education has not worked as well as many had hoped

Justification for Fixed Base

1. The merit of active AI sires, based on their Predicted Differences, has been improving steadily. This should continue. If the merit of sires does not continue to improve over time, there can be only two reasons:
   a. Better sires are not being selected and brought into AI studs
   b. Sire evaluation procedures do not recognize the sires that are truly superior
   c. In either case, dairymen need to know this. It will be obvious if the base does not change. If the base does change, it will be more difficult to recognize.
2. Changing the base means that each sire's PD and each cow's index would change significantly each time the base changes. To compare bulls, it would be necessary to be certain that the same base was used. Changing bases would require that everyone using sire summary information understand the base changes and use them properly.

3. Consider pedigree information. If the base changed each five years, sires and cows in each generation of the pedigree would be expressed to different genetic bases, depending upon when the sire's PD or cow's index were computed.
4. Probably the main reason proposed for changing the base is to alert dairymen that better sires are now available to encourage them to update their selection standards. There are other ways to aid in the realization that selection standards need to be raised continually as better sires become available.

Viewpoint of the AI Industry

1. Marketing arm of NAAB opposes changing genetic base due to foreign competition.
2. General managers have recommended regular changes.
3. Sire analysts favor a change with adequate lead-time.

Selected References - Genetic Group - Genetic Base

1. Barton, E. P. and A. E. Freeman. 1981. Should the genetic base be adjusted?

2. Dickinson, F. N. 1980. Alternative genetic bases for sire summaries and cow indexes. J. Dairy Sci. 63:1361.

3. Dickinson, F. N. 1981. Updating the genetic base. Holstein World. October 10. p. 26.

4. Gaillard, C., J. Dommerholt, E. Fimland, L. Gjol-Christensen, J. Lederer, A. E. McClintock, J. C. Mocquot and J. Philipsson. 1977. AI bull evaluation standards for dairy and dual purpose breeds. Livest. Prod. Sci. 4:115.

5. Keown, J. F. 1981. How can I compare proofs? Holstein World. September 10. p. 21.

6. McAllister, A. J. and R. L. Powell. 1980. Geneticists from U.S. and Canada discuss sire proofs. Hoard's Dairyman. March 10. p. 333.

7. Norman, H. D. and G. R. Wiggans. 1982. Would bull selection be easier if genetic base were updated? Hoard's Dairyman. March 10. p. 325.

8. Wiggans, G. R. and R. L. Powell. 1980. If you could change the genetic base how good would you want a bull with zero PD to be? Advanced Animal Breeder. p. 10.

Unifying Intraherd Evaluations Through the National Sire Evaluation

BRETT MIDDLETON

The estimated breeding value ratios currently used by many breeds suffer from failures in the assumptions behind the model (e.g., the assumption of no genetic trend) and do not support the many major selection decisions made between herds. The initial industry response to these failures was the national sire evaluation (NSE), which uses mixed-model analysis to produce best linear unbiased predictors (BLUP) of sire genetic merit.

The NSE solution, however, sacrifices the advantage of the performance test in favor of the progeny test; thus, the next logical step is to combine the superiority of BLUP methodology with the leverage of early performance information by applying mixed-model analysis to intraherd evaluation. Such intraherd evaluations will complement the NSE program by providing the best possible evaluation of females and young stock as well as the extra benefit of genetic and environmental trend estimates for each herd.

This conception of intraherd evaluation still fails, though, to grant a reasonable degree of confidence in making intraherd selection decisions if there are genetic differences among herds; that genetic component common to all records produced in a herd cannot be determined from an intraherd model. The NSE predictors, however, allow the fair comparison of bulls whose progeny are in different herds. This implies that any genetic differences between herds have been taken into account in the NSE procedure, an implication borne out many times in both theory and practice. Thus, it should be possible to recover this information from the NSE and apply it to adjusting intraherd predictors to a common reference point: the base of the national sire evaluation.

One possible adjustment factor is the average of the NSE predictors for sires used in a herd weighted by the relative contribution of each sire to the records in the herd. As a new set of records was received from a herd, the intraherd equations would be constructed and solved with the adjustment applied by imposing a suitable restriction on the solutions. One problem with this approach is that the intraherd evaluation would include records not used in the NSE from which the adjustment was computed. There seems to be no way around this problem if the intraherd predictors are to be available when the breeder is making his selection decisions. The problem, however, is minor if one assumes that the genetic trend for all herds is constant, i.e., that the difference between two herds will not change with the addition of the new records.

The standardization of the intraherd evaluations to a common base offers some interesting possibilities. For example, the intraherd predictors for dams could reasonably be used in the NSE as covariates to account for preferential mating bias, leading to better sire predictors and better herd adjustment factors. In addition, predictors from the NSE or from other intraherd evaluations could be incorporated in an intraherd evaluation to add information on relatives in other herds.

These thoughts are intended solely to stimulate discussion. Refining these ideas into practical industry procedures will require many policy decisions and a substantial amount of methodology research.

ADJUSTING WEANING WEIGHT RECORDS FOR PREFERENTIAL MATING

Doyle Wilson

Preliminary Study Results: Adjusting calf weaning weight records to account for preferential mating.

Purpose of Study

Current mixed model beef sire evaluations assume that sires are randomly mated to dams. Depending upon the degree of preferential mating occurring in reality this may or may not be a valid assumption. If some sires are consistently mated to genetically superior females, then their predicted breeding values will be biased upwards. Conversely, sires mated to inferior females will have their breeding values biased downwards. Pursuant to the goal of providing the "best" fair comparison among all sires in a national sire evaluation, a study has been undertaken to determine:

a) If there exists a significant amount of non-random mating in beef breeding herds, and

b) Adjustment factors which could be used to reduce sire breeding value prediction bias in the event of significant non-random mating.

Data

The American Angus Association provided Iowa State University with 12,870 weaning weight records for calves weaned during December 1982. Dam breeding value ratios (BUR) for growth for each calf record and type of service (artificial insemination or natural) for all registered calves were included with the performance data. Of the 12,870 records, 3,160 calves were sires artificially, 6,467 were sired naturally, and the type of service for 3,243 calves was unknown.

Tests for non-random mating

Evidence of non-random mating in Angus breeding herds is shown in Table 1 where dam BVRs are compared against the type of service they were exposed to. Dams which are serviced artificially have significantly ($P < .0025$) higher BVRs than naturally serviced dams in all age categories, with the exception of dams 10 years and older.

Table 1. Comparison of dam breeding value ratios.

Age of dam (years)	Type of Service		
	AI	Natural	Unknown
2-3	101.41 ± 2.97[a]	101.12 ± 2.96[a]	100.57 ± 2.92
4-6	101.64 ± 3.12[a]	101.32 ± 3.16[a]	100.36 ± 3.17
7-9	102.31 ± 3.49[a]	101.58 ± 3.5[a]	100.51 ± 3.45
10 and older	102.29 ± 3.58	102.03 ± 3.8	100.73 ± 3.4

[a] $P < .0025$, one-tailed t test where H_o is BVRs of dams serviced AI are not larger than BVRs for dams serviced naturally.

Another aspect of preferential mating is evidenced in how AI sires are mated across age categories of dams. Table 2 shows the difference in mating strategy as a function of those sires being used in 1 or 2 herds at most versus those more popular sires being used in many herds. A χ^2 analysis was performed to test whether there are significant differences in how these two categories of AI sires are being used across age of dam categories. Observed mating frequencies are given in Table 2; "expected" mating frequencies are contained in the brackets.

A χ^2 value of 41.86 was calculated. This value strongly rejects the null hypothesis that no difference in mating strategy exists. The more popular AI sires (and probably more expensive in terms of semen and registration certificates) are not mated to the younger females as "expected", but rather to the older females.

Table 2. AI sire "observed" versus "expected" mating frequencies across age of dam categories.

AI Sire Category	Number of Sires	Number of Dams Per Age Category 2-3	4-5	7-9	10 and older
1-2 herds	154	369(304)[a]	408(404)	201(251)	73(90)
3-55 herds	58	478(540)	715(717)	495(445)	179(160)

[a]First number is observed mating frequency, bracket number is "expected" frequency.

Weaning weight record adjustments

One method of accounting for preferential mating in sire evaluation would be to adjust the calf weaning weight record for dam breeding value, in addition to age of dam and 205-day adjustments. For every percentage point in BVR a dam is above the mean, x pounds would be subtracted from the calf's weaning weight, or conversely x pounds would be added for every percentage point the dam's BVR fell below the mean.

Regressions of weaning weight on dam breeding value ratios ($b_{wwt \cdot BVR}$) have been determined from the Angus data for within: type of service, sex, weaning management (creep or non-creep), and age of dam at birth of the calf. A summary for non-creep fed calves is presented in Table 3. Preliminary theoretical calculations of $b_{wwt \cdot BVR}$ for one class of calves (AI/bulls/non-creep) have been determined and are shown as bracketed values.

Table 3. Regression of weaning weight[a] on dam BVRs.

Age of dam	$b_{wwt \cdot BVR}$ ~ lbs/percent change in BVR: AI Service Bulls	AI Service Heifers	Natural Service Bulls	Natural Service Heifers
2-3	8.2(5.5)[b]	6.3	6.3	5.9
4-6	5.4(6.7)	7.6	5.5	5.8
7-9	6.4(7.4)	5.9	3.9	6.1
10 and older	6.3(7.7)	3.7	5.9	5.5
(overall)	6.7	6.5	5.4	6.0

[a]non-creep fed calves.

[b]Bracketed values are theoretical.

Discussion

The extent of preferential mating occurring in Angus beef breeding herds appears to be significant and probably warrants some adjustments to weaning weight records. However, some caution must be exercised when interpreting the results presented herein. First, the current calf records are included in the dam breeding value ratios used to conduct this study. This means that these ratios are not the same one's used by the breeder when selecting the calf's sire. Second, some of the dam breeding value ratios themselves will be biased upwards (or downwards) if the dams are consistently serviced by superior (or inferior) sires. Third, if maternal grandsires of the calves are included in the sire equations of the mixed model evaluation, a percentage of the dam BVR bias effect will be removed from the sire's predictor. This then would mean that adjustments of the magnitude given in Table 3 would not be appropriate.

Using EPD's to Help in Evaluating the Breeding Value of Yearling Bulls

BRAD R. SKAAR

Our national sire summaries have for several years provided us with fair comparisons among sires. Selection among sires is made relatively simple by comparing their EPD's.

Selection between yearling contemporaries may be assisted by considering these EPD's as sib-tests; however, a challenge arises in how to best combine a calf's performance with the EPD of his sire. The goal is fair comparisons among contemporaries using these two sources of information.

The following equations described allow such comparisons. In general, the breeding value of a calf is calculated as

$$BV = b_1\chi_1 + b_2\chi_2,$$

where χ_1 and χ_2 are the selection differential, and the EPD of his sire respectively. The values b_1 and b_2 are the selection index weights given to each. These two weights can be computed in several ways, depending on how the accuracy of the EPD is reported. Two such methods are as follows:

(1) when accuracy is reported, use

$$b_1 = \frac{4 - r^2}{\alpha + 1 - r^2} \qquad b_2 = \frac{\alpha - 3}{\alpha + 1 - r^2},$$

(2) and when EPN is reported, use:

$$b_1 = \frac{3D + \alpha}{\alpha(D + 1)} \qquad b_2 = \frac{D(\alpha - 3)}{\alpha(D + 1)},$$

where

$$\alpha = \frac{4 - h^2}{h^2}$$

h^2 = heritability

r^2 = reported accuracy value

D = EPN + $\alpha(a_{ii})$, the ith diagonal element of the coefficient matrix for sire i.

a_{ii} = either 1 or the diagonal element of the inverted relationship matrix corresponding to sire i.

Heritability and the accuracy of the EPD influence the proportionate weight given to χ_1 and χ_2, with heritability having the larger influence. The following table demonstrates their effect in computing b_1 and b_2.

Table 1. Influence of heritability (h^2) and accuracy (r^2) on b_1 and b_2.

	$h^2 = .2$, $\alpha = 19$			$h^2 = .4$, $\alpha = 9$			$h^2 = .6$, $\alpha = 5.7$		
r^2	.5	.7	.9	.5	.7	.9	.5	.7	.9
b_1	.18	.17	.16	.37	.35	.33	.57	.55	.53
b_2	.82	.83	.84	.63	.65	.67	.43	.45	.47

MINUTES OF
LIVE ANIMAL EVALUATION COMMITTEE MEETING
SACRAMENTO, CALIFORNIA MAY 5, 1983

The Live Animal Evaluation Committee met at 2:00 p.m. on May 5, 1983 with more than 75 participants and Committee members present.

First on the agenda, the Chairman discussed the purpose of the Live Animal Evaluation Committee and reviewed topics that have been discussed over previous years. The Chairman pointed out the Committee serves as a forum for ideas to be introduced, discussed, and brought before the Beef Improvement Federation Board for additional action and possible inclusion in the BIF Guidelines.

The first speaker was Dr. Jim Gosey, University of Nebraska, Lincoln, giving a literature review of linear measurements. Dr. Gosey cited research relative to growth and carcass traits, cow-calf productivity and reproductive performance. He also cited literature relative to scrotal circumference and fertility in bulls and presented fourteen conclusions from the literature review. A copy of his presentation is attached. (Attachment A)

Second on the program was Dr. Henry Webster, Clemson University, Clemson, SC, discussing the general topic of pelvic measurements. Dr. Webster reviewed data available and cited conclusions in the attached report. (Attachment B)

The last speaker was Dr. Carla Chenette, University of Kentucky, Lexington, who thoroughly reviewed the topic of scrotal circumference and reviewed the data available. Her complete report is attached. (Attachment C)

Following the three presentations, the meeting was opened for general discussion and two recommendations followed:

First: the recommendation was given for BIF to develop guidelines by breed for scrotal measurement and adjustment.

Second: the second proposal was a general consensus that a standard frame score chart should be developed by BIF and included in the Guidelines. At the present time, the Guidelines include procedures for linear height measurement and adjustment factors.

There being no further business, the Committee adjourned at 4:30 p.m.

Linear Measurements and Productivity in Beef Cattle

Dr. Jim Gosey
Extension Beef Specialist
Animal Science Department
University of Nebraska, Lincoln

Introduction

Linear measurements have been given considerable attention in recent years in the popular press. This media attention has prompted beef producers to ask for more information/documentation regarding the usefulness of linear measurements in the description and prediction of various production traits. While not all pertinent questions have been researched; some research concerning the impact of a number of linear measurements on productivity in cattle has been done. The purpose of this review is to summarize the present literature with regard to: 1) the accuracy with which various economically important beef production traits can be estimated by linear measurements, and 2) the potential utility of linear measurements in beef cattle selection programs to improve or optimize economically important beef production traits.

Linear Measurements and Growth/Carcass Traits

The majority of literature on linear measurements is found in the area of growth/carcass trait estimation. de Baca (1979) presents an excellent review and extensive bibliography of research, primarily in the area of growth/carcass traits as influenced by linear measurements (primarily height or other measures of long bone growth). A summarization of 15 studies cited by de Baca (1979), indicates an average estimate of .50 for the heritability of height (wither or hip) and repeatability estimates in the .80 to .90 range.

Data from Woodward reported by de Baca (1979) revealed correlations between foreleg length, body length, hind leg length and shoulder width, and average daily gain to be .50, .54, .55 and .65, respectively. These same four linear measures had correlations with final weight of .51, .68, .71 and .68, respectively. Using a rough average of .70 for the correlation between the cited linear measures and the two growth traits; the R^2 value $(.7)^2 = .49$, indicates that about 50% of the variation in growth was accounted for by the linear measurements.

Data from Gibb, also reported by de Baca (1979) indicated low correlations between wither height and hot carcass weight = .23, percent retail yield = .30, lean yield/day = .23, and carcass weight/day = .26.

Green et al., (1969, 1970a,b, 1971a,b,c,d and 1972a,b,c) used 185 body measurements on large numbers of live cattle to predict the weights of a variety of wholesale cuts of beef carcasses. The author concluded these measurements to be quite useful in predicitng weights of wholesale cuts of beef; however, body weight and fat depth were included in the measurements in the prediction equations and likely accounted for a major share of the variation in wholesale cuts.

Hedrick (1968) concluded that linear measurements are more highly related to weight than percent of carcass components.

Recent data reported by Crouse (1982) verified the importance of fat thickness in predicting cutability or precentage of retail product. Carcass length, hindquarter length, round length, round thickness, chuck thickness, and chest depth were included in 18 measurements taken on 1,121 carcasses. Of these 18 measures taken on the cooler; adjusted fat thickness, ribeye area, estimated kidney and pelvic fat, hot carcass weight and marbling score were the most important in predicting percentage of retail product.

Practically no reference to the relationship of linear measurements to feed conversion in cattle exists in the literature. Based on high genetic correlations between growth and feed conversion, it is unlikely that linear measurements could be identified which would impact feed conversion independent of their impact on growth.

Gregory (1982) reported the end point used in a growing-finishing program (time constant, gain constant, fat constant or quality constant) to have a major effect on the rank of different biological types of cattle for feed conversion. When time or gain constant end points are used, breed groups that gain fastest generally require less feed per unit of gain; however, when fat or quality grade end points are used, feed conversion differences between breed groups are usually small and those that reach a specific percentage of fat in the carcass in the least time generally require less feed per unit of gain. At similar carcass composition, differences are large between biological types in final weight and age at slaughter.

Linear Measurements and Cow-Calf Productivity

Brown and Shrode (1971) evaluated six different body measurements and three subjective estimates of body shape and fatness in calves at weaning as predictors of subsequent growth. Use of all of the various measures explained more of the variation in post-wean ADG (24%) and lifetime ADG (11%) than did weaning weight and age alone.

Flock et al., (1962) measured 1,425 calves of three breeds within 24 hours of birth and concluded that early body measurements of calves were not useful in the prediction of either weaning type or ADG.

Vinson et al., (1982) reported variation in repeatability of various measurements in dairy cattle. Wither height was highest (0.90) followed by chest depth (0.88), hip width (0.88), hip-pin angle (0.86), thurl width (0.79), shoulder width (0.72), and pin width (0.72).

Hays and Brinks (1980) concluded that measures of height, weight and weight/height ratio had low relationships to Most Probable Producing Ability (MPPA), an estimate of future productivity of cows based on progeny weaning weight average, number of progeny and repeatability of weaning weight records.

Brown and Dinkel (1978) and Dinkel (1981) summarized five and eight years, respectively, of data from the same project, concluded that cow weight and cow height are lowly associated with efficiency (weaning weight/cow and calf TDN) and occasionally are related in an undesirable direction.

Linear Measurements and Reproductive Performance

The vast majority of the linear measurement work that has been done in the area of reproduction, has been done in regard to dystocia (calving difficulty). Notter et al., (1978) characterizes a wide array of breeds with regard to birth and survival traits of calves produced by 2 and 3 year old crossbred cows.

Calf birth weight and age of dam at calving have been shown to be the most important factors influencing dystocia (Laster, 1974; Bellows et al., 1971a; Deutscher et al., 1975 and Brinks et al., 1973). Although pelvic size has been associated with dystocia

(Laster, 1974; Bellows et al., 1971b; Deutscher et al., 1975 and Deutscher, 1982), pelvic measures and other physical measures have generally served as poor predictors of dystocia (Laster, 1974). Although pelvic size accounts for a portion of the variation in dystocia, it doesn't necessarily mean that pelvic size can be used to predict dystocia.

Neville et al., (1978a, b) concluded that growth patterns for pelvic dimension and hip height were affected by breed and management systems. Taller breeds had smaller pelvic dimensions for a particular hip height, than did breeds of moderate height. Heritability estimates for pelvic dimension were much lower than estimates for hip height.

Laster (1974) included a pelvic slope score and five calf shape measurements in his analysis and concluded that physical measurements of the cow offered little as a predictor of dystocia. Differences in dystocia rates among breeds with similar birth weights suggest calf shape affects dystocia, however, calf shape measurements in Laster's study were not related to dystocia when studied independent of birth weight.

Deutscher et al., (1975) and Detuscher (1982) conducted an extensive set of external and internal measurements on a large number of heifers of various breeds, at various locations and over several years. Some of these measures are especially of interest because they closely or exactly correspond with some of those being taken in commercially available linear measurement system programs. For example, "thurl" or "depth of thurl" (an external measure of pelvic height) is in Deutscher's terminology, "height of hooks," Deutscher's data indicated that while "yearling height of hooks" or thurl ranked fourth in importance in accounting for dystocia, it accounted for less than 2% of the variation in dystocia. Furthermore, the three most important external measures of pelvic area only accounted for 32% of the variation in the actual internal pelvic area. The calculated slopes and angles associated with the pelvic structure had no practical impact on dystocia.

Schlote and Hassig (1979) reported correlations between numerous linear measurements of the dam and dystocia to be low to moderate in magnitude. The highest values were estimated for heart girth (0.22), body length (0.20) and width of chest (0.19), whereas the exterior pelvic measurements had disappointingly low correlations, all less than 0.11. The correlations between a wide array of linear measurements of the calf and dystocia were in general higher than for dam measurements. Most closely correlated with dystocia were calf birth weight (0.38) and muscling of shoulder (0.31). The correlation of sire measurements with dystocia were reported to be low. Highest correlations were found for heart girth (0.15) and body weight (0.12). All other correlations of sire measurements, including external pelvic measures, with dystocia were less than 0.06.

Scrotal Circumference Measurements and Fertility in Bulls

Scrotal circumference is highly correlated with testis weight and sperm output in growing bulls (Coulter, 1982; Coulter and Foote, 1977; Curtis and Amann, 1981 and Lunstra, et al., 1978). Rupp (1981) presents an excellent discussion of breeding soundness examinations in bulls and the utility of scrotal circumference measures as a part of the breeding soundness examination.

Scrotal circumference has been reported to be a highly heritable trait, with most estimates around .60 (Latimer, et al., 1982; Brinks, et al., 1978, and Coulter, 1982). Brinks et al., (1978) reported a correlation of .58 between scrotal circumference and percent normal sperm and obtained a genetic correlation of -.71 (desirable direction) between scrotal circumference and age at puberty in half-sib heifers.

Lunstra et al., (1978) found scrotal circumference to be a more accurate predictor of puberty, regardless of breed or breed cross, than either age or weight. Bulls in this study attained puberty at approximately 28 cm. scrotal circumference.

Coulter,(1982) in reporting some work of Cates, indicates that increases in scrotal circumference increases the probability of a yearling bull having acceptable semen qauality, until a scrotal circumference of about 38 cm. was attained, after which point, associated improvement in semen quality was very slight.

Apparently, scrotal circumference has little relationship to serving capacity or libido in bulls (Blockey, 1978 and Lunstra et al., 1978).

Conclusions

1. Cattle selected for increased growth generally have greater skeletal size. In other words, the form (skeletal size) has followed the function (growth). Turning this relationship around by selection for the form (skeletal size) would surely result in changes in skeletal size, but would depress response in the primary objective, growth.

2. The use of height measurements as a supplement to weight performance recording could help describe compositional maturity and optimum slaughter weight of feedlot cattle.

3. Cow size (weight or height) has little or no impact on efficiency.

4. Weight/height ratio in cows is an acceptable estimate of fatness.

5. Body measurements at birth or weaning are not accurate predictors of weight performance. Height measurements early in life are associated with skeletal size, especially mature skeletal size.

6. Internal measured pelvic area may be the most important trait of the dam (in cows of the same age) in accounting for dystocia.

7. Calf birth weight accounts for more variation in dystocia than pelvic area.

8. External measures of pelvic size (thurl, etc.) do not accurately estimate internal pelvic size nor are they highly associated with dystocia.

9. Pelvic angles and slopes, in the few trials where they have been studied, have not been significant sources of variation in dystocia.

10. Although several scientists express opinions about the importance of calf shape on dystocia, no research to date has demonstrated calf shape to be more important than calf birth weight.

11. Scrotal circumference measurements are probably the most useful linear measurements currently being taken on beef cattle.

12. Scrotal circumference is easily measured, highly heritable and favorably related to measures of semen quality.

13. Scrotal circumference is an excellent indicator of puberty in young bulls and has a high genetic correlation with age of puberty in related heifers.

14. Scrotal circumference apparently has little influence on libido.

Green, W. W., W. R. Stevens and Martha B. Gauch. 1969. Use of body measurements to predict the weights of wholesale cuts of beef carcasses: wholesale round of 900 pound steers. Univ. Md. Agric. Expt. Sta. Bull. A-165. pp. 18.

Green, W. W., W. R. Stevens and Martha B. Gauch. 1970. Use of body measurements to predict the weights of wholesale cuts of beef carcasses: wholesale rib of 1000 pound steers. Univ. Md. Agric. Expt. Sta. Bull. A-167. pp. 20.

Green, W. W., W. R. Stevens, Martha B. Gauch and J. L. Carmon. 1970a. Use of body measurements to predict the weights of wholesale cuts of beef carcasses: wholesale round of 1000 pound steers. Univ. Md. Agric. Expt. Sta. Bull. A-168. pp. 19.

Green, W. W., W. R. Stevens and Martha B. Gauch. 1970b. Use of body measurements to predict the weights of wholesale cuts of beef carcasses: wholesale arm chuck of 900 pound steers. Univ. Md. Agric. Expt. Sta. Bull. A-169. pp. 25.

Green, W. W., W. R. Stevens and Martha B. Gauch. 1971. Use of body measurements to predict the weights of wholesale cuts of beef carcasses: wholesale arm chuck of 1000 pound steers. Univ. Md. Agric. Expt. Sta. Bull. A-173. pp. 18.

Green, W. W., W. R. Stevens and Martha B. Gauch. 1971a. Use of body measurements to predict the weights of wholesale cuts of beef carcasses: wholesale short loin of 900 pound steers. Univ. Md. Agric. Expt. Sta. Bull. A-174. pp. 19.

Green, W. W., W. R. Stevens and Martha B. Gauch. 1971b. Use of body measurements to predict the weights of wholesale cuts of beef carcasses: wholesale short loin of 1000 pound steers. Univ. Md. Agric. Expt. Sta. Bull. A-175. pp. 16.

Green, W. W., W. R. Stevens and Martha B. Gauch. 1971c. Use of body measurements to predict the weights of wholesale cuts of beef carcasses: wholesale sirloin butt of 900 pound steers. Univ. Md. Agric. Expt. Sta. Bull. A-176. pp. 16

Green, W. W., W. R. Stevens and Martha B. Gauch. 1971d. Use of body measurements to predict the weights of wholesale cuts of beef carcasses: wholesale sirloin butt of 1000 pound steers. Univ. Md. Agric. Ext. St. Bull. A-177. pp. 16.

Green, W. W., W. R. Stevens and Martha B. Gauch. 1972. Use of body measurements to predict the weights of wholesale cuts of beef carcasses: combined cuts of 1000 pound steers. Univ. Md. Agric. Expt. Sta. Bull. A-179. pp. 33.

Green, W. W., W. R. Stevens and Martha B. Gauch. 1972a. Use of body measurements to predict the weights of wholesale cuts of beef carcasses: combination cuts of 900 pound steers. Univ. Md. Agric. Expt. Sta. Bull. A-180. pp. 33.

Gregory, K. E. 1982. Breeding and production of beef to optimize production efficiency, retail product percentage and palatability characteristics. J. Anim. Sci. 55:716.

Hays, W. G. and J. S. Brinks. 1980. Relationship of weight and height to beef cow productivity. J. Anim. Sci. 50:793.

Hedrick, H. B. 1968. Bovine growth and composition. N.C. Regional Research Publication No. 181, University of Missouri Agricultural Experiment Station Research Bulletin 928. pp. 72.

Laster, D. B. 1974. Factors affecting pelvic size and dystocia in beef cattle. J. Anim. Sci. 38:496.

Literature Cited

Bellows, R. A., R. E. Short, D. C. Anderson, B. W. Knapp and O. F. Pahnish. 1971a. Cause and effect relationships associated with calving difficulty and calf birth weight. J. Anim. Sci. 33:407.

Bellows, R. A., R. B. Gibson, D. C. Anderson and R. E. Short. 1971b. Precalving body size and pelvic area relationships in Hereford heifers. J. Anim. Sci. 33:455.

Blockey, M. A. de B. 1978. The influence of serving capacity of bulls on herd fertility. J. Anim. Sci. 46:589.

Brinks, J. S., J. E. Olsen and E. J. Carroll. 1973. Calving difficulty and its association with subsequent productivity in Herefords. J. Anim. Sci. 36:11.

Brinks, J. S., M. J. McInerney, P. J. Chenoweth, W. L. Mangus and A. H. Denham. 1978. Relationship of age at puberty in heifers to reproduction traits in young bulls. 29th Annual Beef Cattle Improvement Report, Colorado State University Experiment Station. General Series 973. pp. 12.

Brown, M. A. and C. A. Dinkel. 1978. Relationships of cow height to production traits in Angus, Charolais and reciprocal cross cows. South Dakota State University Publication, A. S. Series 78-21. pp. 45.

Brown, W. L. and R. R. Shrode. 1971. Body measurements of beef calves and traits of their dams to predict calf performance and body composition as indicated by fat thickness and condition score. J. Anim. Sci. 33:7.

Coulter, G. H. 1982. This business of testicle size. Proceedings from the Annual Conference on Artificial Insemination and Embryo Transfer in Beef Cattle, Denver, Colorado. National Association of Animal Breeders, Columbia, Missouri. pp. 28.

Coulter, G. H. and R. H. Foote. 1977. Relationship of body weight to testicular size and consistency in growing Holstein bulls. J. Anim. Sci. 44:1076.

Crouse, J. D. 1982. Estimation of retail product of carcass beef. Beef Research Program, Progress Report No. 1, R.L.H.U.S.M.A.R.C. pp. 39.

Curtis, S. K. and R. P. Amann. 1981. Testicular development and establishment of spermatogenesis in Holstein bulls. J. Anim. Sci. 53:1645.

de Baca, R. C. and M. J. McInerney. 1979. Inherent dangers of linear measurements. Proceedings, Beef Improvement Federation Research Symposium and Annual Meeting. pp. 73.

Deutscher, G. H., L. Blome and R. Trevillyan. 1975. Factors affecting calving difficulty in 2-year-old heifers. South Dakota State University, A. S. Series 75-1.

Deutscher, G. H. 1982. Personal communication and unpublished data.

Dinkel, C. A. 1981. The range beef cow--what size? Proceedings, The Range Beef Cow Symposium VII, Rapid City, South Dakota. pp. 148.

Flock, D. K., R. C. Carter and B. M. Priode. 1962. Linear body measurements and other birth observations on beef calves as predictors of preweaning growth rate and weaning type score. J. Anim. Sci. 21:651.

Latimer, F. G., L. L. Wilson, M. F. Cain and W. R. Stricklin. 1982. Scrotal measurements in beef bulls: heritability estimates, breed and test station effects. J. Anim. Sci. 54:473.

Lunstra, D. D., J. J. Ford and S. E. Echternkamp. 1978. Puberty in beef bulls: hormone concentrations, growth, testicular development, sperm production and sexual aggressiveness in bulls of different breeds. J. Anim. Sci. 46:1054.

Neville, W. E., Jr., B. G. Mullinix, Jr., J. B. Smith and W. C. McCormick. 1978a. Growth patterns for pelvic dimensions and other body measurements of beef females. J. Anim. Sci. 47:1080.

Neville, W. E., Jr., J. B. Smith, B. G. Mullinix, Jr., and W. C. McCormick. 1978b. Relationships between pelvic dimensions, between pelvic dimensions and hip height and estimates of heritabilities. J. Anim. Sci. 47:1089.

Notter, D. R., L. V. Cundiff, G. M. Smith, D. B. Laster and K. E. Gregory. 1978. Characterization of biological types of cattle. VI transmitted and maternal effects on birth and survival traits in progeny of young cows. J. Anim. Sci. 46:892.

Rupp,G. P. 1981. Understanding the breeding soundness examination. 32nd Annual Beef Cattle Improvement Report, Colorado State University Experiment Station. General Series 997. pp. 13.

Schlote, W. and H. Hassig. 1979. Investigations on the relationships of body measurements and weight of heifer and calf to calving difficulties in german simmental (fleckrieh) cattle. Published in; Calving Problems and Early Viability of the Calf, Martinus Nijhoff Publishers - The Hague/Boston/London, for the Commission of the European Communities.

Vinson, W. E., R. E. Pearson and L. P. Johnson. 1982. Relationships between linear descriptive type traits and body measurements. J. Dairy Sci. 65:995.

ATTACHMENT B

FACTORS INFLUENCING CALVING DIFFICULTY

H. W. Webster, III, J. R. Hill, Jr., and P. M. Burrows

Selection for large, fast growing, heavy muscled animals and the need to calve cows first at two years of age have resulted in an increase in calving difficulty (dystocia) in beef cattle. Numerous investigators have shown that the two factors that have the greatest influence on the incidence of dystocia are pelvic size of the cow and birth weight of the calf. One of the major problems with using pelvic measurements to predict the likelihood of dystocia has been the lack of dependable methods of accounting for variability in such things as overall size and age of the animal at the time measurements are made. The objectives of this study were: (1) to determine the relationships between dystocia, pelvic area, wither height and weight of the heifer, and birth weight and size score of the calf; (2) to determine the growth rate of the pelvis, and (3) to develop a method of adjusting for overall size of the heifer at the time pelvic measurements are made.

Nine hundred twenty-eight first calving heifers and their first calves were studied. Of these, 508 calved first at two years of age and 420 calved first at three years of age. These animals were located on private and experiment station farms in North Carolina and South Carolina.

Pelvic measurements were made via the rectum using the Rice Pelvimeter. Heifer weight and height measurements were made at the same time as the pelvic measurements. At calving, the degree of calving difficulty was scored as follows: 1 = no assistance, 2 = little assistance--mechanical puller not required, 3 = moderate assistance--mechanical puller required, 4 = major assistance--mechanical puller required and 30 minutes or more required for delivery, 5 = Caesarean birth, and 6 = posterior presentation, assistance given. Also, birth weight and/or a size score of the calf was recorded at birth (1 = small, 2 = below average, 3 = average, 4 = above average, and 5 = large). For analysis the data were classified according to breed of sire of the dams as Angus, Hereford, and "Exotic." The Hereford group included cows sired by Polled Hereford and Hereford bulls, and the "Exotic" group included cows sired by Charolais, Limousin, Chianina, Maine-Anjou, and Simmental bulls.

Heifers which calved unassisted were slightly taller and heavier, and had significantly larger pelvic areas and smaller calves than those that required assistance to calve (Table 1). The average pelvic area of heifers which required the greatest amount of assistance (score = 4) was less than those that required moderate or no assistance (Table 2). Also, the degree of assistance increased as birth weight increased.

Since it is impractical for cattlemen to make pelvic measurements on all heifers at a constant weight or age, there is a need for a reliable method of adjusting pelvic measurements for these factors. Thus, the relationships between weight, wither height, and age were studied in 170 heifers which were measured monthly during the six months prior to calving. During this period, growth of pelvic area and wither height was linear in pregnant Angus (pelvic area = .30 cm^2/day and wither height = .02 cm/day) and pregnant "Exotic" heifers (pelvic area = .38 cm^2/day and wither height = .03 cm/day). The correlations between traits are shown in Table 3. These correlations suggest that selection for greater size will tend to increase pelvic dimensions.

By using the relationship between weight and wither height, it was possible to predict the pelvic area of a heifer. The following equation (1) can be used for Angus heifers:

(1) Predicted Pelvic Area (cm^2) = -446.1 + 12.42 (Wither Height, in.) + .1347 (Weight, lbs.)

For example, if an Angus heifer weighed 715 pounds and was 44 inches tall, her predicted pelvic area would be 197 cm^2 (2).

(2) $197\ cm^2 = -446.1 + 12.42\ (44) + .1347\ (715)$

This predicted pelvic area is an estimate of the average pelvic area for heifers of a specific weight and height.

By subtracting the predicted pelvic area from the actual pelvic area, it was possible to determine which heifers were above or below the average for their size (Equation 3).

(3) Pelvic Area Deviation = Actual Pelvic Area - Predicted Pelvic Area

Thus, the difference (Pelvic Area Deviation) between the predicted pelvic area and the actual pelvic area can be compared regardless of the overall size of the heifer at the time the measurements were made. Heifers which have pelvic areas larger than the predicted (average) pelvic area for heifers of a particular size should have less calving difficulty than those which have actual measurements which are smaller than the predicted (average) pelvic area of heifers of a particular size.

Tables 4 and 5 show that on the average, heifers requiring assistance had pelvic areas below the predicted (average) area, whereas the heifers which required no assistance were above the predicted area. A similar procedure has been developed for Herefords and "Exotics."

The following example demonstrates how this procedure works.

Example: Four Angus heifers had the following measurements:

Heifer	Age	Wither Height, inches	Weight, pounds	Predicted Pelvic Area, cm^2	Actual Pelvic Area, cm^2	Pelvic Area Deviation, cm^2
A	19 mo.	44	715	196.69	190	-6.69
B	18 mo.	43	700	182.25	189	6.75
C	18 mo.	45	750	226.25	229	2.75
D	20 mo.	46	800	232.98	230	-2.98

In this example, heifer D has the largest actual pelvic area of the group and B has the smallest actual pelvic area; however, the heifers not only vary in pelvic area but in age, wither height, and weight, all of which are related to pelvic area and are themselves interrelated. If the heifers are compared on the basis of pelvic area deviations, you can see that the pelvic area of B is larger (+6.75 cm^2) than expected for her weight and height, whereas D is smaller (-2.98 cm^2) than expected for her size and weight. Thus, heifers A and D would be more likely to have difficulty than B and C.

CONCLUSIONS

1. The average pelvic area of heifers requiring no assistance at calving was significantly larger than for heifers requiring assistance at calving.

2. Heifers with pelvic areas larger than the average for their size had less calving problems than those which were smaller than the average for their size.

3. The use of pelvic area deviations allows the cattleman to compare relative pelvic sizes of heifers of various weights and heights.

Table 1.

COMPARISON OF HEIFERS REQUIRING CALVING ASSISTANCE vs NO ASSISTANCE

	No Assistance		Assistance	
Variables	Number of Heifers	Mean	Number of Heifers	Mean
Wither Height, in.	719	44.8	156	44.09
Weight, lbs.	551	715.63	143	708.60
Pelvic Area, cm^2	742	205.86[a]	165	189.44[b]
Calf Weight, ~~kg~~ lbs.	238	56.51[a]	87	69.39[b]
Calf Size Score (1-6)	566	3.03[a]	112	3.81[b]

[a,b] Means on same line not bearing a common superscript differ significantly ($P<.05$)

Table 2.

MEAN PELVIC SIZE AND BIRTH WEIGHT BY CALVING EASE SCORE[a]

Calving Ease	Number of Heifers	Mean Pelvic Size, cm^2	Number of Calves	Mean Birth Weight, kg
1	752	205.58[b]	238	25.63[b]
2	46	191.47[c]	24	28.24[b,c,d]
3	60	200.40[b,c]	19	31.96[c,d]
4	58	176.03[d]	44	33.03[c,d]
5	1	216.00		
6	11	230.27[e]	4	35.23[c,b,e]

[a] Calving ease scores 1 to 6.
1 = No assistance.
2 = Little assistance - mechanical puller not required.
3 = Moderate assistance - mechanical puller required.
4 = Major assistance - mechanical puller required and 30 minutes or more required for delivery.
5 = Caesarean birth.
6 = Posterior presentation, assistance given.

[b,c,d,e] Means in the same column not bearing a common superscript differ significantly (P<.05).

Table 3. CORRELATIONS AMONG PELVIC DIMENSIONS, BODY WEIGHT, AND WITHER HEIGHT

Item	Body Weight	Wither Height
Pelvic Height	.64*	.59*
Pelvic Width	.58*	.53*
Pelvic Area	.64*	.60*
Wither Height	.49*	

* P<.01.

Table 4. MEAN PELVIC AREA DEVIATIONS OF HEIFERS REQUIRING NO ASSISTANCE AND ASSISTANCE BY BREED

	Angus	Hereford	Exotic
Calving Ease	Pelvic Area Deviation, cm^2	Pelvic Area Deviation, cm^2	Pelvic Area Deviation, cm^2
No Assistance	.95	.33	1.04
Assistance	-5.76	-2.17	-2.96

Table 5. ANGUS HEIFERS: RANKED BY PELVIC AREA DEVIATIONS INTO SMALL, INTERMEDIATE, AND LARGE GROUPS

	Calving Ease			
Rank by Pelvic Area	No Assistance	Assistance	Percent Assisted	Total
Small	95	25	20.83[a]	120
Intermediate	104	16	13.33[b]	120
Large	110	10	8.33[c]	120

[a,b,c] Means in the same column not bearing a common superscript differ significantly (P<.01).

MINUTES OF THE CENTRAL TEST STATION COMMITTEE

Beef Improvement Federation

May 5, 1983

Chairman Keith Vander Velde called the meeting to order and reviewed the section on Central Test Stations in the BIF Guidelines.

Following much discussion concerning methods of calculating adjusted 365-day weight and the advantages and disadvantages of each method, Johnny Crouch moved and Larry Nelson seconded that the currently recommended formula be used and that the alternate formula be deleted from the guidelines. This motion passed.

The second item of concern was how to efficiently get information on breeding values from breed associations to test station supervisors for inclusion in catalogs and test station results to the association in a form convenient for their use. Following discussion, Chiarman Vander Velde appointed a committee consisting of Johnny Crouch, Larry Nelson and Roger McCraw to develop a method and formats for reporting this data.

Bill Swoope moved and David Kirkpatrick seconded that the bull testing survey last conducted in 1979 be updated and that phone numbers again be included. The motion carried.

There was much discussion concerning standardization of test station reports and inclusion of estimated breeding values and EPD's for sire's of bulls in test station sale catalogs. There was a consensus that the recommendations in the guidelines were adequate and no further action was taken.

Jeff Berger presented a method of calculating weighting factors for an index which combines test station performance for yearling weight of a bull and his sire's EPD for yearling weight. No action was taken; however, interest was expressed in having more information on the method of calculating accuracy of the index.

Submitted,

Roger L. McCraw

Roger L. McCraw, Secretary

SYSTEMS COMMITTEE

The Systems Committee proposes that the systems approach be pursued as a conceptual method of evaluating recommendations for beef cattle improvement. The objective is to translate the results of systems research into useable selection objectives and strategies. The selection objective and strategies will help individual breeders and the beef industry evaluate the net effect of genetic inputs of individual animals on life-cycle economic efficiency for a beef enterprise.

In the 1982 BIF symposium, several speakers pointed out that the most efficient production system is not necessarily composed of individual animals with maximum genetic potential for growth, milk production, or indeed maximum genetic potential for most traits. In his review of systems research for this committee in 1983, Dr. G.E. Dickerson supported that view with reference to and discussion of many technical publications.

Therefore, this committee urges BIF to adopt the systems philosophy and pursue a goal of developing and improving:

1. Methods for measuring genetic inputs in each performance trait without implying that maximum or minimum inputs by themselves are desirable or undesirable.

2. Methods for evaluating the net effect of different genetic inputs on life cycle economic efficiency of the production enterprise.

The Systems Committee can take some action now which will help pursue the systems concept even though we do not have all the answers. Among them are:

1. OPTIMAL CARCASS CHARACTERISTICS - Define the classisifation of carcasses in terms of weight, fatness and other appropriate criteria and indicate the financial discount for producing something else. This information should be reviewed periodically to identify trends in consumer demand and processing technology which may influence carcass objectives.

2. INVENTORY - Develop methods for integrating inventory information into performance programs. Inventory information is necessary to properly evaluate reproduction (entry into the beef system) and longevity (disappearance from the beef system).

3. ENVIRONMENTAL ADAPTATION AND REPRODUCTIVE MANAGEMENT - Develop methods for using inventory information and calf death loss to evaluate reproduction and longevity and use calving distribution to evaluate environmental adaptation and reproductive management.

Respectfully submitted,

Jim Gibb, Chairman
Rich Benson, Secretary

BIF
Reproduction Committee Report
May 6, 1983, 9:00 a.m.

Appointed committee members present: Wallace, Burfening and Singleton

Others present: A standing room only group of approximately 80 persons were present.

Chairman Wallace opened the meeting at 9:10 a.m. He introduced Pete Burfening, who at the request of the BIF board, discussed the issue of calving ease. Pete reviewed his work with Simmental data related to calving ease from a maternal and paternal point of view. He concluded that the calving ease of a sires' daughters is an important trait for commercial producers and that there is great variation in sires (i.e.) 15 to 50% or greater. He recommended that calving ease data be collected for use in sire summaries.

Jeff Berger briefly reviewed the Holstein data on daughter's first calf calving ease. The information is presented as percent expected difficult births in first calf heifers.

It was moved and seconded that the committee recommend to the BIF board that birth weight (BW), direct calving ease (CED) and maternal calving ease (calving ease of daughters first calf) be used in sire summaries. Motion carried.

It was also moved and seconded that the committee recommend to the BIF board that the data be reported as percent unassisted births. Motion carried. The committee, in general, agreed that the present calving ease scoring system is sufficient for collecting and recording of the data.

A motion was made and seconded that record systems provide space for recording both calving ease and calf livability. Motion carried.

Carla Chenette reviewed scrotal circumference data and relationships to other traits. After some discussion it was moved and seconded that the BIF board consider adjustment factors for age of bull. Motion carried.

Since there is some variation in measurement techniques it was moved and seconded that the BIF board consider including a statement on uniform SC measurement techniques in the guidelines. Motion carried.

Meeting adjourned.

Wayne L. Singleton
Secretary

MINUTES OF THE GROWTH COMMITTEE
BEEF IMPROVEMENT FEDERATION
MAY 6, 1983

The meeting was called to order at 9:00 a.m. by Chairman Gene Schroeder. He indicated that the two primary purposes for the meeting would be to discuss the factors influencing birth weight and how to predict with a greater degree of accuracy the effect of sires on progeny birth weights. The second item would be to discuss the influence of recipient cows for use in embryo transfer programs and the effect this might have on birth weights as well.

Dave Nichols began the discussion with his observations of calving difficulty problems encountered in his herd and in commercial herds that he has worked with admitting there were year to year differences in calving difficulty. He predicted that by 1985, with all the emphasis on early growth, that there would be considerable problems in trying to calve out two-year-old heifers because of increasing birth weights.

Don Kress reviewed some of the facts regarding birth weights that we already know. He emphasized that selection for post-weaning gain may have less effect on birth weight than weaning or yearling weight selection. His second area of emphasis was that selection for mature weight may have the negative effect on increasing birth weights. He reported on some research at Montana State in which bulls are selected using an index where I = yearling weight - 3.2 x birth weight. The preliminary results of this study indicate that if yearling weight was selected for you would expect an 11.5 pound per year increase whereas the actual observed yearling weight increase has been 11 pounds per year. Likewise, actual birth weights have increased .4 pounds per year whereas they would be expected to increase .8 pounds per year. He indicated this index may have some possible use in the future based upon these preliminary results. He indicated that future research efforts should be in the area of maternal effects on birth weight, the calculation of breeding values for birth weight, the effects of gestation length on birth weight and other factors which affect calving ease.

Larry Cundiff presented research data from the Meat Animal Research Center at Clay Center, Nebraska. In their work reciprocal crosses of Hereford and Angus cows produced a heterosis effect of 3.8% on birth weight. When these F_1 cows were bred to Shorthorn bulls there was an additional 3.6% increase in birth weight which produced an overall increase of 7.4% in birth weight. In cows four years and older they have experienced a 10% incidence of calving difficulty and their observation would show a direct correlation between increasing birth weight and increasing calving difficulty which they attributed to the direct effect of sire breeds. He also confirmed the genetic by environmental interactions often observed with birth weights. Their observations at Clay Center indicated that breeds that have a big direct effect on birth weight also have bigger than expected maternal effects on birth weight in breeds sampled at Clay Center. When Bos indicus were crossed with Bos taurus cattle, the heterosis effect for birth weight was twice that which would be expected. Dual purpose or maternal type breeds add to the direct effect on birth weight. They also noted prenatal effects of the dam may have an effect on postnatal growth.

After considerable discussion the following areas need emphasis:

1. We need to know the average birth weight from which expected progeny differences are calculated by the breed associations.

2. We need to have breed associations provide breeding values for birth weight, if they are not already doing so.

3. The associations need to provide birth weights of dams, birth weights of sires and birth weights of resulting calves in order to further clarify the factors affecting birth weights.

4. Breed associations need to compare calves conceived and born of the natural dams versus those transferred to recipients to determine the maternal effects on birth weight.

Respectfully submitted,

W. Dennis Lamm

W. Dennis Lamm
Secretary

Minutes of Record Utilization Committee
Beef Improvement Federation

Capitol Plaza Holiday Inn
Sacramento, California
May 6, 1983

Earl Peterson, Chairman, opened the committee meeting by posing the following questions with regard to the utilization of performance concepts:

1. Does the responsibility of BIF for utilization end with the publishing of the Guidelines?
2. Whose responsibility should it be to extend performance information?
3. What should BIF do to extend information in the future?

Dixon Hubbard pointed out that each BIF member organization has a responsibility for extending information to its clientele but perhaps better educational materials and a concerted effort is now needed. Dixon suggested that BIF evaluate strengths of member organizations and forge an action plan to increase utilization of performance technology. Dixon further suggested the possibility of holding 3 or 4 regional seminars to discuss the implementation of performance concepts.

Several comments attested to the value of performance demonstrations in their impact on attitudes of people. The concensus of the group was that these demonstrations were useful, but would best be conducted by BIF member organizations, not by BIF directly.

Hop Dickenson recommended that a committee be formed to investigate methods to aggressively promote the use of National Sire Evaluation data.

Frank Baker pointed to the need to develop educational methodology, specific to the use of National Sire Evaluation data.

J. D. Mankin emphasized that cattlemen are "growth managers" whose profit is controlled by the number of units (calves) and the weight of those units produced. J. D. suggested that producers be worked with at their level of inquiry which may not be National Sire Evaluation Programs.

Jim Gibb reviewed the efforts of the American Polled Hereford Association to sell performance concepts to their membership and to commercial breeders.

Bob Dickenson cautioned against overwhelming commercial producers with large amounts of non-essential performance data. In discussing the completeness of his own seedstock program; Bob suggested a simple records program with emphasis on bull selection would be useful to most commercial producers.

Henry Gardiner cautioned that how we explain ourselves may be as important as what we say in trying to merchandize performance ideas and concepts. Henry urged seedstock breeders to fit their discussions to the target audience (commercial producers) and merchandize seedstock to fit a specific need.

Jim Gosey reviewed his extension program emphasis aimed at simple approaches to performance records and crossbreeding programs for commercial producers. Gosey pointed out the need to get performance information (sire evaluation reports for example) into the hands of Beef Production instructors in our Universities. Gosey also reviewed available slide sets regarding sire evaluation and breeding value concepts, and agreed to pursue completion of a slide set in this area for use by industry & extension personnel.

The final action of the committee was to empower Chairman, Earl Peterson to appoint a committee to pursue awareness of Sire Evaluation Programs. Peterson appointed Dixon Hubbard, Roy Wallace, J. D. Mankin, Ike Eller, Henry Gardiner, John Crouch, Al Smith, and Gary Connally to this committee with Jim Gibb as an alternate member. Peterson charged this committee to; 1) determine areas of importance in utilization, 2) establish priorities (such as regional seminars, eduational materials needed, etc.), 3) determine printed materials needed, and 4) develop methods to achieve increased awareness of performance concepts. Hopefully, this committee can communicate during the summer and come to the BIF board meeting this fall with a definite action plan.

There being no further business, the Records Utilization Committee was adjourned.

Respectfully submitted,

Jim Gosey
Secretary

1983
BIF COMMITTEE ASSIGNMENTS

	Meet May 5				Meet May 6		
	SIRE EVALUATION	LIVE ANIMAL EVALUATION	SYSTEMS	CENTRAL TEST STATION	REPRODUCTION	GROWTH	UTILIZATION
Ch.	Larry Cundiff	Richard Spader	Jim Gibb	Keith VanderVelde	Roy Wallace	Gene Schroeder	Earl Peterson
Secy.	Richard Willham	Henry Webster	Rich Benson	Roger McCraw	Wayne Singleton	Dennis Lamm	Jim Gosey
	F.D. Kirkpatrick	Carla Chenette	Dean Frischnecht	Larry Nelson	Ron Parker	Chuck Christians	J. D. Mankin
	Larry Corah	Greg Martin	Keith Gregory	Don Franke	Peter Burfening	Doug Hixon	Ken Ellis
	John Crouch	Earl Peterson	David Notter	Bruce Howard	Robert Bellows	Jim Brinks	Richard Willham
	Craig Ludwig	John Massey	Bill Borror	John Masters	Don Lunstra	Richard Frahm	Bobby Rankin
	Jim Gibb	Will Butts	Frank Baker	Connie Greig	Merlyn K. Nielson	Robert Koch	Mark Keffeler
	Paul Miller	Les Holden	Steve Hammack	Bill Swoope	Mary Garst	Don Kress	Don Hutzel
	Larry Benyshek	Bob Dickenson	Chris Dinkel	Charles McPeake	Daryl Strohbehn	James Bennett	James Nolan
	Jim Brinks	Harold Bennett	Art Linton	Bill Rishel	Chuck Shroeder	C. DuVall	Jim Leachman
	Greg Martin	Russ Danielson	Peter Marble	Bill Zollinger	Bill Durfey	Tom Chrystal	John Crouch
	Lyle Springer	Martin Jorgensen	Glenn Butts	Bill Borror	Bob Sand	Larry Foster	Glen Klippenstein
	Darryl Loepke	Robert Schalles	John Brunner	Jim Glenn	Dave Nichols	Joe Sagebiel	
	Roy Wallace		Dave Breiner			Steve Wolfe	
	Robert Scarth					Roy Beeby	
	Jack Farmer					Henry Gardiner	

BEEF IMPROVEMENT FEDERATION BOARD OF DIRECTORS MEETING
May 5 and 6
Capitol Plaza Holiday Inn
Sacramento, California

The BIF Board of Directors held two Directors Meetings in conjunction with the 1983 Annual Convention at Sacramento, California. The first meeting was held on Wednesday, May 4th at 6:00 p.m. with dinner being served at 7:00 p.m. Attending this meeting was Steve Radakovich, President; Bill Borror, Vice President; A. L. Eller, Jr., Executive Director; Roger McCraw, Jim Gosey, and Ken Ellis - Regional Directors; John Masters, Dick Spader, Jack Farmer, Greg Martin, Robert Scarth, Gene Schroeder, Roy Wallace, Jim Gibb, Frank Baker, Bruce Howard, Glenn Butts, Larry Cundiff, Keith VanderVelde, and Dixon Hubbard. Larry Corahof the American Simmental Association sat in for Earl Peterson, Elton Leighton, New Mexico State University sat in for Lyle Springer. The following items of business were transacted:

1. Minutes

   The Board voted to dispense with the reading of the minutes of the mid-year meeting.

2. Financial Report

   Art Linton who served as Executive Director until January 1, 1983 provided a financial report for the calendar year 1982 which showed an income for the year of $14,420.10 and expenses for the year of $8,523.74 leaving a balance in checking and savings account and certificates of desposit of $39,270.18. He indicated that all financial transactions had been moved to the Blacksburg location. A. L. Eller gave a report from January 1 to April 20, 1983 showing an income of $8,318.90, expenses of $1,966.71 and a total assets in checking account and money market certificates of $46,758.02. Complete reports are attached. Eller indicated that dues have come in well this year and that $1,750.00 are still outstanding from 16 member organizations. He indicated that they will be rebilled for dues.

3. Executive Director's Report

   A. L. Eller indicated that the transition from Montana to Virginia has been made smoothly. He indicated that BIF Update columns have been sent to the Livestock Press since December 1982 and that they are being extremely well received as this seems to be a good vehicle for communication. He indicated that a dictaphone transcriber had been purchased at a cost of $185.35. A part-time secretary who works part time in afternoons has been hired and is working out well. He indicated that copies of the BIF Guidelines have been mailed upon requests. He suggested that the cost in postage is a bit higher than in former years because of mailing BIF Update as well as programs to the 1983 Convention. New stationary and envelopes had to be ordered and are shown as a cost of printing and supplies. There was a question relative to the number of copies of Guidelines available. Eller says there are about 300 in Blacksburg. Dixon Hubbard says there are 300 plus in Washington, though he does not know the exact number and will find out and mail or ship same to Blacksburg. It was suggested that speakers' talks from the 1983 Convention be sent to the Livestock Publications list one at a time for printing in those publications. Eller asked the directors to make suggestions at any time to him.

4. Report on Committee Meetings at 1983 Convention

Dixon Hubbard thanked the Board for involving themselves in the committee activity. He indicated that committee reports will be written to be published in the BIF Proceedings. He stated that a Sire Evaluation Committee meeting would be held Wednesday evening May 4th between the hours of 8 and 10 p.m. as well as May 5th as scheduled in the program. He reported that all is in order for a good set of committee meetings at the convention.

5. Location of the 1984 BIF Convention

Eller reported that three invitations had been received. One from Wisconsin inviting BIF to meet at Madison, Wisconsin. Another from Kentucky with the meeting to be held in Lexington. A third from Georgia with the meeting to be held in Atlanta. Eller read M. K. Cook's letter of invitation from Georgia for 1984 or 1986. Carla Chennett from Kentucky came to the board meeting and made a verbal and slide presentation inviting BIF to Kentucky. Eller indicated that the Directors had gone on record a year ago at the South Dakota meeting voting to go to Georgia in 1984, but since that was never communicated to the Georgia people he indicated that it appeared that it was an open situation. The board agreed to make a final decision at the Friday morning, May 6th Board Meeting.

6. Slide Presentation on Performance Pedigrees and Sire Evaluation

Jim Gosey presented a slide presentation using selected slides from the American Polled Hereford Association set and Keith VanderVelde made a presentation using the ABS slides set. Gosey asked the board what it wants to do about the slide set. It was the general consensus of the board for the committee to continue to work putting together a slide set that could be made available to member organizations and Extension either on a loan or sale basis. This work will be culminated by the mid-year board meeting in November, 1983.

7. Linear Measurements Report

Jim Gosey reported to the board that he will report on the literature review which he put together at the Live Animal Evaluation Committee Meeting. He also indicated that the committee plans to address issues relative to linear measurements in the committee meeting.

8. Mid-Year Board Meeting

Bill Borror moved, Keith Vandervelde seconded the motion that the BIF Mid-Year Board Meeting be held in Kansas City in an Airport Motel November 4th and 5th. The motion was carried.

9. Director Election

Eller indicated that five directors are to be elected replacing those going off the board as of the convention. These are: Steve Radakovich, At Large who has served a three year term and is eligible for re-election; Bill Borror representing Western BCIA's has served three years and is eligible for another three year term; Mark Keffeler, Central BCIA's has six years and is not eligible for re-election; John Masters, Eastern BCIA's has served one term and is eligible for re-election; Dick Spader, Breed Associations has served six years and is not eligible for re-election.

Directors are to be elected May 5th at the convention. Officers will be elected at the Friday Board Meeting May 6th.

10. Regional Directors

Eller introduced new Eastern Regional Director, Roger McCraw, to the board. Jim Gosey announed that he is now ready to vacate the Central Regional Director position after many years of service. Gosey made a motion that Dennis Lamm at Colorado State University be his replacement in the Central Region. Motion was seconded. It was brought up that Colorado is in the Western Region rather than Central Region. With this in mind there was no need to vote on the motion.

The Directors second meeting was held at 6 a.m. on Friday, May 6th. Those in attendance included Radakovich, Borror, Gosey, Baker, Howard, Ellis, Gibb, Peterson, Hubbard, Lemmon (newly elected Eastern BCIA's), Wallace, Martin, Eller, Linton, Farmer, Butts, Leighton (for Springer), McCraw, Masters, Gardiner (newly elected Central BCIA's), Scarth, Schroeder, Ludwig (newly elected representing Breed Associations and Cundiff). Radakovich and Borror were re-elected for another three year terms on May 5th.

The following items of business were acted upon:

1. Election of Officers

Earl Peterson, Chairman of the Nominating Committee placed in nomination the names of Bill Borror for President and Gene Schroeder for Vice-President. There being no further nominations, the two officers were elected as nominated by acclamation.

2. 1984 BIF Convention

After considerable discussion, Jack Farmer moved that BIF hold its convention in 1984 in Georgia and that tentatively it set its annual convention for 1985 in Madison, Wisconsin and 1986 in Lexington, Kentucky. The motion was seconded by Martin and carried.

Convention Program Committee

The 1984 Convention Program Committee was appointed by President Borror and is Gene Schroeder, Chairman; Harvey Lemmon, Roger McCraw, and Craig Ludwig.

Date for 1984 Annual Convention

The dates of May 3rd and 4th 1984 were selected. Eller was charged with informing the Georgia group of these dates asking the Georgia group to line up the meeting for these dates. If for any reason May 3rd and 4th are unworkable it was the concensus of the board to move the convention one week earlier.

3. BIF Guidelines

Dixon Hubbard indicated that the board needed to make a decision relative to the format for future BIF Guidelines - who might print such Guidelines, and other matters relative to the Guidelines which probably will need to be reprinted in whole or in part within the next two years. President Borror appointed a committee to study this matter and bring a recommendation to the board at the mid-year meeting in November. The committee is as follows: Dixon Hubbard, Chairman; Frank Baker, Larry Cundiff, Ike Eller, Bob Scarth, and Henry Gardiner.

4. Committee Reports to the Board

The following reports were made:

A. Systems Committee - Jim Gibb - He indicated that the committee would recommend that BIF adopt a systems philosophy. Baker moved acceptance of the report, seconded by Scarth and carried.

B. The Sire Evaluation Committee Report was given by Larry Cundiff indicating that the committee met twice during the convention. Once the night of May 4th and again the afternoon of May 5th and pointed out the recommendations that were made and discussed. Martin explained why the Wednesday night meeting was held which was an add on meeting. It was suggested that in the future the Sire Evaluation Committee meeting be set so that it does not conflict with other committee meetings. Roy Wallace said that the BIF Board should give direction to the Sire Evaluation Committee now in terms of standardization. Martin moved the acceptance of the committee report, seconded by Baker and carried. It was the concensus of the board that the BIF Board should act on Sire Evaluation giving it considerable time in the mid-year board meeting.

C. Central Test Station Committee - Roger McCraw indicated that the committee recommends that the first formula on page 50 of the Guidelines be the only one recommended. The BIF Guideline should not contain the other formula. He indicated that considerable time was spent by the committee in determining how Test Station Bull Records should be gotten to Breed Associations and also how Breed Associations could get information on estimated Breeding Values to Test Stations in time to be useful for sale purposes. McCraw suggested that the list of Test Stations in the country should be updated. McCraw indicated that Jeff Burger from Iowa State presented a formula for calculation of Estimated EPD's from Yearly Ratio made at the Test Stations and Yearly Weight EPD's from Sire Summaries on Bulls Sired By Sires that are in Summaries. The formula was as follows:

Estimated EPD = .37 x individual yearly ratio + .63 x Sire EPD for Yearly Weight

Baker moved acceptance of the report but that the board table the part of the report having to do with revision of Guidelines. Martin seconded, carried.

D. Live Animal Evaluation Committee Report - Craig Martin made the report recommending that BIF develop a frame score chart to go in the Guidelines which should be acted upon in the fall mid-year board meeting. Martin was asked to pull together a recommended frame score chart. Wallace moved that the report be accepted, seconded by Farmer, carried.

5. Development of Fact Sheets

Eller indicated that the board in a meeting a year or so ago had started making plans for getting fact sheets written and camera ready copies made that would be available to Extension and member organizations and suggested that this effort be continued so that it would be brought to fruition on subjects such as Sire Evaluation, Understanding Estimated Breeding Values from Performance Pedigrees, EPD's from Sire Summaries, How Performance Records Should Be Used in Junior Activities as examples of this kind of subject matter.

Dixon Hubbard indicated that the Utilization Committee would be working on this matter in their meeting on May 6th and would be coming forth with some recommendations.

The following awards were presented at the Awards' Banquet held the evening of May 5th.

Continuing Service
Art Linton - Bozeman, Montana

Pioneer
Jim Elings - California
Ben Kettle - Colorado
Jim Sanders- California
Carroll O. Schoonover - Wyoming
Dean Frischnecht - Oregon

Seedstock Producer of the Year
Bill Borror - California

Commercial Producer of the Year
Al Smith - Virginia

Respectfully submitted,

A. L. Eller
BIF Executive Director

BEEF IMPROVEMENT FEDERATION

FINANCIAL STATUS - January 1, 1983

by

Arthur C. Linton

	1-1-82	1-1-83
Checking Account	$2,098.61	318.76
Savings Account	1,275.21	1,216.64
Certificate of Deposit	30,000.00	37,734.78
	$33,373.82	$39,270.18

1982 BIF INCOME

Interest	$4,276.21
Proceedings	109.20
Dues	7,563.54
Other	2,471.15
TOTAL INCOME	$14,420.10

1982 BIF EXPENSES

Trophies	$174.20
Postage	128.15
Printing	2,067.68
Legal	35.00
Bank charges	7.25
Canadian discounts	1.78
Board meetings	484.14
Speaker travel	4,028.04
Board travel	1,597.50
TOTAL EXPENSES	$8,523.74

BEEF IMPROVEMENT FEDERATION

FINANCIAL STATUS - April 20, 1983

BY

A. L. Eller, Jr.

Checking Account	$ 1,522.53
Money Market	$45,235.49
	46,758.02

1983 BIF Income

Dues	$8,200.00
Proceedings	14.00
Interest (Checking)	30.22
Interest (Money Market)	74.68
TOTAL INCOME	$8,318.90

1983 BIF Expenses

Printing (Program)	$ 123.76
Bank Charges (Money Market)	4.00
Supplies	395.88
Salary (Secretary)	445.06
Postage	626.08
Director Expenses	351.88
Canadian Discounts	20.05
TOTAL EXPENSES	$1,966.71

BIF AWARDS PROGRAM

The Commercial Producer Honor Roll of Excellence

Chan Cooper	MT	1972
Alfred B. Cobb, Jr.	MT	1972
Lyle Eivens	IA	1972
Broadbent Brothers	KY	1972
Jess Kilgore	MT	1972
Clifford Ouse	MN	1973
Pat Wilson	FL	1973
John Glaus	SD	1973
Sig Peterson	ND	1973
Max Kiner	WA	1973
Donald Schott	MT	1973
Stephen Garst	IA	1973
J. K. Sexton	CA	1973
Elmer Maddox	OK	1973
Marshall McGregor	MO	1974
Lloyd Mygard	ND	1974
Dave Matti	MT	1974
Eldon Wiese	MN	1974
Lloyd DeBruycker	MT	1974
Gene Rambo	CA	1974
Jim Wolf	NE	1974
Henry Gardiner	KS	1974
Johnson Brothers	SD	1974
John Blankers	MN	1975
Paul Burdett	MT	1975
Oscar Burroughs	CA	1975
John R. Dahl	ND	1975
Eugene Duckworth	MO	1975
Gene Gates	KS	1975
V. A. Hills	KS	1975
Robert D. Keefer	MT	1975
Kenneth E. Leistritz	NE	1975
Ron Baker	OR	1976
Dick Boyle	ID	1976
James D. Hackworth	MO	1976
John Hilgendorf	MN	1976
Kahua Ranch	HI	1976
Milton Mallery	CA	1976
Robert Rawson	IA	1976
Wm. A. Stegner	ND	1976
U. S. Range Experiment Station	MT	1976
John Blankers	MN	1977
Maynard Crees	KS	1977
Ray Franz	MT	1977
Forrest H. Ireland	SD	1977
John A. Jameson	IL	1977
Leo Knoblauch	MN	1977
Jack Pierce	ID	1977
Mary & Stephen Garst	IA	1977
Odd Osteroos	ND	1978
Charles M. Jarecki	MT	1978
Jimmy G. McDonnal	NC	1978
Victor Arnaud	MO	1978
Ron & Malcolm McGregor	IA	1978
Otto Uhrig	NE	1978
Arnold Wyffels	MN	1978
Bert Hawkins	OR	1978
Mose Tucker	AL	1978
Dean Haddock	KS	1978
Myron Hoeckle	ND	1979
Harold & Wesley Arnold	SD	1979
Ralph Neill	IA	1979
Morris Kuschel	MN	1979
Bert Hawkins	OR	1979
Dick Coon	WA	1979
Jerry Northcutt	MO	1979
Steve McDonnell	MT	1979
Doug Vandermyde	IL	1979
Norman, Denton & Calvin Thompson	SD	1979
Jess Kilgore	MT	1980
Robert & Lloyd Simon	IL	1980
Lee Eaton	MT	1980
Leo & Eddie Grubl	SD	1980
Roger Winn, Jr.	VA	1980
Gordon McLean	ND	1980
Ed Disterhaupt	MN	1980
Thad Snow	CAN	1980
Oren & Jerry Raburn	OR	1980
Bill Lee	KS	1980
Paul Moyer	MO	1980
G. W. Campbell	IL	1981
J. J. Feldmann	IA	1981
Henry Gardiner	KS	1981
Dan L. Weppler	MT	1981
Harvey P. Wehri	ND	1981
Dannie O'Connell	SD	1981
Wesley & Harold Arnold	SD	1981
Jim Russel & Rick Turner	MO	1981
Oren & Jerry Raburn	OR	1981
Orin Lamport	SD	1981
Leonard Wulf	MN	1981
Wm. H. Romersberger	IL	1982
Marvin & Donald Stoker	IA	1982
Sam Hands	KS	1982
Larry Campbell	KY	1982
Lloyd Atchison	CAN	1982
Earl Schmidt	MN	1982

Milton Krueger	MO	1982	Raymond Josephson	ND	1982
Carl Odegard	MT	1982	Clarence Reutter	SD	1982

1983

Leonard Bergen	CAN	1983	Charlie Kopp	OR	1983
Kent Brunner	KS	1983	Duwayne Olson	SD	1983
Tom Chrystal	IA	1983	Ralph Pederson	SD	1983
John Freitag	WI	1983	Ernest & Helen Schaller	MO	1983
Eddie Hamilton	KY	1983	Al Smith	VA	1983
Bill Jones	MT	1983	John Spencer	CA	1983
Harry & Rick Kline	IL	1983	Bud Wishard	MN	1983

BIF AWARDS PROGRAM

The Seedstock Breeder Honor Roll of Excellence

John Crowe	CA	1972	Joseph P. Dittmer	IA	1975
Dale H. Davis	MT	1972	Dale Engler	KS	1975
Elliot Humphrey	AZ	1972	Leslie J. Holden	MT	1975
Jerry Moore	OH	1972	Robert D. Keefer	MT	1975
James D. Bennett	VA	1972	Frank Kubik, Jr.	ND	1975
Harold A. Demorest	OH	1972	Licking Angus Ranch	NE	1975
Marshall A. Mohler	IN	1972	Walter S. Markham	CA	1975
Billy L. Easley	KY	1972	Gerhard Mittness	KS	1976
Messersmith Herefords	NE	1973	Ancel Armstrong	VA	1976
Robert Miller	MN	1973	Jackie Davis	CA	1976
James D. Hemmingsen	IA	1973	Sam Friend	MO	1976
Clyde Barks	ND	1973	Healy Brothers	OK	1976
C. Scott Holden	MT	1973	Stan Lund	MT	1976
William F. Borror	CA	1973	Jay Pearson	ID	1976
Raymond Meyer	SD	1973	L. Dale Porter	IA	1976
Heathman Herefords	WA	1973	Robert Sallstrom	MN	1976
Albert West III	TX	1973	M. D. Shepherd	ND	1976
Mrs. R. W. Jones, Jr.	GA	1973	Lowellyn Tewksbury	ND	1976
Carlton Corbin	OK	1973	Harold Anderson	SD	1977
Wilfred Dugan	MO	1974	William Borror	CA	1977
Bert Sackman	ND	1974	Rob Brown, Simmental	TX	1977
Dover Sindelar	MT	1974	Glenn Burrows, PRI	NM	1977
Jorgensen Brothers	SD	1974	Henry & Jeanette Chitty	FL	1977
J. David Nichols	IA	1974	Tom Dashiell, Hereford	WA	1977
Bobby Lawrence	GA	1974	Lloyd DeBruycker, Charolais	MT	1977
Marvin Bohmont	NE	1974	Wayne Eshelman	WA	1977
Charles Descheemaeker	MT	1974	Hubert R. Freise	ND	1977
Bert Crane	CA	1974	Floyd Hawkins	MO	1977
Burwell M. Bates	OK	1974	Marshall A. Mohler	IN	1977
Maurice Mitchell	MN	1974	Clair Percel	KS	1977
Robert Arbuthnot	KS	1975	Frank Ramackers, Jr.	NE	1977
Glenn Burrows	NM	1975	Loren Schlipf	IL	1977
Louis Chesnut	WA	1975	Tom and Mary Shaw	ID	1977
George Chiga	OK	1975	Bob Sitz	MT	1977
Howard Collins	MO	1975	Bill Wolfe	OR	1977
Jack Cooper	MT	1975	James Volz	MN	1977

A. L. Grau		1978
George Becker	ND	1978
Jack Delaney	MN	1978
L. C. Chestnut	WA	1978
James D. Bennett	VA	1978
Healey Brothers	OK	1978
Frank Harpster	MO	1978
Bill Womack, Jr.	AL	1978
Larry Berg	IA	1978
Buddy Cobb	MT	1978
Bill Wolfe	OR	1978
Roy Hunt	PA	1978
Del Krumwied	ND	1979
Jim Wolf	NE	1979
Rex and Joann James	IA	1979
Leo Schuster Family	MN	1979
Bill Wolfe	OR	1979
Jack Ragsdale	KY	1979
Floyd Mette	MO	1979
Glenn and David Gibb	IL	1979
Peg Allen	MT	1979
Frank and Jim Willson	SD	1979
Donald Barton	UT	1980
Frank Felton	MO	1980
Frank Hay	CAN	1980
Mark Keffeler	SD	1980
Bob Laflin	KS	1980
Paul Mydland	MT	1980
Richard Tokach	ND	1980
Roy & Don Udelhoven	WI	1980
Bill Wolfe	OR	1980
John Masters	KY	1980
Floyd Dominy	VA	1980
James Bryan	MN	1980
Blythe Gardner	UT	1980
Richard McLaughlin	IL	1980
Charlie Richards	IA	1980
Bob Dickinson	KS	1981
Clarence Burch	OK	1981
Lynn Frey	ND	1981
Harold Thompson	WA	1981
James Leachman	MT	1981
J. Morgan Donelson	MO	1981
Clayton Canning	CAN	1981
Russ Denowh	MT	1981
Dwight Houff	VA	1981
G. W. Cornwell	IA	1981
Bob and Gloria Thomas	OR	1981
Roy Beeby	OK	1981
Herman Schaefer	IL	1981
Myron Aultfather	MN	1981
Jack Ragsdale	KY	1981
W. B. Williams	IL	1982
Garold Parks	IA	1982
David A. Breiner	KS	1982
Joseph S. Bray	KY	1982
Clare Geddes	CAN	1982
Howard Krog	MN	1982
Harlin Hecht	MN	1982
Willard Kottwitz	MO	1982
Larry Leonhardt	MT	1982
Frankie Flint	NM	1982
Gary & Gerald Carlson	ND	1982
Bob Thomas	OR	1982
Orville Stangl	SD	1982

1983

C. Ancel Armstrong	KS	1983
Bill Borror	CA	1983
Charles E. Boyd	KY	1983
John Bruner	SD	1983
Leness Hall	WA	1983
Ric Hoyt	OR	1983
E. A. Keithley	MO	1983
J. Earl Kindig	VA	1983
Jake Larson	ND	1983
Harvey Lemmon	GA	1983
Frank Myatt	IA	1983
Stanley Nesemeier	IL	1983
Russ Pepper	MT	1983
Robert H. Schafer	MN	1983
Alex Stauffer	WI	1983
D. John & Lebert Shultz	MO	1983

Continuing Service Awards

Clarence Burch	Oklahoma	1972
F. R. Carpenter	Colorado	1973
E. J. Warwick	ARS-USDA Wash.DC	1973
Robert De Baca	Iowa State Univ.	1973
Frank H. Baker	Okla. State Univ.	1974
D. D. Bennett	Oregon	1974
Richard Willham	Iowa State Univ.	1974
Larry V. Cundiff	RLHUSMARC	1975
Dixon D. Hubbard	USDA-FES,Wash.DC	1975
J. David Nichols	Iowa	1975
A. L. Eller, Jr.	VPI & SU	1976
Ray Meyer	South Dakota	1976
Don Vaniman	Montana	1977
Lloyd Schmitt	Montana	1977
Martin Jorgensen	South Dakota	1978
James S. Brinks	Col. State Univ	1978
Paul D. Miller	Am. Breeding Svc-Wisconsin	1978
C. K. Allen	Am. Angus Assn.	1979
Wm. Durfey	NAAB	1979
Glenn Butts	PRI	1980
Jim Gosey	Univ. Neb.	1980
Mark Keffeler	South Dakota	1981
J. D. Mankin	Idaho	1982
Art Linton	Montana	1983

Commercial Producer of the Year

Chan Cooper	MT	1972	Mose Tucker	AL	1978
Pat Wilson	FL	1973	Bert Hawkins	OR	1979
Lloyd Nygard	ND	1974	Jess Kilgore	MT	1980
Gene Gates	KS	1975	Henry Gardiner	KS	1981
Ron Baker	OR	1976	Sam Hands	KS	1982
Steve and Mary Garst	IA	1977			

1983

Al Smith	VA	1983

Seedstock Breeder of the Year

John Crowe	CA	1972	Glenn Burrows	NM	1977
Mrs. R. W. Jones	GA	1973	James D. Bennett	VA	1978
Carlton Corbin	OK	1974	Jim Wolf	NE	1979
Leslie J. Holden	MT	1975	Bill Wolfe	OR	1980
Jack Cooper	MT	1975	Bob Dickinson	KS	1981
Jorgensen Brothers	SD	1976	A. F. "Frankie" Flint	NM	1982

1983

Bill Borror	CA	1983

Organizations of the Year

Beef Improvement Committee, Oregon Cattlemen's Assn.	1972
South Dakota Livestock Production Records Assn.	1973
American Simmental Association, Inc.	1974
American Simmental Association, Inc. (Breed)	1975
Iowa Beef Improvement Association (BCIA)	1975
The American Angus Association (Breed)	1976
The North Dakota Beef Cattle Improvement Assn. (BCIA)	1976
The American Angus Association (Breed)	1977
The Iowa Beef Improvement Association (BCIA)	1977
The American Hereford Association (Breed)	1978
Beef Performance Committee or Cattlemen's Assn.	1978
The Iowa Beef Improvement Association (BCIA)	1979

Pioneer Awards

Jay L. Lush	Iowa State Univ.	Research	1973
John H. Knox	New Mexico State Univ.	Research	1973
Ray Woodward	American Breeders Svc.	Research	1974
Fred Willson	Montana State Univ.	Research	1974
Charles E. Bell, Jr.	USDA-FES	Education	1974
Reuben Albaugh	Univ. of California	Education	1974
Paul Pattengale	Colorado State Univ.	Education	1974
Glenn Butts	Performance Registry Intl.	Service	1975
Keith Gregory	RHLUSMARC	Research	1975
Bradford Knapp, Jr.	USDA	Research	1975
Forrest Bassford	Western Livestock Journal	Journalism	1976
Doyle Chambers	Louisiana State Univ.	Research	1976
Mrs. Waldo Emerson Forbes	Wyoming Breeder	Breeder	1976

C. Curtis Mast	Virginia BCIA	Education	1976
Dr. H. H. Stonaker	Colorado State Univ.	Research	1977
Ralph Bogart	Oregon State Univ.	Research	1977
Henry Holszman	South Dakota State Univ.	Education	1977
Marvin Koger	Univ. of Florida	Research	1977
John Lasley	Univ. of Missouri	Research	1977
W. C. McCormick	Tifton, Georgia Test Stn.	Research	1977
Paul Orcutt	Montana Beef Perf. Assn.	Education	1977
J. P. Smith	Performance Registry Intl.	Education	1977
James B. Lingle	Wye Plantation	Breeder	1978
R. Henry Mathiessen	Virginia Breeder	Breeder	1978
Bob Priode	VPI&SU	Research	1978
Robert Koch	RLHUSMARC	Research	1979
Mr. & Mrs. Carl Roubicek	Univ. of Arizona	Research	1979
Joseph J. Urick	U.S. Range Livestock Experiment Station	Research	1979
Bryon L. Southwell	Georgia	Research	1980
Richard T. "Scotty" Clark	USDA	Research	1980
F. R. "Ferry" Carpenter	Colorado	Breeder	1980
Clyde Reed	Oklahoma State Univ.		1981
Milton England	Panhandle A&M College		1981
L. A. Maddox	Texas A&M Univ.		1981
Charles Pratt	Oklahoma		1981
Otha Grimes	Oklahoma		1981
Mr. & Mrs. Percy Powers	Texas		1982
Gordon Dickerson	Nebraska		1982

1983

Jim Elings	California	1983
Jim Sanders	Nevada	1983
Ben Kettle	Colorado	1983
Carroll O. Schoonover	Univ. of Wyoming	1983
W. Dean Frischknecht	Oregon State Univ.	1983

BILL BORROR - BIF SEEDSTOCK PRODUCER OF THE YEAR

Bill Borror of Tehama Angus Ranch, Gerber, California was named Seedstock Producer of the Year by the Beef Improvement Federation (BIF) during their annual convention at Sacramento, California on May 5 & 6, 1983.

Bill Borror, a breeder of registered Angus cattle for 40 years, has produced a herd of cattle with a national reputation and along the way has developed into a respected leader with a national audience. Tehama Angus Ranch has had a consistent goal of producing practical cattle that are useful to commercial cattle producers. Twenty years ago, the Borror cattle, a little longer, taller, and leaner than most Angus cattle of that period, were considered too plain. Daring to be different, he persisted with what he knew was right. When the tide change, Tehama Angus were the right kind. Now as the pendulum swings to another extreme of "biggest and tallest is best", Bill Borror is among the leaders searching for the optimum level of growth and milk production consistent with good fertility and functionality.

Bill Borror has been active in BIF, the California Beef Cattle Improvement Association, and several other industry organizations including the American Angus Association. He is the current vice president for BIF and has been on the board of directors for three years. He has been both president and vice president of the California BCIA and has been a director for ten years.

Bill Borror has been actively involved with the Angus Hered Improvement Records Program of the American Angus Association since 1970 and prior to that time, maintained records through the California BCIA. He has conscientiously submitted complete information on approximately 250 cows each year and has included birth, calving ease, weaning, and yearling data. The extent of his performance work has been observed in 1982 by the herd having 21 cows in the annual American Angus Association Pathfinder Report. This is a report issued by the American Angus Association that identifies superior cows in the breed for fertility, reproduction, and milk production as measured by the weaning weight of their progeny. The Tehama herd ranked 10th over all herds in the Angus breed in 1982 as measured by the number of cows in the Pathfinder Report.

Bill Borror has been a supporter of National Angus Sire Evaluation and has eight completed or is presently testing a total of nine bulls through the national program. He has also utilized his herd in the randomized mating of sire evaluation test bulls for other bull owners. The superiority of his breeding program can be measured in many ways, one of which is the placement of at least two of his bulls in major A.I. studs.

His involvement with record keeping has included the use of a home computer and Bill was the first breeder to submit home computerized records to AHIR.

Bill Borror is not only a superior seedstock breeder but an outstanding leader for the nation's cattle industry.

AL SMITH - BIF COMMERCIAL PRODUCER OF THE YEAR

Al Smith, manager of Neuhoff Farms at Dublin, Virginia was named Commercial Producer of the Year by the Beef Improvement Federation (BIF) during their annual convention at Sacramento, California on May 5 and 6, 1983.

Al Smith is a native Virginian and a graduate in Agricultural Economics from Virginia Polytechnic Institute and State University, who has been cattle manager for Neuhoff Farms, headquartered at Dublin, Virginia, for the past ten years. Al has done an amazing job as manager of this large commercial cattle enterprise dedicated to the concepts of beef cattle improvement through performance testing. He has carried out a very complete performance testing program through the Virginia Beef Cattle Improvement Association, including birth weights, weaning weights, yearling weights, and carcass evaluation. He has been an advocate for the use of superior herd sires and has used nothing but performance tested bulls coming from some of the leading herds in Virginia and other states across the country in natural service and progeny proven bulls via artificial insemination.

Under his direction, Neuhoff Farms have cooperated with the American Polled Hereford Association and the American Angus Association in progeny testing a large number of young sires. This activity has certainly been a plus for breeders in those breeds and also has left genetic improvement in the commercial herd for Neuhoff Farms.

Since Neuhoff Farms begun keeping performance records in 1972, they have shown an increase of 47 pounds on weaning weights and 138 pounds on yearling weights. Performance selection has been a major factor but a very well planned crossbreeding program has contributed to this increase also.

In addition to operating an excellent performance oriented commercial program at Neuhoff Farms, Al Smith has been a real leader in the beef cattle industry in the state of Virginia. His service as a director and president of the Virginia Beef Cattle Improvement Association marks some very progressive years with that organization. He has been involved in many other Virginia BCIA activities and committees and in addition, has involved himself with the Virginia Cattlemen's Association, currently serving as chairman of the Self Help Program Committee.

Al Smith has been recognized and called upon to travel out of state in a number of instances to give talks before cattle groups, including a national Angus meeting, the annual convention of the Beef Improvement Federation, and a number of state cattle meetings and field days. He is an excellent, enthusiastic speaker who carries a positive message for beef cattle improvement through performance testing and superior sires.

Smith is an active reservist in the U.S. Army Reserves holding the rank of Captain. He has been active in his own community, having served as an officer in the local Parent Teachers Association; has served as graduate assistant in the Dale Carnegie Courses; served on the executive committee and as co-chairman of the New River Valley Chapter of Ducks Unlimited; and is active in the New River Valley Big Brother-Big Sister Organization. He received the Pulaski, Virginia Jaycee's Outstanding Young Farmer Award in 1982. In the same year he was awarded the Virginia BCIA Commercial Producer of the Year Award. He is the father of a daughter, Shannon, age 11, and a son, Sean, age 8.

1983 BIF Continuing Service Award - Dr. Arthur Linton

Art Linton is a native Californian having received his BS and MS degrees in Animal Science from Cal Poly and his Ph.D from Colorado State University. Dr. Linton joined the American Hereford Association's staff in charge of the total performance records program in 1967 and held that position until 1971. In 1971 he joined Ankina Angus in Colorado and later worked as Manager of McLean Herefords in Arkansas. He served a brief period of time with the Utah Extension Service before becoming Extension Beef Cattle Specialist at Colorado State University. In 1981 he was named Head of the Department of Animal and Range Science at Montana State University in Bozeman,Montana, a position he continues to hold.

Dr. Linton became Executive Director of the Beef Improvement Federation in 1978 and served in that capacity through 1982. Art provided stable leadership for BIF during the period when rapid changes were occurring in statistically, genetic and physiological methodology for use and performance programs. Art's unique background in management of performance data and information in private herds and industry organizations and in education and research institutions permitted him to provide appropriate leadership during this period.

No doubt, Art Linton, will be called on by BIF in future times to provide light on the pathway to progress that is often dimly lit.

1983 Pioneer Award - Jim Elings

Jim Elings is a native of Montana receiving his BS degree from Oregon State University in 1947. He is a veteran of World War II and Korean and Vietnam conflicts.

Jim begun his Extension career as an Extension Agent and later Livestock Specialist in Oregon from the years 1947 through 1954. His Extension career in California as Farm Advisor and County Director of Extension and later as Extension Specialist at the University of California span the years of 1955-1962. As Extension Animal Husbandman at the University of California, he was very effective as Technical Director of California BCIA from 1962 to 1972. With the help of a group of dedicated cattlemen and livestock farm advisors, he was successful in computerizing the California BCIA records including the first computer printed annually updated cow records for California.

Jim later moved to private industry and served from 1972 to 1976 as Beef Program Director for the Genetic Division of Carnation Company. He was the individual that procured the Simmental Bull Signal.

Jim served as consultant for the Upjohn Company in 1976 through 79 in matters pertaining to Heat Synchronization and AI. In 1977 he went into business with two friends and his now half owner and Executive Vice President of Agriculture Industries, Inc. whose primary activities is in farm and ranch management headquartered in Sacramento.

His wife is Virginia Lee. They have three daughters and three grand-children.

1983 Pioneer Award - Dr. Ben Kettle, DVM

Dr. Ben Kettle is a Colorado native. He and his wife, Elizabeth, own and operate SanIsabelle Ranch at Westcliffe, Colorado which was founded in 1872 by his grandfather, Will Kettle. His grandfather and father, W. Charles Kettle, started a registered Horned Hereford Herd in 1916 which is being continued until this time.

Dr. Kettle graduated from the School of Veterinary Medicine at Colorado A&M in 1944, but his real love has been cattle breeding and he has been quite successful as a Performance Hereford Seedstock Breeder. The first Performance Tested Bulls brought to his ranch were from the herd of John and Mary Crowe at Millville,California.

Dr. Kettle was one of the founders of the Colorado BCIA in 1954 and has been most active with that organization. In 1960 he helped expand Colorado BCIA to include feedlot and carcass evaluation through Colorado Cattleman's Association, Colorado State University, Monfort Packing Company, Safeway Stores through a combined effort of the Colorado BCIA and Colorado Cattleman's Association serving as a stalwart on the Cattleman's Association and Improvement Committee. In fact, he was chairman of that committee from its beginning through the present time.

He also will serve the industry by performing well as a member of the National Cattleman's Association Cattle Improvement Committee which is now the Research and Education Committee. Dr. Kettle has been a member since the inception of the Beef Cattle Industry Advisory Committee to Colorado State University.

Dr. Kettle and his wife, Bet, have both been extremely influential cattle improvement leaders over a long span of time.

1983 Pioneer Award - W. Dean Frischknecht

Dean Frischknecht is a native of Manti, Utah who was raised on a Livestock Ranch in that area. He received a BS degree from Utah State University in 1942 and an MS degree in Animal Breeding from Utah State in 1943.

He has broad experience in ranch management having served in the late 40's and early 50's as Sheep Operation's Manager for Dessert Livestock Company. Since 1956 he has served as Livestock Extension Specialist for Beef Cattle at Oregon State University in Corvallis.

The work of Dean Frischknecht had tremendous influence in Oregon and the northwest.

Dean Frischknecht's Beef Improvement programs have had a significant and positive effect on the Oregon beef industry. They are generally accepted and identified as the 'spark' which has resulted in increased average weaning weights of calves of 60 pounds over the past 20 years, stimulating increased annual income of $20,000,000. Beyond this weight increase, Oregon cattlemen now raise 12 more calves per 100 cows than 20 years ago for a further annual income increase of $24,000,000. During the past 20 years also the programs have pointed the way to increased carcass values of one USDA yield grade which adds approximately $30 per carcass on some 200,000 cattle finished in the state. This improved carcass merit adds about $6,000,000 annually to Oregon's beef industry income, so that the total increment resulting from application of the programs' principles is the order of $50,000,000 annually. Mr. Frischknecht would be the first to acknowledge the efforts of many people in achieving this result: cattlemen, extension workers and association officials, but he has been the instigator and the key person who has kept the momentum going.

Dean's remarkable results in Oregon have had further impact nationally. The Oregon Cattlemans Association through its Beef Improvement Committee helped organize the Beef Improvement Federation (BIF), an international organization, in 1968 at Denver. Dean Frischknecht was one of Oregon's two representatives at this meeting. This Federation is composed of organizations, not individuals, and includes all the purebred breed associations, National Cattlemens Association, state Beef Cattle Improvement Associations, Performance Registry International, National Association of Animal Breeders, and the Federal Cooperative Extension Service in the United States; and similar organizations in Canada. One of its main functions is to unify, expand, and refine performance testing programs in the two countries. In 1972, the BIF, seeking to recognize superior achievement in the two countries, made awards for the first time, and Oregon was recognized as the BIF outstanding Beef Improvement Organization of the Year. Oregon achieved this distinction again in 1978. This awards program to state and breed associations was discontinued in 1979.

BIF also makes one award to the Commercial Cattle Producer of the Year and one to the outstanding Seedstock Breeder of the Year. In 1976, Ron Baker, C & B Livestock Co., Hermiston, Oregon was named BIF Commercial Producer of the Year, and in 1979 Bert Hawkins, Ontario, Oregon won this same award. In 1980, Bill Wolfe, Wolfe Polled Herefords, Wallowa, Oregon was named BIF Seedstock Breeder of the Year. Dean Frischknecht was the instigator of the awards, and Extension agents working with individual producers is a key function in the success of Oregon's program.

1983 Pioneer Award - C. O. Schoonover

C.O. Schoonover became Extension Animal Scientist at the University of Wyoming in 1954.

He holds the BS, MS, and Ph.D. from the University of Wyoming. Schoony provided leadership for development of the Wyoming extension meats program and the beef cattle performance testing program. He has supervised the operation of a successful beef bull testing station at Douglas, Wyoming. Consignment to the station and the subsequent sale of bulls rated high in meat producing potential have been under his direction.

Another of Dr. Schoonover's successful producer oriented projects was his study which identified production and carcass traits of steers from individual Wyoming producers which were fed in Iowa feedlots and slaughtered in Midwest packing plants. This program made available to the range operator, feedlot and carcass data on animals which he produced. A thorough study of shrink as related to marketing, management, feeding, and breeding practices was also accomplished.

Performance testing in beef cattle has been an area of concern in Extension for many years. Little progress had been made in this area until Dr. Schoonover took over and was able to develop and promote a program of performance testing that was acceptable to the commercial producer as well as the purebred breeder. Greater emphasis has been placed on commercial cow herds. Just recently I had an opportunity to attend a farmer-ranchers' program in the largest cattle producing county in Wyoming. Two county agents who have been somewhat slow in accepting the promotion of performance testing and crossbreeding were on the program. They presented information to the group depicting the merits of both. Both agents, during the course of the presentations, presented data that had been provided to them by Dr. Schoonover. The crowd was most receptive; perhaps even more so than if Dr. Schoonover had been giving the original presentation. The point in fact, however, was that these agents, who are highly respected by cattle producers in their counties, are disciples of "Schoony's" program.

His professional interest is evident by the fact that "Schoony" has attended the Reciprocal Meat Conference (RMC) since 1954. His leadership led to publications such as "Guides for Beef Carcass Evaluation" which he proposed in RMC presentations years before it became a reality. As a member of technical advisory committees for Performance Registry International, the Beef Improvement Federation, the Limousin Foundation, and as past chairman of the American Society of Animal Science Meats Committee, he has been influential in the adoption of improved carcass standards which "Guides for Beef Carcass Evaluation" recommends. He participated in compilation of the United States Beef Cattle Records Committee Report of February 1965 and in its recent revision. This report by industry, research, and extension personnel gives recommended procedures for measuring traits of economic value in beef cattle.

1983 Pioneer Award - James G. Sanders

"Jim" G. Sanders, widely and favorably known as a livestock consultant, is one of the most highly respected authorities in the livestock field.

After graduating from the University of Nebraska with a B.S. in Animal Science, he supervised and managed the development and production of several large registered Hereford herds in the western states including the 6,000 head of registered Hereford cattle of the Mill Iron Ranch. He also managed the Lucky Hereford Ranches at Gilroy and Loyallton, California and in Lovelock, Nevada. During this period, he built up the Lucky Hereford herd to one of the most productive in the nation and at the same time developing 27,000 acres of land for cattle and sheep production. He also managed the Suncrest Hereford Ranch at Springerville, Arizona and the Thornton Hereford Ranch at Gunnison, Colorado.

Mr. Sanders was the first president of the California Beef Cattle Improvement Association and used this organization's guide lines to improve the Lucky Hereford herd. He was an excellent cooperator of the Cooperative Extension Service of the University of California in several research projects including the Sire Evaluation projects.

Jim is an outstanding cattle judge having judged the Hereford breeding cattle at the Western International Stock Show at Denver, Colorado for four years. He also judged the largest and most outstanding stock show at Fort Worth, Texas plus numerous county and district fairs. Presently, he is the manager of the Western Farm Management Co. of Reno, Nevada which is an outstanding consulting firm on many phases of agriculture management.

During the pioneer phase of the beef cattle improvement era, Jim Sanders, always rode the point in championship style. He stays tall in the improvement saddle.

BIF Seedstock Producer of the Year - Bill Borror and Mrs. Borror

BIF Commercial Producer of the Year - Al Smith.

BIF Continuing Service Award Recipient - Dr. Art Linton

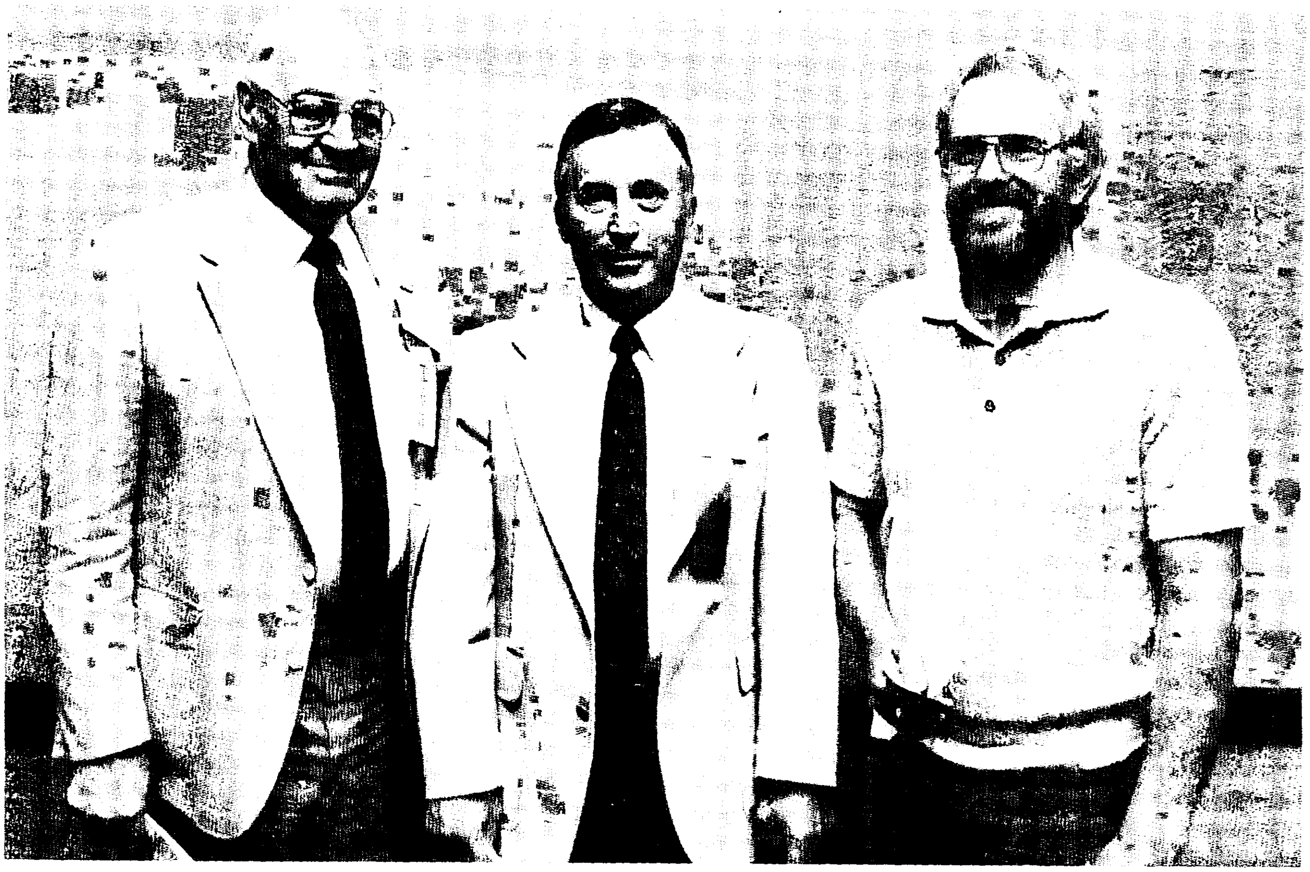
BIF Pioneer Award Recipient -
Dean Frischnecht and Mrs. Frischnecht.

BIF Pioneer Award Recipient -
James Sanders and Mrs. Sanders.

BIF Pioneer Award Recipient -
Jim Elings and Mrs. Elings.

BIF Pioneer Award Recipient -
Dr. Ben Kettle and wife Bet.

BIF BOARD OF DIRECTORS (seated L to R) Frank Baker; Bill Borror, President; Gene Schroeder, Vice President; Ike Eller, Executive Director; Dixon Hubbard; Bob Scarth. (standing L to R) Bruce Howard; Jim Gibb; Craig Ludwig; Jim Gosey; Larry Cundiff; Harvey Lemmon; Jack Farmer; Earl Peterson; Eldon Leighton; Steve Radakovich; Roy Wallace; Glenn Butts; John Masters; Roger McCraw; and Henry Gardiner.



BIF OFFICERS (L to R) Gene Schroeder, Vice President; Ike Eller, Executive Director; and Bill Borror, President.

REUBEN ALBAUGH
ANIMAL SCIENCE EXT.
UNIV. OF CALIFORNIA
DAVIS, CA 95616

DON W. ALBERT
ANIMAL SCIENCE DEPT.
UNIV. OF NEVADA
RENO, NV 89557

TERRY ANDERSON
ANDERSON LAND & LIVESTOCK
RT. #2
PILOT ROCK, OR 97868

MR&MRS FRANK ARATA
2917 PEAR ST.
ANTIOCH, CA. 94509

C. ANCEL ARMSTRONG
R. R. 5, BOX 236A
MANHATTAN, KS 66502

FRANK H. BAKER
RT. 3
MORRILTON, AR 72110

MR&MRS BILL BARTON
RT. 1, BOX 504C
RED BLUFF, CA 96080

W. C. BEHRENS
ANIMAL SCIENCE DEPT.
UNIV. OF NEVADA
RENO, NV 89557

HAROLD W. BENNETT
1224 ANTON DARBY RD.
COLUMBUS, OH 43228

C. RICHARD BENSON
ANIMAL SCIENCE EXT.
UNIV. OF CALIFORNIA
DAVIS, CA 95616

LARRY BENYSHEK
RT. 1
DANIELSVILLE, GA 30633

P. JEFFREY BERGER
239 KILDEE
IOWA STATE UNIV.
AMES, IA 50011

MR. & MRS. B BORROR
TEHAMA ANGUS RANCH
RT. 1, BOX 358
GERBER, CA 96035

CHARLIE BRADBURY*
800 NW LOOP 410
GPM S. #350
SAN ANTONIO, TX 78216

ERIC BRADFORD
ANIMAL SCIENCE DEPT.
UNIV. OF CALIFORNIA
DAVIS, CA 95616

MR&MRS E.J. BRUNER
R. R. 1, BOX 80
WINFRED, SD 57076

KENT BRUNNER
RT. 1
LOST SPRINGS, KS 66859

LESTER A. BURDETTE
317 ANIMAL INDUSTRIES BLDG.
PENN STATE UNIV.
UNIVERSITY PARK, PA 16802

PETER BURFENING
ANIMAL & RANGE SCIENCES
MONTANA STATE UNIV.
BOZEMAN, MT 59715

JIM BURNS
BOX 669
COCHRAN
ALBERTA, CANADA
TOLOWO

MR&MRS PHIL BURROUGHS
RT. 2, BOX 2588
ORLAND, CA 95963

WARD BURROUGHS
VISTA LIVESTOCK CO.
22323 EAST MONTE VISTA
DENAIR, CA 95316

GLENN BUTTS
RT. 1, BOX 126
FAIRLAND, OK 74343

MIKE BYRNE
ANTONIO MOUNTAIN RANCHES
3053 CHILENO VALLEY RD.
PETALUMA, CA 94952

HOLLIS D. CHAPMAN
KNAPP HALL
LOUISIANA STATE UNIV.
BATON ROUGE, LA 70816

MR&MRS JERRY CHAPPELL
MARLAND FARMS
RT. 2, BOX 768
THE PLAINS, VA 22171

CARLA G. CHENETTE
803 AG SCI-S
UNIV. OF KENTUCKY
LEXINGTON, KY 40546

JACQUES CHESNAIS
AGRICULTURE CANADA
930 CARLING AVE., S.J.C.B.
OTTAWA, CANADA
K1A0C5

TOM CHRYSTAL
BOX 136, R1
SCRANTON, IA 51462

MICHAEL N. COMPSTON
COMPSTON FEEDLOT
P. O. BOX 108
WELLINGTON, NV 89444

DR. GARY CONLEY
RT. 1, BOX 31
PERRYTON, TX 79070

DICK COON
BOX 627
WASHTUCNA, WA 99371

LARRY CORAH
ONE SIMMENTAL WAY
BOZEMAN, MT 95715

JACK COWLEY
5301 F STREET, SUITE 111
SACRAMENTO, CA 95819

JOHN R. CROUCH
3201 FREDERICK BLVD.
ST. JOSEPH, MO 64501

LARRY CUNDIFF
USDA-ARS
CLAY CENTER, NE 68933

WAYNE DALEY
397 DIANNE DR.
TURLOCK, CA 95380

RUSS DANIELSON
ANIMAL SCIENCE DEPT.
NORTH DAKOTA STATE UNIV.
FARGO, ND 58105

HARRY DASHER
LIVESTOCK FARM ADVISOR
11477 E AVENUE
AUBURN, CA 95603

MILES DAVIES
BOX 159
DEER TRAIL, CO 80105

JACKIE DAVIS
224 CRITTER CREEK RD.
LINCOLN, CA 95648

KARL DEAN
1901 E 2990 S.
SALT LAKE CITY, UT 84106

JUDITH M. DEARMAN*
P. O. BOX 272
ACAMPO, CA 95220

RICHARD E. DEESE
COOPERATIVE EXT. SERVICE
217 EXTENSION HALL
AUBURN UNIV.
AUBURN, AL 36849

RICK DELMAS
SIERRA FOOTHILL RANGE STAT.
P. O. BOX 28
BROWNS VALLEY, CA 95918

SUE DENISE
AGR. SCIENCES BLDG.
UNIV. OF ARIZONA
TUCSON, AZ 85721

DAVE DEROSA
SEQUOIA RANCH
RT. 2, BOX 300
SPRINGVILLE, CA 93265

H. H. DICKENSON
AMERICAN HEREFORD ASSOC.
715 HEREFORD DR.
KANSAS CITY, MO 64101

G. E. DICKERSON
225 BAKER HALL
UNIV. OF NEBRASKA
LINCOLN, NE 68583

BOB DICKINSON
GORHAM, KS 67640

WADE A. DOUGLASS*
OAK HAVEN FARM
1201-A GRAYBAR LANE
GALATIN, TN 37215

DAN DRAKE
LIVESTOCK FARM ADVISOR
1655 SOUTH MAIN
YREKA, CA 96096

JOHN DUNBAR
ANIMAL SCIENCE EXT.
UNIV. OF CALIFORNIA
DAVIS, CA 95616

MR&MRS C. DUVALL
19740 ROAD 22
GRANADA, CO 81041

JAMES ELINGS
AGRICULTURAL INDUSTRIES, INC.
P.O. BOX 1076 WEST
SACRAMENTO, CA 95691

A. L. ELLER, JR.
ANIMAL SCIENCE DEPT.
VPI&SU
BLACKSBURG, VA 24061

KEN ELLIS
COOP. EXT. HDQ.
UNIV. OF CALIFORNIA
DAVIS, CA. 95616

BILL EPPLER
BOVINE TEST CENTER
11900 - 28 MILE RD.
OAKDALE, CA 95361

WARREN EVANS
ASSOC. DEAN, COLLEGE OF AGR.
UNIV. OF CALIFORNIA
DAVIS, CA 95616

THOMAS R. FAMULA
2662 BLACKBURN DR.
DAVIS, CA 95616

JAMES FARLEY
LIVESTOCK FARM ADVISOR
2145 WARDROBE AVE.
MERCED, CA 95340

MR&MRS JACK FARMER
ANTONIO MOUNTAIN RANCH
3053 CHILENO RD.
PETALUMA, CA 94952

DELBERT FARNHAM
LIVESTOCK FARM ADVISOR
108 COURT ST.
JACKSON, CA 95642

FRANK W. FOX
BEEF CATTLE SPEC.
CAL POLY STATE UNIV.
SAN LUIS OBISPO, CA 93407

BOB FRIEDRICH
ONE SIMMENTAL WAY
BOZEMAN, MT 59715

W. DEAN FRISCHKNECHT
EXT. ANIMAL SCIENTIST
OREGON STATE UNIV.
CORVALLIS, OR 97331

TONY FURTADO
TRANQUILITY BRANGUS
P. O. BOX 264
CORNING, CA 96021

HENRY GARDINER
ASHLAND, KS 67831

JIM GIBB
4700 E. 63RD ST.
KANSAS CITY, MO 64130

ROGER F. GLANCY
P. O. BOX 214
HAYWARD, CA 94543

JIM GLENN
123 AIRPORT RD.
AMES, IA 50010

JIM GOSEY
209 BAKER HALL
UNIV. OF NEBRASKA
LINCOLN, NE 68583

J. HAYES GREGORY
COUNTY OFFICE BLDG.
NORTH CAROLINA ST. UNIV.
WILKESBORO, NC 28697

C. LENESS HALL
P. O. 2152
CARNATION, WA 98014

S. P. HAMMACK
BOX 1177
STEPHENVILLE, TX. 76401

MR&MRS M. HANEY
1442 ST. FRANCIS
MODESTO, CA. 95356

HOPE HANSON
YUBA COLLEGE AG. DEPT.
N. BEALE RD.
MARYSVILLE, CA. 95901

JACK HANSON
BOX 999
SUSANVILLE, CA. 96130

KEN HARTZELL
1112 WOODBINE DR.
NORTH ENGLISH, IOWA 52316

WILLIAM HELPHINSTINE
LIVESTOCK FARM ADVISOR
11477 E AVENUE
AUBURN, CA 95603

MAX HERZOG
7689 LAKEVILLE HIGHWAY
PETALUMA, CA 95952

DOUG L. HIXON
PO BOX 3354, UNIV. STATION
UNIV. OF WYOMING
LARAMIE, WY 82071

WILLIAM D. HOHENBOKEN
DEPT. OF ANIMAL SCIENCE
OREGON STATE UNIV.
CORVALLIS, OR 97330

BRUCE G. HOWARD
930 CARLING AVE, S.J.C.B.
OTTAWA, CANADA
K1A0C5

MR&MRS RICK HOYT
P. O. BOX 647
BURNS, OR 97720

DIXON HUBBARD
USDA-ES
ROOM 5525 - SOUTH BLDG.
WASHINGTON, DC 20250

REX E. HUNT
1848 HWY. 70
OROVILLE, CA 95965

DON HUIZEL
BOX 607
TIFFIN, OH 44883

HENRY J. JAEGER
P. O. BOX 507
BURLINGTON, WA 98233

WAYNE JENSEN
LIVESTOCK FARM ADVISOR
P. O. BOX 697
SANTA MARIA, CA 93456

JIM JOHNSON
DEPT. OF ANIMAL SC.
CAL STATE UNIV.
FRESNO, CA 93740

BILL JONES
BOX 769
HARLOWTON, MT 59036

MARTIN JORGENSEN
IDEAL, SD 57541

FRED KERR
13 SW NYE
PENDLETON, OR 97801

DR&MRS B.W. KETTLE
SAN ISABEL RANCH
WESTCLIFFE, CO 81252

MELVIN A. KIRKEIDE
HULTZ HALL, UNIV. STATION
NORTH DAKOTA STATE UNIV.
FARGO, ND 58105

DAVID KIRKPATRICK
P. O. BOX 1071
KNOXVILLE, TN 37901

GLENN KLIPPENSTEIN
RR 2
MAYSVILLE, MO 64469

RONALD KNIGHT
LIVESTOCK FARM ADVISOR
P. O. BOX 370
RED BLUFF, CA 96080

MARVIN KNOWLES
6325 TIMBELL RD.
OAKDALE, CA 95361

LOIS KOEFOED
J BAR P RANCH
RT. 6, BOX 760
LAKEVIEW, OR 97630

MR&MRS C. KOPP
BOX N
PILOT ROCK, OR 97868

DON KRESS
ANIMAL & RANGE SCI. DEPT.
MONTANA STATE UNIV.
BOZEMAN, MT 59717

AL KUMLIN
RR #2
CALGARY
ALBERTA, CANADA
T2P2G5

W. DENNIS LAMM
DEPT. OF AN. SCI.
COLORADO STATE UNIV.
FORT COLLINS, CO 80523

ELLIE T. LARSON
3427 BOHN RD.
MT. HOREB, WI 53572

JAKE LARSON
R.RTE.
ALMONT, ND 58520

BILL LEACHMAN
CONCAR RANCH
P.O. BOX 906
MODESTO, CA 95353

ELDIN LEIGHTON
NEW MEXICO STATE UNIV.
BOX 3-I
LAS CRUCES, NM 88003

HARVEY LEMMON
P.O. BOX 524
WOODBURY, GA 30292

ART LINTON
AN. & RANGE SCI. DEPT.
MONTANA STATE UNIV.
BOZEMAN, MT 59715

JOHN & MAY LOCKHART
BOX 5, SITE 3, RR 1
OKOTOKS
ALTA, CANADA
TOL1TO

DARYL W. LOEPPKE*
AMERICAN GELBVIEH ASSOC.
5001 NATIONAL WEST DR.
DENVER, CO 80216

CRAIG LUDWIG
BOX 4059
KANSAS CITY, MO 64101

BOYD MAHRT
311 MCBROWN RD
PETALUMA, CA 94952

JAMES MAINO
RT. 1, BOX 31
SAN LUIS OBISPO, CA 93401

JOHN J. MAINO
1117 SAN BERNARDO CREEK RD.
MORRO BAY, CA 93442

JERRY MALTBY*
BOVINE TEST CENTER
1190 - 28 MILE ROAD
OAKDALE, CA 95361

J. D. MANKIN
RT. 8, BOX 8478
CALDWELL, ID 83605

BILLY MAPLES
RT. 2, BOX 107
ELKMONT, AL 35620

TOM MARCUS
SUITE 101
LIVESTOCK EXCHANGE BLDG
DENVER, CO 80216

PETER MARDLE
RANCHO TOLAR CATOS
CARMEL VALLEY, CA 94923

GARY MARKEGARD
LIVESTOCK FARM ADVISOR
5630 S. BROADWAY
EUREKA, CA 95501

GREG MARTIN
N. AMER. LIMOUSIN FOUND.
100 LIVESTOCK EXCH. BLDG
DENVER, CO 80216

JOHN MASSEY
UNIV. OF MISSOURI
130 MUMFORD HALL
COLUMBIA, MO 65201

JOHN W. MASTERS
366 WALLER AVE.
SUITE 100
LEXINGTON, KY 40504

NYLE J. MATTHEWS
P.O. BOX 804
RICHFIELD, UT 84701

GREGORY MAY
1810 HANOVER AVE.
RICHMOND, VA. 23220

THOMAS R. MCCORD
BOX 218
CATHEYS VALLEY, CA 95306

DON MCCORMICK
BOX 939
HUGHSON, CA 95326

ROGER L. MCCRAW
NORTH CAROLINA STATE UNIV.
109 POLK HALL
RALEIGH, NC 27607

HOWARD MCCULLOCH
1050 W 16TH ST.
MERCED, CA 95340

NEIL MCDOUGALD
LIVESTOCK FARM ADVISOR
128 MADERA AVE
MADERA, CA. 93637

JOHN MCGARVA
P.O. BOX 1006
ALTURAS, CA. 96101

HAROLD MCLAIN
RT. 3, BOX 3060
ORLAND, CA 95963

CHARLES A. MCPEAKE
OKLA. STATE UNIV.
201F AN. SCI. BLDG.
STILLWATER, OK 74078

ROY MCPHEE
P.O. BOX 8334
STOCKTON, CA 95208

DAVID MEDEIROS
9233 EAST AVE
TURLOCK, CA 95380

EDDIE MESPLE
P.O. BOX 613
CITRUS HEIGHTS, CA 95611

PAUL MILLER
AMERICAN BREEDERS SERVICE
P.O. BOX 459
DEFOREST, WI 53532

GLEN NADER
LIVESTOCK FARM ADVISOR
MEMORIAL BLDG
SUSANVILLE, CA 96130

DEAN NEER
P.O. BOX 1006
ALTURAS, CA 96101

AARON NELSON
LIVESTOCK FARM ADVISOR
1720 MAPLE AVE.
FRESNO, CA 93702

LARRY NELSON
ANIMAL SCI. DEPT.
PURDUE UNIVERSITY
WEST LAFAYETTE, IN 47907

MR&MRS N. NICHOLAS
4705 T STREET
SACRAMENTO, CA 95819

BARBARA NICHOLAS
4705 T STREET
SACRAMENTO, CA 95819

J. DAVID NICHOLS
RT. 1, BOX 67
ANITA, IA 50020

FRED NICK
STAR ROUTE BOX 68
SANTA MARGARITA, CA 93453

GLENN NOBMANN
15 EDGEWOOD WAY
SAN RAFAEL, CA 94901

MARGARET NOBMANN
15 EDGEWOOD WAY
SAN RAFAEL, CA 94901

DAVID E. NOLLER
RR 3, BOX 51
SIGOURNEY, IOWA 52591

DU WAYNE OLSON
N. RTE, BOX 25
MCINTOSH, SD 57641

BRUCE ORVIS
STAR ROUTE, BOX 360
FARMINGTON, CA 95230

GINO PEDRETTI
1975 E. ROOSEVELT RD.
EL NIDO, CA 95317

EARL B. PETERSON
ONE SIMMENTAL WAY
BOZEMAN, MT 95715

JOHN PETERSON
C/O SENATOR JAMES NIELSEN
STATE CAPITOL BLDG
SACRAMENTO, CA 95814

GARY L. PEVEY
200 B ST., SUITE E
DAVIS, CA 95616

RALPH PHILLIPS
LIVESTOCK FARM ADVISOR
P.O. BOX 2509
BAKERSFIELD, CA 93303

BILL PLUMMER
REPRODUCTIVE PHYSIOLOGY
CAL POLY STATE UNIV
SAN LUIS OBISPO, CA 93407

LYNN POPE
STAR ROUTE, BOX 28
MERRILL, OR 97633

LYLEEN POPE
STAR ROUTE, BOX 28
MERRILL, OR 97633

MR&MRS STEVE RADAKOVICH
RT. 2
EARLHAM, IOWA 50072

DONALD E. RAY
DEPT OF AN. SCI.
UNIV. OF ARIZONA
TUCSON, AZ 85721

DAVID REAUME
1375 WISE RD
LINCOLN, CA 95648

WM. S. ROCHE
P.O. BOX 396
GALT, CA 95632

JAMES ROSS
UNIV. OF MISSOURI
130 MUMFORD HALL
COLUMBIA, MO 65201

WILLIAM C RUSSELL
DEPT. OF AN. SCI.
UNIV. OF WYOMING
LARAMIE, WY 82071

BURT RUTHERFORD
WESTERN LIVESTOCK JOUR.
P.O. DRAWER 17-F
DENVER, CO 80216

JAMES SANDERS
P.O. BOX 320
RENO, NV 89504

WILLIAM E. SANDROCK
RT. 1, BOX 3133
ANDERSON, CA 96007

NANCY ANN SAYRE
FREDERICK & BROOKSIDE
ST. JOSEPH, MO 64501

BOB SCARTH
1610 OST
HOUSTON, TX 77054

ROBERT H. SCHAFER
OXLEY HEREFORD RANCH
MAHNEMEN, MN 56557

BOB SCHALLES
RT. 3, BOX 302A
MANHATTAN, KS 66502

JOE SCHIMMEL
801 SAN FRANCISCO
RAPID CITY, SD 57701

GENE SCHROEDER
102 SOUTH VENNUM
PALISADE, NV 69042

TIM SHAW
RT. 6, BOX 24
RENO, NV 89506

MIKE SIDE
KRAK RADIO
3326 EL CAMINO AVE
SACRAMENTO, CA 95821

DANNY D. SIMMS
170 W. 4TH ST
COLBY, KS 67701

WAYNE SINGLETON
ANIMAL SCI. DEPT.
PURDUE UNIVERSITY
WEST LAFAYETTE, IN 47907

AL SMITH
RT. 2, BOX 213
DUBLIN, VA. 24084

RICHARD SNEDDEN
P.O. BOX 592
MARICOPA, CA 93252

RICHARD SNIDER
P.O. BOX 428
CLEMENTS, CA 95227

LYLE K. SORUM
3924 STARLITE DRIVE
CERES, CA 94066

RICHARD L. SPADER
3201 FREDERICK BLVD.
ST. JOSEPH, MO 64501

JOHN SPENCER
3116 E. CALLAHAN RD
ETNA, CA 96027

JULIUS B. STANLEY
1848 HWY 70
OROVILLE, CA 95965

MARION STANLEY
LIVESTOCK FARM ADVISOR
P.O. BOX 815
KING CITY, CA 93930

NORRIS J. STENQUIST
ANIMAL SCI. DEPT, UMC 48
UTAH STATE UNIV.
LOGAN, UTAH 84322

JOHN STEWART-SMITH*
P.O. BOX 396
COCHRANE ALTA
ALBERTA, CANADA
TOLOWO

DARYL STROHBEHN
109 KILDEE HALL
ISU
AMES, IA 50011

W.A.& LYNDA STUART, JR.
BOX 146
ROSEDALE, VA. 24280

JOHN S. SULLIVAN, JR.
RM. 239, KNAPP HALL
LOUISIANA STATE UNIV.
BATON ROUGE, LA 70803

BILL SWOOPE
BOX 5425
MISSISSIPPI STATE, MS 39762

CHUCK TEMPUS
220 CORBETT CYN RD.
ARROYO GRANDE, CA 93420

RICHARD W. TETHEROW
BOX 726
VALENTINE, NE 69201

MIKE THOMAS
318 S. MASON
ARROYO GRANDE, CA 93420

ARTHUR TOOBY
P.O. BOX 5
FAIRFIELD, CA 94533

BART TOPPING
DEPT. OF ANIMAL SCI.
CAL STATE UNIV.
FRESNO, CA 93740

ROBERT TOUCHBERRY
DEPT. OF AN. SCI.
UNIV. OF CALIFORNIA
DAVIS, CA 95616

THOMAS B. TURNER
ANIMAL SCIENCE
OHIO STATE UNIV.
2029 FYFFE RD.
COLUMBUS, OHIO 43210

WILLIAM VAN RIET
LIVESTOCK FARM ADVISOR
733 COUNTY CTR III COURT
MODESTO, CA 95355

BILL&MARILYN VAN TASSEL
P.O. BOX 683
LINDEN, CA 95236

KEITH VANDER VELDE
6908 RIVER RD., P.O.BOX 459
DE FOREST, WI 53532

W. NORMAN VINCEL
P.O. BOX 370
ROCKY MOUNT, VA. 24151

WAYNE WAGNER
G030 AG SCI BLDG
WEST VIRGINIA UNIV.
MORGANTOWN, W. VA. 26506

ROY A. WALLACE
11740 U.S. 42
PLAIN CITY, OH 43064

W. M. WARREN
P.O. BOX 1257
KINGSVILLE, TX 78363

GAYLE WATKINS
P.O. BOX 223
FARMINGTON, CA 95230

HENRY W. WEBSTER
145 P & AS BLDG
CLEMSON UNIVERSITY
CLEMSON, S.C. 29631

RICHARD L. WILLHAM
ANIMAL SCI. DEPT.
IOWA STATE UNIV.
AMES, IA 50011

DWIGHT WILLIAMS
1540 MARSHA AVE
MODESTO, CA 95350

BOB WILLOUGHBY
LIVESTOCK FARM ADVISOR
2279 DEL ORO AVE
SUITE B
OROVILLE, CA 95965

CHARLES B. WILSON
LIVESTOCK FARM ADVISOR
P.O. BOX 628
YUBA CITY, CA 95991

BURL WINCHESTER
8401 HUFFINE LANE
BOZEMAN, MT 59715

RALPH WISHARD
TRAIL, MN 56684

STEPHEN D. WOLFE
RT. 1, BOX 135A
WALLOWA, OR 97885

KEITH O. ZOELLNER
WEBER HALL
KANSAS STATE UNIV.
MANHATTAN, KS 66506

JOHN C. ADAMS
2150 PASO ROBLES ST
OCEANO, CA 93445

BRENDA BALLACHEY
DEPT. OF AN. SCI.
OREGON STATE UNIV.
CORVALLIS, OR 97331

BRIAN BASSETT
2916 AUGUSTA #46
SAN LUIS OBISPO, CA 93401

KAREN BIERY
1817 PICASSO AVE
DAVIS, CA 95616

JESSLYN BILBO
1429 H STREET, #2
DAVIS, CA 95616

KEITH BOLDMAN
1607 H STREET, #2
DAVIS, CA 95616

JIM BROWN
1425 NORD AVE., #K9
CHICO,CA 95926

LORI CABRAL
RT. 2, BOX 76
SAN LUIS OBISPO, CA 93401

HEIDI CARTAR
132 CALIFORNIA
SAN LUIS OBISPO, CA 93401

DAVID W. COLTON
501 RUSSELL BLVD
DAVIS, CA 95616

JEFF DANCER
DEPT. OF AN. SCI.
CA STATE UNIV.-CHICO
CHICO, CA 95929

KIM DAVIS
1548 DRAKE DRIVE
DAVIS, CA 95616

LINNEA ERICSON
3960 S. HIGUERA #164
SAN LUIS OBISPO, CA 93401

JOHN FITZGERALD
RED ROCK STAR RT
MACLEOD, CA 96053

ANNETTE FOURNIER
244 OLD WILLOW RD
ARROYO GRANDE, CA 93420

CAROLYN GEARHARD
572 FOOTHILL #27
SAN LUIS OBISPO, CA 93401

JENNIFER GOODE
817 ARNOLD ST
DAVIS, CA 95616

RON HUTCHINS
DEPT. OF AN. SCI.
CA STATE UNIV.-CHICO
CHICO, CA 95929

CLIF LEWIS
ANIMAL SCI. DEPT.
CAL POLY
SAN LUIS OBISPO, CA 93410

JO ANNE LILIENTHAL
D-8 ORCHARD PARK
DAVIS, CA 95616

GARRY MAHRT
724 COTTONWOOD, APT 206
WOODLAND, CA 95695

NANCY L. MARTIN
1506 ANDERSON RD
DAVIS, CA 95616

DON MCCOON, JR.
3060 TRIANGLE RD
MARIPOSA, CA 95338

BRIAN MCMURRAY
ANIMAL SCI. DEPT.
TEXAS A&M
COLLEGE STATION, TX 77843

JERRY MOORE
BOX 9524
WOODLEAF STAR RT.
OROVILLE, CA 95965

SUE MOORE
P.O. BOX 6276
LOS OSOS, CA 93402

NOELLE MUGGLI
DEPT. OF ANIMAL SCI.
OREGON STATE UNIV.
CORVALLIS, OR 97331

A. OKEYO MWAI
307 K STREET, #71
DAVIS, CA 95616

JIM OLTJEN
DEPT. OF AN. SCI.
UNIV. OF CALIFORNIA
DAVIS, CA 95616

RUSSELL PAULSON
1050 FOOTHILL
SAN LUIS OBISPO, CA 93401

GUY PORTERFIELD
380 WOODLAND DRIVE
LOS OSOS, CA 93402

EDWARD J. REGE
DEPT. OF AN. SCI.
UNIV. OF CALIFORNIA
DAVIS, CA 95616

PHYLLIS RHINEHART
4745 VACHELL LANE
SAN LUIS OBISPO, CA 93401

JOHN ROSE
ANIMAL SCI. DEPT.
CAL POLY
SAN LUIS OBISPO, CA 93407

DANIEL T. SCHOLL
1824 ALAMEDA AVE.
DAVIS, CA 95616

DEBBIE SCHONS
DEPT. OF AN. SCI.
RM. 17, WITHYCOMBE HALL
OREGON STATE UNIV.
CORVALLIS, OR 97331

DANA SENS
539 HERMOSA PLACE
DAVIS, CA 95616

JOHN SHETLER
1205 FOOTHILL, #2
SAN LUIS OBISPO, CA 93401

JOAN SMITH
436 OAK ST., #2
CHICO, CA 95926

BILL SNYDER
1205 FOOTHILL, #2
SAN LUIS OBISPO, CA 93401

STEVE SODERSTROM
RT. 2, BOX 654
SAN LUIS OBISPO, CA 93401

SUBANDRIYO
302 MILLS DRIVE
DAVIS, CA 95616

NANCY SULLIVAN
284 PACIFIC AVENUE
CAYUCOS, CA 93430

JOELLEN TRASK
848 W. 5TH ST., #5
CHICO, CA 95926

ROSE TRYON
ANIMAL SCI. DEPT.
CAL POLY
SAN LUIS OBISPO, CA 93401

BEVERLY VAN DYK
3057 S. HIGUERA #140
SAN LUIS OBISPO, CA 93401

SAMOA WALLACH
DEPT. OF AN. SCI.
UNIV. OF CALIFORNIA
DAVIS, CA 95616

JULIE WESTLAND
DEPT. OF AN. SCI.
CA STATE UNIV.-CHICO
CHICO, CA 95929

MARY LEE WHITE
1885 GARFIELD #7
SAN LUIS OBISPO, CA 93401

LYNN WINEMAN
1545 EL CAMINO REAL
SAN LUIS OBISPO, CA 93401

GRONN YRJO
0-3 ORCHARD PARK
DAVIS, CA 95616

KIM ZETTLER
4745 VACHELL
SAN LUIS OBISPO, CA 93401