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RB28-229 Fattening Steers of Various Ages

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Bulletin 229 October, 1928

Fattening Steers of Various Ages

H. J. GRAMLICH
Department of Animal Husbandry

COLLEGE ASTER, CHAMPION HEREFORD STEER AT THE NATIONAL WESTERN STOCK SHOW, DENVER, 1927 — BRED AND SHOWN BY THE UNIVERSITY OF NEBRASKA

THE UNIVERSITY OF NEBRASKA
COLLEGE OF AGRICULTURE
EXPERIMENT STATION
LINCOLN

W. W. BURR, DIRECTOR

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GENERAL SUMMARY

1. Calves fed upon a ration of shelled corn and alfalfa hay made much more economical gains than did 3-year-olds, 2-year-olds, or yearlings fed upon the same ration.

2. Three-year-old and 2-year-old steers gained much more rapidly during the first 100-day period than did yearlings and calves.

3. During the second 100 days on feed, calves gained somewhat more rapidly than during the first and much more rapidly than older cattle.

4. Calves made more efficient gains during the second 100-day period than did 3-year-olds and 2-year-olds during the first 100 days, and gained as economically as did yearlings during their first 100-day period.

5. Calves made as much gain from 61.2 pounds of feed as did yearlings from 82.2 pounds, 2-year-olds from 94.2 pounds, and 3-year-olds from 100 pounds.

6. Calves made 10.6 pounds of gain from one bushel of corn and 19.6 pounds of alfalfa hay; yearlings made 8 pounds of gain from one bushel of corn and 22 pounds of alfalfa hay; 2-year-olds made 6.9 pounds of gain from one bushel of corn and 22 pounds of alfalfa hay; and 3-year-olds made 6.7 pounds of gain from the same quantity of corn and 23.3 pounds of alfalfa hay.

7. One hundred pounds of gain were produced on calves by 529 pounds of corn, while 702 pounds were required for 100 pounds of gain on yearlings, 798 pounds on 2-year-olds, and 836 pounds on 3-year-olds. The alfalfa supplement necessary to produce gain increased in like proportion.

8. The younger the cattle, the less spread necessary between cost and sales price for an even break.

9. Three-year-old steers develop finish quite rapidly and can be sold as beef after 75 to 100 days of feeding on corn and alfalfa. Younger cattle, especially calves, must be fed longer in order to acquire acceptable finish.

10. The calves used in these three trials were worth more as feeders after being fed 100 days than they were as killers.

Fattening Steers of Various Ages

H. J. GRAMLICH *

During recent years the beef industry has undergone vast changes. These have been made necessary in part by economic conditions and in part by changes in the demands of the American people. The tendency has been toward earlier marketing of steers, so that instead of going to the block as mature individuals at from 3 to 5 years of age, they are now reaching the market at a much younger age. In consuming centers where only heavy carcasses of beef were demanded formerly there is a call today for carcasses of the yearling and long yearling class. Retailers say that their patrons insist on light cuts, not too wasty in surplus fat. This demand is evidenced in the coolers of the large packers and by their buyers at the stockyards. During the recent financial depression the tendency has been to realize as quickly as possible upon investments in livestock, and this has augmented the tendency toward feeding younger cattle. Thru earlier marketing the producer realizes on the steer from 6 months to 2 years sooner than he formerly did.

Because of this tendency toward the marketing of beef cattle at a very young age, it became apparent that some experimentation to show what age has to do with cost and rate of gains was needed. The experiments reported in this bulletin cover a 4-year period from October, 1920, to May, 1924. There were 4 trials, each beginning in October and ending in May. The major part of this bulletin is devoted to a report of the last 3 trials. The first trial is not averaged with the others because in it 3 instead of 4 lots were used and a ration different from that of the following 3 trials was fed. This first trial is treated in an appendix at the end of the bulletin.

OBJECTS OF THE EXPERIMENT

This series of trials was carried on with the object of ascertaining what steers of similar breeding but of different ages would do when fed under like conditions. It is offered for the benefit of the man who buys western cattle, either on the market or directly from the range districts, and for the benefit of the man in the corn belt who maintains a small herd of grade or purebred beef cows and desires to fatten their

* The feeding was supervised by Charles Johnson, head herdsman at the University. Milo Sherman, a student, did the feeding in the first 3 trials. Walter Ruden, another student, did the feeding in the last trial. W. F. Dickson, a graduate student, rendered much assistance in compiling data for the charts. Thanks are due John Clay & Company for appraising the cattle at periods in each of the trials.

FIG. 1.—Trial 1, Lot 1, 1921-22

progeny. Because of the extensive possibilities of the baby beef industry, figures which are brought out in these trials should be doubly interesting and valuable. It must be borne in mind that the effect of age only upon the rate and economy of gains was sought in these experiments.

ANIMALS, FEEDS, AND EQUIPMENT

ANIMALS USED

High grade Hereford steers were used in each of the trials and with one exception each set of cattle was purchased on one ranch. This exception was the 3-year-old lot used in Trial 1. They were bought on a ranch other than the one from which the younger cattle of the same set were obtained. An effort was also made to secure cattle 12 months apart in age. Average-sized rather than extremely large or small cattle were selected. The steers used in the 1922-23 trials were age branded and came from a herd in which the entire calf crop was dropped between the middle of March and May 1st each year. The cattle were selected on the ranges where they were produced rather than purchased on the open market where size is the most commonly used index of age. Because the data from these trials are on the rate and cost of gains rather than on the profit and loss per head it was important to know the ages of the animals.

DIVISION OF CATTLE

As has been explained, there were but 3 lots in the 1920-21 trial (See Appendix) but in the latter 3 trials, designated Trials 1, 2, and 3, with which the major part of this bulletin is concerned, there were 4 lots, as follows:

Lot 1—3-year-old steers
Lot 2—2-year-old steers
Lot 3—Yearling steers
Lot 4—Steer calves

There were 10 steers in each lot. The various lots were selected for uniformity at the source of origin. Hence, the dividing at the Experiment Station was quite simple.

RATIONS FED

A shelled corn and alfalfa hay ration was used in the three trials because this is the ration used for fattening all classes of cattle by most cattle feeders in Nebraska. While certain supplements might have produced greater gains, it was thought best to conduct this series of trials with as simple and practical a ration as possible so that the results would be interpretable in a general way by feeders. Other rations have been tried and are at the present time being used experimentally at this Station to check on this simple ration for beef production, and future bulletins will give the results of these trials.

FIG. 2.—Trial 1, Lot 2, 1921-22

FIG. 3.—Trial 1, Lot 3, 1921-22

FEEDS USED

Practically all of the corn used in these trials was purchased locally. Most of it was No. 2 yellow. In two trials a little white was fed and on several occasions it was necessary to use No. 3. The figures presented represent a practically 14 per cent moisture basis corn.

The alfalfa was good first-cutting or fair second-cutting hay. It would have graded as standard on the market. Color was not considered. A leafy, not too stemmy hay was selected. Most of the hay came from the proximity of Kearney and Lexington, in the Platte valley.

Moisture determinations of the corn were made each week and complete analyses were made at irregular intervals. Since there were no mixed feeds used and the corn and alfalfa were kept as nearly uniform as possible, it did not seem necessary to make as many complete analyses as would normally be desirable if the aim of the experiment were a comparison of rations rather than a comparison of animals.

FEED PRICES

It was thought advisable to use the same prices in all the trials; thus the trials become more nearly comparable. It should be remembered that the quantity of feed required to produce 100 pounds of gain remains the same even tho prices fluctuate. Should a person desire to change the tables to fit prices prevailing at any future time, he can recalculate by

multiplying the amount of feed required to produce 100 pounds of gain by existing prices.

The feed prices used in the trials were:

Shelled corn.....$00.70 per bushel
Alfalfa hay..... 15.00 per ton

or, in terms of cost per pound:

Shelled corn..... 1¼ cents per pound
Alfalfa hay..... ¾ cent per pound

FEED-LOT EQUIPMENT

The plant used until the fall of 1922 consisted of an open shed facing south, with shed space approximately 20 feet square and a lot 20 by 100 feet for each group. A concrete floor covered the area under the shed and a strip immediately adjacent. The equipment used in Trials 2 and 3 was very similar, but opened to the east. The north fence was a tight windbreak. The hay was fed in the sheds in all cases and the grain in bunks in the open. Water and block salt were available at all times.

METHOD OF FEEDING AND HANDLING

DURATION OF TESTS

All of the trials reported herein were of 200 days duration. Each year the cattle were purchased on the range during the summer and were received at the College about October 15. The trials started between October 26 and November 1 and

FIG. 4.—Trial 1, Lot 4, 1921-22

closed between May 14 and 19; consequently they were carried thru like seasons each year, and at the same time thru a season which would be typical of the feeding period used on the majority of farms.

FEEDING

Grain was fed regularly at 7 a. m. and 4:30 p. m. Hay was fed shortly thereafter. The plan was to get all lots on a full feed of corn gradually and to diminish the amount of alfalfa as the corn was increased. As indicated previously, the rations fed were the same in all groups. Corn was fed rather liberally after the cattle became used to it. In other words, the steers were encouraged to consume practically a full feed as soon as they would handle it. The aim was to feed a quantity which would be cleaned up within an hour to an hour and a half after placing in the bunks. At the outset, it seemed best to permit the cattle to have approximately all of the hay they would take. There was virtually no weigh-back of hay at any time.

WEIGHING, APPRAISING, AND MARKETING

Individual weights were taken upon three consecutive days at the opening and at the close of each trial. Group weights were taken every 25-day period, with individual weights at 50- and 100-day periods. Starting with the seventy-fifth day, experts from the Omaha market appraised the various groups upon each weigh-day. The cattle were weighed at 8 o'clock in the morning and in no instance were they held from water or in any way prepared for weighing. After the official termination of the trial, oats and prairie hay were fed 36 hours in order to condition the cattle for shipment.

The tables show periodic gains made by each group and, likewise, the time at which each could have been marketed with the best financial result. Fluctuations in profit or loss are governed quite largely by variations in markets and too much importance should not be placed upon these figures, altho they tend to show quite consistently that following a short feed the older cattle could have been marketed to better advantage than the younger ones. This was due to variations in the degree of finish in the several lots at such times.

EXPERIMENTAL DATA

For the purpose of brevity, complete reports of each project have been omitted from this bulletin. Upon the pages which follow will be found a series of tables which contain considerable data pertaining to each trial. The data in Table 1 were procured by taking a weighted average of the three experiments.

TABLE 1.—*Three-year average—1921-1924*

	Lot 1 3-yr.-olds 10 steers	Lot 2 2-yr.-olds 10 steers	Lot 3 Yearlings 10 steers	Lot 4 Calves 10 steers
Initial weight per steer (Lincoln) *(pounds)*	1138	872	659	399
Final weight per steer (Lincoln) *(pounds)*	1655	1319	1102	849
Gain per steer *(pounds)*	517	447	443	450
Daily gain per steer *(pounds)*	2.59	2.24	2.21	2.25
Selling weight per steer (Omaha) *(pounds)*	1599	1274	1079	832
Daily ration per steer:				
Shelled corn *(pounds)*	21.57	17.77	15.46	11.85
Alfalfa hay *(pounds)*	9.08	7.00	5.88	4.17
Shrink in shipment to market *(pounds)*	56	45	23	17
Shrink in transit *(per cent)*	3.42	3.40	2.78	2.37
Carcass weight (shrunk 2.2 per cent) *(pounds)*	986	792	649	489
Dressing percentage cold, basis selling weight *(p.ct.)*	61.67	62.20	60.10	58.76
Dressing percentage cold, basis final weight out of experiment *(per cent)*	59.60	60.05	58.93	57.59
Feed required per 100 pounds gain:				
Shelled corn *(pounds)*	835	798	702	529
Alfalfa hay *(pounds)*	350	314	266	186
Feed cost of 100 pounds gain *(dollars)*	13.08	12.33	10.76	8.01
HOGS FOLLOWING				
Pork produced per steer *(pounds)*	90	70	59	44
Value at $7.00 per cwt. *(dollars)*	6.30	4.90	4.13	3.08
Extra feed cost per steer *(dollars)*	.57	.97	.80	.73
Pork profit per steer *(dollars)*	5.73	3.93	3.33	2.35

TABDE 1.—*(Concluded)—Three-year average—1921-1924*

	Lot 1 3-yr.-olds 10 steers	Lot 2 2-yr.-olds 10 steers	Lot 3 Yearlings 10 steers	Lot 4 Calves 10 steers
FINANCIAL STATEMENT				
Initial cost per cwt. *(dollars)*	7.08	7.08	7.33	7.58
Initial cost per steer *(dollars)*	80.57	61.74	48.30	30.24
Feed cost per steer *(dollars)*	67.62	55.12	47.67	36.05
Feed cost per steer from close of experiment to date shipped *(dollars)*	1.28	1.07	.99	.80
Interest on feed for 100 days * *(dollars)*	1.49	1.21	1.05	.78
Interest on investment at 8 per cent *(dollars)*	3.52	2.70	2.12	1.33
Cost of marketing *(dollars)*	3.25	2.71	2.36	1.89
Total cost per steer *(dollars)*	157.73	124.55	102.49	71.09
Value per cwt. at market *(dollars)*	9.62	9.63	9.55	9.33
Returns per steer, including pork profit *(dollars)*	159.55	126.62	106.37	79.88
Profit per steer *(dollars)*	1.82	2.07	3.88	8.89
Profit per $100 investment in cattle *(dollars)*	2.26	3.35	8.03	29.40

Feed prices: corn at 70 cents per bushel, alfalfa hay at $15.00 per ton.

* Interest is figured for 100 instead of 200 days because approximately one-half of the feed is consumed at the end of 100 days.

INITIAL WEIGHT

TABLE 2.—*Initial weight; average per steer*

	3-yr.-olds	2-yr.-olds	Yearlings	Calves
	Pounds	*Pounds*	*Pounds*	*Pounds*
Trial 1	1215	854	635	399
Trial 2	1107	916	686	390
Trial 3	1091	845	657	407
3-year average	1138	872	659	399

As previously stated, the cattle used in these trials were representative in size of the several ages and as noted by Table 2 there was comparatively little variation each year in initial weights. The average initial weight of the 3-year-olds was 1138 pounds, the 2-year-olds 872 pounds, the yearlings 659 pounds, and the calves 399 pounds. This gives a spread of 216 to 266 pounds between groups. In other words, one year's growth under range conditions resulted in the average increase as represented by the spread between the weights of these various groups.

DAILY RATION

TABLE 3.—*Daily ration; average per steer*

	3-yr.-olds		2-yr.-olds		Yearlings		Calves	
	Shelled corn	Alfalfa hay	Shelled corn	Alfalfa hay	Shelled corn	Alfalfa hay	Shelled corn	Alfalfa hay
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Trial 1	20.33	10.32	16.21	7.46	13.64	5.41	11.12	3.89
Trial 2	22.23	9.14	19.58	7.86	17.26	6.85	12.79	4.63
Trial 3	22.16	7.77	17.52	5.68	15.47	5.37	11.65	4.00
Average	21.57	9.08	17.77	7.00	15.46	5.88	11.65	4.17

There was comparatively little fluctuation each year in the daily ration of the various groups. All lots were allowed practically all of the corn and alfalfa hay which they would consume after becoming used to the former. As will be brought out in the tables which follow, the older steers consumed a heavy corn ration early in the trials and showed a relatively small increase thereafter, while the younger cattle showed a continuous increase thruout the trials. The 3-year-old steers consumed an average of 21.57 pounds of corn per day, the 2-year-olds 17.77 pounds, the yearlings 15.46 pounds, and the calves 11.85 pounds. The 2-year-olds consumed 82 per cent as much corn daily as the 3-year-olds, the yearlings 72 per cent, and the calves 55 per cent. The decrease in alfalfa consumption was in about the same proportion.

Taking the initial weights plus one-half the gain as an average weight per steer thruout the trial, we find that the 3-year-olds consumed corn and alfalfa at the rate of 21.9 pounds per 1000 pounds average live weight, the 2-year-olds 22.6 pounds, the yearlings 25.2 pounds, and the calves 24.7 pounds. Thus the 2 groups of younger cattle consumed more feed in proportion to the average body weight than the 2 older groups.

There was no big difference between lots in the ratio of corn to alfalfa consumed. The 3-year-olds ate 41.9 pounds of

alfalfa to each 100 pounds of corn, the 2-year-olds 39.3 pounds, the yearlings 39.3 pounds, and the calves 35.1 pounds. Inasmuch as both feeds were fed to suit the tastes of the steers, one would expect a greater spread between the extremes.

DAILY RATIONS PER STEER

TABLE 4.—*Daily rations per steer—by 100-day periods*

	3-yr.-olds	2-yr.-olds	Yearlings	Calves
First 100 days:	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Shelled corn	19.3	15.7	13.3	9.5
Alfalfa hay	11.7	9.0	7.6	4.9
Second 100 days:				
Shelled corn	24.0	19.7	17.7	14.2
Alfalfa hay	6.0	5.0	4.3	3.5

Table 4 indicates that as the experiment progressed there was a relatively greater increase in corn consumption in the younger groups than in the older. For instance, the 3-year-olds consumed 19.3 pounds of corn daily during the first 100 days and 24 pounds during the second, thus an increase of 4.7 pounds. The 2-year-olds increased 4 pounds, the yearlings 4.4 pounds, and the calves 4.7 pounds. In Lot 1 the increased corn consumption during the second period amounted to 24.3 per cent. In Lot 2 the increase was 25.5 per cent, and in Lot 3 it was 32.3 per cent. Lot 4, the calves, increased 49.4 per cent, hence quite a noticeable variation when expressed on a percentage basis. The decrease in hay consumption was much more noticeable in the lots of older cattle than in the younger groups. In the case of the 3-year-olds, the daily hay consumption was practically cut in two, being reduced from 11.7 to 6 pounds, whereas in the case of the calves it was reduced from 4.9 to 3.5 pounds—a reduction of only 1.4 pounds.

The above table is doubly important because of its relationship to the gains made during these periods as will be brought out later.

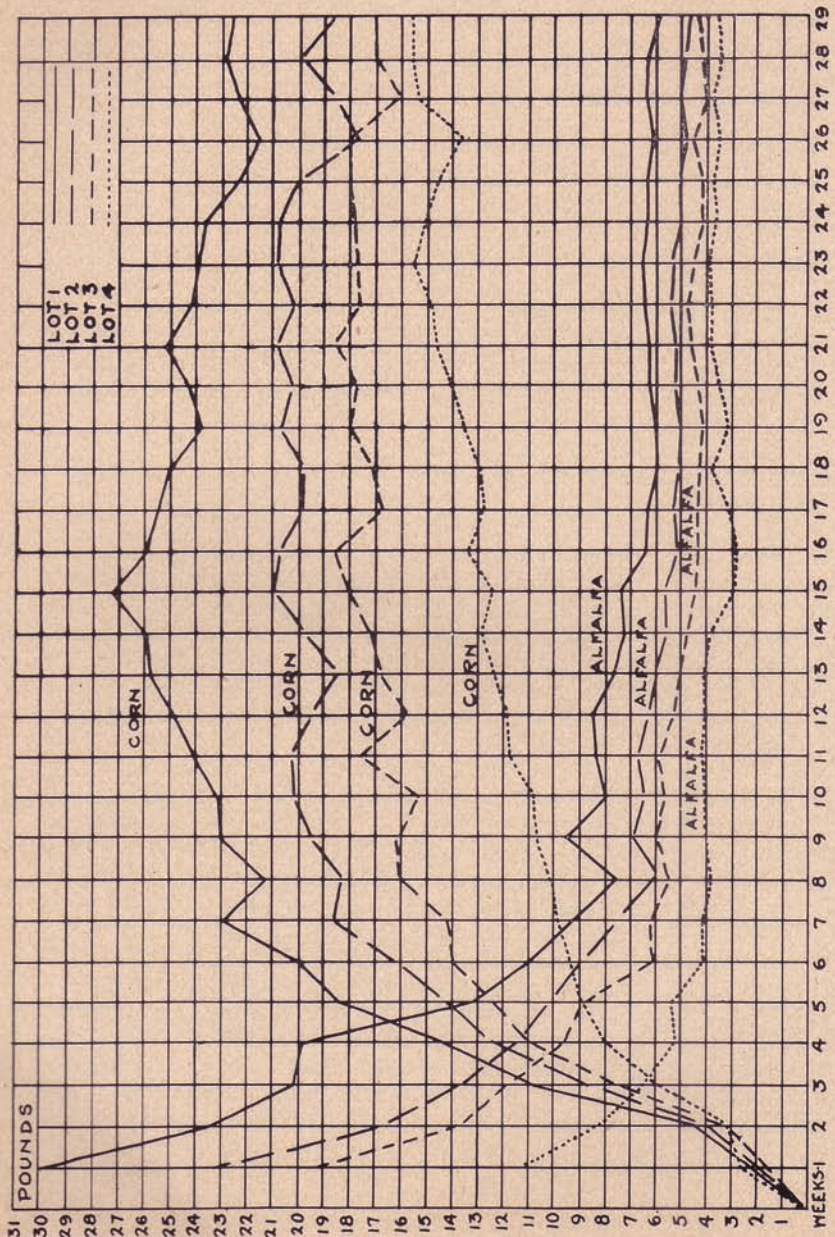

CHART I.—Daily rations per steer by weeks; 3-year average

Carrying the study of feed records one stage further and noting daily feed consumption by weekly periods, Chart I shows graphically the variation in daily rations of each group. All lots made a fairly rapid increase in corn consumption up to the close of the seventh week. At this time the 3-year-olds were consuming 23 pounds daily, the 2-year-olds 18.5 pounds, the yearlings 14 pounds, and the calves 9.75 pounds. Following this date, there was a slight drop in Lots 1 and 2, then a material increase to the fifteenth week, at which time the maximum corn consumption occurred in both Lots 1 and 2, and practically the maximum in Lot 3. At this time the 3-year-olds were consuming 27.25 pounds of corn daily, the 2-year-olds 21 pounds, the yearlings 18 pounds, and the calves 12.5 pounds. The calves, following this date, showed a rather gradual increase to the close, at which time they were consuming 15.5 pounds of corn. Thus they show an increase of 5 pounds in daily consumption from the end of the first 100 days to the end of the second. The 3-year-old steers that were consuming 27.25 pounds of corn per day at the end of the first 100 days showed a daily consumption of less than 23 pounds at the close, hence a decrease of 4.25 pounds. It is of interest to note the correlation existent between corn consumption and daily gains in the various lots.

The alfalfa consumption curves are much more consistent in their relationship to each other. During the second 100 days they are practically horizontal. Lot 1 consumed 30 pounds per day at the first and this decreased quite rapidly as the corn increased. The hay and the corn consumption in this lot were of equal amount, namely 16.5 pounds, during the fifth week. The hay consumption in Lot 2 started at 23 pounds and rapidly dropped to 6 at the end of the first 50 days. The corn and the alfalfa consumption in this group were of equal quantity, namely 11.75 pounds, during the fourth week. In the case of Lot 3, the hay consumption opened at 19 pounds and dropped to 6 at the end of the sixth week. The corn and the alfalfa consumption here were equal during the fourth week and crossed on the 10-pound line. In the case of Lot 4, the most hay consumed at the opening was 11 pounds daily. At the end of six weeks the calves were consuming 4 pounds and continued to do so thruout the remainder of the trial. At the beginning of the fourth week, the hay and corn consumption curves crossed at a shade over 6 pounds.

DAILY RATIONS PER 1000 POUNDS LIVE WEIGHT

TABLE 5.—*Daily rations per 1000 pounds live weight—by 50-day periods*

Lot	Age	Ration	First 50 days	Second 50 days	Third 50 days	Fourth 50 days
			Pounds	*Pounds*	*Pounds*	*Pounds*
1	3-yr.-olds	Corn	11.72	17.63	16.43	14.13
		Alfalfa	12.96	5.79	4.14	3.92
2	2-yr.-olds	Corn	12.12	17.63	15.81	14.44
		Alfalfa	12.32	5.61	3.85	3.53
3	Yearlings	Corn	13.81	19.70	18.62	15.24
		Alfalfa	13.63	6.27	4.59	3.41
4	Calves	Corn	16.11	20.99	20.16	18.88
		Alfalfa	12.99	7.06	4.90	4.60

With such a great difference in size between the cattle of the various groups, the daily rations are more significant when stated on a basis of 1000 pounds live weight rather than per animal. Table 5 shows the consumption of corn and alfalfa based on 1000 pounds live weight during each of the four 50-day periods. The average weights were secured by taking the weight at the beginning of each period and adding one-half of the gain made during the 50 days following. This should be a fair average weight for the period. It will be noted that during every period the corn consumed per 1000 pounds live weight varied inversely with the age of the cattle. In other words, the older the cattle the less corn they consumed per 1000 pounds of weight. For instance, during the first period the 3-year-old steers consumed 11.72 pounds of corn per 1000 pounds live weight, while the 2-year-olds consumed 12.12 pounds, the yearlings 13.81 pounds and the calves 16.11 pounds. During the next two periods all groups showed a material increase in grain consumption; however, the calves, during both the second and the third periods, showed a consumption of better than 20 pounds. In the fourth period there was a recession in all lots. The hay consumption was found to vary but little between the lots, altho it was materially greater the first period than the third and fourth, with the fourth slightly lower than the third. This, of course, would be expected with the marked reduction in hay consumption which occurred thruout the early part of the trial and with the fairly constant ration from then on.

CORN CONSUMPTION PER 1000 POUNDS LIVE WEIGHT

TABLE 6.—*Corn consumption per 1000 pounds live weight —by 50-day periods*

Basis 100 per cent to Lot 1

Lot	Age	First 50 days	Second 50 days	Third 50 days	Fourth 50 days	Average
		Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*
1	3-yr.-olds	100	100	100	100	100
2	2-yr.-olds	107.3	104.1	105.3	107.7	106.1
3	Yearlings ..	117.8	111.7	113.4	130.5	118.3
4	Calves	140	118.3	122	133.6	128

Table 6 shows clearly that for each 1,000 pounds of weight the younger the cattle the greater the feed consumption. This held true in each of the 50-day periods. The average for the 200 days indicates that the calves consumed 28 per cent more per 1000 pounds live weight than the 3-year-olds, the yearlings 18.3 per cent, and the 2-year-olds 6.1 per cent.

TOTAL GAINS PER STEER

TABLE 7.—*Total gains per steer; 200-day period*

	3-yr.-olds	2-yr.-olds	Yearlings	Calves
	Pounds	*Pounds*	*Pounds*	*Pounds*
Trial 1.....	522	406	403	434
Trial 2.....	540	516	514	513
Trial 3.....	489	419	410	404
Average.....	517	447	443	450

By referring to Table 7 to note the average gains made by the various groups, one sees that the greatest gain (517 pounds) was made by the 3-year-olds. There was not a great deal of variation between years in this lot, the maximum being made in Trial 2 when the gain was 540 pounds and the minimum in Trial 3 when the gain was 489 pounds. In Lot 2, the average gain was 447 pounds or 70 pounds less than in Lot 1. Here we find considerably more variation between years, the first and third trials being just a shade over 400, with Trial 2 above 500. In Lots 3 and 4, somewhat the same condition existed, namely, a relatively higher gain in Trial 2 than in either of the other trials. The average in Lot 3 was

443 pounds and 450 pounds in Lot 4. Thus, the calves ranked second in gain, altho not materially higher than either Lot 2 or 3. The heavy gains made in Trial 2 were partly due to the cattle being quite thin at the outset.

The gains as given in Table 7 are on a basis of home weights both at the opening and at the close of the trial. If one were to take the market weights as the closing ones of the trials, the spread between lots would be materially altered inasmuch as the younger cattle did not shrink as many pounds per head in shipment as did the older ones. As will be noted in Table 1, upon which all of the figures regarding the experiment appear, the shrink per head by lots was 56, 45, 23, and 17 pounds. Deducting the shrink from the total gain as given above, we would have 461 pounds net on the 3-year-olds, 402 on the 2-year-olds, 420 on the yearlings, and 433 on the calves. Thus the gain made by the calves would show up more favorably with those made by the larger cattle.

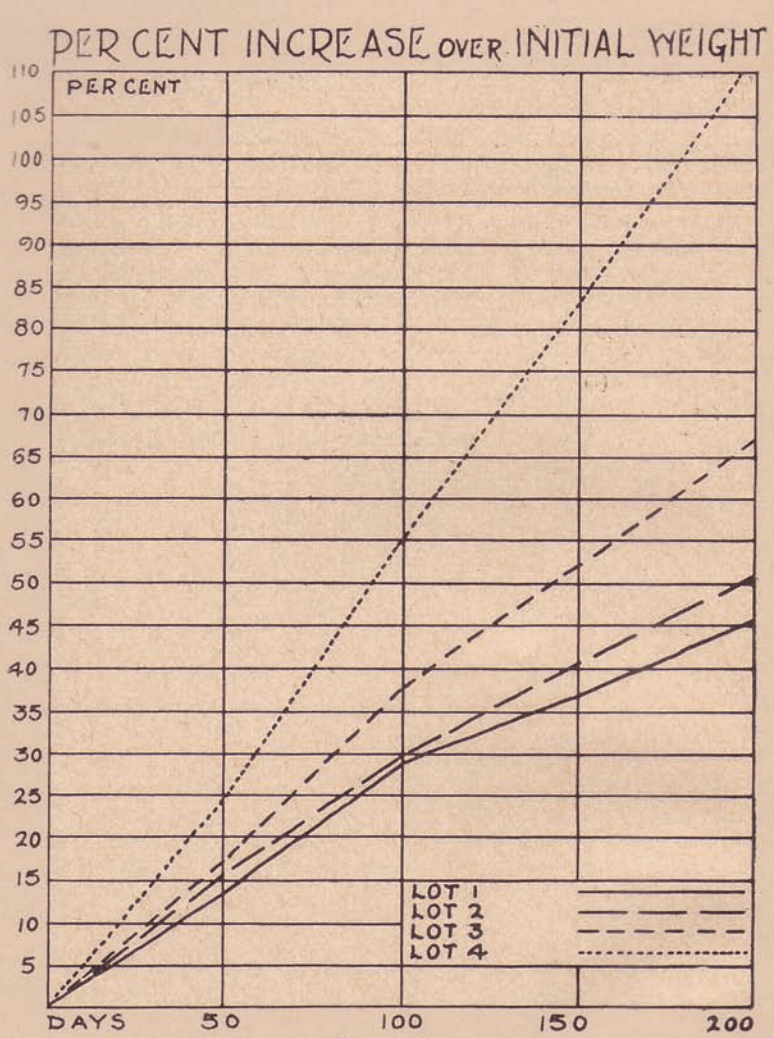

CHART II

PERCENTAGE OF INCREASE OVER INITIAL WEIGHT

While the total gain per head in the various lots was relatively uniform, the percentage of increase over initial weight shows a tremendous variation. The chart giving these data is presented herewith. The calves had doubled in weight at the end of 175 days while at the close they were 111 per cent above initial weight. At this time the yearlings had increased 67 per cent, the 2-year-olds 45 per cent, and the 3-year-olds

40 per cent. Obviously the percentage increase in body weight decreased with the age of the cattle.

TOTAL GAINS PER STEER

TABLE 8.—*Total gain per steer—by 100-day periods*

	3-yr.-olds		2-yr.-olds		Yearlings		Calves	
	1st period	2nd period	1st period	2nd period	1st period	2nd period	1st period	2nd period
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Trial 1	311	211	244	162	215	188	211	223
Trial 2	344	196	290	226	294	220	250	263
Trial 3	331	158	263	184	249	194	220	230
Average	329	188	263	184	249	194	220	230
Gain second 100 days in terms of gain first 100 days (*p.ct.*)	57		70		78		105	

The data in Table 8 disclose some interesting things regarding gains by 100-day periods. The total gain over the full 200-day period did not vary materially between lots. There was, however, a material difference between lots as regards the gains made during the first and second 100-day periods. Without exception, the 3-year-olds gained much more rapidly during the first 100 days than during the second. They averaged 329 pounds in this period and there was but little variation between trials. On the other hand, in the second 100 days they show an average of only 188 pounds of gain and in one trial drop as low as 158 pounds. On an average they gained only 57 per cent as much the second period as during the first. The 2-year-olds gained an average of 263 pounds during the first 100 days and 184 pounds during the second, hence 70 per cent as much. The variation between trials is a little more marked than in the case of the 3-year-olds, altho in no instance did the 2-year-olds gain as much as 300 pounds during the first 100 days. The yearlings gained 249 pounds during the first period and 194 during the second, or 78 per cent as much. In the case of the calves the average gain during the first 100 days was 220 pounds and during the second 230 pounds, or 105 per cent as much. This shows very clearly that the 3-year-olds ceased gaining rapidly at the close of 100 days and that the reduction became less noticeable in the case of the 2-year-olds and yearlings, whereas the calves actually gained more during the second 100 days than during the first.

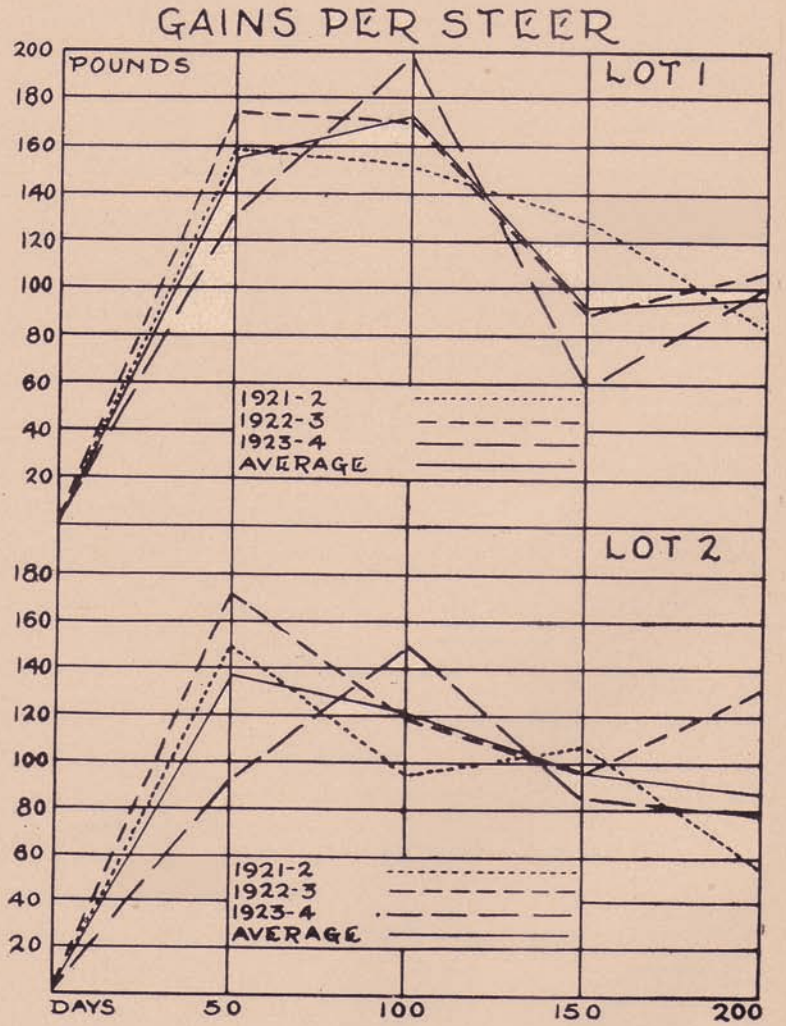
GAINS PER STEER
POUNDS
LOT 1
200
180
160
140
120
100
80
60
40
20
1921-2
1922-3
1923-4
AVERAGE
LOT 2
180
160
140
120
100
80
60
40
20
1921-2
1922-3
1923-4
AVERAGE
DAYS
50
100
150
200

CHART III

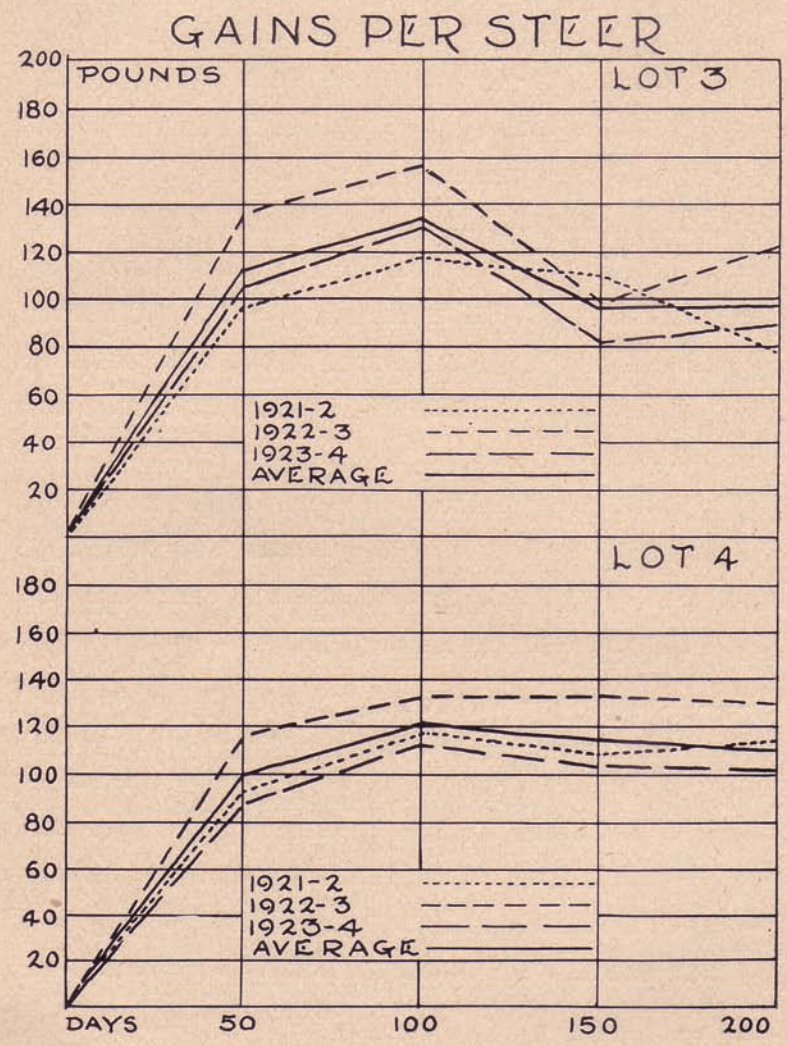
GAINS PER STEER
POUNDS
LOT 3
200
180
160
140
120
100
80
60
40
20
1921-2
1922-3
1923-4
AVERAGE
LOT 4
180
160
140
120
100
80
60
40
20
1921-2
1922-3
1923-4
AVERAGE
DAYS
50
100
150
200

CHART IV

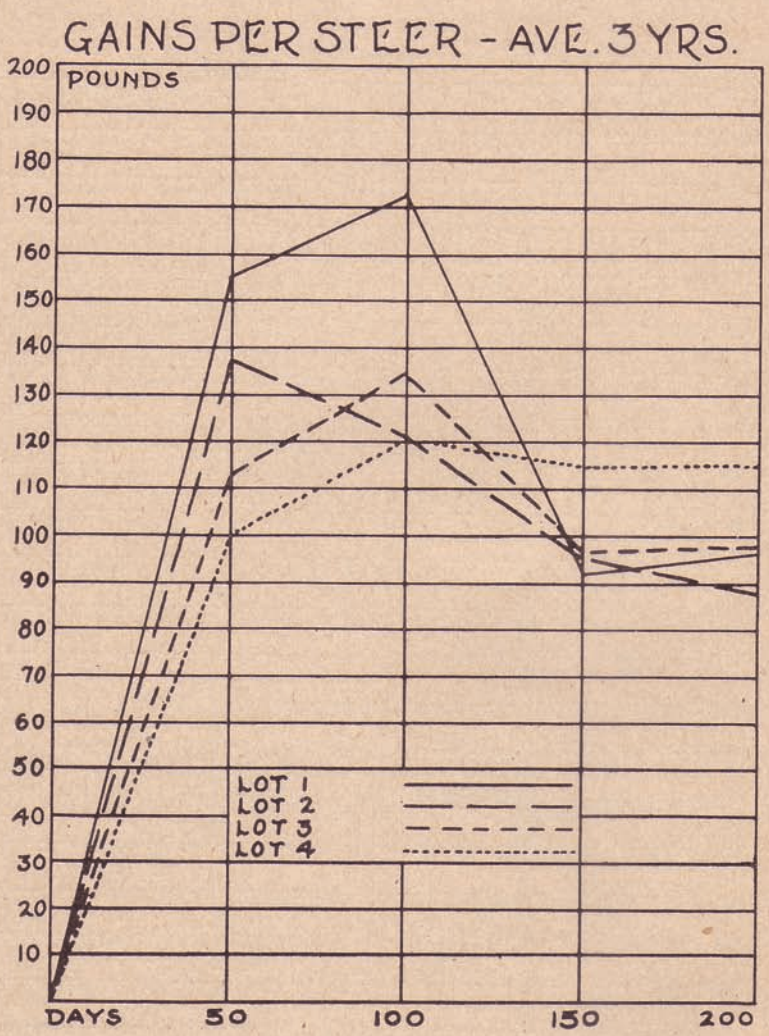
GAINS PER STEER - AVE. 3 YRS.
POUNDS
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
DAYS
50
100
150
200
LOT 1
LOT 2
LOT 3
LOT 4

CHART V

GAINS PER STEER ON A BASIS OF 50-DAY PERIODS

The curves which the rate of gain in the various lots made during each of the three trials and the average are brought out nicely in Charts III, IV, and V. These are based on 50-day periods. It will be noted that curves representing Lots 1, 2, and 3 are quite broken and do not carry the consistency which those followed by Lot 4 do. Lot 3 shows more marked consistency than either Lot 1 or Lot 2 and each year runs true to form.

TABLE 9.—*Daily gains per steer—by 50-day periods*

Lot	Age	1st 50 days	2nd 50 days	3rd 50 days	4th 50 days
		Pounds	*Pounds*	*Pounds*	*Pounds*
1	3-yr.-olds	3.12	3.46	1.84	1.92
2	2-yr.-olds	2.78	2.50	1.92	1.76
3	Yearlings	2.26	2.70	1.92	1.96
4	Calves	1.98	2.50	2.30	2.32

TABLE 10.—*Daily gains per 1000 pounds live weight—by 50-day periods*

Lot	Age	1st 50 days	2nd 50 days	3rd 50 days	4th 50 days	200 days
		Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*
1	3-yr.-olds	2.56	2.51	1.21	1.20	1.86
2	2-yr.-olds	2.94	2.31	1.63	1.38	2.04
3	Yearlings	3.03	3.22	2.02	1.84	2.51
4	Calves	4.30	4.35	3.42	2.92	3.61

Referring again to the unit of 1000 pounds live weight rather than the individual steer, we find that the calves made relatively much greater gain in all periods than did the older steers. In fact, at the opening of the trial when the 3-year-old steers were making what appeared to be an abnormally large gain, the calves were actually gaining more on a basis of 1000 pounds live weight. Table 10 is self-explanatory and the last figure giving the gain per 1000 pounds live weight on a basis of the full 200-day period is doubly interesting. For each 1000 pounds weight in the 3-year-olds we have a gain of less than 2 pounds, slightly over 2 pounds in the 2-year-olds, 2½ pounds in the yearlings, and over 3½ pounds in the calves.

GAINS PER STEER BY 25-DAY PERIODS

TABLE 11.—*Gains per steer—by 25-day periods*

Lot	Age	1st	2nd	3rd	4th	5th	6th	7th	8th	200 days
		Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
1	3-yr.-olds ..	80	76	87	86	44	48	38	58	517
2	2-yr.-olds ..	65	74	67	58	40	56	37	51	447
3	Yearlings	53	60	71	64	43	53	43	55	443
4	Calves	45	54	63	62	52	63	47	69	450

The cattle were weighed at intervals of 25 days thruout all trials. Table 11 represents the gains made by each group during the eight periods. These figures, in a general way, follow the same trend as those brought out in Table 8. For instance, Lot 1 gained from 76 to 87 pounds during each 25-day period in the first 100-day series; then, during the second 100 days, the gains varied from 38 to 58 pounds. In this lot the break seemed to occur at the close of the first 100 days. In the case of the 2-year-olds, the gains varied from 58 to 74 pounds in the first four periods and from 37 to 56 pounds during the second 100 days. In the case of Lot 3, the gains varied from 53 to 71 pounds in the first 100 days and from 43 to 55 pounds in the second period. The gains by periods were found to be much more consistent and to show less variation in the case of the calves. The minimum gain made by them in the first 100 days was 45 pounds and the maximum 63 pounds, while in the second period the minimum was 47 pounds and the maximum 69 pounds. There was a slight drop in the seventh period, the gain being somewhat below the period average, while the eighth period gain was above the average.

FEED REQUIRED TO PRODUCE 100 POUNDS GAIN

TABLE 12.—*Feed required to produce 100 pounds gain*

	3-yr.-olds		2-yr.-olds		Yearlings		Calves	
	Shelled corn	Alfalfa hay	Shelled corn	Alfalfa hay	Shelled corn	Alfalfa hay	Shelled corn	Alfalfa hay
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Trial 1	778	395	798	367	678	269	512	179
Trial 2	823	338	759	304	672	266	498	180
Trial 3	904	317	836	271	755	262	577	198
Average.....	835	350	798	314	702	266	529	186

As would be expected, with so little difference in daily gain between lots and so great a difference in total feed consump-

tion, the quantity of feed necessary to produce 100 pounds of gain was materially greater for the 3-year-olds than in any of the other lots. The 2-year-olds ranked next to the threes in this respect, while the yearlings were quite a little more efficient and the calves much more so than the older groups. The actual difference between the twos and the threes was not so great and the yearlings ranked about halfway between the calves and the two older groups in economy of production. While the 3-year-olds required 836 pounds of corn to produce 100 pounds of gain, the calves used only 529 pounds.

In terms of percentage, the quantity of beef produced by 100 pounds of feed in the 3-year-olds was produced by 94.2 pounds of feed in the 2-year-olds, 82.2 pounds in the yearlings, and 61.2 pounds in the calves. This gives the younger animals a big lead in economy of production.

A different way of stating the above and bringing out the contrast in requirements of feed to produce gain would be to give the amount of gain produced by one bushel of corn in the various lots. Table 13 illustrates this for each of the three trials and gives the average of the same.

GAIN PRODUCED PER BUSHEL CORN FED TO CATTLE

TABLE 13.—*Gain produced per bushel corn fed to cattle*

	3-yr.-olds	2-yr.-olds	Yearlings	Calves
	Pounds	*Pounds*	*Pounds*	*Pounds*
Trial 1	7.1	7.0	8.3	10.9
Trial 2	6.7	7.3	8.3	11.2
Trial 3	6.2	6.4	7.5	9.6
Average	6.7	6.9	8.0	10.6

It will be noted that each trial adheres rather consistently to the average; consequently these results should be indicative of what would occur under average feed-lot conditions. Referring to the average, we find that from one bushel of corn 6.7 pounds of gain were produced by the 3-year-olds, 6.9 pounds by the 2-year-olds, 8 pounds by the yearlings, and 10.6 pounds by the calves. It should be borne in mind that alfalfa is not taken into account in the above compilations. With each bushel of corn the 3-year-olds consumed 23.3 pounds of alfalfa hay, the 2-year-olds 22 pounds, the yearlings 22 pounds, and the calves 19.6 pounds. In a general way, we might say that in each lot approximately 2½ pounds of corn

were consumed to one pound of alfalfa. In connection with Table 13 one should give cognizance to the fact that corn was not entirely responsible for the gains as indicated, altho the ratio is found to be fairly consistent between lots when the alfalfa is taken into account.

FEED REQUIRED PER 100 POUNDS GAIN

TABLE 14.—*Feed required per 100 pounds gain—by 100-day periods*

	3-yr.-olds	2-yr.-olds	Yearlings	Calves
	Pounds	*Pounds*	*Pounds*	*Pounds*
First 100 days:				
Shelled corn	586	597	534	431
Alfalfa hay	363	346	304	221
Second 100 days:				
Shelled corn	1282	1085	916	623
Alfalfa hay	320	272	219	148

There was a tremendous reduction in rate of gain during the second period in Lots 1 and 2, and to some extent in Lot 3. This, together with the fact that the corn consumption increased materially during this period, increased the feed requirement to produce 100 pounds of gain. Table 14 depicts the change which occurred in a graphic manner. In the 3-year-olds the amount was more than doubled, in the 2-year-olds it was not quite doubled, in the yearlings it was 1¾ times as great, and in the calves 1½. Hence, all four groups of cattle proved to be less efficient in the utilization of feed during the second 100 days than during the first.

While the 3-year-olds made 100 pounds of gain during the first 100 days on 586 pounds of corn and 363 pounds of alfalfa, they required 1,282 pounds of corn and 320 pounds of alfalfa during the second period. During the first 100 days these cattle made 9½ pounds of gain from one bushel of corn plus 34½ pounds of alfalfa, and during the second period they made 4⅓ pounds of gain from one bushel of corn plus 14 pounds of alfalfa. In each of the three trials the ratio was practically as it appears in the average.

The calves required 1½ times as much feed to produce 100 pounds of gain during the second 100 days as during the first; nevertheless they made gains on but little more corn and considerably less alfalfa during the second period than did either the 2- or the 3-year-olds during the first 100 days. This has material significance in that it indicates very clearly the much greater efficiency of calves in the utilization of feed.

COST OF 100 POUNDS GAIN

TABLE 15.—*Cost of 100 pounds gain—by 100-day periods*

	3-yr.-olds	2-yr.-olds	Yearlings	Calves
	Dollars	*Dollars*	*Dollars*	*Dollars*
First 100 days	10.05	10.05	8.94	7.04
Second 100 days	18.76	15.60	13.10	8.90
Full 200 days	13.08	12.33	10.76	8.01

Feed prices: corn at 70 cents per bushel, alfalfa hay at $15.00 per ton.

The data in Table 15 match those in Table 14, the only difference being that quantities have been changed to dollars and cents. This table illustrates in a most forceful manner the big economic advantage which younger cattle possess, not only in the early part of the fattening process but likewise in the latter part. During the first 100 days the two older groups of cattle put on 100 pounds of gain for $10.05, the yearlings for $8.94, and the calves for $7.04. During the second 100 days the cost greatly increased in Lots 1, 2, and 3 but was only nominally higher in Lot 4.

For the entire trial 100 pounds of gain on the calves cost 61.2 per cent as much as on the 3-year-olds. On the yearlings the gain cost 82.2 per cent as much as on the 3-year-olds, while on the 2-year-olds it cost 94.2 per cent as much.

Inasmuch as feed prices fluctuate very spasmodically, the cost of gains as brought out in this bulletin should not be given too much significance, but rather one should attach weight to the quantity of feed necessary to produce 100 pounds of gain and be prepared to calculate this at existing feed prices at any time. Granting that the corn and alfalfa used were of average quality, one could expect approximately the same feed requirements for gains as were experienced in these trials. This would apply whether feed prices be but one-half those used in this bulletin or much higher.

HOGS FOLLOWING

Cholera-immune shotes weighing at the outset approximately 100 pounds were used in all trials. The number in each lot was increased as the corn consumption of the steers increased so that during the greater part of the trial there were 8 hogs in Lot 1, 7 in Lot 2, 5 in Lot 3, and 3 in Lot 4. During the first 100 days, the two groups of younger cattle would not carry the number of hogs indicated. Four with the yearlings and 2 with the calves proved sufficient. The practice of removing hogs when fat and replacing them with shotes

weighing approximately 100 pounds was followed thruout the entire series of trials. In a trial lasting 200 days, hogs would finish before the expiration of the period; hence the fairness of the system used is evident.

The original plan which was to be followed called for no extra feed to be given to the hogs. However, there were times at the outset and following the addition of hogs to the various lots when it was necessary to feed some shelled corn to supply sufficient food. It will be noted in Table 17 that over the 3-year period there was a quantity of corn varying from 46 to 78 pounds per head of cattle fed directly to the hogs. Aside from this, the hogs received no supplemental feed of any kind.

TABLE 16.—*Pork production*

	3-yr.-olds	2-yr.-olds	Yearlings	Calves
Pork produced per steer *(lbs.)*	90	70	59	44
Value at $7 per cwt. *(dollars)*	6.30	4.90	4.13	3.08
Extra feed cost per steer *(dollars)*	.57	.97	.80	.73
Pork profit per steer *(dollars)*	5.73	3.93	3.33	2.35

As brought out in the above table, the pork produced per steer varied in direct proportion to the age of the cattle. The oldest cattle produced the most pork and the youngest the least. An average price of hogs during the 3-year period was $7.00 per hundredweight. Crediting the pork produced at this value, there was a credit of $6.30 per steer in Lot 1, $4.90 in Lot 2, $4.13 in Lot 3, and $3.08 in Lot 4. Making deduction for the corn which was fed directly to the hogs, the pork profits were reduced in all lots from 57 cents to 97 cents. This leaves a profit slightly less than $6.00 in Lot 1 and ranging from that down to $2.35 in Lot 4.

Table 16 is not in itself complete, and supplementary figures are given in Table 17 to show the ratio existent between corn fed to the cattle and quantity of pork produced.

TABLE 17.—*Calculated pork produced without extra corn for hogs*

	3-yr.-olds	2-yr.-olds	Yearlings	Calves
Corn fed per steer *(bushels)*..	77	63.4	55.2	42.3
Total pork produced *(pounds)*	90	70	59	44
Pork per bushel corn fed to steers *(pounds)*.....	1.17	1.10	1.07	1.04
Corn fed to hogs per head cattle *(pounds)*	46	78	64	58
Estimated pork produced directly by this * *(pounds)*..	8.2	13.9	11.4	10.4
Estimated net pork from cattle refuse *(pounds)*.....	81.8	56.1	47.6	33.6
Estimated net pork per bushel corn fed to cattle *(pounds)*..	1.06	.88	.86	.79

* Assuming that 5.6 pounds corn necessary to produce 1 pound pork.

Table 17 gives the bushels of corn fed per steer in the various lots, then the total pounds of pork produced, and in the third line the pounds of pork produced per bushel of corn fed to the cattle. In Lot 1 there were 1.17 pounds of pork produced per bushel of corn fed to the steers, 1.1 pounds in Lot 2, 1.07 pounds in Lot 3, and 1.04 pounds in Lot 4. In terms of bushels of corn fed to the cattle, comparatively little difference is found in pork produced. The older cattle show some advantage, altho not nearly so great an advantage as one would expect, considering the much more efficient utilization of the corn which the younger cattle apparently make in producing gains. The pigs in Lot 1 received 46 pounds of corn per head of cattle, 78 pounds in Lot 2, 64 pounds in Lot 3, and 58 pounds in Lot 4. Assuming that 5.6 pounds of corn would be utilized in producing a pound of pork, 8.2 pounds of pork were produced in Lot 1 from the extra feed, 13.9 pounds in Lot 2, 11.4 pounds in Lot 3, and 10.4 pounds in Lot 4. Converting this into quantity of pork produced per bushel of corn consumed, 1.06 pounds pere produced in Lot 1, .88 pound in Lot 2, .86 pound in Lot 3, and .79 pound in Lot 4. The ratio remains the same altho the amount is reduced somewhat from the figures given where total pork produced was divided into the number of bushels of corn fed per steer. In a general way, approximately one pound of pork was produced per bushel of corn fed to the cattle in all four groups.

INITIAL COST PER STEER

TABLE 18.—*Initial cost per steer*

	3-yr.-olds	2-yr.-olds	Yearlings	Calves
Initial cost per cwt. *(dollars)*	7.08	7.08	7.33	7.58
Initial weight *(pounds)*	1138	872	659	399
Initial cost per steer *(dollars)*	80.57	61.74	48.30	30.24
Ratio of cost per steer:	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Basis Lot 1—100	100	76	60	37
Basis Lot 4—100	266	204	160	100

The cattle used in these trials were purchased on the range and appraised by market men after arrival at the College. The value put upon the cattle in each trial amounted to actual cost; however, in one or two instances the figures between cost in the three trials was $7.08 in Lots 1 and 2, $7.33 in Lot 3, and $7.58 in Lot 4. It might be of interest to state that in the first and third trials the initial cost of the 2- and 3-year-olds was $6.75, the yearlings $7.00, and the calves $7.25, while in the second trial all lots cost $1.00 per hundred more. During the 3-year period, 2- and 3-year-old feeder steers sold on the markets at about the same price, yearlings slightly higher, and calves somewhat higher than the yearlings. In these trials the actual difference was 25 cents when comparing them with the calves. The spread between groups was somewhat lower than usual. In times past there frequently has been as great a spread as $1.00 between 2-year-old and yearling feeder steers and a like amount between yearlings and calves. Had the spread been as great as that in this trial, the margins would not show quite so favorably for the younger cattle. Considering that the calves weighed about 400 pounds at the outset, the spread did not affect the total cost per head as much as it did the older cattle where the weight per head was much greater. Thus, a slight premium paid per 100 pounds for calves can be absorbed without being very noticeable because of the comparatively small weight per animal at the outset.

The total cost per head amounted to $80.57 in Lot 1, $61.74 in Lot 2, $48.30 in Lot 3, and $30.24 in Lot 4. The initial cost per head is in direct proportion to the age of the cattle. Using cost per head as a basis, with the 3-year-olds costing 100 per cent, the 2-year-olds cost 76 per cent, the yearlings 50 per cent, and the calves 37 per cent as much. These figures

are interesting in their relationship to profits as is brought out later.

FINAL WEIGHTS OF CATTLE

The final weights of the steers in the various groups were 1655, 1319, 1102, and 849 pounds respectively. These represented the average 3-day weights taken in each trial. In Trial 1, the cattle were held on feed two days after the close of the experiment before shipment, in Trial 2 four days, and in Trial 3 eight days. The greater period of holding in the last trial was due to the fact that the annual feeders' meeting was held four days following the close of the trial and the cattle had to be held into the following week before marketing. Shrink in transit to market was calculated in all cases from final experimental weights in spite of the fact that the cattle were held several days before shipment. The average weight of the cattle in Omaha was 1599 pounds in Lot 1, 1254 pounds in Lot 2, 1079 pounds in Lot 3, and 832 pounds in Lot 4. This represents a shrink of 56, 45, 23, and 17 pounds respectively. In Table 19 the shrink which occurred each year is given as well as the average and the percentage.

SHRINK IN SHIPMENT TO MARKET

TABLE 19.—*Shrink in shipment to market*

	3-yr.-olds	2-yr.-olds	Yearlings	Calves
	Pounds	*Pounds*	*Pounds*	*Pounds*
Trial 1	48	38	23	20
Trial 2	68	57	39	24
Trial 3	50	38	5	12.5
Average	56	45	23	17
	Per cent	*Per cent*	*Per cent*	*Per cent*
Percentage of live weight	3.42	3.40	2.78	2.37

It will be noted that the percentage shrink by lots amounts to 3.42, 3.40, 2.78, and 2.37 respectively. This gave a relatively uniform shrink between Lots 1 and 2 and, likewise, between Lots 3 and 4. It will be noted that in the case of Trial 3 the yearlings showed a very light shrink. The fact that the cattle in this trial were held eight days before shipment following the close of the experiment tends to make these figures less dependable than the figures in Trials 1 and

2, where the cattle were held but a few days. The cattle in Lot 3 of this trial evidently had gained considerably during the intervening eight days, hence the relatively light shrink. At the time the cattle were loaded on the cars, the 3-year average showed Lot 1 with only 4 pounds increased weight from final experimental weight, Lot 2 an increase of 2 pounds, Lot 3 an increase of 28 pounds, and Lot 4 an increase of 10.5 pounds. We have deemed it better, however, to keep the figures comparable as nearly as possible and consequently have not used these weights out of the feed lot in the case of Trial 3.

SALES PRICE

TABLE 20.—*Sales price*

	3-yr.-olds	2-yr.-olds	Yearlings	Calves
	Dollars	*Dollars*	*Dollars*	*Dollars*
Trial 1	8.20	8.40	8.50	8.60
Trial 2	10.40	10.50	10.40	10.15
Trial 3	10.25	10.00	9.75	9.25
Average	9.62	9.63	9.55	9.33

The sales price in the various lots in trials of this kind must receive consideration inasmuch as a material difference in prices for finished animals could result in a marked alteration of the financial outcome. In the first trial, the younger cattle sold to better advantage, while in the next two trials the opposite was true. By averaging the three, the difference in sales price of the 3-year-olds, the 2-year-olds, and the yearlings is insignificant, while the calves sold approximately 30 cents per hundred lower. Fluctuations from year to year, due to available supplies of cattle of the various weights, would naturally influence figures; however, as these tables represent 3-year averages, they probably can be relied upon to indicate the present demand on the markets for cattle of various weights during spring months.

PROFIT OR LOSS

The net profit can be stated in two ways: first, on a basis of each individual steer and, second, on a basis of $100 initial investment. The average return per steer was the least in Lot 1, somewhat greater in Lots 2 and 3, and materially larger in Lot 4. The 3-year-olds show a profit of $1.82 per steer, the 2-year-olds $2.07, the yearlings $3.88, and the calves $8.89. All lots returned a profit in the second and third trials, while in the first trial Lots 1, 2, and 3 showed a loss.

TABLE 21.—*Profit or loss per steer*

	3-yr.-olds	2-yr.-olds	Yearlings	Calves
	Dollars	*Dollars*	*Dollars*	*Dollars*
Trial 1	—9.68	—7.88	—1.60	8.19
Trial 2	5.85	10.60	10.17	15.88
Trial 3	9.90	7.85	5.71	5.03
Average	1.82	2.07	3.88	8.89

It possibly should be mentioned that in calculating profit or loss per head the following factors were taken into consideration: the initial cost of the steer with the interest for the full period at 8 per cent; the cost of the feed with the interest on this at 8 per cent for 100 days, or one-half of the trial; and the cost of marketing. No deduction was made for labor, as it would be difficult to arrive at a fair charge for this under experiment station conditions. Under practical feed lot conditions, possibly a charge of $5.00 per head on the 2- and 3-year-olds would be sufficient, $4.00 on the yearlings, and from $3.00 to $3.50 on the calves. By deducting these amounts from the profits, one could ascertain the profit minus labor; or, as is frequently done, the entire profit could be regarded as labor income or labor profit. No charge was made for depreciation or for interest on equipment. Experiment station conditions differ so from actual feed lot conditions, both as regards initial cost and upkeep of equipment, that it is difficult to arrive at a fair charge for this. In any event, the charge would be slightly greater for the older cattle because of the fact that they require more room and consume considerably more feed per head. No charge was made for bedding, as it would seem reasonable to assume that the manure produced would be worth the cost of this. No charge was made for salt, altho out of fairness a charge probably should be made. Pressed block salt was kept before the cattle at all times, and charging this at 70 cents per hundred the cost per head for salt would be approximately 15 cents. If all of the above charges had been deducted the profits in the several lots would continue to bear approximately the same relationship to each other.

SPREAD BETWEEN COST AND SALES PRICE PER 100 POUNDS

TABLE 22.—*Spread between cost and sales price per 100 pounds; 3-year average*

	3-yr.-olds	2-yr.-olds	Yearlings	Calves
	Dollars	*Dollars*	*Dollars*	*Dollars*
Sales price	9.62	9.63	9.55	9.33
Cost price	7.08	7.08	7.33	7.58
Spread	2.54	2.55	2.22	1.75

In studying profits per head in experiments of this type, one should take into account the relative cost and sales price of the different groups. In this series the sales price tends to show a slight discrimination against the younger cattle. The cost price, on the other hand, was higher for the younger cattle. Under such circumstances the fact that the profit per head is greater for the calves than for any other group is all the more significant. The average spread between cost and sales price is found to be $2.54, $2.55, $2.22, and $1.75 respectively. Thus, the calves sold for a spread of approximately 80 cents less than the 2- and 3-year-old steers and 47 cents less than the yearlings.

Based on the average obtained in these trials, it would seem that one could not hope to have as great a spread in feeding young cattle as in feeding older ones. A wide spread is doubly necessary with the older cattle because of the much more expensive gains which they make and the fact that these gains usually cost a great deal more than the sales price of the cattle. In order to show favorable returns in feeding mature steers, the spread must take care of the financial loss on the increase in weight and on the expense of handling.

It cost 136 per cent of the sales price to produce 100 pounds of gain in Lot 1, 128 per cent in Lot 2, 113 per cent in Lot 3, and only 86 per cent in Lot 4—hence, the obvious necessity of a wide spread between cost and sales price where older cattle are fed. These figures show most distinctly the comparative economic safety of the calf feeder.

The other way of figuring returns in this trial is that on the basis of $100 initial investment in the cattle; and here again the spread is markedly in favor of the calves.

PROFIT PER $100 INVESTMENT

TABLE 23.—*Profit per $100 investment; 3-year average*

	3-yr.-olds	2-yr.-olds	Yearlings	Calves
	Dollars	*Dollars*	*Dollars*	*Dollars*
Profit per steer	1.82	2.07	3.88	8.89
Cost per head	80.57	61.74	48.30	30.24
Profit per $100 initial investment	2.26	3.35	8.03	29.40

As brought out in Table 23, the returns per $100 investment are $2.25, $3.35, $8.03, and $29.40 respectively. Because of the fact that the younger cattle cost much less than $100, the returns per $100 invested are markedly larger than when stated in terms per head. The increase is not so apparent in the two older groups. There is more or less fairness in figuring on this basis. Not only do the younger cattle require so much less initial investment, but they take feed, water, labor, equipment, and room in about the same proportion.

APPRAISALS AND CALCULATED PROFIT OR LOSS BY PERIODS

Due to the proximity of the Experiment Station to the Omaha market, we were able to have the cattle appraised by 25-day periods from the seventy-fifth day until the close of each trial. This is rather an important phase of the work in a trial of this type, inasmuch as the final profit is not entirely the goal but rather information regarding the stage at which the greatest profit might have been obtained in the several lots. While the final profit shows very markedly in favor of the younger cattle, the older steers would have returned the greatest profit per head following a shorter feeding period. Table 24 gives the appraisals by periods.

TABLE 24.—*Estimated value by periods; 3-year average*

Lot	Age	75 days	100 days	125 days	150 days	175 days	Actual 200 days
		Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1	3-yr.-olds	9.38	8.80	9.35	9.47	9.57	9.62
2	2-yr.-olds	9.13	8.63	8.72	9.08	9.47	9.63
3	Yearlings	8.75	8.32	8.33	8.65	9.05	9.55
4	Calves	8.00	7.83	8.22	8.45	8.67	9.33

The older cattle, especially the 3-year-olds, were appraised relatively higher than the other groups from the 75- to the 150-day period, and from then on the spread narrows quite

materially. The calves showed the slowest advancement in value of any group. Toward the close of each trial, quite an increase occurred, thus tending to show that the calves were not regarded as finished beeves until near the close of the 200-day period. After 100 days of feeding in each of the three trials, the calves were estimated to be worth 25 cents per hundred more as feeders than the packers would pay for them as killers. This would tend to show that while the older cattle had taken on a reasonable degree of flesh and were regarded as quite satisfactory beeves, the calves were but little more than in good fleshy feeder condition. They had made a satisfactory gain, but it was largely growth, whereas the older cattle had been fattening and doing virtually no growing.

TABLE 25.—*Estimated profit or loss by periods; 3-year average*

Lot	Age	75 days	100 days	125 days	150 days	175 days	Actual 200 days
		Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1	3-yr.-olds	15.11	8.82	12.26	8.98	6.79	1.82
2	2-yr.-olds	10.80	4.89	2.48	2.95	5.39	2.07
3	Yearlings	4.09	.66	—1.54	—1.47	1.27	3.88
4	Calves	—.23	—.62	2.01	3.44	4.27	8.89

In Table 25 it is apparent that the time of greatest profit on the older cattle prevailed at 75 days, while the greatest profit on the calves occurred at the close.

The deduction which should be made from the tables and material above is that mature steers will produce reasonably satisfactory beef carcasses after feeding from 75 to 125 days. This would apply to the 3-year-olds and to the 2-year-olds to a somewhat more limited extent, depending upon the flesh they carry at the start. Yearlings and calves, however, need the full 200 days to make them attractive and without question the calves would stand an additional 50 days in order to become prime. This would be true where heavy grain feeding was resorted to, such as was the case in these trials. Where slower grain feeding is used, unquestionably the calves would be held a year before reaching a prime finished stage.

DRESSING PERCENTAGES

TABLE 26.—*Dressing percentages; 3-year average*

	3-yr.-olds	2-yr.-olds	Yearlings	Calves
Shrink in shipment to market *(pounds)*	56	45	23	17
Shrink in transit *(per cent)*	3.42	3.40	2.78	2.37
Carcass weight (shrunk 2.2 per cent) *(pounds)*	986	792	649	489
Dressing percentage cold, basis selling weight *(p.ct.)*	61.67	62.17	60.13	58.73
Dressing percentage cold, basis final weight out of experiment *(per cent)*	59.60	60.05	58.93	57.59

The older cattle yielded a somewhat higher percentage of beef, based upon weights at the market. Strange to say, the 2-year-olds outdressed the 3-year-olds by one-half of one per cent. In two out of the three trials, they dressed higher and hence the average showing in their favor. The carcass weights and percentages were figured on a basis of a shrink of 2.2 per cent from warm weights taken on the killing floor. The yields of Lots 1 and 2 were each year regarded as highly satisfactory by the beef men at the packing house. The yields of Lot 4 were somewhat disappointing, altho above the average of short yearlings being received at the market at the season these were shipped. Occasional loads were making 60 to 61 per cent; however, the beef men regarded these as outside figures, altho they cited this to show that the experimental calves were not really carrying sufficient flesh to yield a high percentage of beef, whereas the two groups of older steers dressed as well as any full loads of big cattle that were received at the time. In the last trial, the market men stated that Lots 1 and 2 outyielded any cattle that they had had in the house during the week preceding, thus tending to show that these two groups of cattle were ripe at the conclusion of the 200-day trial.

It is rather interesting to figure dressing percentages on a basis of final experimental weights. This has been done in Table 26 for purposes of comparison. The ratio between lots remains quite similar, altho there is a reduction of slightly over 2 per cent in Lots 1 and 2, and only 1.2 per cent in Lot 3, and 1.14 per cent in Lot 4. Becase of the fluctuations often made in weights in shipment of experimental stock, it has been deemed advisable to present figures giving dressing percentage on a basis of final experimental weights in each case.

Each year the carcasses of the two groups of younger cattle were the favorites of the dressed-beef men. They were smoother, seemed to carry sufficient covering, and were somewhat more shapely than the older carcasses. Possibly the fact that the lighter carcasses were more popular on the markets influenced the judgment of the beef men toward these carcasses. They stated that 60 to 75 per cent of the demand for beef at that time was for carcasses weighing from 400 to 600 pounds. This, of course, would include heavy calves and most yearlings. Incidentally, in this bulletin we have referred to the four groups of cattle on a basis of the classification which they held at the time they entered the experiment. At the market Lots 1 and 2 were spoken of as heavy beeves, Lot 3 as long yearlings, and Lot 4 as yearlings. This distinction applied both at the stockyards and at the beef coolers. We have avoided the use of these terms in commenting on the carcasses, however, in order to prevent confusion.

REPORT BY TRIALS

Upon the pages following will be found detailed tables of each of the three trials which are summarized in the fore part of this bulletin; also, a full report of Trial A, an experiment conducted in the winter of 1920-21. These tables are submitted for anyone who might desire to make further compilations and to show the striking degree of uniformity of results obtained in this series of trials. With such consistency of results as was secured in this series, one would seem justified in drawing the conclusion that they would be sustained in future trials of similar nature as well as in actual feed-lot practice.

TRIAL 1

TABLE 27.—*October 26, 1921, to May 14, 1922; 200-day report*

	Lot 1	Lot 2	Lot 3	Lot 4
	3-yr.-olds 10 steers	2-yr.-olds 10 steers	Yearlings 10 steers	Calves 10 steers
Initial weight per steer (Lincoln) *(pounds)*	1215	854	635	399
Final weight per steer (Lincoln) *(pounds)*	1737	1260	1038	833
Gain per steer *(pounds)*	522	406	403	434
Daily gain per steer *(pounds)*	2.61	2.03	2.01	2.17
Selling weight per steer (Omaha, May 17) *(pounds)*	1689	1222	1015	819
Daily ration per steer:				
Shelled corn *(pounds)*	20.33	16.21	13.64	11.12
Alfalfa hay *(pounds)*	10.32	7.46	5.41	3.89
Shrink in shipment to market *(pounds)*	48	38	23	14
Shrink in transit *(per cent)*	2.75	3.02	2.10	1.69
Carcass weight (shrunk 2.2 per cent) *(pounds)*	1041	758	623	482
Dressing percentage cold, basis selling weight *(p.ct.)*	61.62	62.00	61.40	58.88
Dressing percentage cold, basis final weight out of experiment *(per cent)*	60.00	60.15	60.10	57.86
Feed required per 100 pounds gain:				
Shelled corn *(pounds)*	778	798	678	512
Alfalfa hay *(pounds)*	395	367	269	179
Feed cost per 100 pounds gain *(dollars)*	12.71	12.74	10.50	7.75
HOGS FOLLOWING				
Pork produced per steer *(pounds)*	83	56	46	48
Value at $7 per cwt. *(dollars)*	8.30	5.64	4.59	4.80
Extra feed cost per steer *(dollars)*	.03	.61	.53	.39
Pork profit per steer *(dollars)*	8.27	5.03	4.06	4.41

TABLE 27 *(Concluded).—October 26, 1921, to May 14,* 1922; *200-day period*

	Lot 1	Lot 2	Lot 3	Lot 4
	3-yr.-olds 10 steers	2-yr.-olds 10 steers	Yearlings 10 steers	Calves 10 steers
FINANCIAL STATEMENT				
Initial cost per cwt. *(dollars)*	6.75	6.75	7.00	7.25
Initial cost per steer *(dollars)*	82.01	57.64	44.45	28.93
Feed cost per steer *(dollars)*	66.34	51.72	42.32	33.64
Interest on feed for 100 days *(dollars)*	1.45	1.13	.93	.74
Interest on investment at 8 per cent *(dollars)*	3.59	2.53	1.95	1.27
Cost of marketing *(dollars)*	3.06	2.54	2.29	2.07
Total cost per steer *(dollars)*	156.45	115.56	91.94	66.65
Value per cwt. at market *(dollars)*	8.20	8.40	8.50	8.60
Returns per steer, including pork profit *(dollars)*	146.77	107.68	90.34	74.84
Profit or loss per steer *(dollars)*	—9.68	—7.88	—1.60	+8.19
Profit or loss per $100 investvestment in cattle *(dollars)*	—11.80	—13.67	—3.60	+28.31

Feed prices: corn at 70 cents per bushel, alfalfa hay at $15 per ton.

TABLE 28.—*Summary of data by 100-day periods*

	3-yr.-olds	2-yr.-olds	Yearlings	Calves
DAILY RATION				
	Pounds	*Pounds*	*Pounds*	*Pounds*
First 100 days:				
Corn	17	14	11	8.6
Alfalfa	14	10	7	4.2
Second 100 days:				
Corn	24	18	16	13.5
Alfalfa	6	5	4	3.5
GAINS				
First 100 days	311	244	215	211
Second 100 days	211	162	188	223
Total gain	522	406	403	434
FEED REQUIRED TO PRODUCE 100 POUNDS OF PORK				
First 100 days:				
Corn	548	481	512	409
Alfalfa	448	417	332	200
Second 100 days:				
Corn	1114	1110	850	610
Alfalfa	280	300	210	150
COST OF PRODUCING 100 POUNDS GAIN				
	Dollars	*Dollars*	*Dollars*	*Dollars*
First 100 days	10.21	10.39	8.89	6.61
Second 100 days	16.03	16.13	12.21	8.76

TABLE 29.—*Summary per basis one bushel corn consumed* *

	3-yr.-olds	2-yr.-olds	Yearlings	Calves
Total gain for 200-day period *(pounds)*	522	406	403	434
Corn fed per steer *(bushels)*	73	58	49	40
Beef made from one bushel corn *(pounds)*	7.1	7.0	8.3	10.9
Pork from one bushel corn *(pounds)*	1.14	.96	.94	1.2
Combined beef and pork from one bushel corn *(pounds)*	8.24	7.96	9.24	12.1

* With each bushel of corn there was an alfalfa consumption of from 21 to 24 pounds in the several lots. This was not taken into account in making the above compilations.

TRIAL 2

TABLE 30.—*October 30, 1922, to May 18, 1923; 200-day report*

	Lot 1	Lot 2	Lot 3	Lot 4
	3-yr.-olds 10 steers	2-yr.-olds 10 steers	Yearlings 10 steers	Calves 10 steers
Initial weight per steer (Lincoln) *(pounds)*	1107	916	686	390
Final weight per steer (Lincoln(*(pounds)*	1647	1432	1200	903
Gain per steer *(pounds)*	540	516	514	513
Daily gain per steer *(pounds)*	2.70	2.58	2.57	2.57
Selling weight per steer (Omaha, May 23) *(pounds)*	1579	1375	1161	879
Daily ration per steer:				
Shelled corn *(pounds)*	22.23	19.58	17.26	12.79
Alfalfa hay *(pounds)*	9.14	7.86	6.85	4.63
Shrink in shipment to market *(pounds)*	68	57	39	24
Shrink in transit *(per cent)*	4.1	4.0	3.25	2.65
Carcass weight (shrunk 2.2 per cent) *(pounds)*	968	848	699	512
Dressing percentage cold, basis selling weight *(p.ct.)*	61.3	61.7	60.2	58.3
Dressing percentage cold, basis final weight out of experiment *(per cent)*	58.7	59.2	58.2	56.7

TABLE 30 *(Concluded).—October 30, 1922, to May 18, 1923; 200-day report*

	Lot 1	Lot 2	Lot 3	Lot 4
	3-yr.-olds 10 steers	2-yr.-olds 10 steers	Yearlings 10 steers	Calves 10 steers
Feed required per 100 pounds gain:				
Shelled corn *(pounds)*	823	759	672	498
Alfalfa hay *(pounds)*	338	304	266	180
Feed cost of 100 pounds gain *(dollars)*	12.83	11.76	10.40	7.58
HOGS FOLLOWING				
Pork produced per steer *(pounds)*	96	90	70	41
Value at $7.50 per cwt. *(dollars)*	7.21	6.76	5.21	3.10
Extra feed cost per steer *(dollars)*	.71	.40	.33	.29
Pork profit per steer *(dollars)*	6.50	6.36	4.88	2.81
FINANCIAL STATEMENT				
Initial cost per cwt. *(dollars)*	7.75	7.75	8.00	8.25
Initial cost per steer *(dollars)*	85.79	70.99	54.88	32.17
Feed cost per steer *(dollars)*	69.28	60.68	53.46	38.88
Feed cost per steer May 18 to May 22 *(dollars)*	1.20	1.12	1.08	1.00
Interest on feed for 100 days *(dollars)*	1.54	1.35	1.19	.84
Interest on investment at 8 per cent *(dollars)*	3.75	3.11	2.40	1.41
Cost of marketing *(dollars)*	3.31	2.89	2.44	1.85
Total cost per steer *(dollars)*	164.87	140.14	115.45	76.15
Value per cwt. at market *(dollars)*	10.40	10.50	10.40	10.15
Returns per steer, including pork profit *(dollars)*	170.72	150.74	125.62	92.03
Profit per steer *(dollars)*	5.85	10.60	10.17	15.88
Profit per $100 investment in cattle *(dollars)*	6.82	14.93	18.53	49.37

Feed prices: corn at 70 cents per bushel, alfalfa hay at $15 per ton.

TABLE 31.—*Summary of data by 100-day periods*

	3-yr.-olds	2-yr.-olds	Yearlings	Calves
DAILY RATION				
	Pounds	*Pounds*	*Pounds*	*Pounds*
First 100 days:				
Corn	21	17	15	10
Alfalfa	11	10	9	5.5
Second 100 days:				
Corn	24	22	20	15.6
Alfalfa	7	6	5	4
GAINS				
First 100 days	344	290	294	250
Second 100 days	196	226	220	263
Total gain	540	516	514	513
FEED REQUIRED TO PRODUCE 100 POUNDS GAIN				
First 100 days:				
Corn	599	589	498	399
Alfalfa	329	335	296	222
Second 100 days:				
Corn	1216	977	904	593
Alfalfa	355	266	227	141
COST OF PRODUCING 100 POUNDS GAIN				
	Dollars	*Dollars*	*Dollars*	*Dollars*
First 100 days	9.95	9.87	8.44	6.66
Second 100 days	18.86	14.20	13.00	8.46

TABLE 32.—*Summary per basis one bushel corn consumed* *

	3-yr.-olds	2-yr.-olds	Yearlings	Calves
Total gain for 200-day period *(pounds)*	540	516	514	513
Corn fed per steer *(bushels)*	80	70	62	46
Beef made from one bushel corn *(pounds)*	6.7	7.5	8.3	11.2
Pork from one bushel corn *(pounds)*	1.2	1.3	1.1	.89
Combined beef and pork from one bushel corn *(pounds)*	7.9	8.8	9.4	12.09

* With each bushel of corn there was an alfalfa consumption of from 21 to 24 pounds in the several lots. This was not taken into account in making the above compilations.

TRIAL 3

TABLE 33.—*November 1, 1923, to May 19, 1924; 200-day report*

	Lot 1	Lot 2	Lot 3	Lot 4
	3-yr.-olds 10 steers	2-yr.-olds 10 steers	Yearlings 10 steers	Calves 10 steers
Initial weight per steer (Lincoln) *(pounds)*	1091	845	657	407.5
Final weight per steer (Lincoln) *(pounds)*	1580	1264	1067	811.5
Gain per steer *(pounds)*	489	419	410	404
Daily gain per steer *(pounds)*	2.45	2.095	2.05	2.02
Selling weight per steer (Omaha, May 28) *(pounds)*	1530	1226	1062	799
Daily ration per steer:				
Shelled corn *(pounds)*	22.16	17.52	15.47	11.65
Alfalfa hay *(pounds)*	7.77	5.68	5.37	4.00
Shrink in shipment to market (based on May 27 weight) *(pounds)*	54	40	33	23
Shrink in transit *(per cent)*	3.4	3.17	3.0	2.77
Carcass weight (shrunk 2.2 per cent) *(pounds)*	960	769	624	472
Dressing percentage cold, basis selling weight *(p.ct.)*	62.1	62.8	58.8	59.1
Dressing percentage cold, basis final weight out of experiment *(per cent)*	60.1	60.8	58.5	58.2
Feed required per 100 pounds gain:				
Shelled corn *(pounds)*	904	836	755	577
Alfalfa hay *(pounds)*	317	271	262	198
Feed cost of 120 pounds gain *(dollars)*	13.69	12.48	11.39	8.69
HOGS FOLLOWING				
Pork produced per steer *(pounds)*	90	64	61	42
Value at $6 per cwt. *(dollars)*	5.41	3.85	3.63	2.50
Extra feed cost per steer *(dollars)*	.96	1.90	1.54	1.50
Pork profit per steer *(dollars)*	4.45	1.95	2.09	1.00

TABLE 33 *(Concluded).—November 1, 1923, to May 19, 1924; 200-day report*

	Lot 1	Lot 2	Lot 3	Lot 4
	3-yr.-olds 10 steers	2-yr.-olds 10 steers	Yearlings 10 steers	Calves 10 steers
FINANCIAL STATEMENT				
Initial cost per cwt. *(dollars)*	6.75	6.75	7.00	7.25
Initial cost per steer *(dollars)*	73.66	56.06	45.97	29.54
Feed cost per steer *(dollars)*	67.01	52.25	46.70	35.11
Feed cost per steer from close of experiment to date shipped *(dollars)*	2.64	2.08	1.88	1.40
Interest on feed for 100 days *(dollars)*	1.47	1.15	1.02	.77
Interest on investment at 8 per cent *(dollars)*	3.23	2.46	2.02	1.30
Cost of marketing *(dollars)*	3.37	2.70	2.34	1.76
Total cost per steer *(dollars)*	151.38	116.70	99.93	69.88
Value per cwt. at market *(dollars)*	10.25	10.00	9.75	9.25
Returns per steer, including pork profit *(dollars)*	161.28	124.55	105.64	74.91
Profit per steer *(dollars)*	9.90	7.85	5.71	5.03
Profit per $100 investment in cattle *(dollars)*	13.44	14.00	12.42	17.03

Feed prices: corn at 70 cents per bushel, alfalfa hay at $15 per ton.

TABLE 34.—*Summary of data by 100-day periods*

DAILY RATION	3-yr.-olds	2-yr.-olds	Yearlings	Calves
	Pounds	*Pounds*	*Pounds*	*Pounds*
First 100 days:				
Corn	20	16	14	10
Alfalfa	10	7	6.7	5
Second 100 days:				
Corn	24	19	17	13.6
Alfalfa	5	4	3.8	3

GAINS	3-yr.-olds	2-yr.-olds	Yearlings	Calves
First 100 days	331	254	237	200
Second 100 days	158	165	173	204
Total gain	489	419	410	404

FEED REQUIRED TO PRODUCE 100 POUNDS GAIN				
First 100 days:				
Corn	611	621	591	484
Alfalfa	313	285	283	242
Second 100 days:				
Corn	1517	1168	995	666
Alfalfa	326	250	220	153

COST OF PRODUCING 100 POUNDS GAIN				
	Dollars	*Dollars*	*Dollars*	*Dollars*
First 100 days	9.98	9.89	9.50	7.86
Second 100 days	21.40	16.47	14.09	9.48

TABLE 35.—*Summary per basis one bushel corn consumed* *

	3-yr.-olds	2-yr.-olds	Yearlings	Calves
Total gain for 200-day period *(pounds)*	489	419	410	404
Corn fed per steer *(bushels)*	79	63	55	42
Beef made from one bushel corn *(pounds)*	6.2	6.7	7.5	9.6
Pork from one bushel corn *(pounds)*	1.14	1.02	1.11	1.00
Combined beef and pork from one bushel corn *(pounds)*	7.34	7.72	8.61	10.60

* With each bushel of corn there was an alfalfa consumption of from 21 to 24 pounds in the several lots. This was not taken into account in making the above compilations.

The trial reported below represents the first effort on the part of the Nebraska Experiment Station to assemble information pertaining to the feeding of steers of different ages. Inasmuch as there were no 3-year-olds fed in this trial, it was not deemed advisable to use the data of this experiment in preparing the averages which appear in the fore part of this bulletin. A further complication which prevented the use of this material was the fact that linseed meal and ensilage were used in conjunction with shelled corn and alfalfa hay in making up the rations used. It will be found of interest to compare the results secured in this experiment with those obtained in later trials and note the consistency of the same.

APPENDIX

TRIAL A

COMPARISON OF 2-YEAR-OLDS, YEARLINGS, AND CALVES OCTOBER 31, 1920, TO MAY 19, 1921

CATTLE USED

The steers used in this trial were purchased in October, 1920, on the Braddock ranch at Chadron, Nebraska, and consisted of 10 head of each age. All three groups, 2-year-olds, yearlings, and calves, were sired by the same bull and out of the same group of cows. They had been raised under typical ranch conditions. They were high grade Herefords of choice quality. The cost per hundred pounds by lots was $8.75, $9.00, and $9.25 respectively.

RATIONS

All lots were fed upon the same ration, namely, shelled corn, linseed oil meal, ensilage, and alfalfa hay. The silage was fed liberally at first and diminished as the corn was increased. On January 1, all lots were on a full feed of corn. No oil meal was fed until December 10, 2 pounds per head daily being fed in all lots from then on. During February and March, the steers in all three lots consumed the maximum ration of corn. At this time, the 2-year-olds consumed 21 pounds per head daily, the yearlings 17 pounds, and the calves 14 pounds. The average corn consumption decreased during April and May, being approximately 16 pounds at the close in Lot 1, 14 pounds in Lot 2, and 12 pounds in Lot 3.

FEED PRICES

Shelled corn	$00.70	per bushel
Linseed oil meal	50.00	per ton
Ensilage	6.00	per ton
Alfalfa hay	15.00	per ton

The shelled corn used in this experiment was charged at 70 cents and the alfalfa hay at $15.00 per ton. These prices are the same as those used thruout the bulletin. Linseed meal was selling at approximately $70.00 per ton when the experiment opened and at $35.00 per ton when it closed. However, $50.00 per ton was the price paid by most feeders during the fall months. There was some question regarding the price that should be charged for ensilage. On a basis of cost of producing silage at the time, $6.00 was a very fair value.

TABLE 36.—*Trial A; comparison of 2-year-olds, yearlings, and calves; October 31, 1920, to May 19, 1921*

	Lot 1	Lot 2	Lot 3
	2-yr.-olds 10 head	Yearlings 10 head	Calves 10 head
Initial weight per steer (Lincoln) *(pounds)*	785	562	381
Final weight per steer (Lincoln) *(pounds)*	1226	1004	781
Gain per steer *(pounds)*	441	442	400
Daily gain per steer *(pounds)*	2.21	2.21	2.00
Selling weight per steer (Omaha) *(pounds)*	1187	967	774
Daily ration per steer:			
Shelled corn *(pounds)*	13.69	11.40	9.16
Linseed oil meal *(pounds)*	1.51	1.50	1.48
Silage *(pounds)*	16.69	13.04	7.52
Alfalfa hay *(pounds)*	1.46	1.49	2.10
Shrink in shipment to market *(pounds)*	39	37	7
Shrink in transit *(per cent)*	3.20	3.67	.845
Dressing percentage cold, basis selling weight *(per cent)*	62.56	61.04	58.22
Feed required per 100 pounds gain:			
Shelled corn *(pounds)*	619	516	458
Linseed oil meal *(pounds)*	68	68	74
Silage *(pounds)*	755	590	376
Alfalfa hay *(pounds)*	66	67	105
Feed cost of 100 pounds gain *(dollars)*	12.22	10.43	9.50
HOGS FOLLOWING			
Pork produced per steer *(pounds)*	74	80	72
Value at $7.00 per cwt. *(dollars)*	5.20	5.59	5.02
Extra feed cost per steer *(dollars)*	.96	1.17	1.08
Pork profit per steer *(dollars)*	4.24	4.42	3.94

TABLE 36 *(Concluded).—Trial A; comparison of 2-year-olds, yearlings, and calves; October 31, 1920, to May 19, 1921*

	Lot 1	Lot 2	Lot 3
	2-yr.-olds 10 head	Yearlings 10 head	Calves 10 head
FINANCIAL STATEMENT			
Initial cost per cwt. *(dollars)*	8.75	9.00	9.25
Initial cost per steer *(dollars)*	68.67	50.60	35.21
Feed cost per steer *(dollars)*	53.94	46.06	37.99
Feed cost per steer from May 19 until loaded *(dollars)*	.80	.68	.60
Interest on investment at 8 per cent *(dollars)*	3.01	2.22	1.54
Cost of marketing *(dollars)*	2.82	2.55	2.31
Total cost per steer *(dollars)*	129.24	102.11	77.65
Value per cwt. at market *(dollars)*	8.60	8.85	8.60
Returns per steer, including pork profit *(dollars)*	106.32	90.00	70.50
Loss per steer *(dollars)*	22.92	12.11	7.15
Loss per $100 investment in cattle *(dollars)*	33.39	21.96	20.30

Feed prices: shelled corn at 70 cents per bushel, silage at $6.00 per ton, linseed oil meal at $50.00 per ton, alfalfa hay at $15.00 per ton.

The cattle were weighed and evaluated at the close of 100 days and each 25 days thereafter until the close of the experiment. Table 37 discloses some interesting facts regarding the estimated financial outcome of the several lots by periods.

SELLING PRICE

The cattle were sold on the Omaha market May 24. The 2-year-olds shrunk 39 pounds, the yearlings 36 pounds, and the calves 7 pounds from their average final weight out of the experiment. They sold at $8.60, $8.85, and $8.60 per hundredweight respectively. While the 2-year-olds were slightly too heavy for market demands, the packers valued them as highly as the calves because of the greater degree of finish which they carried and the consequent higher dressing percentage which the buyers anticipated.

CARCASSES

In the coolers the carcasses presented a splendid appearance. They were all of a very blocky, smooth, thick-made type and were designated as show cattle by the superintendent of the Cudahy plant where they were hung. The calves showed a slight lack of finish compared with

the older cattle. The 2-year-olds were perhaps a trifle wasty, whereas the yearlings were ideal. All three groups showed a splendid marbling. The older cattle dressed the highest percentage. The figures given are for cold weights. These were secured by deducting 2.2 per cent from warm weights.

FINANCIAL OUTCOME

All groups sold below their initial cost. The calves showed the least loss of the three groups. The necessary selling price in order to break even was $10.80 on the 2-year-olds, $10.50 on the yearlings, and $10.00 on the calves. The above figures do not take labor into account. Many feeders contend that the fertilizer produced will offset the labor. The charge made for labor should be practically the same for each group.

TABLE 37.—*Summary of data by 25-day periods*

Lot	Age	First 100 days	Fifth* 25 days	Sixth* 25 days	Seventh* 25 days	Eighth* 25 days	Total 200 days
		GAIN PER STEER					
		Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
1	2-yr.-olds	264	33	36	57	51	441
2	Yearlings	251	33	64	48	46	442
3	Calves	205	54	50	51	40	400
		COST OF 100 POUNDS GAIN					
		Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1	2-yr.-olds	9.70	23.83	19.65	11.63	13.27	12.22
2	Yearlings	8.61	19.56	9.67	11.42	13.18	10.43
3	Calves	7.82	10.46	11.07	10.77	13.30	9.50

Lot	Age	100 days	125 days	150 days	175 days	Actual 200 days
		ESTIMATED VALUE				
		Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1	2-yr.-olds	8.40	9.40	9.15	8.25	8.60
2	Yearlings	8.25	9.25	9.00	8.50	8.85
3	Calves	8.00	9.00	8.75	8.50	8.60
		ESTIMATED PROFIT OR LOSS				
1	2-yr.-olds	—16.49	—10.75	—16.50	—28.18	—22.92
2	Yearlings	—12.61	— 6.63	— 9.82	—15.09	—12.11
3	Calves	—10.02	6.52	— 7.42	— 9.00	— 7.15

* This experiment is reported in five periods—the first 100 days as one period andeach successive 25 days as a period.

SUMMARY OF TRIAL A

In this experiment the calves showed relatively greater efficiency in all periods. It will be noted that the economy of gain in each period was very markedly in favor of the calves. The yearlings were more economical gainers than the 2-year-olds. The calves produced as much beef from 77½ pounds of feed as did the 2-year-olds from 100 pounds. The yearlings produced as much beef from 86 pounds of feed as did the 2-year-olds from 100 pounds.

The rate of gain within the three groups during the various periods is quite interesting. During the first 100 days the 2-year-olds gained 264 pounds, the yearlings 251, and the calves 205. During the second 100 days the 2-year-olds gained 177 pounds, the yearlings 191, and the calves 195. In other words, in the first period the older cattle made the greatest daily gain, while in the second period the younger cattle showed the greatest daily gain. Stating it in another way, during the second 100 days the 2-year-olds gained 67 per cent as much as during the first, the yearlings 76 per cent, and the calves 95 per cent. The calves made virtually the same gain during each period, whereas the 2-year-olds gained only two-thirds as much during the latter period as during the first. This point is quite worthy of attention, as it indicates a more consistent gain in the case of the calves.

[10M]