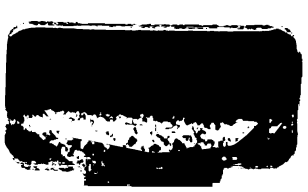
FEEDING FINISHED STEERS

Thesis for the Degree of B. S.

Antranig G. Bodourian

1900



Thesis

on

Feeding Finished Steers.

By

A. G. Bodourian.

Michigan Agricultural College, 1900.

Thesis

On Feeding Finished Steers.

This thesis is the result of 12 weeks trial made by me during the winter term of 1900. Unfortunately, the time devoted for such an experiment as this was very short. Therefore, perhaps, the results obtained from it may be doubted, and would not be considered as valuable as they would have been otherwise. However, what is herein stated is accurate and true to the best of my knowledge and belief. I confess frankly that I did learn much from this trial than I did during four years of my college course in the Agricultural classroom, as far as the feeding is concerned.

Respectfully Submitted

A. G. Bodourian.

Note,- The author will be glad to answer any question, at any time, in regard of any point found in this thesis.

A. G. B

History and Object in View.

During the latter part of the fall term 1899 the Superintendent of Michigan Agricultural College Farm - Herbert W. Mumford, bought from Smith and Wiggins, of Corning, Mich, some steers that were prize winners at State Fair at Grand Rapids In September of 1899. The prime object of his purchase, as reported in the M. A. C. Record, was to show to students especially to Short Course what a finished steer looks like. Also, if possible, to carry some further experiment with them in the line of feeding. At the time of their arrival on the College grounds their condition was very striking, so there was some doubt whether anything could be done with the steers; but after several consultations with Professor Mumford I decided to take my thesis work experimenting in"feeding finished steers," in order to convince myself, if not others, with an object lesson so easily obtained, how much could be done, under ordinary conditions, with the steers that were already in good marketable condition.

With this idea I chose from the lot the two which were better than any of the others namely, Peck and Senator, nearly of the same size and age, and apparently one a good feeder, the other bad. According to Mr. Smith's letter, Peck dropped on December 25th, '97 from a pure bred Angus and high grade Shorthorn cow, and Senator on December 1st, '97 from a pure bred Angus. For a proper comparison, we added a heifer Baroness's Girl, which was dropped on December 22, '97, from a pure bred Angus cow and Royal Mysie. Baroness's Girl was in a poor condition, but was a good feeder.

Environment.

The barn where we fed our animals, though better than the average farmers provide, was not entirely satisfactory for such a purpose. One of the most disagreeable features, according to my judgment, was the fact that three of the pens in the barn were occupied by pigs, whose noise and odor are not agreeable to such sensitive animals as cattle. The season, as it was noted by nearly all the stock feeders in the state was not favorable, especially in our locality. However, the su ply of food and help for the accomplishment of our experiment was satisfactory in all respects.

General Care of the Steers.

Animals were fed three times a day regularly. The amount of food varied each day according to the climatic conditions and the appetite of the animal. The Schedule of meals was a follows,-

Morning 6 a. m.	Noon 12:30 p. m.	Evening 4 p. m.
Cut Clover Hay, Mixed Grain, Sugar Beets,	Sugar Beets alone	Same as in the morning.

The cattle were watered twice a day. In the morning before or after meals and at noon before feeding. Rock salt was kept in the mangers at all times. Stables were kept clean and the animals were carefully groomed. A close attention was given to the condition of the animals, and a kindly attitude toward them was at all times maintained. A habit to which the feeder attributes largely his success

if any at all. The mangers were cleaned thoroughly every morning before feeding, and the residue was kept in separate boxes for each steer. The waste material thus obtained was weighed and used for some other purpose.

On the whole, I might say, the care was not extraordinary, because the idea was to make it such that every stock feeder could adopt without difficulty or expense.

Rations Used in Our Trial.

The following are the three different combinations of grains used in three successive periods of our trial,- The first is rather a continuation to that of Mr. Smith's. The second is the richest of any, and the third is the most economical.

Mixture No. 1 for the 1st four weeks.

By Weight,-

1/2 Corn Meal
1/8 Oat Meal
1/4 Wheat Bran
1/8 Oil Meal

Mixture No. 2 for the 2nd four weeks.

By Weight,-

3/8 Corn Meal
3/8 Wheat Bran
1/4 Oil Meal

Mixture No. 3 for the 3rd four weeks.

By Weight,-

½ Corn Meal

½ Wheat Bran

Feeding Stuffs and Percentage of Their Digestibility.

The following table shows the average coefficents of digestibility of the respective feeding stuffs used in our experiment. Scientific feeders have used Oil Meal very extensively in order to balance their ration. But it was entirely omitted in the third period of our trial, in order to reduce the economic value of the ration.

Table I.

Feeding Stuff	Percentage Digestibility			
	Dry matter	Protein	Carbo-Hydrate	Ether extract
Corn Meal	89.1	7.9	66.7	4.3
Wheat Bran	88.5	12.9	40.1	3.4
Oil Meal	91.8	25.8	43.3	11.
Oat Meal	92.1	11.5	52.1	5.9
Clover Hay	84.7	6.8	35.8	1.7
Sugar Beet	13.5	1.1	10.2	0.1

Table II.

Trial Ration(first period) for Peck, weighing 1220lbs.

Feeding Stuff.	lbs.	D. M.	Digestible Nutriment.			
			prot.	C. H.	eth. ext.	N. Ratio.
Mixture No. 1.	5.5	2.45	.217	1.83	.118	
&		.63	.07	.35	.04	
Clover Hay	4.5	.63	.17	.29	.07	
&		1.21	.17	.55	.046	
Sugar Beet	30.	3.81	.3	1.61	.076	
		4.05	.33	3.06	.03	
		12.78	1.257	7.69	.38	
W. L. Standard		30.	2.5	15.	.50	1:6.5

This table shows that Peck consumed 40# of feeding stuff a day. The ration far below the standard yet gave average daily gain of 2.14#.

Table III.

Trial Ration(second period)for Peck, weighing 1280#.

Feeding Stuff.	lbs.	D. M.	Nutrient Digestible. prot.	C. H.	eth.ext.	N. Ratio
Mixture No 2.	4.5	1.49	.13	1.12	.07	
&		1.43	.21	.67	.05	
Clover Hay	4.	1.04	.29	.49	.12	
&		3.38	.27	1.43	.06	
Sugar Beet	45.	6.07	.49	4.59	.64	
		13.41	1.39	8.3	.34	

During this period Peck consumed per day 4.5# of grain, 4# of hay and 45# of sugar beets. This ration is richer than the first, but in eth. ext. However the average daily gain during this period was 1.42#.

Table IV.

Trial Ration(third period)for Peck, weighing 1320#.

Feeding Stuff.	lbs.	D.M.	Digestible Nutriment. prot.	C. H.	eth.ext.	N. Ratio
Mixture No. 3	5.	2.22	.19	1.66	.1	
&		2.15	.32	1.	.08	
Clover Hay	5.	4.23	.34	1.79	.08	
&		6.07	.49	4.59	.04	
Sugar Beet	45.					
		14.65	1.34	9.04	.3	

This third ration comparatively is the richest of the three. Yet during this period the animal weighed more than before. The average daily gain was 1.78#. It is higher than the second by .36#, and less than the first by .36 #.

Table IX.

Trial Ration(third Period)for Pen, weighing 1800#.

Digestible Nutriment.

Feeding Stuff.	lbs	D.C.	Prot.	C. H.	ar. ext.	Ratio C.
Mixture No. 3	5.	0.02	.19	1.04		.1
"	0.15	.10	1.			.02
Clover Hay	5.	4.02	.24	1.29		.08
"	0.07	.10	0.19			.04
Sugar Beet	41.	14.22	1.14	0.04		.3

This third ration consumatively is the richest of the three. Yet during this period to animal varied more than before. The average daily gain was 1.9#. It is higher than the second by .3#, and less than the first by .1# #.

Table V.

Trial Ration(first period)for Senator, weighing 1308#.

Feeding Stuff.	lbs	D. M.	Digestible Nutriment.			
			prot.	C. H.	eth.ext.	N. Ratio
Corn Meal	2.75	2.45	.217	1.83	.118	
Oil Meal	.687	.63	.07	.35	.04	
Oat Meal	.687	.63	.17	.29	.07	
Wheat Bran	1.375	1.21	.17	.55	.046	
Clover Hay	5.	4.02	.32	1.69	.08	
Sugar Beet	30.	4.05	.33	3.06	.03	
		12. 99	1.277	7.77	.374	
W. L. S.		30.0	2.5	2.5	.50	1:6.5

The above table shows the first ration for the first period. It falls much below the standard. Yet Senator, during this period, has shown 2.28# daily gain.

Table VI.

Trial Ration(second period)for Senator, weighing 1372#

Feeding Stuff	lbs	D.M.	Digestible Nutriment. prot.	C. H.	eth.ext.	N. Ratio
Corn Meal	1.875	1.67	.14	1.25	.08	
Wheat Bran	1.875	1.65	.24	.75	.06	
Oil Meal	1.25	1.14	.32	.54	.13	
Clover Hay	4.75	3.99	.32	1.70	.08	
Sugar Beet	42.	5.67	.46	4.28	.04	
		14.12	1.48	8.52	.39	
W. L. S.		30.	2.5	15.	.50	1:6.5

This second ration also falls below the standard. However it is richer than the first. But the gain during this period is 1.42# daily, that is .86# less than the first period. What does this test show? I leave this for the Scientist to answer. Were we to get greater daily gain if our ration was richer or the amount of feed increased??? I do not think so.

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Table VII.

Trial Ration(third period)for Senator, weighing 1412#.

Feeding Stuff.	lbs.	D. M.	Digestible Nutriment. prot.	C. H.	eth.ext.	N. ratio
Corn Meal	2.625	2.33	.2	1.75	.11	
Wheat Bran	2.625	2.32	.33	1.05	.08	
Clover Hay	5.25	4.44	.35	1.87	.08	
Sugar Beet	42.	5.67	.46	4.28	.04	
		14.76	1.34	9.47	.31	
W. L. S.		30.	2.5	15.	.50	1:6.5

This ration is richer than the first, but eth.ext. also richer than the second in D. M. and C. H. but deficient in prot. and eth. ext. yet the average daily gain during this period was 2.92#, being higher than any of the best.

Table VIII.

Trial Ration(first period) for Baroness's Girl,weighing 1042#.

Feeding Stuff.	Lbs.	D. M.	Digestible Nutriment.			
			Prot.	C. H.	eth.ext.	N. Ratio
Corn Meal	3.5	2.33	.27	2.33	.15	
Wheat Bran	1.75	1.54	.22	.7	.05	
Oil Meal	.875	.8	.22	.37	.09	
Oat Meal	.875	.8	.1	.45	.05	
Clover Hay	6.	5.	.4	2.14	.1	
Sugar Beet	30.	4.05	.33	3.06	.03	
		15.30	1.54	9.05	.47	
W. L. S.		30.0	2.5	15.	.5	1:6.5

This ration falls below the standard very heavily. It is deficient in all constituents. However the W. L. Standard is a ration for the rapid fattening of a steer weighing 1000#(first period) yet our trial shows positively that the average daily gain of Baroness's Girl was 2.78#(during this period).

Table IX.

Trial Ration(second period) for Baroness Girl,weighing 1120#.

Feeding Stuff.	lbs.	D. M.	Digestible Nutriment.			
			prot.	C. H.	eth.ext.	N. Ratio
Corn Meal	2.34	2.08	.18	1.55	.1	
Wheat Bran	2.34	2.07	.3	.93	.07	
Oil Meal	1.57	1.44	.4	.07	.17	
Sugar Beet	39.	5.26	.42	3.97	.01	
Cut Clover Hay	6.	5.	.4	2.14	.1	
		15.85	1.80	8.66	.45	
W. L. S.		30.	2.5	15.	.50	1:6.5

This second ration also falls below the standard, being 14.15# D. M. .9 prot. 6.44 C. H. .05 eth. ext. It is slightly richer in digestible matter, prot. eth. ext., but lacks in C. H. yet the average daily gain for this period is 2.35#.

Table X.

Trial Ration(third period)for Baroness's Girl,weighing 1186#.

Feeding Stuff.	lbs.	D. M.	DIgestible Nutriment. prot.	C. H.	eth.ext.	N. Ratio
Corn Meal	3.5	3.11	.27	2.33	.15	
Wheat Bran	3.5	3.09	.45	1.4	.1	
Clover Hay	6.	5.	.4	2.14	.1	
Sugar Beet	39.	5.26	.42	3.97	.01	
		16.46	1.54	9.84	.36	
W. L. S.		30.0	2.5	15.	.50	1:6.5

This ration also needs much in order to equal the W. L. Standard. It is richer in dry matter and C. H. than the preceding ones but lacks in eth. ext. Yet the average daily gain for this period is 3.5#. Taking in consideration the ration on which she was fed, the average gain seems to be remarkable.

Table XI.

Mean Rations.

Table showing the Mean Rations of each animal for each period, and for the whole time.

Name	Ration.	period.	D.M.	Digestible Nutriment. prot.	C.H.	eth. ext.	Gain per day.
	No.1.	1st.	12.78	1.257	7.69	.38	2.14
Peck	No.2.	2nd.	13.41	1.39	8.3	.34	1.42
	No.3.	3rd.	14.65	1.34	9.04	.3	1.78
Average.			13.61	1.32	8.34	.34	1.78
	No.1.	1st.	12.99	1.277	7.77	.374	2.28
Senator	No.2.	2nd.	14.12	1.48	8.52	.39	1.42
	No.3.	3rd.	14.76	1.34	9.47	.31	2.92
Average			13.95	1.36	8.62	.35	2.21
	No.1.	1st	15.30	1.54	9.05	.47	2.78
Baroness's Girl	No.2.	2nd.	15.85	1.60	8.66	.45	2.35
	No.3.	3rd.	16.46	1.54	9.84	.36	3.5
Average			15.87	1.56	9.15	.42	2.88

This table shows the average ration of each animal for the whole period.

| | | |

Table XII.

Mean Ration for the whole period of the animals.

Table showing the average Mean Ration for the whole period.

Names	Av. Ration. for the whole period.	whole period	Digestible Nutriment. D. M.	prot	C.H.	eth. ext.	Daily gain.
		12 w'ks.					lbs.
Peck		" "	13.61#	1.32#	8.34#	.34#	1.78#
Senator		" "	13.95	1.36	8.62	.35	2.21
Baroness's Girl		" "	15.87	1.56	9.15	.42	2.88
Average			14.47	1.41	8.7	.37	2.29

Above table shows that the Mean Average Ration for the whole period, of the animals, was as follows,- 14.47# dry matter; 1.41# prot., 8.7# C. H. and .37# eth. ext.

Table XIII.

Results of Trial.

Variation in individual weight while feeding.

Weekly weight of steer during 12 weeks trial-A. G. B.

	W't of steer Peck lbs.	gain or loss lbs.	W't of steer Senator lbs.	gain or loss lbs.	W't of B. Girl heifer lbs.	gain or loss lbs.
Dec. 2nd---	1220	---	1308	---	1042	---
" 9th---	1244	24	1342	34	1074	32
" 16th---	1260	16	1352	10	1098	24
" 23rd---	1260	---	1350	2	1100	2
" 30---	1280	20	1372	22	1120	20
Gain per week		60		64		78
Jan. 6-'00.	1292	12	1390	18	1134	14
" 13---	1282	10	1390	--	1134	--
" 20---	1296	14	1404	14	1162	28
" 27---	1320	24	1412	8	1186	24
per week		40		40		66
Feb. 3---	1336	16	1436	24	1206	20
" 10---	1346	10	1450	14	1218	12
" 17---	1350	4	1474	24	1250	32
" 24---	1370	20	1494	20	1284	34
per week		50		82		98

The above table shows that Peck gained the most during the first four weeks, which is about 60#. But he falls to 40# during the second, and he raised to 50# during the third period. However the weights taken in each week were not so variable. On the other hand Senator shows the best gain during the third period, which is,82#, ha falls to 40# during the second period just as Peck did, and, he gives 64# gain during the first period. Senator shows more weekly varaitions than Peck, the highest gain being 24# and the lowest 2#. Baroness's Girl shows the greatest gain during the third period, however, she falls to 66# during the second period.

Now we observe that all of the animals show the least gain during the second period. By the way, I call your attention to the fact that the first and the last weights were taken after the animals were fed and watered. This is a great mistake, though it does not effect the rate of gain for the whole period.

Table XIV.

The rate of gain of steers during their early period compared with that of ours.

period.	No. of days.	Av. gain per head	Av. gain per week.	Av. gain per day.	No. of period.	No. of days.	Av. gain per head.	Av. gain per week.	Av. gain per day.
				-for-					
		Peck					Senator		
1	28	22.14	5.6	.8	1	28	45.08	11.27	1.61
2	"	54.04	13.51	1.93	2	"	76.72	19.18	2.74
3	"	44.8	11.2	1.6	3	"	44.8	11.2	1.6
4	"	31.36	7.84	1.12	4	"	45.08	11.27	1.61
5	"	4.48	1.12	.16	5	"	18.48	4.62	.66
6	"	67.48	16.87	2.41	6	"	31.36	7.84	1.12
7	"	76.72	19.18	2.74	7	"	76.72	19.18	2.74
8	"	31.36	7.84	1.12	8	"	26.88	6.72	.96
9	"	85.68	21.42	3.06	9	"	34.44	8.61	1.23
		45.98	11.49	1.64			44.39	11.09	1.58
				Averages of both.					

This table shows that during 9 four weeks periods Peck made the best gain during the 9th period, which is 85.68# for four weeks, 21.42# per week and 3.06 per day. The lowest gain he made was 5.6# per week and .8# per day which was during the first period.

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Table XV.

Monthly weight taken by Mr. Smith during the period of fattening.

Date	Weight of steer Peck	Gain or loss	Weight of steer Senator	Gain or loss
Dec. 1st, 1898	730#	---#	740#	---#
Jan. 1st, 1899	755	25	790	50
Feb. 1st, "	815	60	875	85
March 1st, "	860	45	920	45
April 1st, "	895	35	970	50
May 1st, "	890	5	990	20
June 1st, "	965	75	1025	35
July 1st, "	1050	85	1110	85
Aug. 1st, "	1085	35	1140	30
Sept. 1st, "	1180	95	1180	40

The above table shows that the highest gain for Peck was 95# during the month of August, the lowest 25# while he was in proper condition for fattening, on the other hand Senator made the best gain during the month of January, being 85#, the lowest is 20# during April. In comparing these results with the gains that they made during the short period of our trial, we found that they made better records in our hands. We do not doubt that they had good care under Mr. Smith. However, we cannot help asking the question , why is it that they gave better results when they were already finished than in poor condition?

Table XVI.

The effect of age, breed and condition on rate of gain.

Name of animal.	Age	Breed	Cond.	Weight at commencment.	Gain in 12 weeks.	Gain per week.	Gain per day.
Peck	705 days	Ab. Angus	fair	1220#	150#	12.5	1.78
Senator	730 "	" "	well	1308	186	15.5	2.21
Baroness 's Girl	710 "	Shorthorn	poor	1042	242	20.16	2.88
Average							

The above table shows that the Shorthorn heifer made the best gain, perhaps most ly on account of her poor condition than the breed. The following table shows the same thing , but in three successive four weeks periods.

Table XVII.

Comparison of the first and last periodical gains.

Name of animal.	Period	Length of period	Av. gain per head.	Av. gain per week.	Av. gain per day.
	No. 1	28 days	60	15	2.14
Peck	No. 2	" "	40	10	1.42
	No. 3	" "	50	12.5	1.78
	No. 1	" "	64	16	2.28
Senator	No. 2	" "	40	10	1.42
	No. 3	" "	82	20.5	2.92
	No. 1	" "	78	19.5	2.78
Baroness's Girl	No. 2	" "	66	16.5	2.35
	No. 3	" "	98	20.45	3.5

In comparing Table XV. with Table XVII. we observe that the steers did show better results during the last part of their feeding period than the 1st. This result seems to be so marked and contrary to those obtained by different experimentors.

Table XVII. B.

Comparison of the effect of age and condition on the rate of gain.

Name of animal.	Age	Breed	Cond.	W't at beginning.	Total gain.	Gain per week.	Gain per day.
Peck		Ab.Angus	young	730	413.84	11.49	1.64
Senator			young	740	399.56	11.09	1.58
Average				735	406.7	11.29	1.61
Peck	705days	" "	fair	1220	150	12.5	1.78
Senator	730 "	" "	well	1308	186	15.5	2.21
Average				1264#	168#	14.#	1.99"

The above table shows plainly that the average gain for both, during our trial was higher than that in their early period; one being 1.99# per day, and the other 1.61#. Why is it that we get such a good result as this? If it is true that they make better gain in the early period, why did they not in this experiment??

Table XVIII.

The amount of feed consumed for 100# gain, and cost of the same during each period according to three different rations.

Name	Ration & period	Gain in 28 days per head	Gain per head per day	Am't of grain for 100# gain	Hay for 100# gain	Roots for 100# gain	Cost for 100# gain
Peck		60#	2.14#	256.66#	210.#	1400#	$4.69
Senator	No. 1	64	2.28	240.62	218.75	1312.5	#4.48
Baroness's G.		78	2.78	251.16	215.38	1076.91	$4.26
Average		67.33	2.40	249.48	214.71	1263.13	"4.47
Peck		40.	1.42	315.	280.	3150.	$7.60
Senator	No. 2	40.	1.42	350.	332.5	2940.	$7.82
Baroness's G.		66.	2.35	296.96	254.54	1654.54	$5.48
Average		48.66	1.73	320.65	289.01	2581.51	$6.96
Peck		50	1.78	280.	280.	2520.	$6.12
Senator	No. 3	82	2.92	179.26	179.26	1434.14	$3.69
Baroness's G.		98	3.5	200.	171.42	1114.28	$2.79
Average		76.6	2.73	219.75	210.22	1689.47	$4.18

The above table shows that it took on an average of grain, 214.71#, clover hay, and 1263.13# roots to make 100# gain live weight, during the first period with the first ration, costing $4.47 per hundred. During the second period it took 320.65# grain, 289.01# hay and 2581.51# sugar beets, which cost $6.96 per hundred pounds: but that during the third period the amount of feed consumed for 100# gain was

Continued.

219.75# grain, 210.22# hay and 1689.47# sugar beets, thus making the average value of each 100# gain $4.18. Therefore we notice readily that the trial of the third period was the most economical.

Average cost for 100# gain for each animal during whole period.

The following table shows that the average cost for 100# gain for three periods of three animals separately, was $6.13 for Peck, $5.33 for Senator, and$4.16 for Baroness's Girl. We notice that Baroness's Girl had the lowest cost and Peck stood the highest. The average cost of each during the whole period was $5.26 per 100# which, considering the unfavorable conditions is quite reasonable. Hence, it took only $5.26¢ to produce one pound of flesh live weight.

Table XIX.

Average cost for 100# gain, live weight, each animal.

Name	Ration	Period	Cost 100# gain.	Av. cost 100# gain.	cents. 100# gain.
	No. 1	1st 4 w's.	$4.69		
Peck	No. 2	2nd " "	$7.60	$6.13	6.13
	No. 3	3rd " "	$6.12		
	No. 1	1st 4 w's.	$4.48		
Senator	No. 2	2nd " "	$7.82	$5.33	$.33
	No. 3	3rd " "	$3.69		
	No. 1	1st 4 w's.	$4.26		
Baroness's Girl	No. 2	2nd " "	$5.48	$4.16	4.16¢
	No. 3	3rd " "	$2.74		
Average				$5.26	5.26¢

Here also we see plainly that the third ration, though poorest of all, in the amount of digestible nutriments gave the most economical results.

Table XX.

Table Showing the various gains in different successive periods.

Name	Date	Total gain.	Av. gain per week.	Av. gain per day.	Total gain.	Av. gain per week.	Av. gain per day.
	Dec2-						
	" 30.	60	15	2.14			
	" 30-						
Peck	Jan.27.	40	10	1.42	150	12.5	1.78
	" 27-						
	Feb.24.	50	12.5	1.78			
	Dec.2-						
	" 30.	64	16	2.28			
	" 30						
Senator	Jan.2.	40	10	1.42	186	15.5	2.21
	" 27-						
	Feb.24.	82	20.5	2.92			
	Dec.2-						
	" 30.	78	19.5	2.78			
	" 30-						
Baroness's Girl	Jan.27.	66	16.5	2.35	242	2o.16	2.88
	" 27-						
	Feb.24.	98	20.45	3.5			
					196.66#	16.05#	2.29#

These figures show the total and average amount of gain by each individual animal , and all during three successive periods.

Table XXI.

Total Amount of Gain in Three Periods.

Table showing the total amount of gain by three successive periods.

Name	Period	Gain per period.	Gain per week.	Gain per day.	Total gain in 12 weeks.	Av. gain per week.	Av. gain per day.
Peck	1st. 4 w'ks.	202#	505#	7.21#			
Senator	2nd. 4 w'ks.	146	36.5	5.21	578#	48.16#	6.88#
Baroness's Girl	3rd. 4 w'ks.	230	57.5	8.21			
Average	1st. 4 w'ks.	67.33	16.83	2.4			
	2nd. 4 w'ks.	48.33	12.16	1.7	192.66	16.05	2.29
	3rd. 4 w'ks.	76.33	19.16	2.74			

The above table shows the total and average amount of gain by three animals per period, per week and per day. And, also, the final average gain of all for the whole period. The gain is quite variable in three successive periods of four weeks each, probably due more to the climatic condition than to the food itself. So the average daily gain during the whole period of trial was 2.29#.

Table XXII.

The Amount of Feeding Stuff Consumed.

Table Showing the amount of feeding stuff consumed.

Name	Time	Av.w't. of the animal.	Av. daily gain.	Feed per animal daily. Mixed grain.	Cut clover hay.	Sugar beet.
	1st.p'd.	1252.8#	2.14#	5.5#	4.5#	30#
Peck	2nd "	1314.	1.42	4.5	4.	45
	3rd "	1344.4	1.78	5.	5.	45
	1st.p'd.	1344.8#	2.28#	5.5#	5.#	30#
Senator	2nd "	1393.6	1.42	5.	4.75	42
	3rd "	1413.2	2.92	5.25	5.25	42
	1st.p'd.	1086.8	2.78#	7.#	6#	30#
Baroness's Girl	2nd "	1147.2	2.35	6.25	6.	39
	3rd "	1208.5	3.5	7.	6.	39

The above table shows the amount of feeding stuff consumed according to three different rations, in each period. There was a wide difference in the daily variation. However, the feed per animal, consumed in each period is practically the same, except sugar beets. Baroness's Girl shows better gain with the same amount of feed during the third period than in the second. The contehts of this table will reveal to you a new insight of standard ration.

Amount of Feeding Stuff Consumed by Period.

Table Showing the amount of feed consumed by each by periods.

	Per four weeks.			per week.			Per day.		
Date	Cut clover hay.	Mixed grain.	Sliced sugar beets.	Hay	Grain	Beet	Hay	Grain	Beet
				For Peck.					
	lbs.	lbs.	lbs	lbs	lbs.	lbs	lbs.	lbs.	lbs.
Dec.2-." 30.	126	154	840	31.5	38.5	210	5.5	4.5	30
" 30-Jan.27.	112	126	1260	28.	31.5	315	4.5	4.	45
" 27-Feb.24.	140	140	1260	35.	35.	315	5.	5.	45
				For Senator					
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs
Same	140	154	840	35.	38.5	210	5.5	5.	30
as before	133	140	1176	33.25	35.	284	5.2	4.75	42
	147	147	1176	36.75	36.75	284	5.25	5.25	42
				For Baroness's Girl.					
	lbs.	lbs.	lbs.	lbs	lbs.	lbs	lbs.	lbs.	lbs.
Same	168	196	840	42	49	210	7.	6	30
as before	168	173	1092	42	47.25	273	6.25	6	39
	168	196	1092	42	49.	273	7.	6	39

The above table shows, as near as possible, the average amount of feeding stuff consumed for three animals, and each, during three periods of trial. That is to say, on an average each of them consumed

Continued.

per day, 5.16# hay, 5.66# grain and 38# sugar beets to give 2.29# daily gain.

Table XXV.

Comparison of 84 days trial at Ontario and Michigan Agricultural Colleges.

Roots fed	Wt of animal at commencement.	Daily increase.	Feed for steer daily. Hay	Bran	Pea meal.	Roots.
Sugar Beet	1059	2.31	10.5	3	6.5	52
Many Rts.	1063	2.38	11.5	3	6.5	55
Turnips	1061	2.30	12.	3	6.5	52
Average	1061	2.33	11.3	3	6.5	53
Feed for 100# gain			485	129	279	2275

Results of 84 days trial with sugar beet for cattle feeding. - M. A. C.

Roots fed.	W't of animal at commencement	Daily increase	Feed per animal daily. Hay	Grain	Roots	Name
Sugar Beet	1220	1.78	4.5	5.	40	Peck Senator
" "	1308	2.21	5.	5.25	38	B's Girl
" "	1042	2.88	6.	6.75	36	
	1190	2.29	5.16	5.66	38	
Feed for 100# gain.			225.33	247.11	1688.88	

In comparing these two tables we find that it required a less amount of feed to produce the same amount of gain in our trial that it did at Ontario Agricultural College Experiment Station. As you notice the average weight of the animals was about 43# grater than those of the Ontario College yet when under these conditions we see clearly that it took only on aa average 225.33# of hay, 247.11# of grain and 1688.88# of sugar beets for 100# of gain live weight, at M. A. C., but on the other hand at the Ontario Agricultural College it took 485# of hay, 129# bran, 279# pea meal and 2275# of roots, for the same amount of gain. Our result seems to be remarkable when compared with that of the Ontario College.

Total.

The amount of feed consumed for 100# gain, and cost of the same during 12 weeks trial.

The following table shows that it cost $9.41 to produce 150# gain, live weight, for Peck, $9.91 to produce 186# gain, live weight, for Senator and $10.06 for Baroness's Girl to produce 242# gain. Also, on an average, it cost only $9.79 to produce 196.66# of flesh during the whole period. Hence the cost is $5.26 per 100# gain.

Table XXVI.

Table showing the total amount of feed consumed for 100# gain and cost of the same.

Name	Feeding stuff	Gain in 84 days per head	Gain per head per day	Total cost of food per head	Grain for 100# gain	Hay for 100# gain	Roots for 100# gain	Cost for 100# gain
		lbs.	lbs.		lbs.	lbs.	lbs.	
Peck	O.M.Oil Meal,W.B.	150	1.78	$9.41	280	252	2240	$6.13
Senator	S.Beet C.Meal	186	2.21	$9.91	237.09	225.8	1716.12	$5.33
B.Girl	" "	242	2.88	10.06	234.29	208.26	1249.58	$4.16
Average		192.66	2.29	$9.79	250.46	228.68	1401.90	$5.26

Continued.

These calculations are made according to the following prices.

	Per ton.	Per pound.
Corn Meal	$14.00	.7¢
Oil Meal	$25.00	1.25¢
Oat Meal	$25.00	1.25¢
Wheat Bran	$12.50	.625¢
Clover Hay	$ 8.00	.4¢
Sugar Beets	$ 2.50	.125¢

Table XXVII.

Economic value of the trial.

Name	W't at the commencment	Cost for each	Cost of food during the trial	Their value, market value	Profit or loss.
	lbs.				
Peck	1200	$60.	$9.41	$66.82	-$2.59¢
Baroness's Girl	1000	$39.52	$10.06	$59.90	$10.32¢
Average	1100	$49.76	$9.73	$63.36	$3.86

The above table shows that the average cost of each animal at the beginning of the trial was $49.76¢, weighing 1100, and the average cost of the feed per animal for the whole period was $9.73. They brought in, after deducting all expenses incurred for their shipment and sale, on an average $63.36¢, clear money, giving an average net profit of $3.86¢ per animal. Senator is not taken into account in this calculation because he was not sold, but he was kept for the Chicago Stock Show in 1900 that will take place some time during the next fall.

Continued.

However, my belief is, that Senator would have increased rather than decreased our profit. The animals were sold by Carrier and Robinson to A. W. Smith, at Buffalo, March 12th, 1900. Had the market been favorable for beef, we would have made an average net profit for each animal of at least $15.00 However, we believe, as far as business is concerned, it was profitable to ship the animals as soon as they were ready for the market. Though it always pays to put the animals on the market as soon as they are all in good condition. This will please both the purchaser and seller, and moreover, it will create a good reputation which will always bring higher prices than otherwise. In the first case the stockman will go (follow) the market, and in the other, the market will seek the stockman. The last condition should be always preferred.

Table XXVIII.

Live and Dressed Weights of the Steers and Heifer.

Live and dressed weights of Aberdeen Angus steers and heifer fed at M. A. C.

Name	W't in Buffalo	Dressed beef	Dressed fat & tallow%	Dressed beef fat & tallow%	Dressed beef%
Roxie	1680#	1083#	145#	73.93%	64.46%
Wiggins	1660	988	145	68.25	59.51
Peck	1280	810	102	71.25	63.28
Johnson	1050	630	80	67.61	60.00
Baroness's Girl	1230	714	84	64.87	58.86

Continued.

Percent of fat and tallow in relation to.

Name	Live weight	Dressed beef fat and tallow	Dressed beef
Roxie	8.62#	11.80#	13.30#
Wiggins	8.73	12.79	14.67
Peck	7.96	11.18	12.59
Johnson	7.61	11.26	12.71
Bareness's Girl	6.82	10.52	11.76

The above table was prepared by Mr. Ferguson, Canadian, with the consent of Professor Mumford for the M. A. C. Record, and published in No. 29, Vol. 5, April 10th, 1900 with the following remarks,-

"During the past week the Farm Department received and tabulated the data obtained in connection with the beef steers and heifer fed at the farm this winter, and subsequently sold on the Buffalo market. While the showing of all animals is good, that of Roxie is exceptional, in that, if not actually the best on record it is very close to the champion. From Secretary Coburn's "The Beef Steer," we learn that the best record of "Net Dressed Meat" given, was that of the pure bred Shorthorn Steer, Clarence Kirk Livingston, which dressed 70 per cent. Roxie dressed 73.93 percent."

[illegible]			
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Theory of the Profit of Feeding Finished Cattle: -

Suppose we had sold Senator at the beginning of our trial, other things being equal, we would have received ½ cent less for each pound of flesh than we would after having increased his weight by 200#.

For example: -

Animal weight at commencement was---------- 1200#
It was sold 5.5¢ per pound live weight---------- 5.5
Total amount received(expenses are----------$66.00
not taken into consideration).

The animal weight after trial was----------1400#
It was sold at 6¢ per pound live weight---------- 6¢
Total amount received----------$84.00

Now, suppose, our trial was not profitable. That is to say, it cost us six cents to increase per pound flesh, that is what we got for it, but mark you even under this condition, we made $6.00 net profit. Because if we had sold the animal at the commencement we could have gotten only $66.00 but we now receive $72.00,-

that is,

1200# 5.5¢ =$66.00
1200# 6 ¢=$72.00
Net profit $6 .00

In this calculation the fluctuation of the price of beef on the market, and the unfavorable condition for the feeding of cattle are not taken into consideration.

Remarks and Suggestions.

This trial, though not very extensive in nature, reveals some facts in regard to the rations, average gain per day, percent of dressing, and the effect of age and condition upon the rate of gain that are contrary to the books. The question then is, not simply to deny the results thus obtained with improper criticism, but proceed to disprove or establish them with a trial that will be comparatively extensive. I believe that such an experiment will prove to be very interesting and valuable both scientific and practical. Stockmen of the state, We do not question that the results obtained from our trial can be altered or modified more or less under different climatic and non-climatic conditions. Yet, I insist upon the proposition that the facts observed from these results will remain always unchanged. I do not mean by this at all that a Standard Ration is useless, on the contrary it may be useful at certain periods at certain times, but not essential.

Hence I suggest to our Experiment Station that they allow some conscientious student to take two lots of steers, five animals in each lot, as nearly alike as possible in all points and conditions and feed lot No. 1, according to American and German Standard Rations, but the lot No. 2, according to the most economical rations regardless of the ration principle itself. The experiment should run at least two years under the management of a single person having in mind the following prineiples,-

1. Be kind with the steers at all times and in all places. Avoid harsh expressions and profanity while feeding or cleaning.

2. Be conscientious and manly in your feeding.

3. Be honest, accurate and particular in your records.

Continued.

4. Observe the principles of feeding - "Be always on time" - as promptness in feeding is essential.

b. "Avoid sudden changes. Increase and decrease your grain rations gradually."

c. "Water the animal at least twice a day."

d. "Provide some exercise for the animal according to the climatic conditions."

Note:- I prefer not to feed the grain, hay and roots at the same time. It is better to feed one kind at a time, because in the first place you will be able to keep accurate record of wasting stuffs, and secondly animals will not be apt to waste so much.

Summary.

Facts observed:-

1. The kind treatment of the feeder is much more important in feeding stock, especially at the end of the fattening periods, than the feed itself.

2. Regularity in feeding is essential for obtaining the best results and the proper condition of the animal.

3. It pays, and moreover it is necessary, to be conscientious in stock feeding.

4. Do not feed the animal according to your habit, but according to the appetite and climatic conditions.

5. Standard ration is not necessary for an economical gain, it may be beneficial, but not essential.

6. A finished steer can be fed more or less profitably with proper care.

7. Under favorable conditions the time of watering - before or after meals - will not effect the rate of gain.

8. The animal should be watered at least twice a day.

9. Cleanliness effects the rate of gain. The cleaner the animal, the stall and the surroundings are, other things being equal, the greater the average gain, and vica versa.

Continued.

10. Weather affects the rate of gain as well as increases or decreases the amount of feed. The warmer the weather the less the consumption of feed and vice versa.

Points of interest:-

1. The average daily gain for each animal for the whole period of our experiment was 2.29#.

2. The average cost for 100# gain, live weight, was $5.26¢.

3. The average amount of feed consumed per day for each animal was 5.16# cut clover hay, 5.66# grain and 38# sugar beets.

4. The highest ration fed was as follows:-

Dry matter 16.46#, protein 1.54#, carbo-hydrates 9.84#, ether extract .36#. This ration gave a daily gain of 3.5# during the third period of our trial.

5. The steers gained 158# per day when they were about of an average a year old, and 1.88# when two years old.

6. Peck dressed 71.25 percent, and Baroness's Girl 64.87. Senator would have exceeded both of these, and perhaps equaled Roxie, if not exceeded her. She dressed 73.93 percent.

7. The average net profit of each animal was $3.86¢ for the whole period.

8. The average mean ration of all animals for the whole period was 14.47# dry matter, 1.41# protein, 8.7# carbo-hydrate and .37# ether extract.