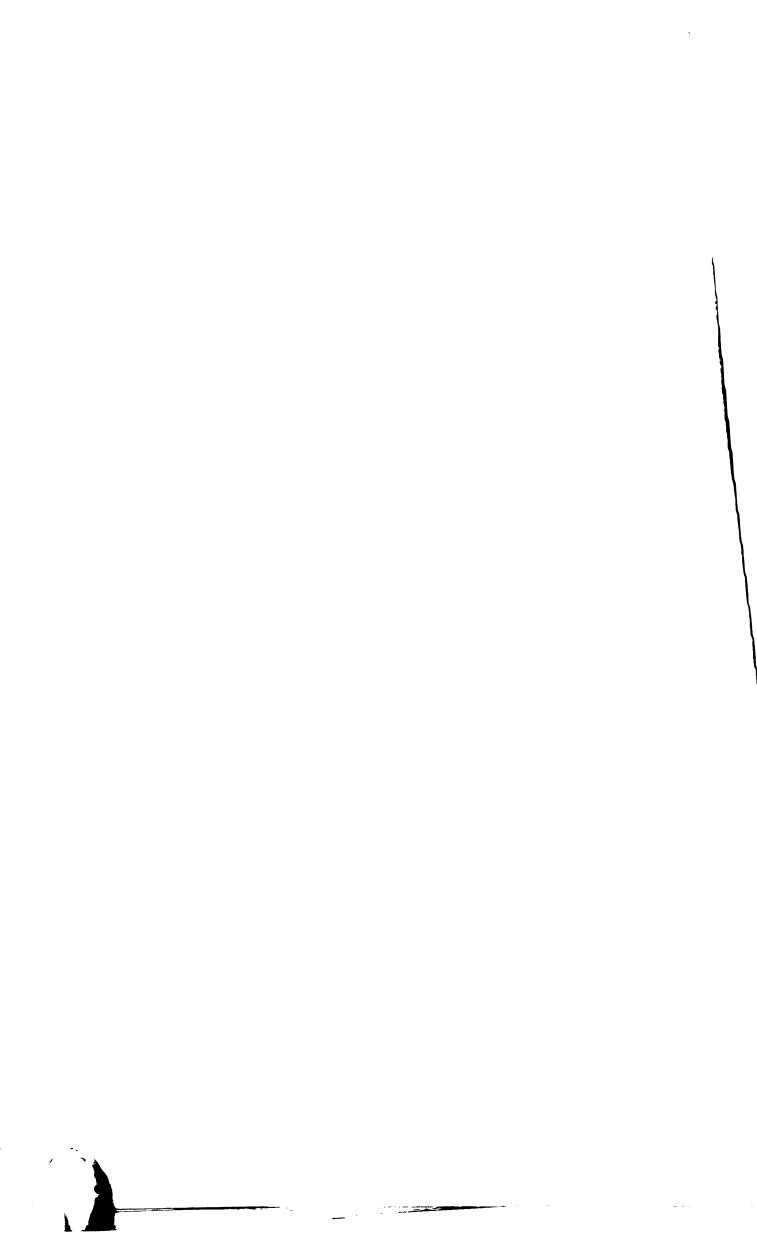


FEEDING FINISHED STEERS

Thesis for the Degree of B. S. Antranig G. Bodourian 1900



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Thesis

on

Feeding Finished Steers.

By

A. G. Bodourian.

Michigan Agricultural College, 1900.

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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.

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History and Object in View.

During the latter part of the fall term 1899 the Superintendent of Michigan Agricultural College Farm - Herbert W. Humford, 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 <u>Short Wourse</u> 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 Cellege grounds their condition was very striking, so there was some doubt whether anything could be done with the steers; but after several eonsultations 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.

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Environment.

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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. Nowever, 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,-

Norming 6 a. m.	Noon 12:30 p. m.	Evening 4 p. m.
Gut Clover Hay,		
Hixed Grain,	Sugar Beets	Same as in the
Sugar Bests,	alone	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

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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 "heat 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 1 – e grant elle – Tromandor and same ellering conservation de lever (loorenge) lightere ellering en transmissione ellering en transmissione ellering en transmissione ellering e ellering elle ellering e ellering e

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<u>nationa</u> national and the take there t Hixture No. 3 for the 3rd four weeks.

By Weight,-

+ Corn Heal

1 Wheat Bran

Feeding Stuffs and Percentage of Their Digestibility.

The following table shows the average coefficients 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 emitted in the third period of our trial, in order to reduce the economic value of the ration.

Table I.

	Percen	tage Dige:	stibility	
Feeding Stuff	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	1.1.
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

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Table II.

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

			Digesti	ble Nutrim	ent.	
Feeding Stuff.	lbde	D. M		C. H.	eth. ext.	N. Retio
Mixture No. 1.	5.5	2.45	.217	1.83	.118	
å:			.07	.35	.04	
Clover Hay	4.5	.63	.17	.29	.07	
æ		1.21	.17	.55	•046	
Sugar Beet	30.	3.81	.3	1.61	.076	
		4.05	.33	3.06	.03	
	I	2,78	1.257	7.69	.38	
W. L. Standard	7	0 .	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#.

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Table III.

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

Deeddaw fituer	'ha	D• N•		Nutrient Digestible.				
Feeding Stuff.				С. Н.	eth.ext.	I. Ratic		
Mixture No 2.	4.5	1.49	.13	1.12	.07	<u></u>		
æ		1.43	.21	.67	.05			
Clover Hay	4.	1.04	.29	. 49	.12			
₹c		3.38	.27	1.43	.06			
Sugar Beet	45.	6.07	4 9	4.59	.64			
		13.41	1.39		, 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%.

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

Feeding Stuff.	lbs	D.H.	Dicestible Nutriment.				
- Course pours				С. Н.	eth.ext.	N. Ratio	
Mixture No. 3	5.	2.22		1.66	. l		
æ		2.15	.32	1.	.08		
Clover Hay	5.	4.23	.34	1.79	.08		
۵		S.07	.49	4.59	.04		
Sugar Beet	4 5.						
		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 $1.78\frac{4}{7}$. It is higher than the second by .36¢, and less than the first by .36 ‡.

 VI.	1.0	187

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 Γ.	1.65	ęr.	5.02	5.	E .om ernfall
80.	1.	22.	21.10		. A
80.	1.79	1.7.4	67.8	5.	Clover INT
40.	4.52	C2.	4.07		- Ba
	_			.73	feet Taura
а.	10.9	1.7.1	24.73		

Trial Ration(third period) for peek, weighing 1320d'.

This third mition comparatively is the ristent of the three. Yet during this period the animal vergled more than before. The average daily gain was 1.00%. It is higher than the second by .30%, and less than the first by .30%.

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

	jpa		Digestible Nutriment.					
Feeding Stuff.		D. M	prot.	C. I.	eth.ext.	N. Ratio		
Corn Meal	2.75	2.45	.217	1.83	.118			
Oil Meal		.63		.35	.04			
Oat Heal	.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 sable 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.

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Table VI.

Trial	Ration	second	period)	for	Senator,	weiching	1372#
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	lba.		Digestible Mutriment.					
Feeding Stuff		₽•₩•	prot.		eth.ext.	N. Ratio		
Corn Meal	1.875	1.67	.14	1,25	.08			
Wheat Bran	1.875	1.65	. 24	.75	.06			
011 Meal	1.25	1.14	. 7.2	. 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.	○ .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#.

	1 bs .	D. M.	Digestible Intriment.					
Feeding Stuff.				C. H.	eth.axt.	N. Ratio		
Corn Meal	2,625	2.33	•5	1.75	.11			
Wheat Bran	2.325	2.32	. 33	1,05	.08			
Clover Hay	5.25	4.44	. 35	1.87	• 0 8			
Sugar Beet	42.	5.67	• 46	4.28	.04			
• •	-	14.76	1.34	9.47	.31			
W. L. C.	- - * ,	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 $2.92\frac{\pi}{2}$, being higher than any of the best.



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Table VIII.

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

129.	- D. M.	Digestible Hutriment.					
	De ile		C. .	eth.ext.	ll. Ratio		
3.5	2.33	.27	2.33	.15			
1.75	1.54	.22	. 7	•05			
.875	•8	. 2.2	.37	•0 9			
.875	.8	.1	• 45	.05			
6.	5.	. 4	2.14	.1			
0.	4.05	• 33	3.06	•03			
	15.30	1.54	9.05	.47			
	30.0	2.5	15.	• 5	1:6.5		
	1.75 .873 .875 6. 0.	$1.75 1.54 \\ .875 .8 \\ .875 .8 \\ 6. 5. \\ 0. 4.05 \\ . \\ 15.30 $	3.5 2.33 .27 $1.75 1.54 .22$ $.875 .8 .22$ $.875 .8 .1$ $6. 54$ $0. 4.05 .33$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3.5 2.33 .27 2.33 .15 $1.75 1.54 .22 .7 .05$ $.875 .8 .22 .37 .09$ $.875 .8 .1 .45 .05$ $6. 54 2.14 .1$ $0. 4.05 .33 3.06 .03$ $.154 9.05 .47$		

This ration falls below the standard very heavily. It is defieient in all constituents. However the \forall . 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).

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Table IX.

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

	2 b s .		Digestible Intriment.					
Feeding Stuff.				С. Н.	eth.ext.	I. Fatio		
Corn Meal	2.34	2.08	.18	1.55	.1			
Wheat Bran	2.34	2.07	• 3	.93	• 07			
011 Meal	1.57	1.44	.4	.07	.17			
Sugar Beet	<u>59</u> .	5.26	.42	3.97	.01			
Cut Clover Hay	ñ.	5.	• 4	2.14	.1			
		15.85	1.00	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 wrot. 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#.

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Table X.

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

]} 9.	D. I.	Digestible Nutriment.					
Feeding Stuff.			prot.	C. F.	eth.ext.	I. Ratio		
Corn lieal	3.5	3.11	.27	2.33	.15			
Wheat Bran	3 .5	3,09	.45	1.4	.1			
Clover Tay	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 \mathbb{V} . L. Standard. It is richer in dry matter and C. F. than the preceding ones but lacks in eth. ext. Yet the average daily gain for this period is $3.5\frac{\mu}{2}$. Taking in consideration the ration on which she was fed, the average gain seems to be remarkable.

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Table XI.

Mean Rations.

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

Nane	Rat- ion.	-	D.K	Dicestible Nutriment.				
					C.∐.	eth. ext.	Lain per day.	
	No.l.	lst.	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.l.	lst.	12.99	1.277	7.77	.374	2 .2 8	
Senator	No.2.	2nd.	14.12	1.48	8.52	. 39	1.42	
	110.3.	3rd.	14.76	1.34	9.47	.31	2.92	
Average			13,95	1.36	8.62	.35	2.11	
	No.1.	lst	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.

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Table XII.

Mean Ration for the whole period of the animals.

Table showing the average Mean Ration for the whole

period.

Names	Av. Rat- ion.	whole period		D. K	Digestible Hutriment.				
	for the whole period	•	prot		С.Н.	eth. ext.	Daily gain.		
		12 v	v12:s	•			******	169.	
Peck		Ħ	11	13.61#	1.32#	8.34 <u>#</u>	.34#	1.78 <u>#</u>	
Senator		17	11	13.95	1.36	8.62	.35	2.21	
Baroness's Girl		Ħ	19	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.

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Table MIII.

Results of Trial.

Variation in individual vertex while feeding.

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

	Wit of steer Peck Ng	Cain or loss lts	wit of steer Sena- tor lbs.	Cain or Loss Ibs.	Wit of B.Cirl heifer lbs.	Uain or loss lbs
Dec. 2nd	1220		1308		1042	• • •
• 9th	1244	24	1342	34	1074	32
" 16th	1260	13	1352	10	1098	24
• 23rd	1260		1350	2	1100	2
• 30	1280	20	1372	2.2.	1120	20
G ain per week		<u>60</u>		64		78
Jan. <u>6</u> -100.	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. 5	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

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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. Genator 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. لل ه بالمحالي بالذكر بالمحالي المالي المحالي المحالي بالمحالي ب محالي بالمحالي محالي محالي محالي محالي محالي محالي محالي محالي بالمحالي محالي محالي محالي محالي محالي محالي محالي بالمحالي محالي محالي محالي محالي بالمحالي بال محالي محالي بالمحالي محالي بالمحالي محالي بالمحالي محالي مح

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Table XIV.

The rate of gain of steers during their early period compared with

t at of ours.

	No. of days	Av. Gain per .head	Av. gain per veek.	Av. gain per day.	No. of per- iod.	No. of days.	Av. gain per head.	AV. Sain per week.	Av. gain per day.
					-for-				
		P	eck				Sena	tor	
1	28	22.14	5.6	.8	1	28	45.08	11.27	1.61
2		54.04	13.51	1.93	2	17	76.72	19.18	2.74
3	18	44.8	11.2	1.6	3	11	44.8	11.2	1.6
4	W	51.36	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	₩ 1	31,36	7.84	1,12	8	57	26.88	6.72	.96
9		85.68	21.42	3.06	9	11	34.44	8.61	1.23
		45,98	11.49	1.64			44.39	11.09	1.58
					Avera	es of b	oth.		

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	\mathbf{fa}	tt	eni	ng.
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Date	Weight of steer Peck	Gain or loss	Veight of steer Senator	Gain or loss
Dec. 1st, 1898 Jan. 1st, 1899	730# 755	<u>#</u> 25	740- <i>":</i> 790	# 50
Feb. 1st, "	815	60	875	85
March 1st, "	860	45	920	45
April 1st, "	895	35	970	50
ay 1st, "	890	5	9 9 0	20
June 1st, "	965	75	1025	35
July 1st, "	1050	8 5	1110	85
lug. 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 $25\frac{4}{2}$ while he was in proper condition for fattening, on the other hand Senator made the best gain during the month of January, being $85\frac{4}{2}$, 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 Hr. 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?

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Table XVI.

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

Name of animal.	Age		Breed	Cond.	Weight at com- menc- ment.	Gain in 12 weeks.		Gain per dey.
Peck	705	days	Ab. Angus	fair	1220#	150#	12.5	1.78
Senator	730	¥	81 1 7	well	13 08	186	15.5	2.21
Baroness 's Girl	7 10	W	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.

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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 deys	60	15	2,14
Peck	110. 2	11 11	40	10	1.42
	110 . 3	n n	50	12.5	1.78
	No. 1	17 17	64	16	2,28
Senator	No. 2	17 17	40	10	1.42
	No. 3	11 11	82	20.5	2.92
	No. 1	17 19	78	19.5	2.78
Baroness's Girl	No. 2	17 17	66	16.5	2.35
	No. 3	t7 TF	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 lst. This result seems to be so marked and contrary to those obtained by different experimentors.

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Table XVII. B.

Comparison of the effect of age and condition on the rate

of gain.

Hame of animal.	Age	Bre	ed	Cond.	Wit at begin- ning.	Total	(lain per week.	Gain per dey.
Peck		Ab.	Ang:	isyoung	730	413,84	11.49	1.64
Senator				young	7 40	39 9. 56	11.09	1.58
Average					735	406.7	11,29	1.61
Peck	705days	11	W	fair	1220	150	12.5	1.78
Senator	730 "	π	Ħ	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??

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Table MVIII.

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

name	Ration & period	Cain in 28 days per head	Cain per head per day	Am't of Crain for 100# Eain	Fay for 100# gein	Roots for 100# gain	Cost for 100 <u>#</u> gain
Peck		60 <u>-</u> 1	2.14#	256.66#	210.4	1400#	4.6 9
Senator	. l	64	2.2 8	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.	₹7.6 0
Senator .	No. 2	40.	1.42	350.	332.5	2940 .	ð 7 82
Baroness's C.		66.	2.35	296.96	254.54	165 4,54	\$5.4 8
Ave ra ge		48.66	1.73	320.65	289.01	2581.51	\$6.9 6
Peck		50	1.78	280.	280.	2520.	\$6 .12
Senator	10. 3	82	2.92	179.26	179.26	1434.14	\$ 3 .69
Baroness's G.		98	3.5	200.	171.42	1114.28	<u>\$</u> 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

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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 $100\frac{4}{2}$ 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, \$5.33for 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.

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Table XIX.

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

Name	Fation	Period Cos	st 100# Av. Eain. 100	eost en # gain.	nts.
	No. 1	let 4 w's.	\$4.69	****	<u></u>
Peck	No. 2	2nd " "	\$7.60	\$6.13	6.13
	10. 3	3rd " "	36.12		
	No. 1	lst 4 w's.	\$4.4 8		
Senator	Mo. 2	2nd " "	\$7.82	\$ 5,3 3	\$. 33
	No. 3	3rd " "	\$3 . 69		
	No. 1	lst 4 w's.	\$4.2 6	**-*******	
Baroness's Girl	No. 2	2nd " "	ۇ5 ∎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.

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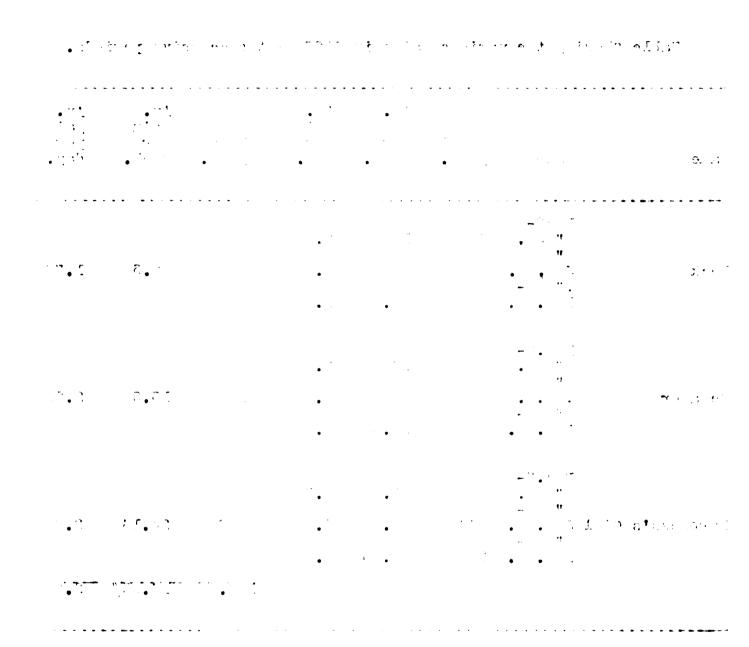
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Table XX.

Table Showing the various gains in different successive periods.

60 40 50	15 10 12,5	2.14 1.42 1.78	250	12.5	1.78
40	10].42	350	12.5	1.78
-			150	12.5	1.78
50	12,5	1.78			
64	16	2.28			
40	10	1.42	186	15.5	2.21
82	20.5	2 .92			
78	19.5	2.78			
66	16.5	2.35	242	20.16	2.88
98	20.45	3.5			
			196.66 #	16.05#	2.29#
	66	66 16,5	66 16.5 2.35	66 16.5 2.35 242 98 20.45 3.5	66 16.5 2.35 242 20.16 98 20.45 3.5

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



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Table XXI.

Total Amount of Gain in Three Periods.

Table showing the total amount of gain by three

successive periods.

Name	Period	Gain per per- iod.	Gain per week.	Gain per day.	Total Cain in 12 weeks.	Av. gain per week.	Av. gain per day.
Peck	lst. 4 w'ks.	202#	505#	7.21#			
	2nd.			B	- 1	de la composition de la compos	
Senator	4 w'ks. 3rd.	146	36.5	5.21	578	48.16#	6.88
Baroness's Girl	4 w'ks.	230	57.5	8.21			
		67.33	16.83	2.4			
Average	2nd. 4 w'ks. 3rd.	48.3	12.16	1.7	192.66	16.05	2.29
	4 wiks.	76.33	19.13	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 #.

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Table XXII.

The Amount of Feeding Stuff Consumed.

Table Showing the amount of feeding stuff consumed.

				Fee	ed per a	nime.I	daily.
ITame	Time	Av.w't. of the animal.	daily		Cut clove hay.		Sucar Deet.
	lst.p'd.	1252 . 8#	2.14#	5.5%	4.5 #		50 .
Peck	2nd "	1314.	1.42	4.5	4.	4	15
	3rd "	1344.4	1.78	5 _.	5.	4	15
	lst.p'd.	1344.8 #	2.	28 <i>4</i>	5.5 <i>4</i>	5 . #	30#
Senator	2nd "	1393.6	1.	42	5.	4.75	42
	3 <u>rd</u> "	1413.2	2.	9 2	5,25	5 .25	42
	lst.; 'd.	1086.8	"2 . 78#	7.#	6-"	3	50- <u>"</u>
Baroness's Girl	2nd "	1147.2	2.35	6.25	6.	Ş	59
	3rd "	1208.5	3.5	7.	6.	7	3 9

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 contents of this table will reveal to you a new insight of standard ration.

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Amount of Feeding Stuff Consumed by period.

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

	Per fou	r weeks	3.	per wee	k.		Per da	Per day.		
Date	Cut clover hay.			Hay	Grain	Beet	Fay	G ará i 1	n Beet	
				For Pe	eck.					
	1 b3 .	lbs.	Ibs.	113	l ba	bs.	- 1 bs .	113	its.	
0ec.2-	126	154	840	31.5	38,5	210	5.5	4.5	30	
* 3 0- Jan.27.	112	126	1260	28.	S1.5	315	4.5	4.	45	
* 27- Feb.24.	140	140	1260	35.	35.	315	5.	5.	45	
			:	For Sena	ator					
	1b a	3 6 3.	229.	1bs.	its.	Ibs.	1 US.	1 ba .	lbs	
Jame	140	154	840	35.	38.5	210	5.5	5.	30	
as efore	133	14 0	1176	33,25	55.	284	5.2	4.75	42	
	147	147	1176	36.75	36.75	284	5.25	5.25	42	
			For	Barones	ss's dirl	1.				
	1 b 9.	lba	263.	lts	ોઇલ	1 29 .	Ibs.	1 b 3.] bs.	
58.200	168	196	840	42	49	210	7.	6	30	
as be fore	168	173	1092	42	47.25	273	6.25	R	39	
	168	196	1092	42	49.	273	7.	6	39	

The above table shows, as near as possible, theasverage 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

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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

.

wit of animal at com- menc- Hent.	Daily increase.	Hay	Bran	Pea meal.	Roots.
1.059	2.31	10.5	3	6.5	52
1063	2.38	11.5	3	6.5	5 55
1061	2.30	12.	3	6.5	52
1061	2.33	11.3	3	6.5	53
		485	129	2 79	2275
	animal at com- menc- ment. 1059 1063 1061	animal at com- menc- Daily Hent. increase. 1059 2.31 1063 2.38 1061 2.30	animal at com- menc- Daily Dent. Daily Dent. Daily Dent. Daily Dent. Hay 1059 2.31 10.5 1063 2.38 11.5 1061 2.33 11.3	animal at com- menc- Daily Dent. increase. Hay Bran 1059 2.31 10.5 3 1063 2.38 11.5 3 1061 2.33 11.3 3	animal at com- menc- Daily increase. Hay Pea Bran Pea meal. 1059 2.31 10.5 3 6.5 1063 2.38 11.5 3 6.5 1061 2.33 11.3 3 6.5

Feed for steer daily.

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er der, 5.130 ber, 5.250 preise auf 960 angee 3 etse f.1000. Sublig gala.

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Results of 34 days trial with sugar beet for cattle

feeding. - N. A. C.

				Feed p	er animal (daily.	
Roots fed.	fed.	Wit of animal Daily at com- in- Mencmentcrease	Hay	G f ain	Roots	Hane	
Sucar	Beet	1220	1.78	4.5	5.	40	Peck
W	•	1308	2.21	5.	5.25	58	Sena- tor
		1042	2.88	e.	6.75	36	B's Girl
		•••			1011-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-		
		1190	2.29	5.16	5.66	38	
Feed 1	or 100# cain.			225.33	247.11	1668.88	

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 an average 225.03# 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.

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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 $100\frac{\pi}{t}$ gain and cost of the same.

Cost of	the	san	le.		Total				
Tame	Feed ing stui		Cain in 84 days per head	Gain per head per day	cost of food per head	Grain for 100# Eain	Hay for 100# Esin	Roots for 100# £ain	Cost for l00# Cain
	0.11	<u></u>	123.	lba.		lb s .	lbs.	lbs.	
Peck		. , ⁷⁷ .	B1 50	1.78	\$9.41	280	252	2 240	\$6.13
Senator	S.Be C.Me		186	2.21	\$9 .9 1	237.0 9	225.8	1716.12	\$5 ,33
B .Girl	**	Ħ	242	2,88	10.06	234,29	208.26	1249.58	\$4. 16
Average			192,66	2.29		250.46	228.68	1401.90	\$5.26

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These calculations are made according to the following prices.

	Per ton.	Per pound.
Corn Meal	0\$14.00	• 7¢
011 Meal	······································	1.25¢
Oat Meal	<u> </u>	1.25¢
Wheat Bran	O∲12.50	.625¢
Clover Hay	@\$ 8.00	. 4 <i>¢</i>
Sugar Beets	O\$ 2.50	.125¢

Table XXVII.

Name	vit at the com- mencment	Profit or loss,			
angender after an der Andersten an der Andersten	lbs.				
Peck	1200	\$60 .	\$9.41	\$66 .82	-\$2.59\$
Bareness's Girl	1000	\$39 . 52	\$10.06	\$59 .90	\$10 . 32¢
Average	1100	49.76	\$9.73	\$63 .36	\$3.86

Fconomic value of the trial.

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 \$63.364, 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.

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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 Buffale, 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 cencerned, 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 $An_{C}us$ steers and heifer

fed at M. A. C.

Hame	W't in Buffelo	Dressed beef	Dressed fat & tellow%	Dressed beef fat & tallow;	Dressed beef;;
Roxie	16807	1083#	145#	73.93	6 4. 46 ."
Wiggins	1660	9 88	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

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Percent of fat and tallow in relation to.

Name	Live weight	Dressed beef fat and tallow	Dressed beef
Rexie	8.62 <u>#</u>	11.80 #	13.30#
Wiggins	8.73	12.79	14.67
Peck	7.96	11.18	12,59
Jehnson	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."

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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 $\frac{1}{2}$ cent less for each pound of flesh than we would after having increased his weight by 200#.

For example: -

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.

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కారి, నిర్యాణకంత కొంటి ఉంటేంటి హిల్యాల కార్డ్ కా ఉందిన నినిస్సర్లు లో అంటా కలియి 3 - గ్రాంజ 13కోలయు 3 లో బృం అంటెలయె. కాలా సరోతో విల్తాలు అందిగాలి గ్రాంజ్ స్థాలకు ని హాలయా నిరిద్దం బోటి కోడితాడు ది నిరాంజ్ లా నిరిద్దంలు కాలను నిరిద్దంలు ని కిర్ణాలో చిల్లి.

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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 nonclimatic 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 centrary it may be useful at certain periods at certain times, but not essential.

Hence I suggest to our Experiment Station that they allow some consciencious student to take two lots of steers, five animals in each let, as nearly alake as possible in all points and conditions and feed let No. 1, according to American and German Standard Rations, but the let 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 principles,-

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

2. Be consciencious and manly in your feeding.

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

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

b. "Avoid suddon 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.

Summery.

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.

5. 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. <u>Cleanliness</u> 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 vice versa.

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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 vica versa.

Points of interest:-

l. 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¢.

5. 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.
Senater would have exceeded both of these, and perhaps equaled Roxie,
if not exceeded her. She dressed 73.95 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.

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