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A STUDY
of the
CHEMICAL COMPOSITION OF STEERS
on
DIFFERENT PLANES OF NUTRITION
and of
THE RELATIVE COST
of
MAINTENANCE AND GROWTH
by
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HISTORICAL.

The first classical work along the lines of investigation with which this thesis is concerned was done by Lawes and Gilbert at the Rothamsted Experiment Station, England, about the middle of the nineteenth century. (Phil. Trans., part 2, 1859; "Composition of Animals", Rothamsted Expt. Sta., 1858.) Their work contains the analyses of one calf, two oxen, one lamb, four sheep, and two pigs, and the fresh weights of the individual organs and other separated parts of two calves, two heifers, fourteen bullocks, two hundred forty nine sheep, and fifty-nine pigs. A thorough discussion is made of the table for each constituent determined, and also of the table giving the summary of the composition of the ten animals analyzed. The authors also give tables and discussion of the same on the relation of the constituents stored up in the increase to the constituents consumed in the feed.

Another paper, (Phil. Trans., 1883, p. 865) supplementary to the above publication appeared in June 1883 and dealt wholly with the composition of the mineral matter of entire animals analyzed and of the separated parts.

These authors used the so-called "fasted live weight" for obtaining the percentages of the weights of the organs and parts to the whole. The animal was kept without food for eighteen to twenty-four hours, then weighed just before being killed. This weight constitutes the fasted

live weight. This weight is open to the objection that weight of the contents of the alimentary tract is included, and this weight is a varying quantity.

In the analytical work proper the problem was to keep the large number of samples from spoiling until the material could be analyzed. They accomplished this by drying the samples at the temperature of boiling water, collecting the fat which melted from the samples during this process, and also what could be squeezed out through cloths. The residue still containing some fat but free from moisture is called the crude dry substance, and this was subsequently ground and used for the determination of nitrogen, mineral matter, and the remaining fat. This operation was carried out separately for each organ and part of the offal and for each division of the carcass. The carcasses of the calves were divided into three parts: (1) flesh, fat, kidney and kidney membrane; (2) kidney fat; (3) bones. The carcasses of the oxen were divided into five parts: (1) flesh and fat; (2) kidney fat and membrane; (3) kidney; (4) flesh juice; (5) bones.

Their work showed that the bones contained five to seven times as much mineral matter as the softer parts. The percentage of mineral matter in the soft parts is in all cases greater for the lean animal than for the fat animal. The percentages of mineral matter in the soft parts of the offal is generally about the same as that in the soft parts

of the carcass. Considering the entire animal the soft parts yield much less than 1 per cent of the live weight as mineral matter while the bones yield from 3 to 4 per cent of the weight as mineral matter. As the animal fattens the per cent of mineral matter referred to entire animal decreases in both bones and soft parts, which shows that its increase is in a less proportion to the other constituents during the fattening period.

As to the fat the authors show that the amount of fat surrounding the kidneys increases considerably as the animal fattens. In general the per cent of fat in the carcass increases with age, other conditions being the same. A fat calf shows but 16.6 per cent of fat in the carcass, while a moderately fat ox shows 34.8 per cent. In a mature, fattened beef animal it thus appears that about one-third of the live weight consists of fat. It also appears that three-fourths of this fat is found in the carcass. The caul and intestinal fat forms the greater portion of the fat associated with the offal. A much smaller portion of the fat surrounds the heart while the remaining offal parts furnish but little fat in comparison with those two just mentioned.

As to nitrogen, there is four to five times as much nitrogen in the soft parts of the carcass as in the bones. As the animal fattens, the percentage of nitrogen in the carcass decreases. The percentage of water decreases also. It is pointed out that the reason for this may be that the

nitrogenous material of the body requires water to carry on its functions properly. The fat calf shows about the highest percentage of nitrogen. Veal is considered lean meat and this is born out by these figures.

The authors have compared the determinations of nitrogen obtained in three different ways. From the percentage of crude dry substance was subtracted the per cent of mineral matter and fat found by analysis, the result was the per cent of nitrogenous material. Dividing by the factor 6.3 the per cent of nitrogen thus found was compared to the per cent of nitrogen found by a determination upon the composite crude dry substance, and also to that found by adding together the amounts of nitrogen found in each separate crude dry substance. The results by these three methods compare very favorably with each other, although the results obtained by direct analysis are all higher than those obtained by calculation.

Again the collected offal parts contain a higher per cent of nitrogen than the collected carcass parts. However, about three-fifths of the nitrogen is contained in the carcass. Since about one-fifth of this is in the carcass bones, the soft edible portion of the carcass will contain about one-half of the entire nitrogen of the body. Since some parts of the offal are edible, a part of the two-fifths existing here may not be lost as food. Summarizing the results on water, nitrogenous material, fat and mineral

matter, there is seen a tendency of the per cent of nitrogenous compounds to rise and fall with the per cent of mineral matter. This would seem to indicate some relation between the material furnishing the mineral constituents and the nitrogen containing material in the body.

The proportion of fat is generally greater than that of the nitrogenous compounds. In the carcass of the calf, however, they are equal, in the half fat ox the fat is one-fourth more, in the fat ox there is two and one-half times as much fat as nitrogenous substance. In the carcass of good fat beef there may be three times as much fat as nitrogenous substance.

The authors have instituted inquiries in an endeavor to learn what proportion of the fat and nitrogen of slaughtered animals is actually consumed as food. This information combined with their own observations, deductions and calculations of data, furnish the information of the following table calculated for the entire body.

	Per cent Nitrogenous Material used as food:	Per cent Fat used as Food.
Calves	60	95
Oxen	60	80
Lambs	50	95
Sheep	50	75
Pigs	78	90

They also assume that all the carcass fat and about one-fifth of the offal fat may be used as food.

To return to the tables, the authors point out that while the percentages of mineral and nitrogenous matter in the carcass of the animal decreases during the fattening process, the percentage of fat increases. This increase in the percentage of fat is in greater proportion than the decrease of the other constituents, which means that the per cent of solids increases with fattening. This is shown by the percentage of water in the carcasses of the three animals analyzed: Calf, 62.25 per cent; Half Fat Ox, 54 per cent; Fat Ox, 45.5 per cent. As meat is sold by the butcher the percentage of water would be 1 to 2 per cent less in each case due to loss by evaporation.

The proportion of bone becomes less, the fatter the animal, but the percentage of dry matter in the bone increased as the animal matured.

Lawes and Gilbert attempt to show the composition of the increase in weight of a number of heifers and bullocks. These animals, started in the experiment under an average condition of fatness, were assumed to have the composition of the half fat ox which was analyzed. They were fed upon fattening food for a number of weeks and at the close of the experiment were assumed to have the composition of the fat ox analyzed.

Animals in Experiment	No. of Animals	Duration of Experiment	Food for fattening.	Original weight	Final Weight
Heifers	12	Wks. 18 Days 6	Swedish turnips, and oat straw and hay.	12124	15274
Bullocks	50	22 3/4 0	Oil cake, bean meal and turnips.	54796	71470
Bullocks	36	26 3/4 0	Oil cake, bean meal and turnips.	41188	54530

Calculated per cent in Increase.

Increase in weight	Per cent of Increase	Mineral Matter	Nitrogenous Substance	Fat	Total dry matter
3150	26.0	1.05	6.51	72.5	80.0
16674	30.4	1.47	7.68	66.3	75.4
13342	32.4	1.62	8.10	64.1	73.8

Average for all 1.47 7.69 66.2 75.4

This table shows nearly 90 per cent of the total dry matter, gained by the animals during fattening, is fat. The authors assume that the 36 animals give the most reliable data as their period of fattening was the longest; they also show the highest proportion of increase over their original weight.

The authors next take up the relation of the constituents making up the increase, to the constituents in the food consumed. These results are given for different lots of sheep and pigs, but there is no data given for beef animals.

For sheep a general mean of all experiments gave the following:- 100 parts of dry matter in the food consumed gave 8.06 parts stored up in increase in the animal and 91.94 parts expired, perspired or voided. This quantity stored up in increase was divided as follows. Mineral matter 0.21; nitrogenous compounds 0.72; non-nitrogenous matter (fat) 7.13; total 8.06.

For pigs 100 parts of dry matter in food gave 17.27 parts stored up in increase and 82.73 parts expired, perspired or voided. The increase was divided as follows:- Mineral matter 0.02; nitrogenous compounds 1.44; non-nitrogenous substance (fat) 15.81; total 17.27.

In all cases the amount and composition of the food consumed to produce the increase was determined by experiment, and the composition of the increase was calculated from that of the animals analyzed.

As to the relation of the fat stored up in the increase to the ready formed fat in the food consumed, the authors point out that in the case of pigs, in whose food the ready formed fat was determined, an average of 400 to 500 parts of fat was stored up in the increase to 100 parts of fatty matter in the food consumed. This plainly shows that a part of the fat stored up is synthesized or prepared from constituents in the food other than the ready formed fat in the food. They hold that it may be produced from the nitrogenous constituents but are rather inclined to believe that the non-nitrogenous constituents, such as starch, constitute the main source of this formed fat. Discussing the relation of starch to fat chemically they conclude that it

would require 2.5 parts of starch to produce one part of fat, this relation being close to the minimum value. Taking the case of the single fat pig analyzed 13.2 parts of fat out of a total of 14.94 parts increase were stored up for 100 parts of dry matter in the food. Of this, 3.26 parts could have been furnished by the food consumed. At least 9.94 parts must have been formed within the body from other constituents and considering starch the material for this purpose it would require 9.94 times 2.5 equals 24.8 parts of starch to provide this additional fat. Add to this the fat in the food, 3.26, and the 1.73 parts of mineral and nitrogenous material fixed in the increase and we have 29.84 parts out of 100 parts of dry matter in the food contributing to 14.94 parts of dry increase. This would leave 70.16 parts expired, perspired or voided instead of 85.06 parts which is found by taking the difference between 100 parts of dry matter in food and 14.94 parts stored in increase.

From this and other calculations it appears that it requires about two parts of dry matter of the food to produce one part of dry matter increase, and that one-third of the dry matter of the food seems to be devoted directly to the formation of the increase. The remaining two-thirds of the dry matter of the food will contribute but little, if indeed any, to the production of the increase. They probably furnish energy for the transformation going on in the body independent of increase of weight.

As the the food of sheep and oxen there is about one-half as much dry increase produced from 100 parts of dry matter in the food as with pigs. Also the proportion of fat increase is much smaller in the case of ruminants and their food is often richer in fat. It thus appears that a less proportion of the dry matter of the food would be used in the production of the fat in the increase.

Again considering the nitrogenous compounds we notice that 5 per cent or less of the nitrogen consumed is stored up as increase. The authors found that in the case of pigs a larger portion of the nitrogen consumed in the fattening food was excreted as urea. So that it may be possible or even probable that the nitrogeneous compounds may also yield the elements for the production of fat.

ACTUAL FRESH WEIGHTS OF ORGANS AND PARTS OF ANIMALS IN DIFFERENT CONDITIONS OF GROWTH AND FATNESS.

Lawes and Gilbert have given the above data for between 300 and 400 animals, in an effort to trace the tendency of relative development of the different parts as the animal grew and fattened. On beef animals the actual fresh weights of the parts of two calves, two heifers and fourteen bullocks were obtained. These 18 animals include the calf and two bullocks slaughtered for analysis.

The results show that the internal organs and offal parts in general increase in their actual weight as the animal fattens. Their proportion to the live weight of the animal, however, diminishes. This is true expecially of the organs,

which in general do not lay on fat during the fattening process. The internal fat increases both in actual weight and in percentage to the live weight of the animal. The carcass also ~~increases~~ in weight and percentage during this period.

COMPOSITION OF THE ASH OF CERTAIN SEPARATED PARTS AND OF THE ENTIRE ANIMALS SLAUGHTERED FOR HUMAN FOOD.

This is supplementary to the first report of the authors and was published in June 1883. They report the results of the analysis of ash of the carcasses, the offal parts and the ash from the entire animals. The ashes were obtained by burning the composited crude dry substance of the parts making up these divisions.

12 analyses were made upon ash of carcass,
17 " " " " ashes of offal parts,
11 " " " " " " entire animals.

For the ashes of the entire animals the results are reported for crude ash and pure ash. The latter report is the same as the former excluding the sand and charcoal. Following is the report of the crude and pure ash of the three animals figured upon their fasted live weight as 100. The contents of the stomach and intestines are not included in the parts analyzed.

	Crude Ash.			Pure Ash.		
	Carcass parts	Offal parts	Entire Animal	Carcass parts	Offal Parts	Entire Animal
Fat Calf	2.782	1.018	3.800	2.772	1.006	3.779
Half Fat Ox	3.603	1.061	4.664	3.568	1.044	4.612
Fat Ox	3.019	0.901	3.920	2.997	0.882	3.879

The presence of carbonic acid in the ash is of interest in that it indicates more or less exactly the amount of base combined with organic acid. But the amount present may be modified by the conditions of incineration of the material, perhaps causing them to combine with other constituents of the ash expelling carbonic acid and forming more stable salts. The authors made some determinations of carbonic acid upon some of their samples of ash after three different treatments. (1) After standing and not reignited, (2) after reignition, (3) after treatment with ammonium carbonate and heating to a low red heat.

Per Cent of Carbonic Acid.

	Average of five	Average of eight
	carcass ashes	entire animal ashes
After standing not reignited	2.59	2.20
After reignition	0.87	0.87
Using $(\text{NH}_4)_2\text{CO}_3$ and igniting	1.52	1.48

The authors have adopted the results for carbonic acid furnished by the last method, that is, using the ammonium carbonate. The ashes for the determination of the other constituents were weighed out in the reignition condition, which gives the low result for carbonic acid. This accounts for the high totals of the complete ash analysis.

The first constituent reported in the table, - iron

peroxide -, is much higher in the ashes of the offal parts than in the ashes of the carcass parts. In general it may be said that the animal ash consists largely of phosphate of lime, that lime and magnesia are the characteristic bases of bone ash, and that potash and soda are the characteristic bases of blood and flesh. The bones furnish most of the phosphoric acid, some is contained in other parts also, and some may be formed from the phosphorized nitrogenous matter by oxidation of the phosphorus in burning. The sulphuric acid will be formed in part by the oxidation of sulphur in burning.

The authors figure that an excess of base is found in ash of oxen and sheep, and a deficiency in the case of pigs. The ash of the offal parts, which contain but little bone, run higher in potash and soda than does the ash of the carcass. Also the proportion of soda to potash is greater in the offal parts. These parts include the blood whose ash contains a high ratio of soda to potash.

The authors also have calculated the weight of ash yielded by the different animals on the basis of 1000 pounds. It is thus seen that weight for weight, oxen carry off more mineral matter than either sheep or pigs. The loss to the land in mineral constituents is not an important item in the fattening animals, although for growing animals the amount is greater. Comparing animals to other farm products, it may be said in a general way that an acre of land would lose more phosphoric acid in milk, and four or five times as much

phosphoric acid in wheat, weight for weight, as it would lose in the fattening of oxen or sheep. Of lime the acre of land would lose twice as much in animal increase as in milk or wheat, but only one-tenth as much as in hay. Of potash a small fraction of a pound would be carried off by the animal, six times as much milk, twenty times as much by wheat and one-hundred times as much by hay.

Other work along this line of meat investigation has been done and some mention should be made of these. In 1894 Dr. Paul Schweitzer of the Missouri Agricultural Experiment Station published the results of his work with ten beef animals giving the fresh weights and the analytical data of the parts of the offal and the carcass. The carcass was divided into wholesale cuts according to the old English system which varies to some extent with the system used today at the American Packing House. Instead of preparing the sample from the entire organ or part, a slice was cut out from the center of the same and having assumed that this slice represented a fair sample of the whole, it was used to obtain the material weighed out for analysis. In drying the fresh material for analysis the fat would melt out from the fatty portion. To obviate this difficulty the visible fat was carefully trimmed off, weighed, and assuming same to be pure fat it was added to the fat obtained by analysis of the dried sample and the per cents of the constituents recalculated to obtain the percentage composition of the fresh material.

Because of the above variations in the analytical procedure it seems useless to compare this data with that of other investigators, as no conclusions could be properly drawn therefrom.

A. E. Vinson (Beitraege zur Methodik der Analyse ganzer Tierkoerper, Univ. of Goettingen, 1904) has reviewed the work of Lawes and Gilbert, Henneberg, Soxhlet and the German Agricultural Society. Much of the data of Lawes and Gilbert reported in pounds and ounces has been changed over to the metric system. Henneberg (Jour. für Landw. 1878 p. 549) reports slaughter house weights, weights of food constituents consumed and growth in flesh and fat of a number of sheep.

The work of Soxhlet (Versuch über Fettbildung im Tierkörper; Zeit. des Landw. Vereins im Bayern Aug. 1881), gives the result with three pigs, one being killed as a check animal and the other two after having been fattened 75 and 82 days respectively. A report is made of the live weight, empty weight, dry matter, moisture, fat, fat free dry matter, albumen, nitrogen and ash of the three animals, and the increase of each constituent in the last two pigs during growth, using the check animal as a basis.

Martiny reports the work published by the German Agricultural Society (Heft 18). This is a report upon the principal slaughtering house weights for thirty head of beef cattle of three breeds. The average, the highest and the lowest weights are reported for each breed.

Vinson himself undertook some slaughtering experiments with pigs. The object of his investigation was to determine how much flesh can be used as food from the carcass and the offal. He obtained the live weight at the stall and just before killing. In planning the slaughtering house work, he divided the data of weight there obtained into six divisions.

1. Offal - cannot be used as food for man.
2. Offal - used as food by man.
3. Offal - fat used as food by man.
4. Contents of stomach, intestines and bladder (urine).
5. Carcass: including head, tail, feet, ears, kidney and kidney fat. Carcass split and each half weighed separately.
6. Loss including bristles.

After cooling the carcass down, it was weighed and divided into the following parts. Head (with ears) feet and tail, kidney fat, kidney, knuckles, hams, shoulder, belly, sides, back, "carbonade", chuck and ribs. Each part was weighed and further divided into flesh and fat, bone and skin.

The following were taken for the analytical work.

(1) Kidney fat, (2) belly fat without skin, (3) back fat without skin, (4) flesh and fat from other parts including kidney but not including skin, head, feet and tail, (5) flesh and skin of head, feet and tail which could be removed by hand, and the skin of knuckles, (6) skin of other carcass

parts not in (5), (7) composite bones.

These were ground in a mill or chopper in preparation for weighing out the sample. Duplicates of about 300 grams were weighed out into beakers and dried at 100°C. The fat which melted out was poured through a funnel stoppered with a plug of cotton, the fat being received into a tared flask. When most of the moisture was gone, the mass was treated with ether, and the solution poured through the same filter into a second tared flask. This was repeated several times and the residue was then dried again treated with ether and poured off as before into a third tared flask. After distilling off the ether and drying, the three portions were weighed and mixed. This fat was studied for its iodine value, refractive index and average molecular weight and melting point. These last determinations were made upon the kidney fat, back fat, belly fat and intestinal fat only.

The moisture and fat free residue was allowed to come to an air dry condition, then ground fine. Upon this were made determinations of moisture, fat, ash and nitrogen, and from these, results were calculated to the fresh material. Vinson describes at some length his studies in the comparison of analytical methods for meats, and also reports the results of his work upon the different fats of the pig.

The fat of pigs fed a normal ration is compared with the fat of pigs fed (1) sugar, (2) tankage, and (3)

peanut oil. He reports the weights of the following parts for the four different kinds of fed pigs. Heart fat, intestinal fat, kidney fat, back fat, belly fat, flesh, bones and skin. The iodine value and refractive index were determined upon each of these fats for the four different kinds of feeding, and the average molecular weight, saponification value and melting point upon the fatty acids obtained from each fat, for the different kinds of feeding. The most interesting variations shown are the differences between fat inside the animal:- heart fat, kidney fat, intestinal fat:- and fat on the outside:- belly fat, back fat - etc. The inside fat uniformly shows a higher melting point and a lower iodine value than do the outside fats. The fats from the pigs fed upon peanut oil show without exception a higher iodine value and a lower melting point than do the fats obtained from the other methods of feeding. In general the iodine value for the different fats is lowest for the normal or sugar feeding.

The results for refractive indices, molecular weights and saponification values show little or no definite variation with one another.

Vinson also studied the influence of these different kinds of feeding upon the composition of the heart and heart fat. The heart fat from the protein (tankage) fed pig was distinctly different, physically, from the others. On analysis it shows the highest per cent of water. In regard to the fat the heart from the sugar fed pig contains the

highest per cent of fat; the largest amount of heart fat also was obtained from this same pig. From the tankage fed pig we obtain a large amount of heart fat, which, however, differs from the normal heart fat in its high moisture and low fat content. The corresponding heart shows little difference from the heart of the normal fed animal.

A remarkable fact is the large weight of the heart of the pig fed upon peanut oil, this animal also gave the highest weight of flesh. It would be difficult to say definitely whether this was due to individuality or strictly to the feed, in view of the fact that we have but one experiment furnishing the data. It is highly probable that a carbohydrate ration favors the addition of fat, both within and about the heart, which ration rich in fat does not appear to do.

Bulletin No. 53 Division of Chemistry, United States Department of Agriculture published in 1898 by Dr. Wiley deals with the Chemical Composition of the Carcasses of Pigs of different breed. Ten representative animals of each of the following six breeds; Poland China, Berkshire, Duroc Jersey, Chester White, Tamworth, Yorkshire were raised under a standard controlled diet to about 200 pounds weight, by the Iowa Experiment Station. They were slaughtered at Swift's Chicago Packing House, the weights of the carcasses and separated parts being taken at this time, with the exception of the hair and blood. Three representative carcasses of the Duroc Jersey and one each of one of the other breeds, were selected for

analysis. Before leaving Chicago, each carcass was divided, and the following cuts weighed and sent to Washington for analysis. Two American clear backs; two clear bellies; two short cut hams; two New York shoulders; four feet; spare ribs; tenderloins; neck bones; back bones; lean and fat trimmings; tail. On arriving in Washington these were again weighed and divided into the following:- Meat (lean and fat), bones, marrow, skin, spinal cord, tendons, hoofs, After weighing these parts they were used for the analysis proper.

To briefly summarize this investigation, the data shows the following points. (1) The Tamworth shows the highest percentage of bones and hence the heaviest skeleton. The Duroc Jersey shows the lowest per cent of bones, (2) the Berkshire shows the highest per cent of water, 43.1, per cent and the Duroc Jersey the lowest, 30.3 per cent, (3) the Duroc Jersey shows the highest per cent of fat, 57.68 per cent, and the Berkshire the lowest 40.46, (4) the Berkshire shows the highest per cent of nitrogenous substance, 13.02 per cent, while the Duroc Jersey shows the lowest 8.96 per cent.

Emmett and Grindley (Jour. of Ind. & Eng. Chem. July 1907) have reported analyses of beef kept in cold storage and in the fresh condition. Two beef steers were slaughtered, the carcasses divided into two halves as usual and placed in cold storage. The round, rib, plate and loin were taken

for analysis from one-half of the carcass of one animal after two days, and the same cuts from the other half after 22 days further interval. From the other animal, the chuck and loin were taken for analysis from storage from one-half of the carcass after six days, and the same cuts from the other half of the animal after 37 days longer in storage.

The lean beef from these cuts after thorough grinding and careful sampling were submitted to a more or less complete analysis. The following results are reported. Water; soluble and insoluble dry substance; coagulable and non-coagulable soluble protein; insoluble protein; nitrogenous and non-nitrogenous organic extractives; soluble and insoluble ash; nitrogen as coagulable and non-coagulable soluble protein, as non protein soluble substance, as insoluble substance; ratio of protein to non-protein substance in meats and their extracts; inorganic and organic soluble phosphorus; insoluble phosphorus.

The conclusions drawn by the authors from this work are (1) no loss of moisture from the meat after the 22 days storage and a small loss 1.3 per cent after 37 days. (2) No apparent change in the forms of ash, protein, and solids and only a small change in the soluble phosphorus and non-nitrogenous extractives after 22 days and (3) that the nutritive value was unaltered. (4) After 37 days the change of the forms of solids, protein, phosphorus and extractives was noticeable but as far as nutritive value was concerned had not lost any appreciable amount, but had rather gained than other-

wise due to an increase in soluble protein and extractives.

Grindley and his collaborators have published a series of eight or more papers on the chemistry of flesh (Jour. Amer. Chem. Soc. 1904 to date), but their work does not bear directly along our line.

At the present time investigations are in progress at the Vermont Experiment Station on the composition of young pork fed upon milk, varying from skim milk to whole milk. The results of this work have not yet been published.

Wildt, (Landwirt. Versuchsstat. 15 (1872) 404) working with rabbits, considered the composition of bones with special reference to the age of the animal. He shows that the composition of the skeleton varies very markedly in rabbits of different ages. The fat increases and at the same time the water content decreases. In per cent of the fresh, the "ossein" remains nearly constant for varying ages, but reckoned upon the moisture and fat free basis, the proportion of "ossein" is smaller, with age. According to Wildt the "pure" or fat and water free bone contains in addition to the "ossein" only calcium and magnesium phosphate, calcium carbonate and calcium fluoride. He found the ratio of organic to inorganic matter in the skeleton decreased very greatly with age. He gives as a result of his investigations that the composition of the skeleton of full grown animals is dependent only upon the degree of fatness of the animal, and that the age has little effect, after full growth is reached.

Düring (Zeits. Phys. Chem. 7, 1882, 446) working with the bones of fowls gives the following composition for breast, humerus, and femur of the hen and goose (our average): dry substance, 93.26; ash, 57.85 per cent.

C. Sedlmair (Zeits. f. Biol. 37, 1898, 25) studied the effect of hunger upon the skeleton of cats, and reached the following conclusions. The bones contained in most cases a higher percentage of water and a lower percentage of fat after a period of hunger. The dry substance decreased both absolutely and proportionately, the hollow bones of the extremities losing more in weight than the rest of the skeleton. The loss of dry matter in the skeleton was largely fat, but at the same time there is an actual loss of every constituent, the inorganic as well as the organic part. Longer duration of the period of hunger increased the loss in the skeleton.

The effect of lack of nourishment upon the skeleton of rabbits was investigated by H. Gusmitta, (Abst. in Jahrs. Ber. Tier. Chem, 24, 1884, 401). He concluded that during starvation; (1) the total weight of the skeleton decreases; (2) the fat content decreases very markedly; (3) the total amount of organic matter, other than fat, remains nearly constant; (4) the proportion of calcium phosphate to ossein remains practically the same.

The effect of starvation upon the skeleton of rabbits was also investigated by H. Weiske, (Zeits. Physiol.

Chem. 22 1895, 595). In this work he used four animals of the same age. One was killed as a check, the others confined without food. At the end of seven days another was killed. The remaining animals died in ten to eleven days respectively. His results show that the skeleton lost less in proportion than any other part of the body. The greater part of the loss in weight of the skeleton was as fat. The table quoted here gives the results of Weiske's experiment in condensed form.

	I Check Animal	II. Killed after 7 das.	III Died in 10 das.	IV. Died in 11 das.
% Skeleton in whole body.	32.46	41.7	41.7	39.9
Loss in weight of skeleton	-----	4.1	3.3	
Fat in skeleton	13.04	0.54	0.79	0.52
Ash in bones#	61.94	60.27	62.26	60.56
P ₂ O ₅ in bones	24.17	24.02	24.67	24.22

#Reckoned on the H₂O and fat free basis

P. F. Trowbridge and F. W. Woodman (Jour. Ind. and Eng. Chem. Vol. 1, No. 10 . Oct., 1910.) give as the conclusions of their work with five steers the following:

(1) Young, growing steers continue to grow in height and build up skeleton even when losing weight.

(2) The skeleton is unaffected by poor nutrition until practically all of the fat has been removed from the muscles and other organs.

(3) The principal effect of poor nutrition upon the skeleton is the removal of the fat or marrow and the replace-

ment of this with water.

(4) The per cent of organic matter other than fat is practically constant for the whole skeleton, under different conditions of nourishment.

(5) No evidence was obtained to warrant the conclusion that the mineral matter is resorbed, or affected in amount, due to lack of proper nourishment, although in one steer there is some indication that this may have taken place.

(6) The proportion of fat and moisture in the corresponding parts of the skeleton is fairly constant for normally fed steers. In steers which have suffered from insufficient nutrition for a long period the fat may be nearly all resorbed from the skeleton, and this resorption takes place from all parts of the skeleton.

(7) The proportion of organic and mineral matter in the skeleton varies with age. This proportion varies in the different parts of the skeleton, according to the nature of the bone.

(8) The per cent of phosphorus in the ash of the skeleton of steers is nearly constant. The per cent of phosphorus in the ash of different parts of the same steer varies, but the average for the corresponding cuts of the five steers is fairly constant, showing a variation of not more than 0.7 per cent.

The results of malnutrition upon the water and fat content of the body of animals has been pointed out by Carl

Voit (Hermann's Handb. d. Physiol. 6, 1881, 1-575). He asserts that in the case of bad nourishment the whole body becomes watery; a well nourished organism, on the contrary, contains more dry substance, since in it there is more fatty tissue with less water content.

L. Pfeiffer (Zeits. f. Biologie 23, 1886, 340) working on dogs, rabbits and chickens came to similar conclusions. S. Hatai (Amer. Jour. Physiol. 18, 1907, 309) working with rats showed that partial starvation gave a high percentage of water in the fatty tissue.

C.R. Moulton and P.F. Trowbridge in a paper on the composition of the fat of beef animals (Jour. of Ind. and Eng. Chem. Vol. 1, No. 11, p. 761) have shown that the percentage of fat in the fatty tissue of steers increases with the fatness of the animal while the moisture decreases.

C. K. Francis and P. F. Trowbridge (Jour. of Biol. Chem., VII, No. 1, p. 81) in their article on phosphorus in beef animals give the following results: 1, the offal systems contain the highest percentages of phosphorus (not including the bones) of all parts of the animal, the order being - nervous system, liver, respiratory system, digestive system and excretory system, and circulatory system; 2, the fat carcass cuts, or in the thin animals the cuts containing the most connective tissue, are lowest in phosphorus; the cuts high in lean meat are high in phosphorus;

EXPERIMENTAL PART.

DESCRIPTION OF ANIMALS.

Previous Treatment.

The steers used in the experiment, numbers 18, 121, and 48, belonged to the group known, at the Agricultural Experiment Station of the University of Missouri, as Regular Maintenance Cattle. Previous to May, 1907, they had been used in a cooperative feeding experiment. They were discarded from that experiment on account of their poor showing. They were good representatives of a poor feeding type of animal. They were turned to pasture until November, 1906, when they were put on a ration of alfalfa hay and kept on it until the beginning of this experiment, February 1, 1907. At this time they were coarse steers in a very thin condition.

Quarters and General Treatment.

At the beginning of the experiment, these steers were kept at night in the Dairy Barn, and during the day were given the run of a small lot. In the barn they were tied in stalls, each of the stalls being three feet and eight inches wide and floored with plank. Sawdust was used as bedding. The lot in which they were turned during the day was long and narrow and contained about 1000 square feet. During wet weather of spring this lot became very muddy several times

"25"(2)"

3, on a moisture and fat free condition those cuts (lean) which are highest in connective tissue are lowest in amount of phosphorus; 4, there seems to be no relation between ash and phosphorus content.

and it was found necessary to move the cattle to another lot, which contained three-fourths of an acre.

On July 11, 1907, the steers were moved to the new shed built for this experiment. This shed faces south and has an open front. The stalls are each three feet eight inches wide and floored with plank. Sawdust was still used as bedding. The steers were tied in the stalls at night and given the run, during the day, of a lot containing 1400 square feet and provided with a hydrant and water trough. Each steer had a neck strap with a brass tag giving his number.

The steers were fed hay and grain at night and grain in the morning. After eating the morning feed, they were weighed and turned into the lot. They were fed at the same hour each night and morning and were weighed at the same hour each morning.

Breed and Age.

No. 48 was a grade Shorthorn classed as a senior yearling in December, 1905. Calved in the spring of 1904, he was therefore almost three years old at the beginning of this experiment. He was nearly five years old when slaughtered.

No. 121 was a grade Shorthorn. In November, 1905 he had been purchased as a calf. He was thus a scant two years old at the beginning of this experiment. He was between

two and a half and three years old when slaughtered.

No. 18 was a grade Shorthorn purchased at the same time as No. 121 and of the same age. He was nearly three years old when slaughtered.

Method of Feeding.

The grain fed these steers was composed of corn chop (cracked corn) and linseed meal in the proportion of eight parts corn to one part linseed. The hay was alfalfa hay. On February 1, 1907, the steers were put on maintenance, i.e. they were fed sufficient feed to maintain their body weight but not to allow any gain. The daily ration per thousand pounds varied around seven and a half pounds of grain and four-tenths as much hay. The quantity of feed was increased or lessened as was necessary to keep the body weight constant. Water and salt were given ad libitum.

No. 18. This steer weighed 763.6 pounds at the first of February, 1907. From then until November 12, 1907 he was kept on maintenance. His average weight for the last ten days of the maintenance period was 778.1 pounds. On November 12, 1907, he was slaughtered for analysis.

No. 121. This steer weighed 763.5 pounds at the beginning of February 1907. From then until July 10, 1907, he was kept on maintenance. His average weight for the last ten days of the maintenance period was 764.2 pounds. On July 11, the feed was raised in quantity gradually until the

steer was consuming all he would eat. This was continued until December 10, 1907, when the steer weighed 1261.3 pounds. This made a gain in five months of 497.1 pounds. On December 11, 1907, this steer was slaughtered for analysis.

No. 48. This steer weighed 840 pounds at the first of February 1907. From then until June 30, 1907 he was kept on maintenance. His average weight for the last ten days of the maintenance period was 841.5 pounds. At this time he was gradually put on full feed until he was consuming all he would eat. In the middle of November, 1907, this steer showed lack of appetite and had a bad cough. This steer caught cold in the digestion stalls. He was blanketed for several nights. His cough still continued into December. On December 19 the tuberculine test was tried. The steer showed a high temperature but gave no reaction for tuberculosis. From then until January 15, 1908, he was fed all the hay he could eat, no attempt being made to keep the proportion of hay to grain at the theoretical figure. In May the steer was again 'off feed' and out of condition. Towards the latter part of the summer he picked up and his appetite returned. This animal was kept on full feed until January 18, 1909, when he weighed 1785 pounds, a gain of 943.5 pounds in 17.5 months. On January 18, 1909, this steer was slaughtered for analysis.

Digestion Trial. From October 29, 1907, noon until November 8, 1907, noon, steers 48 and 18 were in a digestion

experiment in the digestion stalls. The results of the trial will not be discussed in this thesis.

Weight and Feed Records.

Daily records of the weights of the animals and of the weights of feed fed and feed refused were kept throughout the experiment. Representative samples of the corn, linseed, and alfalfa hay were taken for each lot of feed and were analyzed for the usual constituents by the official methods. Samples were also taken of the refused hay and refused grain. These were analyzed as below.

Moisture, ash, crude protein, crude fat, crude fibre, and nitrogen free extract were determined by the Official Methods of the A. O. A. C. (U. S. Department of Agriculture, Bureau of Chemistry. Bulletin No. 107, revised pp. 38 - 56).

Records and Methods of Slaughtering.

On the morning the animal was to be slaughtered it was fed and weighed as usual but no water was given. The animal was taken for slaughtering to the slaughter house. This is a two story frame building. ~~situated between the Dairy Barn and the Farm Machinery Building.~~ It has a smooth cement floor, is supplied with a drain, steam, water, electric current for lighting and power, stoves for heating, a windlass and pulley with a strong rope for hoisting the animal, an overhead track for hanging the carcasses, and a fairly complete set of slaughtering and butchering tools. The steer

was killed with a killing hammer, then strung up by the heels and bled as completely as possible. The blood was caught in a tared pan and weighed and its volume determined.

Samples were taken in triplicate for analysis before the blood clotted. All blood which oozed from the carcass on to the floor during the dressing of the carcass, was collected and weighed.

The carcass was lowered and the regular slaughter house separations made as practiced by the Kansas City packers. Weights were taken of all the parts and organs as soon as they were separated by the butcher. These included: the feet; the dew claws; the hide; the head; teeth; horns; tongue total; tongue marketable; tongue bones; tongue base; gullet; lungs and windpipe; heart, pericardium and adherent arteries; heart marketable; heart lean; caul fat (the apron covering the intestines and stomach); diaphragm (skirt), stomach and contents, adherent organs and fat; stomach cleaned; intestines and contents, adherent organs and fat; intestines cleaned; stomach fat; intestinal fat; spleen; pancreas; liver; gall bladder and gall; penis; bladder and contents; bladder; tail; brains; and spinal cord. The stomach was cleaned by washing in water. The intestines were cleaned by stripping and washing. The length of the intestines was measured. All adherent fat had been separated as cleanly as possible previous to the washing.

Offal Parts.

The dew claws, teeth and horns were preserved for

future work. Analyses were made of the following:

- 1 hide and hair;
- 2 circulatory system, including heart, pericardium, adherent fat and large arteries;
- 3 respiratory system, including lungs and trachea;
- 4 nervous system, including brain and spinal cord;
- 5 digestive and excretory system, including clean stomach, clean intestines, spleen, pancreas, gall bladder and gall, penis and bladder (empty).
tongue base, gullet, diaphragm; ~~liver~~;
- 6 liver;
- 7 the offal fat, including caul fat, stomach and intestinal fat;
- 8 and the kidneys.

Carcass. As the weather was generally cold enough to chill the carcasses in the slaughter house, they were hung for two days to chill out and set. The carcass was then weighed in whole or in parts and it was cut up into wholesale cuts as is the practice of the Kansas City packers. The following are the cuts: shin, chuck, neck, rib, plate, flank, loin, round, rump, shank, and the kidney and the kidney fat. The weights of these were recorded and each cut was then separated into lean, fat and bone, making as clean a separation as was possible by hand, using a boning knife. The parts were weighed. The head and the tail from the offal parts were separated in the same manner. The total skeleton of the animal was composited and analyzed as one sample.

The kidneys were analyzed as a separate sample, both kidneys being taken. The kidney fat was treated as a separate sample. In all cases the right half of the animal was taken for this work, the left half being used for photographs, water color drawings and cooperative cooking experiments. The following samples were analyzed:

- 1 shin, shank, head and tail, lean and fat;
- 2 round and rump, lean and fat;
- 3 loin, lean and fat;
- 4 flank and plate, lean and fat;
- 5 rib, lean and fat;
- 6 chuck and neck, lean and fat.

The above classification of samples holds in its entirety for steer No. 18 alone.

The following additional samples were analyzed for Steer No. 121. The lean heart was analyzed separately from the circulatory system. The marketable tongue was analyzed separately as was the stomach. The round and rump lean formed one sample and the round and rump fat another; the loin lean one sample and the loin fat another. The rib lean was analyzed separately from the rib fat.

With steer No. 48 the heart marketable was analyzed separately from the circulatory system. The stomach and marketable tongue formed samples separate from the digestive and excretory system. The lean and fat of the rump formed one sample, the round lean another and the round fat another.

The loin lean, loin fat, rib lean and rib fat formed four separate samples. The skeleton with this animal was divided into samples as follows: feet, head and tail; shin and shank; round; rump; loin; chuck and neck; flank and plate; rib.

When plans were first made for this work with the Regular Maintenance Steers it was thought that the analyses of total systems or total animal were all that were wanted. It was later decided to increase the number of samples as this would make possible some comparisons which were then deemed valuable.

Preparation of Samples.

As soon as the skeleton samples could be got ready they were ground through a Mann bone grinder, mixed well and a sample taken and sent to the chemical laboratory. The lean and fat and offal samples were ground through a power grinder with plates with holes of four different sizes. Samples were ground through the coarser plate and next the second plate. The samples were then well mixed and quartered down, if necessary, and then ground through a finer plate. The large samples were then quartered down again and ground through the finest plate. Very homogeneous and fine samples were easily obtained in this manner. An especially difficult sample to get uniform and representative was the respiratory system. The cartilagenous rings of the trachea would partly remain behind in the grinder while the softer lungs were squeezed out past them. But by using a knife and patience

these could be cut fine and mixed with the lungs. The accompanying table gives the triplicate analyses of three samples from each of the steers. These samples are among those hardest to make uniform.

COMPARISON OF TRIPLICATE DETERMINATIONS.

Steer 18.	% Moisture	% Fat	% Nitrogen	% Ash	% Phosphorus.
NO 7-11: 68	74.670.	6.338.	2.108.	.968.	.151.
Respiratory	74.810.	6.156.	2.104.	.958.	.152.
System.	74.650.	6.890.	2.068.	.951.	.151.
NO 7-11: 66	66.340.	lost	2.727.	1.663.	.129.
Dig. & Excret.	66.830.	18.010.	2.748.	1.579.	.126.
System.	66.360.	18.245.	2.793.	1.659.	.131.
NO 7-11: 83	41.430.*	37.494.*	1.604.*	.659.	.122.
Lean & Fat of	52.568.	30.030.	2.645.	.632.	.121.
Flank & Plate.	52.455.	30.176.	2.236.	.656.	.128.
Steer 121.					
NO 7-12: 56	63.850.	19.798.	2.331.	.799.	.165.
Respiratory	64.060.	19.586.	2.266.	.817.	.169.
System.	lost	lost	2.326.	.809.	.175.
NO 7-12: 58	54.990.	32.570.*	1.536.	.651.	.130.
Dig. & Excret.	55.430.	31.820.	1.614.	.617.	.124.
System.	55.640.	31.610.	1.683.	.631.	.125.
NO 7-12: 70	40.980.	46.583.	1.871.	.480.	.093.
Lean & Fat of	40.230.	47.530.	2.013.	.520.	.095.
Flank & Plate.	39.010.	48.990.	1.888.	.500.	.096.
Steer 48.					
NO 9-1: 06	51.590.	35.520.	1.943.	.679.	.130.
Respiratory	43.600.	43.200.	1.912.	.666.	.108.
System.	53.060.	33.440.	2.017.	.662.	.114.
NO 9-1: 08	43.351.	23.320.	1.839.	.682.	.131.
Dig. & Excret.	42.340.	22.170.	1.685.	.682.	.127.
System.	44.912.	21.740.	1.811.	.728.	.126.
NO 9-1: 22	41.656. 27.45	63.750.	1.201.	.389.	.062.
Lean and Fat of	43.300. 30.06	61.450.	1.324.	.425.	.066.
Flank & Plate.	41.700. 32.94	58.140.	lost	.448.	.065.

* Omitted from average.

Method of Analysis.

Moisture (H₂O). For this work the S. and S. extraction shells and glass tubes with hardened filter paper bottoms were filled about one-third full of ignited sea sand and then stuffed with fat free absorbent cotton. In our later work, cotton alone was used. The tubes were numbered consecutively, extracted with ether, dried in vacuo and weighed in glass stoppered weighing bottles. This was done previous to slaughtering. A counterpoised weighing bottle was found very convenient as it obviated complications arising from a broken weighing bottle, the use of a new bottle and subsequent corrections of weights. Scheibler vacuum desiccators six inches in diameter with stop cocks in the lid were filled to the depth of an inch with C.P. sulphuric acid (sp. gr. 1.84). A brass gauze or porcelain plate was placed on the shelf of the desiccator and a half inch above this supported by corks or rubber stoppers was a second gauze. Clean paper was placed on this. It was necessary to have the ground glass surfaces and stop cocks fit well. A lubricant of three parts of hard paraffine and five parts of yellow vaseline was prepared by melting together these ingredients and allowing the mixture to cool slowly. In cold weather a little more vaseline is used and in hot weather a little more paraffine to give the mixture the proper consist-

ency.

The thoroughly mixed samples were placed in weighing bottles provided with short aluminum scoops and triplicate samples of three to five grams were weighed out. The cotton was removed from the extraction tube and placed in a flat bottomed, shallow glazed porcelain dish and the sand was poured carefully into the dish. The meat sample was placed on the sand and the whole was carefully and thoroughly mixed and then returned to the tube by a steel spatula. The cotton was used to wipe every trace of the sample from the dish and spatula. A large sheet of glazed paper prevented loss of sand. The last of the unused cotton was placed in the top of the tube. Later when cotton alone was used, the mixing of the sample was greatly facilitated and the danger of loss of sand was entirely removed. The sand or cotton, was used to separate the particles of the sample and so allow a more thorough drying and extraction. Otherwise the samples had to be ground and reextracted a second time. The triplicate samples were placed in separate desiccators in order to avoid a loss in case a desiccator was broken or acid spilled on the cones. The desiccators held fifteen to twenty tubes. The desiccators when full were exhausted to a one millimeter vacuum by means of a Geryk duplex vacuum pump. The desiccators were rotated carefully twice a day to mix the concentrated acid with the supernatant watery layer. After twenty-four to forty-eight hours or longer, as convenient, air was allowed

to bubble slowly through a sulphuric acid tower into the desiccator until the vacuum was destroyed. The tubes were transferred to desiccators holding fresh acid and the drying was continued as before. The tubes were then transferred to glass stoppered weighing bottles and weighed in the weighing bottle. The drying was continued to constant weight as given in detail above. Loss in weight is moisture.

Fat. The dry tubes from the moisture determinations were extracted for twenty-four hours in Soxhlet extractors, using ether. They were partially dried in an electric oven at a low temperature and then dried in the vacuum desiccators as given in detail above. They were weighed as above and dried again to constant weight. Loss in weight is fat.

Nitrogen. Nitrogen was determined by the modified Kjeldahl-Gunning method. Triplicate samples were weighed out as in the fat determination and placed in S. and S. No. 595 filter papers and introduced into a 500 c. c. Kjeldahl flask. For hide and hair 0.50 to 0.75 grams was used, for lean meat 1.00 to 1.25 grams, and for fat samples 2.50 to 3.50 grams. Other samples in accordance to the nitrogen content. Twenty-five cubic centimeters of C.P. concentrated sulphuric acid was used for the meats and 35 to 50 c.c. for fats. About 0.7 grams of mercury was added and the digestion was made on a digestion frame. When the sample had ceased foaming and was not pasty, 7 to 10 grams of (K_2SO_4) potassium sulphate was added and the digestion was continued for one or two hours. The flasks were then cooled and the necks

washed down with water. They were again digested for an hour or more. About 300 c.c. of nitrogen free water was added to the cool flasks also a piece of paraffine the size of a pea and a few small pieces of granulated zinc. Then 85 c.c. of the alkali solution (100 c.c. for fats) was added carefully, the flask was connected with a condensor, the contents were mixed, the flasks boiled for forty minutes and the distillate caught in a wide mouth receiving flask containing the necessary amount of one-tenth normal hydrochloric acid with some cochineal indicator. The above alkali solution was made by dissolving forty pounds of Greenbank alkali and 375 grams of potassium sulphide in thirty litres of distilled water. For fats and other foaming materials 800 c.c. Kjeldahl flasks were used.

Protein. The protein was calculated by multiplying the nitrogen by the factor 6.25.

Ash. Triplicate samples of ten to fifteen grams were weighed out as for fat and placed in numbered, tared porcelain crucibles. The samples were dried in ovens and then charred carefully. Later they were ashed over Fletcher burners, using a low heat and taking plenty of time. In this way fusion and loss of chlorides was prevented.

Phosphorus. The crucibles from the ash determinations were leached with strong hydrochloric acid and a little nitric acid. The solutions were neutralized and ammonium nitrate was added. The phosphorus was precipitated at 65°C

with acid ammonium molybdate. The yellow phospho-molybdate was filtered off, washed, dissolved in ammonia and hot water and the phosphorus was reprecipitated with magnesia mixture. The precipitate was ignited strongly in a gasoline muffle and weighed as the pyrophosphate (U. S. Department of Agriculture, Bureau of Chemistry, Bulletin 107, revised, p. 2).

The time elapsing between the grinding of the sample and the preliminary part of the analysis, i.e., to a point where the sample was safe, was made as short as possible. The samples were kept in Whitall and Tatum sample jars provided with rubber gaskets, glass tops and metal clamps so no loss of moisture could occur. They were kept in cold storage at just above freezing; so it can be safely said that the fresh sample was analyzed. An outline of the program for slaughtering week will illustrate this. The animal was killed Monday morning. The offal samples were ground, sampled and started on the analysis that afternoon and the following day. The chemical and slaughter house force always worked nights; so by Wednesday noon the offal samples were safe. On Wednesday the carcass was cut up, the separations and composites made and the grinding of samples begun. By the end of the week, analyses were all well on their way and our rush work was over.

Method of Analysis for Bone Samples.

Moisture. Samples for moisture were weighed out directly and rapidly, in triplicate, in tared porcelain evaporating dishes the size of the sample varying according to the coarseness or fineness of the bone. For finely ground samples 25 to 40 grams were considered sufficient while for coarse samples 100 grams or even more were sometimes taken. The dishes containing the weighed samples were at once placed in vacuum desiccators and dried as in the moisture determination above. The dish and dry bone was weighed rather rapidly in the open and the drying was continued until the loss in weight was less than 25 or 30 milligrams.

Fat. The dry samples from the above determinations were transferred carefully to Soxhlet extractors having a disk of hard filter paper in the bottom for filtering the ether extract. Redistilled anhydrous ether was used for the extraction, the extract being collected in weighed flasks. The extraction was continued for thirty hours. The ether was distilled off and saved and the flasks were dried for twenty hours in vacuo and weighed.

The residue from the extraction was saved, the triplicates were combined and the whole was ground in a steel mill until fine enough to pass through a millimeter mesh sieve. This air dry sample was kept for further determinations of moisture, fat, nitrogen ash and phosphorus.

Nitrogen. The nitrogen was determined as given in detail above using 0.5 gram samples.

Moisture and Ash. Two gram samples were weighed out in tared porcelain crucibles and dried at 100 - 110° C. The difference in weight between crucible plus sample and dry weight of crucible plus sample gave the moisture. The samples were then ashed by igniting over Fletcher burners until practically free from carbon and the ignition was completed in a muffle at a dull red heat. A clear white ash was readily obtained by this means in a short time.

Phosphorus. The ash from the above determination was dissolved by digestion in hot, dilute nitric acid and the solution was made up to 250 c.c. Aliquots of 25 c.c. were taken and the phosphorus determined as given in detail above.

Discussion and Interpretation of Data

Feed and Weight Talbes.

Tables 1, 2 and 3 give by ten day periods, in pounds the average weights of the steers; the grain and hay offered, refused and consumed; the consumption daily per 1000 pounds and per pound of gain; the maintenance requirements; the consumption above maintenance; the consumption above maintenance per pound of gain; and the protein, fat nitrogen free extract and fibre consumed. For maintenance for a 750 pound steer 7.50 pounds of grain and 3.75 pounds of hay were taken as the daily requirement per 1000 pounds;

For a steer 800 to 1000 pounds seven pounds of grain and 3.50 pounds of hay, and for a steer over 1000 pounds 6.50 pounds of grain and 3.25 pounds of hay. These figures were obtained from maintenance trials on six steers including the three animals concerned in this thesis, the data being worked out and the above values proposed by the Department of Animal Husbandry at the University of Missouri. The weights by days will not here be given.

The average weight at the beginning of a period is the average of ten consecutive weights, the first weight in each period being the sixth of the weights averaged. The average weight at the close of a period is the average of ten consecutive weights, the last weight in each period being the fifth of the ten weights averaged and the first weight of the following period is the sixth of the ten weights averaged. Hence the final weight for one period is also the initial weight for the period immediately following.

The protein, fat, nitrogen free extract and fibre consumed are calculated from tables four to eight and are the difference between weights in feed offered and weights in feed refused.

At the bottom of the tables are found the total, average per day, and average per day per 1000 pounds of the feeds consumed and the constituents consumed.

It will be seen in table 1 that No. 18 consumed on the average daily 5.75 pounds of grain and 2.43 pounds of hay. The average daily consumption per 1000 pounds was 7.49

pounds of grain and 3.17 pounds of hay while the maintenance figures are 7.50 pounds of grain and 3.75 pounds of hay. With these animals the hay was only four-tenths of the grain. The figures for grain agree very well but it will be seen that this steer consumed on the average daily 0.58 pounds of hay less than maintenance requirements keeping his body weight constant, however. His cost of maintenance is, then, below our average figures.

Steer 121 (table 2) during 160 days of maintenance consumed on the average daily 6.10 pounds of grain and 2.68 pounds of hay, or an average daily consumption per 1000 pounds of 8.04 pounds of grain and 3.53 pounds of hay. His cost of maintenance is higher than our average. During the 153 days of the full fed period he consumed on the average daily 18.34 pounds of grain and 7.21 pounds of hay, gaining 497.1 pounds in weight.

This gain was made on a consumption above maintenance of 1754.12 pounds of grain and 577.18 pounds of hay or 3.53 pounds of grain and 1.16 pounds of hay per pound of gain.

Steer 48 (table 3) during 150 days of maintenance consumed on the average daily 6.82 pounds of grain and 2.97 pounds of hay, or an average daily consumption per 1000 pounds of 8.15 pounds of grain and 3.55 pounds of hay. His cost of maintenance is therefore above our average. During the 567 days of the full fed period, he consumed on the average daily 16.93 pounds of grain and 7.01 pounds of hay, gaining 943.5 pounds in weight. This gain was made on a consumption above maintenance of 4482.03 pounds of grain and 1412.27 pounds

of hay, or 4.75 pounds of grain and 1.50 pounds of hay per pound of gain.

Feed Analysis Tables.

Tables 4,5,6,7 and 8 give the analyses of all feeds fed to the steers, all feeds refused, the weights of the constituents consumed and refused in each feed and the total constituents consumed by ten day periods. At first samples were frequently changed during a ten day period. In such a case the weight of feed was divided proportionately according to the date of the division and weight of feed fed on each day. Adding the two parts gave the total consumption of the period.

Steer 18 refused no feed and the constituents offered and consumed are the same. Steers 121 and 48 refused feed after the beginning of the full fed periods, showing that at times the amount of feed offered was more than appetite or capacity could take care of.

In table 9 are found the maintenance requirements in protein, fat, nitrogen free extract and crude fibre for three different maintenance rations. These are calculated from the average analyses of the feeds fed in this experiment during four years using the rations given on pages 42 and 45. By referring to table 1 it will be seen that for steer 18 the average daily consumption per 1000 pounds was: protein, 1.250 pounds, fat 0.361 pounds; nitrogen free extract 6.299 pounds; and crude fibre 1.275 pounds. These are close to the figures in table 9 which are: protein, 1.343 pounds; fat, 0.380

pounds; nitrogen free extract, 6.536 pounds; and crude fibre, 1.465 pounds. The figures for steer 121 (table 10) are: protein, 1.334 pounds; fat, 0.378 pounds; nitrogen free extract, 6.804 pounds and crude fibre 1.435 pounds. For Steer 48 (table 11) they are: protein, 1.350 pounds; fat, 0.383 pounds; nitrogen free extract, 6.867 pounds and crude fibre 1.434 pounds.

In tables 10 and 11 are found the total consumption, maintenance requirements, and consumption above maintenance, for each constituent of the feed for steers 121 and 48. Steer 18 was on maintenance throughout the experiment and so does not appear in these tables. One set of basal requirements are figured from the maintenance figures and the second from the previous maintenance period of the steer. These latter are reduced to 93.3 per cent and 86 per cent as the maintenance requirement drops to the level of 800 pound steers and 1000 pound steers. At the foot of the tables are found the totals. The close agreement between the two sets of excess of constituent above requirement is due to the fact that the three steers considered in this paper were used in figuring the maintenance requirements given on pages 142 and 143. The total consumption above maintenance for each constituent or the total productive consumption is also given in kilos for the data calculated with the previous maintenance period as the base. For Steer 121 the total productive consumption of protein is 289.723 pounds; fat, 88.299 pounds; nitrogen free extract, 1385.534 pounds; crude fibre, 238.087 pounds.

For Steer 48 the total productive consumption of protein is 681.863 pounds; fat, 188.472 pounds; nitrogen free extract, 3442.802 pounds; crude fibre, 659.406 pounds. Steer 121 had gained 497.1 pounds and Steer 48, 943.5 pounds. Thus 121 required above maintenance for each pound of gain 0.583 pounds protein, 0.178 pounds fat, 2.787 pounds nitrogen free extract and 0.479 pounds of crude fibre. And 48 required above maintenance for each pound of gain 0.723 pounds protein, 0.200 pounds fat, 3.649 pounds nitrogen free extract and 0.699 pounds crude fibre. The first gain in weight of Steer 48 was less costly than this for it is the last gain in weight that is expensive. To put on the final touches in finish and fatness makes a good appearance but is uneconomical. Steer 48 being out of condition part of the time will likely account partly for the greater cost of each pound of gain.

CARCASS AND OFFAL.

Analyses and Weights.

The carcasses of these three animals were graded by a professional cutter from Swift and Company of Kansas City. The carcass of Steer 18 graded as No. 3, that of Steer 121 as No. 1 but a little under finish and that of Steer 48 as No. 1 but greatly overdone and too fat.

The carcass of Steer 48 showed no signs of tuberculosis but some of the organs showed some tubercles and thus confirmed the previous suspicions concerning this steer.

Table 12 gives all slaughter house weights in grams taken of the three animals also the weights of the different cuts of meats with the weights of lean, fat and bone separated. The offal weights are for the total offal parts unless noted otherwise. The carcass weights are for the right half only. In general the weights of the parts or organs increase with the weight of the animal. There is, however, less difference between steers 121 and 48 (the two full fed steers) than between steers 18 and 121. Steer 121 had been fed sufficient to give him his full growth without laying on of much fat.

Tables 13, 14 and 15 give the laboratory numbers and analyses of all parts of the three animals analyzed. From these and the preceding table all the subsequent tables are derived.

In table 16 the systems of the three animals which were analyzed in parts are composited and the composition of

the total system obtained. Take for example, the digestive and excretory system of Steer 18. The analysis of the partial system (for the organs composing this system see page 33 and following), of the liver and of the kidneys is given. By adding the weight of moisture in these three parts and dividing by the total weight of the system the per cent of moisture in the entire system was calculated; and so on for the other constituents and systems. The dry substance is the difference between the total and the moisture and the protein is nitrogen multiplied by 6.25.

Table 17 is the table used for calculating the composition of the fresh bone samples. Part of the analyses were made on the fresh sample and part on the air dry sample. These latter were calculated to a moisture and fat free basis and back to the fresh basis.

Tables 18 to 26 are the tables used in calculating the weights of the different constituents in the lean, the fat and the bone of each wholesale cut of meat, of the fore-quarters, of the hindquarters, of the carcass and of the animal. These are calculated for the cuts on both sides of the animal and so the weights are double those given in table 12. The totals were built up as shown in the discussion of table 16 (above.). The percentages are taken from the composite sample analyzed.

Tables 27 to 32 show the building up of the total wholesale cut, the quarters, the carcass and finally the

total empty animal as analyzed. The method of building up the composite is that described above.

Since analyses were made on composite samples and not on the individual parts of each cut or system, an exact comparison between the animals can be made only of the composite samples. The basis of analysis of Steer 18 is best used as a standard, for fewer samples were analyzed with this animal than in the case of the others. To bring the data together in shape for comparison as outlined above, tables 33 to ~~39~~ were made.

Percentage Composition.

Table 33 shows the percentage composition of the various organs and cuts of meat analyzed using Steer 18 as a basis. The blood of the maintenance steer, No. 18, is higher in moisture content and lower in dry substance than is the blood of either of the other two steers. The blood of No. 48 is 2 per cent lower in moisture content and the blood of No. 121 is 1.5 per cent lower than the blood of No. 48. Steer 18 is shown to have 0.4 per cent fat in his blood while the others show none. This may well be due to incomplete drying of the sample. In none of the blood samples subsequently analyzed has there been found any ether extract. It may be that our method does not permit the obtaining of the fat in the blood in the ether extract and so it can only be said that the ether extract as run here shows no fat in the blood. The protein content varies inversely as the moisture from 18 per cent to 20.3 per cent.

The ash is 0.688 per cent in the blood of No. 18, 0.775 per cent in the blood of No. 48 but only 0.248 per cent in the blood of No. 121. We can not account for the low percentage in the case of No. 121. Analyses of other blood samples have, however, given equally low results. The ash content is considerably higher in the full fed steer than in the maintenance steer. The percentage of phosphorus in the blood is practically the same in all three cases; 0.22 per cent for No. 18, 0.28 per cent for No. 121, and 0.21 per cent for No. 48. We should expect the blood of No. 121 to show the lowest phosphorus content since the ash is lowest here, but it does show the highest content.

The hide and hair runs noticeably high in moisture and protein. The moisture content is 65.4 per cent in the hide of No. 18, 59.8 per cent with No. 121 and 59.2 per cent with No. 48. The fat content, as is to be expected, increases directly with the fatness of the steer; No. 18, 2.88 per cent; No. 121, 4.97 per cent; No. 48, 8.60 per cent. On a moisture free basis the fat runs: No. 18, 8.324 per cent; No. 121, 12.350 per cent; No. 48, 21.099 per cent. The protein content runs from about 32 per cent to 34.6 per cent being lowest in Steer 18 and highest in Steer 121. On a moisture free basis the protein runs; No. 18, 91.959 per cent; No. 121, 85.968 per cent; No. 48, 81.391 per cent. On a moisture and fat free basis: No. 18, 100.30 per cent; No. 121, 98.080 per cent; No. 48, 103.15 per cent. This shows that the protein factor of 6.25 does not hold for

hide and hair. The ash and phosphorus content of the hide and hair decreases with the fatness of the steer, consequently with the fatness of the hide. The notable exception is the ash of Steer 48 which runs unaccountably high. The ash runs 0.868 per cent, 0.758 per cent and 1.197 per cent. The phosphorus is 0.068 per cent, 0.056 per cent and 0.048 per cent.

The skeleton of the three animals runs fairly constant in moisture, fat, protein, ash and phosphorus, the values being: moisture, 28 to 29 per cent; fat, 21 to 25 per cent; protein, 19 to 22 per cent; ash 25 to 27 per cent; phosphorus, nearly 5 per cent. The composition of the skeleton of these three animals seems to be practically independent of the condition of the animal. But Steer 18 runs 4 per cent higher in fat and 3 per cent lower in nitrogen than the fatter animals. As has been noted on table 17, the phosphorus data of Steer 18 is believed to be unreliable and so no discussion will be made here concerning the low percentage of phosphorus (2.879 per cent).

The circulatory system decreases very markedly in water content and increased in fat content with increasing fatness of the steers, 62 per cent of the system being fat in Steer 48. This shows to what extent fat is laid on around the pericardium. The protein, ash and phosphorus decreases relatively as the fat increases, but on a moisture and fat free basis there would be shown an actual increase in these constituents. The same things are true regarding the respira-

tory system. But this system shows relatively less fat and more protein than the preceeding system shows. The nervous system runs rather constant in moisture content, about 69 per cent. The ether extract, however, runs: 17.6 in Steer 18, 19.5 per cent in Steer 121 and only 13 per cent in Steer 48. This may be due to differences in mechanical separation. Outside the sheath of the cord is found some quantities of fat. Had the sheath and fat been separated with the cord in the case of No. 18 and No. 121 and only the cord itself been placed in the sample in the case of No. 48 this would account for the difference in the fat results. Such an inconsistency might have occurred in the first slaughtering or two. The cord alone was separated in all subsequent cases. The protein is about 11 per cent in the first two while it is 12 per cent in the case of No. 48. The ash and phosphorus are fairly constant.

The total digestive and excretory system runs 67 to 68 per cent moisture, 15 to 17 per cent fat, 13 to 14 per cent protein, 1 to 1.5 per cent ash and 0.15 to 0.20 per cent phosphorus. It must be remembered that the fat had been stripped off this system and so the excess of fat in the fatter steers will not be shown in the percentage tables. The higher percentage of fat in the case of No. 121 may easily be due to the difference in the mechanical separation in the slaughter house. The liver of the three animals runs constant in composition: 68 to 69 per cent moisture, 3.5 to 4.5 per cent fat, 18 to 20 per cent protein, 1.25 to 1.40 per cent ash and 0.30 to 0.35 per cent phosphorus. The kidneys

also run fairly constant in composition although Steer 48 runs 4 per cent lower in moisture and higher in fat than the other two. This and the low percentage of fat in No. 121 (5.56 per cent) may be due somewhat to variations in the removal of the kidney fat. The values run 71 to 75 per cent moisture, 5.5, 8.7 and 12 per cent fat, 15 to 17 per cent protein, 0.95 per cent to 1.15 per cent ash, and 0.20 per cent to 0.25 per cent phosphorus.

In the offal fat and kidney fat the dry substance and fat increase with the fatness of the steer while the moisture, protein, ash, and phosphorus decrease. The kidney fat has a greater percentage of dry substance and fat than the offal fat. The fat in these samples runs from 80 to 95 per cent.

Passing to the carcass samples it is seen that the shin, shank, head and tail lean and fat runs highest in moisture content, being 67.5 per cent, 62.3 per cent and 57.8 per cent for steers 18, 121 and 48 respectively. It runs lowest in fat in all cases being 12 per cent, 18.2 per cent, and 23.5 per cent. The protein is highest here likewise - 20.1 per cent, 18.3 per cent and 17.8 per cent. The ash and phosphorus is near the top in the case of No. 18 and at the top with the other two steers. This is the leanest sample of all the composite samples analyzed. The fat increases relatively with the fatness of the steers while the other constituents decrease. One exception is the ash of Steer 48 which is the highest of the three.

The round and rump lean and fat ranks next in low percentage of fat and high percentage of the other constituents. A close third is the chuck and neck lean and fat. Next comes the rib, lean and fat, then the loin lean and fat, and last the flank and plate lean and fat. The exception in the case of Steer 48 is to be noted in that the loin and rib trade places. The flank and plate cut runs from 30 per cent to 60 per cent fat showing what a very fat cut it is. The protein runs from 15 per cent to 8 per cent, the ash from 0.65 per cent to 0.42 per cent, the ash from 0.65 per cent to 0.42 per cent and the phosphorus from 0.124 per cent to 0.064 per cent. The fat and dry substance increase in per cent with fatness of the steer.

The total animal has 56.40 per cent moisture in No. 18, 48.38 per cent in No. 121 and 40.41 per cent in No. 48. The fat runs 18.59 per cent, 30.66 per cent and 42.34 per cent; the protein, 18.85 per cent, 16.02 per cent and 13.02 per cent; the ash, 5.72 per cent, 4.19 per cent and 3.49 per cent; and the phosphorus 0.677 per cent, 0.748 per cent and 0.627 per cent. The low percentage of phosphorus in the case of No. 18 is due to the low phosphorus content of the bone and is consequently considered as erroneous. It can be seen that the relation pointed out just above holds for the entire animal, namely: the fat content increases relatively and the other constituents decrease relatively with the increasing fatness of the steers.

Distribution of Constituents in Entire Animal.

Table 34 shows the distribution of the analytical constituents in the entire animal. The weight of constituent in the entire animal is taken as the base and the amount of the constituent in one system or cut is expressed in per cent of the total constituent.

In the blood the moisture is 7 to 8 per cent of the total moisture. It is about constant for the first two steers (8 per cent) while Steer 48 shows 7 per cent. The dry substance runs about 2 per cent of the total dry substance but for No. 48 it is 1.22 per cent. The protein is 5 to 6 per cent of the total protein. Here Steer 121 is the highest. The ash is 0.64 to 0.79 per cent of the total ash, Steer 121 being a very marked exception with only 0.29 per cent. The triplicate determinations of ash in the blood of Steer 121 were as follows:- 0.229 per cent, 0.237 per cent, and 0.278 per cent. So this data must be accepted. The phosphorus runs 0.173 per cent, 0.186 per cent and 0.117 per cent of the total phosphorus. This is as we should expect from the ash data.

With the hide and hair the moisture is 10.16, 7.39 and 8.32 per cent of the total moisture; the dry substance is 6.96, 4.72 and 3.88 per cent of the total dry substance; the fat is 1.36, 0.97 and 1.15 per cent of the total fat; the protein is 14.81, 12.99 and 14.46 per cent of the total protein; the ash is 1.33, 1.09 and 1.95 per cent of the total ash; and the phosphorus is 0.880, 0.450 and 0.430 per cent

of the total phosphorus. In general each constituent forms relatively less of the total ^{uent}~~constit~~ as the animal increases in size. The animal increases in weight faster than it increases its surface area, hence its hide, and so the relative proportion decreases.

In the circulatory system the moisture forms 0.89 to 0.72 per cent of the total moisture; the dry substance, 0.88 to 1.08 per cent of the total dry substance; the fat, 1.43, 1.20 and 1.38 per cent of the total fat; the protein, 0.59 to 0.44 per cent of the total protein; the ash, 0.116, 0.104 and 0.109 per cent of the total ash.; and the phosphorus, 0.16 to 0.11 per cent of the total phosphorus. The general tendency is the same as in the case of the hide and hair.

The respiratory system, however, shows a tendency diametrically opposed to the tendency of the two systems preceding. The constituent here in almost every case forms a relatively greater part of the total constituent as the animal increases in weight. However, Steer 121 shows a relatively smaller percentage of moisture and protein here than does No. 18. This shows a marked development of the lungs as the animal increases in weight and the development is relatively greater than the increase in weight. The per cents of the total constituents are: moisture 1.39, 1.23 and 1.85 per cent of the total; dry substance 0.61, 0.66 and 1.28 per cent of the total; fat, 0.365, 0.603 and 1.336 per cent of the total; protein, 0.960, 0.846 and 1.420 per cent of the total; ash, 0.176, 0.181 and 0.290 per cent of the total;

and phosphorus 0.024, 0.213 and 0.279 per cent of the total.

The nervous system again shows the same tendency as the hide and hair and circulatory system. The constituent is a smaller per cent of the total constituent as the weight of the animal increases. The values are: moisture 0.289, 0.202 and 0.184 per cent to the total; dry substance 0.176, 0.089 and 0.054 per cent of the total; fat 0.234, 0.092 and 0.033 per cent; protein 0.134, 0.094 and 0.107 per cent; ash 0.076, 0.054 and 0.055 per cent; and phosphorus 0.154, 0.076 and 0.072 per cent of the total.

The order in the total digestive and excretory system follows the other systems as far as the dry substance, fat and ash are concerned. The moisture, protein and phosphorus, however, are highest with Steer 121 and in Steers 18 and 48 they are about equal. The values are: moisture 8.86, 11.06 and 9.37 per cent of the total moisture; protein 5.47, 6.31 and 5.41 of the total protein; ^{phosphorus} ~~A~~ash 1.69, 2.11 and 1.75 per cent of the total ^{phosphorus} ~~A~~s; dry substance 5.62, 5.23 and 2.89 per cent of the total dry substance; fat 6.43, 4.61 and 1.97 per cent of the total fat; and ash 2.04, 1.70 and 1.56 per cent of the total ash.

The relative amounts of the constituents which are found in the liver first increases for Steer 121 and remains about constant for Steer 48. The dry substance and fat are exceptions, the values for Steer 48 falling below those of No. 18. The figures are: moisture 1.096, 2.003 and 1.943 per cent of the total moisture; dry substance 0.637, 0.88 and

0.572 per cent of the total dry substance; fat 0.167, 0.22 and 0.113 per cent; protein 0.899, 1.777 and 1.563 per cent; ash 0.196, 0.447 and 0.449 per cent; and phosphorus 0.411, 0.673 and 0.546 per cent.

In the kidneys a constant relation does not appear. The constituents increase absolutely, but relatively in some case the relation remains about constant, in others it increases between No. 18 and No. 121 and then decreases for No. 48, and in others it decreases. The percentages of the total constituents are: moisture 0.346, 0.35, 0.30 per cent of the total; dry substance 0.149, 0.102, 0.083 per cent; fat 0.122, 0.044 per cent, 0.049 per cent; protein 0.205, 0.238 and 0.198 per cent; ash 0.049, 0.051, 0.056 per cent; phosphorus 0.081, 0.068 and 0.053 per cent.

With the offal fat and kidney fat there is a constant and noticeable increase in the relative percentages as the animal increases in weight. A relatively greater part of the total constituents is in these samples for the animal lays on a large amount of fatty tissue here when it is fattening. By adding the percentages for fat of these two samples it will be seen that 12, 20 and 24 per cent of the total fat of the animal is found here in Steers 18, 121 and 48, respectively.

In the case of the skeleton the constituents form a decreasing proportion of the total as the animal increases in weight. From 84 to 90 per cent of all the ash and phosphorus is in the skeleton, one-fifth to one-sixth of the protein,

27 down to 5 per cent of the fat, 32 to 13 per cent of the dry substance and 10 to 7.5 per cent of the moisture.

The shin, shank, head, and tail lean and fat sample is relatively a waste cut or at least a poor cut. It would therefore be a good part of the animal to eliminate during growing or at least to reduce to a minimum. It can be seen by glancing through the figures that the constituents of this sample form from 4 per cent down to 0.60 per cent of the total constituents and there is decrease as the animal increases in weight.

The round and rump lean and fat contains a constant proportion of the total constituents about 15 per cent of the moisture, 10 per cent of the dry substance, 9 to 10 per cent of the fat, 13.5 per cent of the protein, 2 to 2.5 per cent of the ash, and 3.3 to 2.5 per cent of the phosphorus. The same is true of the chuck and neck lean and fat. Here the values are 17 to 18 per cent of the total moisture, 11 to 12 per cent of the dry substance, 11 to 12 per cent of the fat, 14 to 16 per cent of the protein, 2 to 3.5 per cent of the ash, and 2.7 to 3.4 per cent of the phosphorus. Thus the constituents in the chuck and neck are a relatively larger percentage of the total constituents ^{the case in} than is the round and rump.

In the rib lean and fat the moisture, dry substance, fat, protein and ash form a relatively increasing proportion of the total constituent as the animal grows in weight.

The phosphorus relatively decreases. The values are 5 to 6

per cent of the total moisture, 4 to 7.7 per cent of the dry substance, 4.6 to 9.1 per cent of the fat, 4.79 to 5.05 per cent of the protein, 0.67 to 0.96 per cent of the ash and 1.1 to 0.92 per cent of the phosphorus.

The constituents in the loin lean and fat increase relatively as the animal grows and fattens. The percentages are 10 to 11 per cent of the total moisture, 8.5 to 12.7 per cent of the dry substance, 11.8 to 14.7 per cent of the fat, 8.8 to 9.68 per cent of the protein, 1.28 to 1.88 per cent of the ash and 2.15 to 1.85 per cent of the phosphorus.

The flank and plate lean and fat shows the same relations as the rib lean and fat, namely: the moisture, the dry substance, fat, protein and ash form a relatively greater proportion of the total as the animal fattens. The values run 6.93, 9.33, and 9.38 per cent of the total moisture; 8.11, 13.24 and 14.74 per cent of the dry substance; 12.05, 17.63 and 18.15 per cent of the fat; 6.02, 8.51 and 7.84 per cent of the protein; 0.84, 1.35 and 1.52 per cent of the ash; and 1.36, 1.44 and 1.28 per cent of the phosphorus.

DISTRIBUTION OF OFFAL PARTS.

In table 35 are given the weights in kilograms and pounds of various of the offal parts of the animals and the percentages compared to the live and warm empty weights. The warm empty weight of the animal is obtained by subtracting the "fill", the contents of the stomach, intestines, and bladder, from the live weight. The empty weight forms an

increasing percentage of the total, the fatter and heavier the animal, being 88.18 per cent for No. 18, 89.30 per cent for No. 121 and 91.98 per cent for 48. The carcass is 59, 60 and 64 per cent of the live weight and 67, 68 and 69.7 per cent of the empty weight. Thus with increasing weight of the animal a smaller proportionate part is fill and a greater part is carcass. Consequently the animal "dresses out" higher and higher. The hide and hair runs 7.49, 5.25 and 5.08 per cent of the live weight and 8.50, 5.88 and 5.53 per cent of the empty weight. On the other hand, the offal fat increases relatively and absolutely being 1.66, 4.81 and 7.64 per cent of the live weight and 1.89, 5.39 and 8.30 per cent of the empty weight. The blood forms a relatively decreasing proportion of the animal. It increases in weight about 57 per cent from Steer 18 to Steer 121 with only a 5 per cent increase from there to Steer 48. The blood is 4.55, 4.29 and 3.17 per cent of the live weight and 5.16, 4.81 and 3.44 per cent of the empty weight. The heart increases constantly in weight but is a relatively smaller proportion of the whole as the animal grows larger. It is 0.436, 0.280 and 0.210 per cent of the live weight and 0.495, 0.314 and 0.228 per cent of the empty weight. The respiratory system bears out the statement given in the discussion of table 34. This system increases absolutely in weight but also relatively in proportion to the total. However, the percentages for Steer 121 are not higher than for Steer 18 but a little lower. Referred to the empty weight this system is 1.02, 0.91 and 1.47 per cent of the total.

The stomach about doubles in weight in going from Steer 18 to Steer 121 and then stays constant for Steer 48. The percentage compared to the total first increases slightly and then falls. The values referred to the empty weight are 2.53, 2.80 and 1.90 per cent. The weight of the intestines is about the same for steers 18 and 48 while No. 121 runs three to four kilos heavier. The per cent to the empty weight decreases, being 2.02, 1.96 and 0.95 per cent. The length of the intestines was measured in the two larger steers and found to be about 185 feet in each. The length per 100 pounds of empty weight is 16.77 feet and 11.22 feet for No. 121 and No. 48 respectively. The liver increases noticeably in weight while the proportion increases and then falls again. The per cent of empty weight is 0.87, 1.38 and 1.10 per cent. The gall bladder and gall increases in weight and the proportion increases and then decreases, being 0.031, 0.095 and 0.077 per cent of the empty weight. The spleen increases in weight and the percentage of empty weight runs 0.16, 0.18 and 0.14 per cent. The pancreas weighs about 250, 420 and 300 grams in these animals. In the first two animals it is 0.082 per cent of the empty weight while in No. 48 it is only 0.040 per cent of the empty weight.

Distribution of Cuts.

Table 36 shows the distribution of the various wholesale cuts of meat in the carcass and in the empty animal.

The forequarters, as well as the hindquarters, of each animal are almost one-third of the empty animal and one-half of the carcass. The forequarters are slightly the heavier and form a little larger proportion of the whole. With increasing weight of animal the forequarters are an increasing proportion of the live weight, an increasing and slightly decreasing part of the empty weight, and an increasing and then decreasing proportion of the carcass weight. The hindquarters are an increasing proportion of the live weight, a constant and then increasing proportion of the empty weight, and a decreasing and then increasing proportion of the carcass weight. The hindquarters of Steer 48 are a greater proportion of the live, empty, and carcass weights than is the case in either of the two other steers. The shins (fore shanks) are a smaller proportion of the total as the animal increases in weight. They are 3.45 to 2.14 per cent of the empty weight and 5.15 to 3.07 per cent of the carcass. The plates are a greater proportion of the total in the two heavy animals - about 10 per cent of the empty weight and 15 per cent of the carcass - than in the thin animal, where they are 7.36 and 10.96 per cent respectively. The chucks are a smaller part of the total in the two full fed animals than in the maintenance animal. They run 17.64, 15.59 and 15.96 per cent of the empty weight and 26.28, 22.92 and 22.91 per cent of the carcass. The necks become a smaller part of the total as the animal increases in weight, running 1.05, 0.71 and 0.65 per cent of the empty weight and 1.57, 1.04 and 0.93 per cent of

the carcass. The ribs are a greater part of the total with increasing weight of animal, being 6.23, 6.83 and 7.88 per cent of the empty animal and 9.28, 10.05 and 11.32 per cent of the carcass.

The shanks run as do the shins but the values are 2.67 to 1.55 per cent and 3.97 to 2.23 per cent in place of the 3 and 5 per cent of the shins. The rounds decrease with increasing weight of animal - 12.76, 11.57, 10.27 per cent of empty weight and 19.01, 17.01 and 14.74 per cent of carcass. On the other hand, the values for the rumps increase 2.33, 2.35, 2.63 per cent of the empty animal and 3.47, 3.45 and 3.78 per cent of the carcass. The proportion of loins increases noticeably being 10.96, 12.09 and 12.89 per cent of the empty weight and 16.33, 17.77 and 18.51 per cent of the carcass. The flanks follow the same rule, being 1.62, 1.71 and 3.43% of the empty animal and 2.41, 2.52 and 4.92 per cent of the carcass. With the kidney fat the same is true. The values run 1.05, 1.65 and 2.47 per cent and 1.57, 2.42 and 3.55 per cent of the empty animal and carcass respectively.

Distribution of Total Constituents.

Table 37 shows the percentages of the constituents in the warm empty animal and in the empty animal analyzed. The latter value is obtained by subtracting the horns, Hoofs, teeth and dew claws from the former. The difference between the warm empty weight of the animal and the built up animal

analyzed (which is the total animal given in tables 28, 30 and 32) plus the horns, hoofs, teeth and dew claws, gives the loss on cooling and sampling. Great care was taken to prevent any loss of the sample being cut up or separated, every particle and piece was returned to the proper container whenever any was dropped or flew away from the cleaver. Some "sawdust" was lost. This loss is considered as moisture and is added to the weight of moisture obtained from analysis to give the grand total of moisture. On this basis the percentages are given.

The loss on cooling is a fairly constant percentage of the empty weight, running 2.37, 2.67 and 2.83 per cent taken in the usual order. The percentage of total moisture in the empty animal, less horns and so forth, runs one or two per cent above that in the animal as analyzed and is 57.45, 50.08 and 42.31 per cent. The dry substance on the same basis is 42.55 per cent, 49.92 per cent and 57.69 per cent; the protein is 18.40 per cent, 15.59 per cent and 12.73 per cent; the fat is 18.15, 29.84 and 41.37 per cent; the ash is 5.58, 4.08 and 3.41 per cent; and the phosphorus is 0.661, 0.728 and 0.619 per cent. These all run a little lower than in the animal as analyzed on account of the greater weight of the warm empty animal less horns, hoofs, teeth and dew claws.

The skeleton is 17.01, 11.66 and 9.79 per cent of the live weight; 19.28, 13.06 and 10.64 per cent of the warm empty weight. The skeleton of the carcass is 22.07, 14.79

and 12.03 per cent of the carcass. The lean meat of the animal is 39.21, 35.36 and 30.43 per cent of the live weight; 44.47, 39.60 and 33.08 per cent of the warm empty weight. The carcass lean is 65.57, 59.96 and 47.08 of the carcass. The fat (hand separated and exclusive of the offal fat) is 7.34, 16.56 and 26.26 per cent of the live weight; 8.33, 18.54 and 28.55 per cent of the warm empty weight! The fat of the carcass is 12.36, 27.25 and 40.89 per cent of the carcass. The relative amount of fat increases, while the lean and bone relatively decrease, with increasing weight of the animal.

Skeleton Comparisons.

Table 38 gives the comparison of the constituents in the skeleton to the constituents in the total animal and in the carcass. According to the table the skeleton contains 9.56, 7.76 and 7.13 per cent of the total moisture; 32.71, 18.47 and 13.15 per cent of the total dry substance; 27.03, 9.31 and 5.47 per cent of the total fat; 19.92, 18.40 and 16.45 per cent of the total protein; 88.03, 87.17 and 83.86 per cent of the total ash; and 84.53(7), 86.52 and 86.01 per cent of the total phosphorus. The skeleton in the animal thus contains a relatively smaller amount of the total moisture, a relatively less amount of the total dry substance, a decreasing proportion of the fat and a slightly decreasing proportion of the total protein, ash and phosphorus. The same relation holds for the skeleton of the carcass compared to the carcass. The exception in both cases is in the case

of the phosphorus of the skeleton of Steer 18. This data has been pointed out before as unreliable on account of a loss of all but one sample of the bone. We believe that a true value would bear out the above relations. The proportion of each constituent in the carcass skeleton of the total constituent in the carcass is similar to that in the total animal. The carcass skeleton has of the constituents in the carcass: 11.409, 9.298, and 8.030 per cent of the moisture; 34.967, 19.696 and 14.550 per cent of the dry substance; 27.549, 9.599, and 6.474 of the fat; 22.736, 20.931, and 18.480 per cent of the protein; 90.055, 87.972 and 85.924 per cent of the ash; 84.172, 86.843, and 87.317 per cent of the phosphorus. The phosphorus of the carcass skeleton of Steer 121 is only 86.84 per cent of the total phosphorus of the carcass, one half per cent lower than in Steer 48. The proportion of the phosphorus in the skeleton to the total is about constant in these two animals.

Fat Distribution.

Table 39 gives a special study of the analytical fat in the total animals. The total fat in the animal is 54.465 kilograms in Steer 18, 151.116 kilograms in Steer 121, and 307.082 kilograms in Steer 48. The weight of fat in the total fleshy parts of the animal exclusive of the kidney fat is 27.660 kilograms for Steer 18, 94.471 kilograms for Steer 121 and 199.074 kilograms for Steer 48. The percentage of fat in the entire animal and in the skeleton have been

compared previously but are given here for comparison.

The fat in the flesh and internal organs (exclusive of offal and kidney fat) is 60.72 per cent of the total fat in Steer 18, 70.20 per cent for Steer 121 and 70.69 per cent for Steer 48. It is about constant in the fat animals and 10 per cent above that in the thin steer. The fat in the offal and kidney fat is a greater proportion of the whole as the animal is fatter, being 12.24 per cent, 20.50 per cent and 23.84 per cent. The fat in the offal and kidney fat is 24.11 per cent fat in the flesh of the animal (less the kidney fat) in Steer 18, 32.69 per cent in Steer 121 and 36.77 per cent in Steer 48. The fat in the flesh is 50.79 per cent of the total fat for Steer 18, 62.71 per cent for Steer 121 and 64.89 per cent for Steer 48. The fat in the skeleton is 27.03, 9.31 and 5.47 per cent of the total fat in the three animals. These figures show, in simple words, that fat is laid on more rapidly on the internal organs and in the abdominal cavity than on the external part of the animal as it is fattened. The fat deposited in and over the flesh is a somewhat greater part of the entire fat but changes only from 51 per cent to 65 per cent. In the thin animal over one-fourth of the total fat is in the skeleton while in the fatter animals only 9.31 per cent and 5.47 per cent is there. An animal on maintenance will build up his skeleton and store up fat in it before it will devote much material to the fleshy parts.

Cost of Maintenance and Weight Gained.

Tables 40 to 45 inclusive give the data used in computing the maintenance costs, the cost of each pound of gain and the energy stored in each pound of gain. The values for percentage of digestible protein and energy value for corn, alfalfa and linseed meal were obtained from the tables given by H. P. Armsby in Farmers Bulletin No. ³⁴⁶~~136~~ of the U. S. Department of Agriculture. The energy value of corn, linseed and alfalfa are given in therms per 100 pounds of feed, a therm being the quantity of heat required to raise 1,000 kilograms of water 1°C in temperature. A therm is, therefore, 1000 large calories or 1,000,000 small calories.

During the maintenance period of Steer 18 this animal consumed daily in its feed 0.691 pounds of digestible protein and 5.881 therms of energy. Steer 121 consumed 0.741 pounds of digestible protein and 6.278 therms. Steer 48 consumed 0.827 pounds of digestible protein and 7.004 therms. Armsby gives the maintenance requirements of 750 pound steers as 0.40 pounds of digestible protein and 4.95 therms daily. Our two 750 pound steers required from 75 per cent to 85 per cent more digestible protein and from 18 per cent to 26 per cent more energy. The heavier steer required 90 per cent more digestible protein and about 32 per cent more energy than a steer of corresponding weight on Armsby's requirements. This great difference may likely be due to the difference in

the breed of cattle. The Hereford-Shorthorn grade steer is a large framed animal while the cattle at Pennsylvania State College are small.

Table 41 gives the data for computing the total productive digestible protein and total productive energy consumed above maintenance by Steers 121 and 48 during the full fed period. Steer 121 had consumed 199.39 pounds of productive digestible protein and 1737.632 therms of energy. It had gained 497.1 pounds. There were required, therefore, 0.401 pounds of digestible protein and 3.496 therms of energy for each pound of gain. Steer 48 consumed 505.173 pounds of productive digestible protein and 4418.568 productive therms. This steer gained 943.5 pounds and thus required per pound of gain 0.535 pounds of digestible protein and 4.683 therms of energy.

Table 42 shows the weight in kilograms of the different analytical constituents Steer 121 had in excess of Steer 18. It is here assumed that the three steers had practically the same composition while on maintenance and this excess is taken as showing the amount of the constituents gained by the steer during the full fed period. Steer 121 thus had 74.79 kilos of moisture, 125.117 kilos of dry substance, 96.651 kilos of fat, 23.72 kilos of protein, 3.884 kilos of ash and 1.704 kilos of phosphorus above Steer 18. The therms stored in the fat and protein gained were calculated from Benedict's and Osterberg's value for fat (9.523 per kilo) and the average of Stolmann and Kohler's values for protein

(5.665 per kilo) as given in "The Principles of Animal Nutrition" by H. P. Armsby, page 244. Steer 121 stored 134.374 therms in the protein gained and 920.407 therms in the fat gained, or a total of 1054.781 therms. The animal thus stored up an amount of energy equal to 60 per cent of the productive energy consumed.

Table 43 shows the same things for Steer 48 as table 42 shows for Steer 121. However, Steer 48 weighed, during the maintenance period, 63.3 pounds or 31.434 kilos more than Steer 18. It is assumed that this difference in weight has the same composition as Steer 18. Steer 48 had therefore 110.079 kilos of moisture, 290.775 kilos of dry substance, 246.774 kilos of fat, 33.939 kilos of protein, 6.873 kilos of ash and 2.392 kilos of phosphorus above Steer 18. This animal stored 192.264 therms in its protein gained and 2350.029 therms in the fat stored, or a total of 42.293 therms. It thus stored up an amount of energy equal to 57.5 per cent of the productive energy consumed.

Summaries.

Blood. As to composition the water content decreases while the dry substance and protein increase with fatness of the steers. The phosphorus is constant and the ash shows no relation to condition. The constituents form a slightly decreasing proportion of the total constituents in the animal. The weight of the blood forms a decreasing proportion of the empty weight of the animal. The blood of No. 121 is 57 per cent more by weight than the blood of No. 18. No. 48 shows but a 5 per cent increase over No. 121. The heart is a smaller proportion of the empty weight as the animal fattens.

Circulatory System. The percentage of fat in this system increases with the fatness of the animal while the other constituents decrease. The system forms a relatively decreasing proportion of the animal.

Hide and Hair. The percentage of dry substance, fat, and protein in the hide and hair increase while the other constituents decrease with increasing fatness of the animal. The weight of the hide and hair as well as the weights of its constituents form a smaller proportion of the total as the animal fattens.

Nervous System The composition of this system is constant. It forms a decreasing proportion of the animal as the animal fattens.

Respiratory System. The percentage of fat in this

system increases with increasing fatness of the animal while the other constituents decrease. The system (as well as the constituents) forms a greater proportion of the total as the animal fattens. There is, however, not much difference between Steer 18 and Steer 121.

Digestive and Excretory System. This system has a constant composition. It forms a decreasing proportion of the empty animal as the animal fattens. The liver is an increasing proportion of the total and so is the gall bladder and gall. The spleen is about constant, as is the pancreas for No. 18 and No. 121. The various organs increase in weight it is true, but not in proportion to the increase in weight of the animal. The stomach increases proportionally from No. 18 to No. 121 but falls again for No. 48.

Offal Fat and Kidney Fat. These samples show increasing per cent. of dry substance and fat with increasing fatness of the steers. The other constituents decrease. They form a greater part of the empty animal (and of the total constituents) as the animal fattens. Twelve to twenty-four per cent of the total fat is here.

The carcass cuts will be treated in the order of highest percentage of moisture, protein, ash, and phosphorus and ~~lowest~~ per cent of dry substance, and fat.

Shin, Shank, Head and Tail Lean and Fat.

This cut comes first in the above order. The fat and dry substance increase as the fatness of the steer. The cut is a decreasing part of the empty animal and carcass.

Round and Rump Lean and Fat comes second in high per cent of moisture, etc. This cut has a constant composition. It forms relatively less of the empty animal and carcass as the animal fattens. The rump cut alone increases, however, as the animal fattens.

Chuck and Neck Lean and Fat. This ranks third, has a constant composition and forms less of the empty animal and carcass as the animal fattens.

Rib Lean and Fat. This cut ranks fourth. The per cent of dry substance and fat increase, the other constituents decrease, as the animal fattens. This cut forms a greater part of the empty animal and carcass as the animal fattens.

Loin Lean and Fat. This cut ranks fifth. Otherwise it follows exactly the rib lean and fat.

Flank and Plate Lean and Fat. This cut ranks sixth. Otherwise it follows the rib lean and fat.

Skeleton. The skeleton runs fairly constant in composition in all three animals in spite of the extreme thinness of Steer 18. The skeleton and the various constituents increase in weight with the weight of the animal but the increase is proportional for all the constituents. The constituents form a decreasing proportion of the total constituents and the weight of skeleton is a smaller part of the empty animal and carcass as the animal fattens. From 90 to 84 per cent of all the ash and phosphorus is found here, one-fifth to one-sixth the protein, and twenty-seven to five per

cent of the total fat.

Lean Flesh. This is 44.5 to 33.1 per cent of the empty animal and 65.6 to 47.1 per cent of the carcass. It decreases proportionately as the animal fattens.

Fat Flesh, (exclusive offal fat.). This is 8.3 to 28.6 per cent of the empty animal and 12.4 to 40.9 per cent of the carcass. It increases proportionately with the fatness of the steer.

Total Animal. The percentage of fat in the animal increases with the fatness of the steer. The other constituents decrease. The lean animal is over half moisture (56 - 57 per cent) and the fat animal 40 per cent moisture. The fat animal is over 40 per cent while the lean animal is only 18.6 per cent.

The "fill" is a smaller part of the animal and the carcass a larger part with increasing fatness.

Fat Distribution. In the thin animal 12 per cent of the total fat is in the offal and kidney fat, 12.5 per cent in the adipose tissue, 27 per cent in the bones. The remainder is in the lean flesh and internal organs. In the fatter animal 21 per cent of the total animal fat is in the offal and kidney fat, 38.8 per cent in the adipose tissue, 9 per cent in the bones and the remainder in the lean flesh and internal organs. In the fattest steer 24 per cent of the total fat is in the offal and kidney fat, 46 per cent in the adipose tissue, 5.5 per cent in the bones, and the remainder in the lean flesh and internal organs.

Maintenance Cost of Steer 18. Per thousand pounds live weight daily the consumption, or cost, was 7.49 pounds

grain and 3.17 pounds hay; or 1.25 pounds protein, 0.361 pounds fat, 6.299 pounds nitrogen free extract, and 1.275 pounds of crude fibre; or 0.691 pounds of digestible protein and 5.881 therms of energy.

Maintenance Cost of Steer 121. In the same units as above the cost was 8.04 pounds grain and 3.53 pounds hay; or 1.33 pounds protein, 0.378 pounds fat, 6.804 pounds nitrogen free extract, and 1.435 pounds crude fibre; or 0.741 pounds of digestible protein and 6.278 therms of energy.

Maintenance Cost of Steer 48. The cost was, in the above units, 8.15 pounds grain and 3.55 pounds hay; or 1.35 pounds protein, 0.383 pounds fat, 6.867 pounds nitrogen free extract, 1.434 pounds crude fibre; or 0.827 pounds digestible protein and 7.004 therms.

Cost of Gain, Steer 121. The cost per pound of gain was: 3.53 pounds grain and 1.16 pounds of hay; or 0.583 pounds of protein, 0.178 pounds of fat, 2.787 pounds of nitrogen free extract, and 0.479 pounds of crude fibre; or 0.401 pounds of digestible protein and 3.496 therms. This steer stored up in the fat and protein gained 60 per cent of the energy consumed above maintenance.

Cost of Gain, Steer 48. The cost per pound of gain was: 4.75 pounds grain and 1.50 pounds of hay; or 0.723 pounds protein, 0.200 pounds of fat, 3.649 pounds of nitrogen free extract, and 0.699 pounds of crude fibre; or 0.535 pounds of digestible protein and 4.683 therms. This steer stored up in the fat and protein gained 57.5 per cent of the energy consumed above maintenance.

The work of which this thesis is a part was originally planned by President H. J. Waters of Manhattan, Kansas, formerly Dean of the College of Agriculture of the University of Missouri. The work was done under the immediate direction of Professor P. F. Trowbridge of the Department of Agricultural Chemistry. The author wishes to acknowledge his indebtedness to them, to Mr. L. D. Haigh for part of the abstracts of literature and for other assistance, and to his past and present associates in the Department of Agricultural Chemistry.

Table I. Steer 18 Weight and Feed Record - 10 Day Periods.

Period	Inclusive Dates	Average Weight for Period	Average Weight at Beginning of Period	Average Weight at end of Period	Gain or Loss During Period	Grain offered and Consumed in Period Pounds	Hay offered and Consumed During Period. Pounds.	Total weight Protein Consumed	Total weight Fat Consumed	Total weight Nitrogen-free extract Consumed	Total weight Crude Fibre Consumed
1907											
1	2/1 - 2/10	764.6	763.6	762.9	- 0.7	58.0	54.00	13.490	3.200	59.471	19.928
2	2/11 - 2/20	756.0	762.9	746.6	- 16.3	60.0	27.50	10.238	2.825	51.044	10.932
3	2/21 - 3/2	737.1	746.6	736.9	- 9.7	60.0	25.00	9.911	2.782	50.120	10.078
4	3/3 - 3/12	739.5	736.9	742.1	+ 5.2	69.5	25.00	10.961	3.155	56.590	10.320
5	3/13 - 3/22	747.9	742.1	748.8	+ 6.7	75.0	29.50	12.159	3.447	62.005	11.999
6	3/23 - 4/1	748.3	748.8	750.7	+ 1.9	75.0	30.00	12.225	3.456	62.190	12.169
7	4/2 - 4/11	750.6	750.7	754.7	+ 4.0	75.0	30.00	12.225	3.456	62.190	12.169
8	4/12 - 4/21	761.0	754.7	765.2	+ 10.5	72.5	28.75	11.785	3.337	60.024	11.679
9	4/22 - 5/1	770.4	765.2	769.9	+ 4.7	64.0	25.25	10.386	2.943	52.940	10.264
10	5/2 - 5/11	769.7	769.9	767.0	- 2.9	60.0	25.00	9.911	2.780	50.120	10.078
11	5/12 - 5/21	768.5	767.0	776.5	+ 9.5	60.0	25.00	9.911	2.780	50.120	10.078
12	5/22 - 5/31	780.5	776.5	782.0	+ 5.5	60.0	25.00	9.483	2.847	50.182	10.621
13	6/1 - 6/10	784.5	782.0	777.5	- 4.5	49.0	19.50	7.497	2.331	40.661	8.517
14	6/11 - 6/20	758.0	777.5	747.5	- 30.0	40.0	15.00	6.023	1.885	32.851	6.620
15	6/21 - 6/30	748.0	747.5	758.0	+ 10.5	48.5	19.50	7.442	2.310	40.320	8.509
16	7/1 - 7/10	759.5	758.0	754.7	- 3.3	50.0	20.00	7.662	2.380	41.530	8.733
17	7/11 - 7/20	750.9	754.7	752.8	- 1.9	50.0	20.00	7.662	2.380	41.530	8.733
18	7/21 - 7/30	759.6	752.8	764.9	+ 12.1	54.0	22.00	8.317	2.579	44.999	9.588
19	7/31 - 8/9	764.8	764.9	760.2	- 4.7	55.0	22.50	8.439	1.991	45.600	9.737
20	8/10 - 8/19	766.4	760.2	772.9	+ 12.7	55.0	22.50	8.439	1.991	45.600	9.737
21	8/20 - 8/29	772.8	772.9	777.6	+ 4.7	55.0	22.50	9.450	2.890	46.609	8.468
22	8/30 - 9/8	778.5	777.6	766.2	- 11.4	55.0	22.50	10.328	2.899	46.858	7.113
23	9/9 - 9/18	770.8	766.2	789.8	+ 23.6	55.0	22.50	10.328	2.899	46.858	7.113
24	9/19 - 9/28	801.4	789.8	802.9	+ 13.1	55.0	22.50	10.289	2.896	46.776	7.328
25	9/29 - 10/8	799.9	802.9	796.4	- 6.5	52.5	21.00	8.961	2.827	43.746	8.768
26	10/9 - 10/18	791.8	796.4	791.3	- 5.1	50.0	20.00	8.533	2.692	41.702	8.351
27	10/19 - 10/28	788.7	791.3	782.0	- 9.3	50.0	20.00	8.533	2.692	41.702	8.351
28	10/29 - 11/7	785.0	782.0	781.8	- 0.2	50.0	20.00	8.502	2.613	41.434	8.382
29	11/8 - 11/11	778.1	781.8	4 days		20.0	8.00	3.412	1.072	16.667	3.343
Average		767.3				Total. 1633.0	690.00	272.452	78.335	1372.439	277.706
Average per day						5.75	2.43	0.959	0.276	4.833	0.978
Average per day per 1000 ^{lb}						7.49	3.17	1.250	0.360	6.299	1.275

Table II Steer 121 weight and Feed Record - 10 Day Period
Maintenance Period.

Period	Inclusive Dates	Average weight for Period	Average weight at Beginning of Period	Average weight at End of Period	Gain or loss during Period	Grain Consumed During Period	Hay Consumed During Period	Total Protein Consumed Pounds	Total Fat Consumed Pounds	Total Nitrogen Free Extract Consumed Pounds	Total Crude Fibre Consumed Pounds
	1907										
1	2/1-2/10	763.5	761.0	764.7	+ 3.7	58.00	58.00	14.014	3.268	60.949	21.294
2	2/11-2/20	762.7	764.7	745.7	-19.0	60.00	27.50	10.238	2.825	51.044	10.932
3	2/21-3/2	731.5	745.7	732.8	-12.9	60.00	25.00	9.911	2.782	50.120	10.078
4	3/3-3/12	730.3	732.8	735.9	+ 3.1	69.50	25.00	10.961	3.155	56.590	10.320
5	3/13-3/22	746.3	735.9	751.2	+15.3	75.00	29.50	12.159	3.447	62.005	11.999
6	3/23-4/1	752.8	751.2	754.5	+ 3.3	75.00	30.00	12.225	3.456	63.190	12.169
7	4/2-4/11	750.4	754.5	750.4	- 4.1	75.00	30.00	12.225	3.456	63.190	12.169
8	4/12-4/21	757.2	750.4	762.0	+11.6	72.50	28.95	11.785	3.337	60.024	11.679
9	4/22-5/1	759.5	762.0	770.0	+ 8.0	64.00	25.25	10.386	2.943	52.939	10.264
10	5/2-5/11	767.5	770.0	764.0	- 6.0	60.00	25.00	9.911	2.780	50.120	10.078
11	5/12-5/21	767.5	764.0	775.0	+11.0	60.00	25.75	10.009	2.793	50.397	10.334
12	5/22-5/31	781.5	775.0	782.5	+ 7.5	60.00	25.00	9.483	2.732	50.182	10.621
13	6/1-6/10	781.0	782.5	779.0	- 3.5	49.00	19.50	7.497	2.331	40.661	8.529
14	6/11-6/20	767.5	779.0	754.5	-24.5	40.00	15.00	6.023	1.885	32.851	6.620
15	6/21-6/30	748.5	754.5	755.7	+ 1.2	48.50	19.50	7.442	2.310	40.320	8.509
16	7/1-7/10	764.2	755.7	771.5	+15.8	50.00	20.00	7.662	2.380	41.530	8.733
Average		758.87				Total 976.50	428.95	161.931	45.880	826.112	174.328
Average Per Day						6.103	2.681	1.012	0.287	5.163	1.089
Average Per Day per 1000#						8.042	3.533	1.334	0.378	6.804	1.435

Table IIa
Steer 121

Weight and Feed Records - 10 Day Periods.
Full Fed Period.

Steer 121																					
Serial	Inclusive Dates	Average Weight for Period	Average Weight at Beginning of Period	Average Weight at End of Period	Gain for Period	Grain Consumed During Period	Hay Consumed During Period	Average Grain Consumed Daily per 1000 lbs.	Average Hay Consumed Daily per 1000 lbs.	Grain per Pound of Gain	Hay per Pound of Gain	Grain Daily Maintenance Requirement	Hay Daily Maintenance Requirement	Grain above Maintenance Daily	Hay above Maintenance Daily	Productive Grain per Pound of Gain	Productive Hay per Pound of Gain	Total Protein Consumed Pounds	Total Fat Consumed Pounds	Total Nitrogen Consumed Pounds	Total Crude Fibre Consumed Pounds
1907																					
17	7/11-7/20	778.0	771.5	787.7	16.2	84.00	34.00	10.80	4.37	5.19	2.10	5.446	2.723	2.954	0.677	1.82	0.42	13.241	4.105	71.655	15.246
18	7/21-7/30	805.9	787.7	836.0	48.3	129.00	51.50	16.01	6.39	2.67	1.07	5.641	2.820	7.259	2.330	1.50	0.48	19.755	6.137	107.110	22.495
19	7/31-8/9	858.6	836.0	879.4	43.4	153.75	62.00	17.91	7.22	3.54	1.43	6.010	3.005	9.365	3.195	2.16	0.74	23.482	5.548	127.139	26.889
20	8/10-8/19	913.2	879.4	932.1	52.7	160.50	55.25	17.58	6.05	3.05	1.05	6.392	3.196	9.658	2.329	1.83	0.44	23.556	5.654	129.292	24.478
21	8/20-8/29	933.8	932.1	950.9	18.8	179.50	71.50	19.27	7.68	9.55	3.80	6.069	3.035	11.881	4.115	6.32	2.19	30.536	9.399	151.379	27.046
22	8/30-9/8	974.2	950.9	984.9	34.0	186.75	67.75	19.17	6.95	5.49	1.99	6.332	3.166	12.343	3.609	3.63	1.06	33.937	9.703	155.855	21.147
23	9/9-9/18	997.8	984.9	1030.0	45.1	197.00	79.00	19.74	7.92	4.37	1.75	6.486	3.243	13.214	4.657	2.93	1.03	36.740	10.355	167.229	24.994
24	9/19-9/28	1056.3	1030.0	1077.4	47.4	208.50	84.50	19.74	8.00	4.40	1.78	6.866	3.483	13.984	5.017	2.95	1.06	38.692	10.971	176.031	27.541
25	9/29-10/8	1097.4	1077.4	1111.3	33.9	221.75	83.00	20.20	7.56	6.54	2.45	7.133	3.567	15.042	4.733	4.44	1.40	36.996	11.746	181.947	34.885
26	10/9-10/18	1133.3	1111.3	1126.6	15.3	206.25	77.50	18.20	6.84	13.48	5.07	7.366	3.683	13.259	4.067	8.67	2.66	34.740	10.963	170.385	32.496
27	10/19-10/28	1132.7	1126.6	1168.6	42.0	199.00	81.00	17.57	7.15	4.74	1.93	7.363	3.681	12.537	4.419	2.99	1.05	34.153	10.739	166.473	33.735
28	10/29-11/7	1190.3	1168.6	1201.5	32.9	221.50	87.75	18.61	7.37	6.73	2.67	7.737	3.868	14.413	4.907	4.38	1.49	37.725	11.902	184.464	36.662
29	11/8-11/17	1211.9	1201.5	1212.4	10.9	222.75	88.75	18.38	7.32	20.44	8.14	7.877	3.939	14.398	4.936	13.21	4.53	38.011	10.992	185.670	37.082
30	11/18-11/27	1208.9	1212.4	1228.7	16.3	187.50	79.00	15.51	6.53	11.50	4.85	7.858	3.929	10.892	3.971	6.68	2.43	32.694	10.175	157.849	32.752
31	11/28-12/7	1258.1	1228.7	1266.4	37.7	188.50	76.75	14.98	6.10	5.00	2.04	8.178	4.089	10.672	3.586	2.83	0.95	32.478	10.181	157.731	31.970
32	12/8-12/10	1261.3	1266.4	3 days		60.00	24.00	15.85	6.34			8.198	4.099	11.802	3.901			10.241	2.814	50.043	10.022
Total						2806.25	1103.25	Total Maintenance Cost Full Fed Period				1052.134	526.067								
Daily average						18.34	7.21														
																		476.971	141.384	2340.252	439.440

Table III Steer 48 Weight and Feed Record - 10 day periods.
Maintenance Period.

Period	Inclusive Dates	Average weight for Period	Average wt. at Beginning of Period	Average wt. at End of Period	Gain or Loss during Period	Grain Consumed in Period Pounds	Hay Consumed in Period Pounds	Total Protein Consumed Pounds	Total Fat Consumed Pounds	Total Nitrogen Free Extract Consumed	Total Crude Fibre Consumed Pounds
1	1907 2/1-2/10	840.0	840.0	834.2	+ 5.8	58.00	58.00	14.018	3.273	60.950	20.396
2	2/11-2/20	827.5	834.2	814.8	- 19.4	60.00	27.50	10.234	2.826	51.041	10.930
3	2/21-2/2	802.3	814.8	805.5	- 9.3	60.00	25.00	9.970	2.783	50.117	10.677
4	2/3-2/12	807.2	805.5	807.2	+ 1.7	69.50	25.00	10.961	3.159	56.587	10.327
5	2/13-2/22	809.4	807.2	817.0	+ 9.8	75.00	29.50	12.156	3.443	62.010	11.994
6	2/23-2/1	821.8	817.0	826.2	+ 9.2	77.50	31.25	12.666	3.572	64.357	12.661
7	2/2-2/11	833.2	826.2	833.5	+ 7.3	80.00	32.50	13.109	3.693	66.518	13.158
8	2/12-2/21	838.0	833.5	841.5	+ 8.0	80.00	30.00	12.782	3.651	65.595	12.304
9	2/22-2/1	845.9	841.5	851.4	+ 9.9	80.00	32.50	13.109	3.693	66.518	13.158
10	2/2-2/11	859.0	851.4	859.5	+ 8.1	78.50	31.75	12.841	3.623	65.221	12.852
11	2/12-2/21	856.5	859.5	859.0	- 0.5	70.50	27.75	11.437	3.240	58.293	11.286
12	2/22-2/31	859.0	859.0	859.0	no change	70.00	27.50	10.871	3.287	57.918	11.777
13	2/1-2/10	859.7	859.0	855.4	- 3.6	59.00	24.50	9.140	2.821	49.340	10.650
14	2/11-2/20	848.7	855.4	842.5	- 12.9	50.00	20.00	7.660	2.381	41.530	8.730
15	2/21-2/30	841.5	842.5	846.9	+ 4.4	55.00	22.25	8.450	2.622	45.780	9.700
Total						1023.00	445.00	169.404	48.067	861.775	180.000
Average						6.82	2.967	1.129	0.320	5.745	1.200
Average per Day						8.152	3.546	1.350	0.383	6.867	1.434
Average per Day per 1000 ^{lb}											

Table III a Steer 48

Weight and Feed Records - 10 day Periods.

Full Fed Period.

Period	Inclusive Dates	Average weight for Period	Average weight at beginning of Period	Average weight at end of Period	Gain for Period	Grain Consumed during Period	Hay Consumed during Period	Average Grain Consumed Daily per 1000 lbs.	Average Hay Consumed Daily per 1000 lbs.	Grain per pound of Gain	Hay per Pound of Gain	Grain Daily Maintenance Requirement ^{7.00* per 1000}	Hay Daily Maintenance Requirement ^{3.5* per 1000}	Grain Above Maintenance Daily	Hay Above Maintenance Daily	Productive grain per Pound of Gain	Productive Hay per Pound of Gain	Total Protein Consumed Pounds	Total Fat Consumed Pounds	Total Nitrogen Extract Consumed Pounds	Total Crude Fibre Consumed Pounds
16	7 ¹ / ₁ - 7 ¹⁰ / ₁₀	849.9	846.9	854.0	+ 7.1	83.00	34.50	9.77	4.06	11.69	4.86	5.949	2.974	2.351	0.476	3.31	0.67	12.860	3.979	69.480	14.980
17	7 ¹¹ / ₁₁ - 7 ²⁰ / ₂₀	866.5	854.0	889.8	+ 35.8	113.50	46.00	13.10	5.31	3.17	1.28	6.066	3.032	5.284	1.568	1.48	0.44	17.460	5.406	94.500	20.050
18	7 ²¹ / ₂₁ - 7 ³⁰ / ₃₀	917.5	889.8	957.4	+ 67.6	149.00	60.00	16.24	6.54	2.204	.888	6.423	3.211	8.477	2.789	1.254	0.413	22.880	7.100	123.910	26.170
19	7 ³¹ / ₃₁ - 8 ⁹ / ₉	992.9	957.4	1002.8	+ 45.4	178.25	70.00	17.96	7.05	3.93	1.54	6.950	3.475	10.88	3.525	2.40	0.78	27.137	6.409	146.715	30.462
20	8 ¹⁰ / ₁₀ - 8 ¹⁹ / ₁₉	1012.3	1002.8	1016.5	+ 13.7	186.00	58.50	18.37	5.78	13.58	4.27	6.579	3.289	12.021	2.561	8.77	1.87	26.831	4.274	147.827	26.267
21	8 ²⁰ / ₂₀ - 8 ²⁹ / ₂₉	1012.6	1016.5	1027.7	+ 11.2	192.50	75.50	19.01	7.45	17.19	6.65	6.582	3.291	12.668	4.259	11.31	3.80	32.500	9.848	161.865	28.749
22	8 ³⁰ / ₃₀ - 9 ⁸ / ₈	1054.1	1027.7	1069.6	+ 41.9	199.50	79.50	18.93	7.54	4.76	1.90	6.852	3.426	13.098	4.524	3.13	1.08	37.101	10.482	169.234	25.209
23	9 ⁹ / ₉ - 9 ¹⁸ / ₁₈	1076.6	1069.6	1099.9	+ 30.3	200.00	80.00	18.58	7.43	6.60	2.64	6.998	3.499	13.002	4.501	4.29	1.49	37.230	10.513	169.770	25.380
24	9 ¹⁹ / ₁₉ - 9 ²⁸ / ₂₈	1118.7	1099.9	1128.8	+ 28.9	206.75	85.00	18.49	7.60	7.16	2.94	7.272	3.636	13.408	4.864	4.64	1.68	38.563	11.633	176.004	27.665
25	9 ²⁹ / ₂₉ - 10 ⁸ / ₈	1150.8	1128.8	1171.5	+ 42.7	217.00	74.50	18.86	6.47	5.08	1.74	7.480	3.740	14.220	3.710	3.33	0.87	35.611	11.406	176.760	31.666
26	10 ⁹ / ₉ - 10 ¹⁸ / ₁₈	1188.9	1171.5	1215.7	+ 44.2	222.50	89.00	18.71	7.49	5.03	2.01	7.728	3.864	14.522	5.036	3.29	1.14	37.982	11.969	185.599	37.159
27	10 ¹⁹ / ₁₉ - 10 ²⁸ / ₂₈	1233.2	1215.7	1236.0	+ 20.3	226.00	90.00	18.24	7.30	11.08	4.43	8.016	4.008	14.484	4.992	7.14	2.46	38.390	12.108	187.670	37.590
28	10 ²⁹ / ₂₉ - 11 ⁷ / ₇	1241.3	1236.0	1243.2	+ 7.2	225.00	71.75	18.13	5.78	31.25	9.97	8.068	4.034	14.432	3.146	20.04	4.37	36.361	11.482	180.217	30.210
29	11 ⁸ / ₈ - 11 ¹⁷ / ₁₇	1242.7	1243.2	1233.6	- 9.6	144.00	73.25	11.59	5.90			8.078	4.039	6.322	3.291			27.328	8.030	125.797	29.665
30	11 ¹⁸ / ₁₈ - 11 ²⁷ / ₂₇	1210.1	1233.6	1185.5	- 48.1	85.00	53.25	7.02	4.40			7.866	3.933	0.634	1.397			17.623	4.935	77.902	21.084
31	11 ²⁸ / ₂₈ - 12 ⁷ / ₇	1181.4	1185.5	1187.5	+ 2.0	94.25	59.00	7.98	4.99	47.15	29.50	7.679	3.839	1.751	2.061	8.76	10.31	19.010	5.425	86.226	23.338
32	12 ⁸ / ₈ - 12 ¹⁷ / ₁₇	1193.2	1187.5	1195.0	+ 7.5	120.75	63.00	10.12	5.28	16.11	8.40	7.756	3.878	4.324	1.976	5.77	2.63	22.619	6.750	105.967	25.410
33	12 ¹⁸ / ₁₈ - 12 ²⁷ / ₂₇	1198.6	1195.0	1206.8	+ 11.8	106.50	80.50	8.886	6.716	9.026	6.822	7.791	3.895	2.859	4.155	2.423	3.521	23.395	6.355	102.384	31.321
34	12 ²⁸ / ₂₈ - 1 ⁶ / ₆	1220.9	1206.8	1231.4	+ 24.6	139.25	78.00	11.405	6.388	5.661	3.171	7.936	3.968	5.989	3.832	2.435	1.557	26.024	7.908	123.586	32.659
35	1 ⁷ / ₇ - 1 ¹⁶ / ₁₆	1242.6	1231.4	1263.1	+ 31.7	132.75	60.00	10.683	4.828	4.188	1.893	8.077	4.038	5.198	1.962	1.640	0.619	22.854	7.531	112.921	26.029
36	1 ¹⁷ / ₁₇ - 1 ²⁶ / ₂₆	1271.6	1263.1	1268.4	+ 5.3	154.25	63.00	12.131	4.955	29.10	11.887	8.265	4.132	7.160	2.168	13.509	4.092	24.811	11.757	125.223	27.640

Table IIIa cont. Steer 48.

Weight and Feed Records - 10 Day Periods
Full Feed Period.

Period	Inclusive Date	Average weight for Period	Average weight at beginning of Period	Average weight at end of Period	Gain for Period	Grain consumed during Period	Hay consumed during Period	Average grain consumed daily per 1000 lbs.	Average hay consumed daily per 1000 lbs.	Grain per pound of gain	Hay per pound of gain	Grain daily maintenance	Hay daily maintenance	Grain above maintenance	Hay above maintenance	Productive grain per pound of gain	Productive hay per pound of gain	Total Protein Consumed Pounds	Total Fat Consumed Pounds	Total nitrogen-free extract consumed Pounds	Total Crude Fibre consumed Pounds
37	$\frac{1}{27} - \frac{2}{5}$	1265.3	1268.4	1271.2	+ 2.8	135.75	65.00	10.729	5.137	48.485	23.212	8.224	4.112	5.351	2.888	19.112	8.529	22.787	11.892	112.800	28.025
38	$\frac{2}{6} - \frac{2}{15}$	1279.8	1271.2	1289.2	+ 18.0	161.75	65.00	12.639	5.079	8.986	3.611	8.318	4.159	7.857	2.341	4.365	1.301	25.735	12.794	130.373	28.584
39	$\frac{2}{16} - \frac{2}{25}$	1303.9	1289.2	1314.7	+ 25.5	162.50	65.00	12.462	4.985	6.373	2.549	8.475	4.237	7.775	2.263	3.049	0.887	25.820	12.820	130.880	28.600
40	$\frac{2}{26} - \frac{3}{6}$	1323.0	1314.7	1338.9	+ 24.2	155.50	68.00	11.753	5.140	6.426	2.810	8.599	4.299	6.951	2.501	2.872	1.033	25.771	11.613	124.886	29.254
41	$\frac{3}{7} - \frac{3}{16}$	1349.3	1338.9	1363.1	+ 24.2	171.75	70.00	12.728	5.187	7.097	2.892	8.770	4.385	8.405	2.615	3.473	1.081	25.921	12.157	136.043	30.290
42	$\frac{3}{17} - \frac{3}{26}$	1379.1	1363.1	1386.8	+ 23.7	176.75	71.00	12.815	5.148	7.458	2.996	8.964	4.482	8.711	2.618	3.676	1.105	28.610	12.400	139.740	30.790
43	$\frac{3}{27} - \frac{4}{5}$	1399.1	1386.8	1409.5	+ 22.7	182.50	75.00	13.043	5.360	8.040	3.304	9.094	4.547	9.156	2.953	4.034	1.301	29.975	5.388	157.634	33.309
44	$\frac{4}{6} - \frac{4}{15}$	1424.9	1409.5	1444.8	+ 35.3	196.10	78.50	13.761	5.509	5.555	2.224	9.262	4.681	10.348	3.219	2.932	0.912	31.970	5.420	169.360	35.060
45	$\frac{4}{16} - \frac{4}{25}$	1453.0	1444.8	1463.5	+ 18.7	198.50	80.00	13.661	5.506	10.61	4.278	9.445	4.722	10.405	3.278	5.564	1.753	32.441	5.469	171.626	35.698
46	$\frac{4}{26} - \frac{5}{5}$	1481.1	1463.5	1491.9	+ 28.4	187.50	80.00	12.659	5.401	6.602	2.817	9.627	4.814	9.123	3.186	3.212	1.122	31.199	5.025	163.826	35.387
47	$\frac{5}{6} - \frac{5}{15}$	1488.6	1491.9	1478.6	- 13.3	169.25	80.00	11.369	5.374			9.676	4.838	7.249	3.162			29.138	4.298	150.885	34.873
48	$\frac{5}{16} - \frac{5}{25}$	1472.3	1478.6	1469.6	- 9.0	154.00	74.00	10.459	5.026			9.569	4.784	5.831	2.616			26.663	3.827	137.767	32.186
49	$\frac{5}{26} - \frac{6}{4}$	1480.0	1469.6	1480.9	+ 11.3	130.25	62.00	8.801	4.189	11.527	5.487	9.620	4.810	3.405	1.390	3.01	1.229	22.534	3.225	116.360	26.896
50	$\frac{6}{5} - \frac{6}{14}$	1456.4	1480.9	1440.3	- 40.6	127.75	58.25	8.77	3.999			9.467	4.733	3.308	1.092			21.868	3.048	113.295	25.290
51	$\frac{6}{15} - \frac{6}{24}$	1440.2	1440.3	1446.7	+ 6.4	162.50	47.50	11.283	3.298	25.39	7.422	9.361	4.680	6.889	0.070	10.763	0.011	24.310	4.180	134.220	22.400
52	$\frac{6}{25} - \frac{7}{4}$	1462.9	1446.7	1477.5	+ 30.8	171.80	68.69	11.743	4.695	5.578	2.230	9.509	4.754	7.671	2.115	2.491	0.687	28.000	4.740	148.340	30.690
53	$\frac{7}{5} - \frac{7}{14}$	1487.9	1477.5	1498.0	+ 20.5	175.33	73.23	11.783	4.922	8.554	3.572	9.671	4.835	7.862	2.488	3.835	1.214	28.963	4.746	152.590	32.491
54	$\frac{7}{15} - \frac{7}{24}$	1507.7	1498.0	1527.2	+ 29.2	186.08	72.66	12.342	4.819	6.374	2.488	9.800	4.900	8.808	2.366	3.016	0.810	30.640	7.840	156.720	32.080
55	$\frac{7}{25} - \frac{8}{3}$	1536.3	1527.2	1541.3	+ 14.1	190.60	76.30	12.405	4.966	13.517	5.412	9.986	4.993	9.074	2.637	6.435	1.870	31.610	8.060	161.190	33.570
56	$\frac{8}{4} - \frac{8}{13}$	1550.9	1541.3	1561.0	+ 19.7	192.80	77.26	12.431	4.981	9.787	3.922	10.081	5.040	9.199	2.686	4.670	1.363	31.990	8.150	163.070	33.990
57	$\frac{8}{14} - \frac{8}{23}$	1574.7	1561.0	1585.0	+ 24.0	195.00	78.10	12.383	4.960	8.125	3.254	10.236	5.118	9.264	2.692	3.860	1.122	32.350	8.240	164.910	34.360

Table III a Cont. Steer 48

Weight and Feed Records - 10 Day Periods
Full Fed Period

Inclusive Dates	Average weight for Period	Average weight at Beginning of Period	Average weight at End of Period	Gain	Grain Consumed during Period	Hay Consumed during Period	Average grain consumed daily per 1000 lbs.	Average Hay consumed daily per 1000 lbs.	Grain per Pound of Gain	Hay per Pound of Gain	Grain Daily Maintenance Requirement	Hay Daily Maintenance Requirement	Grain above Maintenance Daily	Hay above Maintenance Daily	Productive Grain per Pound of Gain	Productive Hay per Pound of Gain	Total Protein Consumed Pounds	Total Fat Consumed Pounds	Total Nitrogen Extract Consumed Pounds	Total Crude Fibre Consumed Pounds
58 $\frac{8}{24}$ - $\frac{9}{12}$	1589.4	1585.0	1595.5	+10.5	195.00	78.10	12.268	4.913	18.571	7.438	10.331	5.165	9.169	2.645	8.733	2.519	32.300	8.370	165.830	33.470
59 $\frac{9}{13}$ - $\frac{9}{12}$	1608.1	1595.5	1626.3	+30.8	209.74	78.83	13.043	4.902	6.810	2.560	10.453	5.226	10.521	2.657	3.416	0.863	33.938	9.404	180.143	30.523
60 $\frac{9}{13}$ - $\frac{9}{22}$	1643.7	1626.3	1643.8	+17.5	189.74	77.90	11.543	4.740	10.842	4.451	10.684	5.342	8.290	2.448	4.737	1.399	31.605	8.580	165.463	29.745
61 $\frac{9}{23}$ - $\frac{10}{2}$	1644.3	1643.8	1654.1	+10.3	166.11	72.38	10.102	4.401	16.129	7.027	10.688	5.344	5.923	1.894	5.751	1.839	28.306	7.459	146.273	27.395
62 $\frac{10}{3}$ - $\frac{10}{12}$	1660.5	1654.1	1691.6	+17.5	181.25	72.66	10.915	4.375	10.358	4.152	10.793	5.396	7.332	1.870	4.190	1.068	29.872	8.253	157.523	27.842
63 $\frac{10}{13}$ - $\frac{10}{22}$	1683.0	1691.6	1692.1	+20.5	174.99	73.03	10.397	4.339	8.536	3.562	10.939	5.469	6.560	1.834	3.200	0.895	29.275	7.951	153.084	27.815
64 $\frac{10}{23}$ - $\frac{11}{1}$	1707.8	1692.1	1714.9	+22.8	171.37	71.25	10.033	4.172	7.516	3.125	11.101	5.550	6.036	1.575	2.647	0.691	28.561	7.721	150.033	27.139
65 $\frac{11}{2}$ - $\frac{11}{11}$	1710.9	1714.9	1719.4	+4.5	176.32	71.25	10.307	4.165	39.184	15.834	11.121	5.560	6.511	1.565	14.468	3.478	29.125	8.027	153.495	27.261
66 $\frac{11}{12}$ - $\frac{11}{21}$	1720.6	1719.4	1707.0	-12.4	166.86	68.26	9.698	3.938			11.184	5.592	5.502	1.184			27.590	7.344	145.423	26.985
67 $\frac{11}{22}$ - $\frac{12}{1}$	1696.6	1707.0	1702.8	-4.2	169.74	69.76	10.007	4.112			11.028	5.514	5.946	1.462			28.169	7.737	148.160	26.620
68 $\frac{12}{2}$ - $\frac{12}{11}$	1718.2	1702.8	1734.4	+31.6	154.61	68.75	8.999	3.841	4.893	2.088	11.168	5.584	4.293	1.016	1.358	0.322	25.730	6.929	134.960	25.550
69 $\frac{12}{12}$ - $\frac{12}{21}$	1749.1	1734.4	1748.2	+13.8	168.12	63.50	9.612	3.630	12.182	4.601	11.369	5.684	5.443	0.666	3.944	0.483	27.034	8.171	141.672	25.157
70 $\frac{12}{22}$ - $\frac{12}{31}$	1746.8	1748.2	1751.2	+3.0	177.50	61.50	10.162	3.512	59.167	20.500	11.354	5.677	6.396	0.473	21.320	1.577	27.880	8.520	147.450	24.760
71 $\frac{1}{1}$ - $\frac{1}{10}$	1761.0	1751.2	1783.0	+31.8	175.00	67.50	9.938	3.833	5.503	2.123	11.447	5.723	6.053	1.027	1.903	0.323	28.330	8.570	148.170	26.630
72 $\frac{1}{11}$ - $\frac{1}{18}$	1797.4	1783.0	7 days	+23.0	167.00	51.50	13.272	4.093	10.373	3.199	11.683	5.841	12.174	1.516	5.293	0.660	20.900	6.300	108.880	20.150
Total					9602.06	3972.66	Total maintenance, cost period ^{full fed} 5120.031 2559.887													
Daily average					16.93	7.01														

Table IV Steer 18 Feed Analysis - 10 Day Periods

Ratio of grain: 8 corn to 1 linseed.

Period	Inclusive Dates	Grain Consumed Pounds	Corn Consumed Pounds	Protein in corn Pounds	Fat in corn Pounds	Nitrogen free Extract in corn Pounds	Crude Fibre in corn Pounds	Linseed Consumed Pounds	Protein in Linseed Pounds	Fat in Linseed Pounds	Nitrogen Free Extract in Linseed Pounds	Crude Fibre in Linseed Pounds	Hay Consumed Pounds	Protein in Hay Pounds	Fat in Hay Pounds	Nitrogen free Extract in Hay Pounds	Crude Fibre in Hay Pounds
	Percent.			8.100%	3.624%	72.12%	1.936%	6.444	34.713%	6.290%	36.30%	7.607%		13.106%	1.712%	36.949%	34.148%
1	2/1 - 2/10	56.00	51.556	4.176	1.870	37.180	0.998	6.444	2.237	0.405	2.339	0.490	54.00	7.077	.925	19.952	18.440
2	2/10 - 2/20	60.00	53.333	4.320	1.935	38.463	1.034	6.667	2.314	0.419	2.420	0.507	27.50	3.604	.471	10.161	9.391
3	2/21 - 3/2	60.00	53.333	4.320	1.935	38.463	1.034	6.667	2.314	0.419	2.420	0.507	25.00	3.277	.428	9.237	8.537
4	3/3 - 3/12	69.50	61.778	5.004	2.241	44.550	1.196	7.722	2.680	0.486	2.803	0.587	25.00	3.277	.428	9.237	8.537
5	3/13 - 3/22	75.00	66.667	5.400	2.418	48.080	1.291	8.333	2.893	0.524	3.025	0.634	29.50	3.866	.505	10.900	10.074
6	3/23 - 4/11	75.00	66.667	5.400	2.418	48.080	1.291	8.333	2.893	0.524	3.025	0.634	30.00	3.932	.514	11.085	10.244
7	4/2 - 4/11	75.00	66.667	5.400	2.418	48.080	1.291	8.333	2.893	0.524	3.025	0.634	30.00	3.932	.514	11.085	10.244
8	4/12 - 4/21	72.50	64.444	5.220	2.338	46.477	1.248	8.056	2.797	0.507	2.924	0.613	28.75	3.768	.492	10.623	9.818
9	4/22 - 5/1	64.00	56.889	4.608	2.064	41.028	1.101	7.111	2.469	0.447	2.582	0.541	25.25	3.309	.432	9.330	8.622
10	5/2 - 5/11	60.00	53.333	4.320	1.933	38.463	1.034	6.667	2.314	0.419	2.420	0.507	25.00	3.277	.428	9.237	8.537
11	5/12 - 5/21	60.00	53.333	4.320	1.933	38.463	1.034	6.667	2.314	0.419	2.420	0.507	25.00	3.277	.428	9.237	8.537
12	5/22 - 5/25												7.50	0.983	0.128	2.771	2.561
12	5/26 - 5/31	60.00	53.333	4.320	1.933	38.463	1.034	6.667	2.314	0.419	2.420	0.507	Percent. 17.50	Percent. 10.663%	Percent. 2.097%	Percent. 37.30%	Percent. 37.253%
13	6/1 - 6/10	49.00	43.556	3.528	1.580	31.411	0.843	5.444	1.890	0.342	1.976	0.414	19.50	2.079	0.409	7.274	7.260
14	6/11 - 6/20	40.00	35.556	2.880	1.290	25.643	0.688	4.444	1.543	0.280	1.613	0.338	15.00	1.600	0.315	5.595	5.594
15	6/21 - 6/30	48.50	43.111	3.492	1.562	31.090	0.835	5.389	1.871	0.339	1.956	0.410	19.50	2.079	0.409	7.274	7.264
16	7/1 - 7/10	50.00	44.444	3.600	1.612	32.053	0.860	5.556	1.929	0.349	2.017	0.423	20.00	2.133	0.419	7.460	7.450
17	7/11 - 7/20	50.00	44.444	3.600	1.612	32.053	0.860	5.556	1.929	0.349	2.017	0.423	20.00	2.133	0.419	7.460	7.450
18	7/21 - 7/30	54.00	48.000	3.888	1.741	34.615	0.928	6.000	2.083	0.377	2.178	0.456	22.00	2.346	0.461	8.206	8.204
	Percent.			8.006%	2.322%	71.57%	1.825%										
19	7/31 - 8/9	55.00	48.889	3.918	1.135	34.990	0.892	6.111	2.122	0.384	2.218	0.465	22.50	2.399	0.472	8.392	8.380
20	8/10 - 8/19	55.00	48.889	3.918	1.135	34.990	0.892	6.111	2.122	0.384	2.218	0.465	22.50	2.399	0.472	8.392	8.380

Table IV Steer 18
cont.

Feed Analysis - 10 Day Periods

Period	Inclusive Dates	Grain Consumed Pounds	Corn Consumed Pounds	Protein in Corn Pounds	Fat in Corn Pounds	Nitrogen free Extract in Corn Pounds	Crude Fibre in Corn Pounds	Linseed Consumed Pounds	Protein in Linseed Pounds	Fat in Linseed Pounds	Nitrogen free Extract in Linseed Pounds	Crude Fibre in Linseed Pounds	Hay Consumed Pounds	Protein in Hay Pounds	Fat in Hay Pounds	Nitrogen free Extract in Hay Pounds	Crude Fibre in Hay Pounds
				8.6144%	4.147%	73.23%	1.427%										
21	$\left\{ \begin{array}{l} \frac{8}{20} - \frac{8}{25} \\ \frac{8}{26} - \frac{8}{29} \end{array} \right\}$	55.00	48.889	4.226	2.027	35.800	0.698	6.111	2.122	0.384	2.218	0.465	$\left\{ \begin{array}{l} 12.50 \\ \text{Percent} \\ 10.00 \end{array} \right\}$	1.333	0.262	4.662	4.661
22	$\frac{8}{30} - \frac{9}{8}$	55.00	48.889	4.226	2.027	35.800	0.698	6.111	2.122	0.384	2.218	0.465	22.50	3.980	0.488	8.840	5.950
23	$\frac{9}{9} - \frac{9}{11}$	55.00	48.889	4.226	2.027	35.800	0.698	6.111	2.122	0.384	2.218	0.465	22.50	3.980	0.488	8.840	5.950
	$\frac{9}{11} - \frac{9}{28} \text{ AM}$	52.50	46.67	4.034	1.935	34.175	0.666	5.83	2.024	0.367	2.116	0.443	20.25	3.582	0.439	7.956	6.355
24	$\left\{ \begin{array}{l} \text{Percent} \\ \frac{9}{28} \text{ PM} \end{array} \right\}$	50.00	2.22	0.192	0.099	1.623	0.038	0.28	0.097	0.019	0.102	0.023	2.25	0.310	0.037	0.804	0.803
25	$\frac{9}{29} - \frac{10}{8}$	52.50	46.667	4.043	2.074	34.124	0.798	5.833	2.026	0.404	2.115	0.477	21.00	2.892	0.349	7.507	7.494
26	$\frac{10}{9} - \frac{10}{14}$	50.00	44.444	3.850	1.975	32.537	0.759	5.556	1.929	0.385	2.015	0.455	20.00	2.754	0.332	7.150	7.137
27	$\frac{10}{19} - \frac{10}{28}$	50.00	44.444	3.850	1.975	32.537	0.759	5.556	1.929	0.385	2.015	0.455	20.00	2.754	0.332	7.150	7.137
	$\frac{10}{29} \text{ AM}$	2.50	2.22	0.192	0.099	1.623	0.038	0.28	0.097	0.019	0.102	0.023	none	none	none	none	none
28	$\left\{ \begin{array}{l} \text{Percent} \\ \frac{10}{29} \text{ PM} - \frac{11}{7} \end{array} \right\}$	50.00	4.22	0.192	0.099	1.623	0.038	0.28	0.097	0.019	0.102	0.023	none	none	none	none	none
	$\frac{11}{8} \text{ AM}$	2.50	2.22	0.191	0.095	1.611	0.040	0.28	0.097	0.019	0.102	0.023	none	none	none	none	none
29	$\left\{ \begin{array}{l} \text{Percent} \\ \frac{11}{8} \text{ PM} - \frac{11}{11} \end{array} \right\}$	20.00	15.56	1.348	0.691	11.394	0.266	1.94	0.674	0.134	0.703	0.159	8.00	1.102	0.133	2.860	2.855

Table V Steer 121 Feed Analysis - 10 day Periods (Maintenance Period).

Ratio of grain: 8 corn to 1 linseed.

Period	Inclusive Dates	Grain Consumed Pounds	Corn Consumed Pounds	Protein in Corn Pounds	Fat in Corn Pounds	Nitrogen in Corn Pounds	Crude Fibre in Corn Pounds	Linseed Consumed Pounds	Protein in Linseed Pounds	Fat in Linseed Pounds	Nitrogen in Linseed Pounds	Crude Fibre in Linseed Pounds	Hay Consumed Pounds	Protein in Hay Pounds	Fat in Hay Pounds	Nitrogen in Hay Pounds	Crude Fibre in Hay Pounds
		Percent.		8.100%	3.624%	72.12%	1.936%		34.713%	6.290%	36.30%	7.607%	58.00	13.106%	1.712%	36.949%	34.148%
1	2/1 - 2/10	58.	51.556	4.176	1.870	37.180	0.998	6.444	2.237	0.405	2.339	0.490	58.00	7.601	0.993	21.430	19.806
2	2/11 - 2/20	60.	53.333	4.320	1.935	38.463	1.034	6.667	2.314	0.419	2.420	0.507	27.80	3.604	0.471	10.161	9.391
3	2/21 - 3/2	60.	53.333	4.320	1.935	38.463	1.034	6.667	2.314	0.419	2.420	0.507	25.00	3.277	0.428	9.237	8.537
4	3/3 - 3/12	69.5	61.778	5.004	2.241	44.550	1.196	7.222	2.680	0.486	2.803	0.587	25.00	3.277	0.428	9.237	8.537
5	3/13 - 3/22	75.	66.667	5.400	2.418	48.080	1.291	8.333	2.893	0.524	3.025	0.634	29.50	3.866	0.505	10.900	10.074
6	3/23 - 4/1	75.	66.667	5.400	2.418	48.080	1.291	8.333	2.893	0.524	3.025	0.634	30.00	3.932	0.514	11.085	10.244
7	4/2 - 4/11	75.	66.667	5.400	2.418	48.080	1.291	8.333	2.893	0.524	3.025	0.634	30.00	3.932	0.514	11.085	10.244
8	4/12 - 4/21	72.5	64.444	5.220	2.338	46.477	1.248	8.056	2.797	0.507	2.924	0.613	25.25	3.768	0.492	10.623	9.818
9	4/22 - 5/1	64.	56.889	4.608	2.064	41.028	1.101	7.111	2.469	0.447	2.582	0.541	25.25	3.309	0.432	9.329	8.622
10	5/2 - 5/11	60.	53.333	4.320	1.933	38.463	1.034	6.667	2.314	0.419	2.420	0.507	25.00	3.277	0.428	9.237	8.537
11	5/12 - 5/21	60.	53.333	4.320	1.933	38.463	1.034	6.667	2.314	0.419	2.420	0.507	25.75	3.375	0.441	9.514	8.793
12	5/22 - 5/25	60.	53.333	4.320	1.933	38.463	1.034	6.667	2.314	0.419	2.420	0.507	7.50	0.983	0.013	2.771	2.561
													Percent	10.663%	2.097%	37.30%	37.253%
	5/26 - 5/31												17.50	1.866	0.367	6.528	6.519
13	6/1 - 6/10	49.	43.556	3.528	1.580	31.411	0.843	5.444	1.890	0.342	1.976	0.414	19.50	2.079	0.409	7.274	7.272
14	6/11 - 6/20	40.	35.556	2.880	1.290	25.643	0.688	4.444	1.543	0.280	1.613	0.338	15.00	1.600	0.315	5.595	5.594
15	6/21 - 6/30	48.5	43.111	3.492	1.562	31.090	0.835	5.389	1.871	0.339	1.956	0.410	19.50	2.079	0.409	7.274	7.264
16	7/1 - 7/10	50.	44.444	3.600	1.612	32.053	0.860	5.556	1.929	0.349	2.017	0.423	20.00	2.133	0.419	7.460	7.450

Table V		Steer 121		Feed Analysis - 10 Day Periods (Full Fed Period).																						
Cont.		Ratio of grain: 8 corn to 1 linseed.																								
Period	Inclusive Dates	Grain Offered Pounds	Corn Offered Pounds	Protein in corn Pounds	Fat in corn Pounds	Nitrogen free Extract in corn Pounds	Crude fibre in corn Pounds	Linseed Offered Pounds	Protein in Linseed Pounds	Fat in Linseed Pounds	Nitrogen free Extract in Linseed Pounds	Crude fibre in Linseed Pounds	Hay Offered Pounds	Protein in Hay Pounds	Fat in Hay Pounds	Nitrogen free Extract in Hay Pounds	Crude fibre in Hay Pounds	Total Protein Offered Pounds	Total Fat Offered Pounds	Total Nitrogen free Extract Offered Pounds	Total Crude fibre Offered Pounds					
17	7-7/11-20	86.	76.444	6.192	2.770	55.131	1.480	9.556	3.317	0.601	3.469	0.727	35.00	3.732	0.734	13.055	13.039	13.241	4.105	71.655	15.246					
18	7-7/21-30	129.	114.667	9.288	4.155	82.698	2.220	14.383	4.975	0.902	5.203	1.090	51.50	5.492	1.080	19.209	19.185	19.755	6.137	107.110	22.495					
Percent.				8.006%	2.322%	74.87%	1.825%															1.000				
19	7-8/31-9	153.75	136.667	10.941	3.173	87.812	2.494	17.083	5.930	1.075	6.201	1.299	62.00	6.611	1.300	23.126	23.096	23.482	5.548	127.139	26.889					
20	8-8/10-19	162.5	144.444	11.564	3.354	103.379	2.636	18.056	6.268	1.136	6.554	1.374	65.00	6.931	1.363	24.245	24.213	24.763	5.853	134.178	28.223					
Percent.				8.644%	4.147%	73.23%	1.427%																			
21	8-8/20-25	181.	160.889	13.907	6.672	117.819	2.296	20.111	6.981	1.265	7.300	1.530	Percent		41.00	4.372	0.860	15.292	15.273	30.832	9.481	152.788	27.429			
	8-8/26-29												17.688%	2.170%	39.29%	26.443%	30.832	9.481	152.788							
22	8-9/30-9	200.	177.778	15.367	7.372	130.187	2.537	22.222	7.714	1.397	8.067	1.690	80.00	14.150	1.736	31.430	21.153	37.231	10.505	169.684	25.380					
23	9-9/19-18	200.	177.778	15.367	7.372	130.187	2.537	22.222	7.714	1.397	8.067	1.690	80.00	14.150	1.736	31.430	21.153	37.231	10.505	169.684	25.380					
	9-9/19-28 AM		178.889	15.463	7.419	131.000	2.553	22.361	7.762	1.407	8.117	1.701	76.50	13.530	1.660	29.057	20.228									
24	Percent	211.75	9.333	0.8889	4.15	6.833	0.159	1.167	0.405	0.081	0.423	0.096	8.50	1.170	0.141	3.039	3.033	39.139	11.123	178.469	27.770					
	9-9/28 PM																									
25	9-10/1-10	221.75	197.111	17.076	8.760	144.305	3.367	24.639	8.556	1.708	8.934	2.017	89.00	12.253	1.477	31.817	31.760	37.885	11.945	186.056	37.144					
26	10-10/19-18	225.	200.	17.326	8.888	146.420	3.416	25.000	8.681	1.733	9.065	2.046	90.00	12.391	1.494	32.175	32.118	38.398	12.115	187.660	37.580					
27	10-10/19-10	199.	176.889	15.323	7.861	129.500	3.021	22.111	7.678	1.533	8.017	1.810	81.00	11.152	1.345	28.956	28.904	34.153	10.739	166.473	33.735					
28	10-10/29-11	225.	200.	17.326	8.888	146.420	3.416	25.000	8.681	1.733	9.065	2.046	90.00	12.391	1.494	32.175	32.118	38.398	12.115	187.660	37.580					
29	11-11/1-17	225.	200.	17.326	8.888	146.420	3.416	25.000	8.681	1.733	9.065	2.046	90.00	12.391	1.494	32.175	32.118	38.398	12.115	187.660	37.580					
30	11-11/18-27	209.	185.788	16.094	8.256	136.008	3.173	23.222	8.064	1.610	8.420	1.901	83.00	11.428	1.378	29.670	29.619	35.586	11.244	174.098	34.693					
31	11-11/28-7	200.	177.778	15.400	7.900	130.151	3.036	22.222	7.717	1.540	8.058	1.819	80.00	11.015	1.328	28.600	28.549	34.132	10.768	166.809	33.404					
32	12-12/8-10	60.	53.334	4.620	2.370	39.046	.911	6.667	2.316	0.046	2.417	0.546	24.00	3.305	0.398	8.580	8.565	10.241	2.814	50.043	10.022					

Table VI Steer 121

Refused Feed Analysis - 10 Day Periods.

Period	Inclusive Dates	Grain Refused Pounds	Corn Refused Pounds	Protein in corn Pounds	Fat in corn Pounds	Nitrogen free Extract in corn Pounds	Crude Fibre in corn Pounds	Linseed Refused Pounds	Protein in Linseed Pounds	Fat in Linseed Pounds	Nitrogen free Extract in Linseed Pounds	Crude Fibre in Linseed Pounds	Hay Refused Pounds	Protein in Hay Pounds	Fat in Hay Pounds	Nitrogen free Extract in Hay Pounds	Crude Fibre in Hay Pounds	Total Protein Refused Pounds	Total Fat Refused Pounds	Total Nitrogen free Extract Refused Pounds	Total Crude Fibre Refused Pounds
17	No feed was refused until period 20.																				
18	No refused grain was analyzed previous to Jan. 7, 1908, it being fed back each time. So for the refused grain recorded here and in Table VIII before that date, the analyses of the corn and linseed fed was used in the calculation.																				
19	1907	Percent		8.006%	2.322%	71.57%	1.825%	Percent.	34.713%	6.290%	36.30%	7.607%	Percent.	10.138%	1.475%	36.23%	37.905%				
20	$\frac{8}{10} - \frac{8}{19}$	2.00	1.778	0.142	0.041	1.273	0.032	0.222	0.077	0.014	0.081	0.017	9.75	0.988	0.144	3.532	3.696	1.207	0.199	4.886	3.745
			Percent	8.644%	4.147%	73.23%	1.427%														
21	$\left\{ \begin{array}{l} \frac{8}{20} - \frac{8}{21} \\ \frac{8}{22} - \frac{8}{29} \end{array} \right\}$	1.50	1.333	0.115	0.055	0.976	0.019	0.167	0.058	0.011	0.061	0.013	$\left\{ \begin{array}{l} 0.50 \\ \text{Per Cent. } 14.400\% \end{array} \right\}$	0.051	0.007	0.181	0.190	0.296	0.082	1.409	0.383
													0.50	0.072	0.009	0.191	0.161				
22	$\frac{8}{30} - \frac{9}{8}$	13.25	11.778	1.019	0.487	8.625	0.168	1.472	0.511	0.093	0.534	0.112	12.25	1.764	0.222	4.670	3.953	3.294	0.802	13.829	4.233
23	$\frac{9}{9} - \frac{9}{18}$	3.00	2.667	0.231	0.111	1.953	0.038	0.333	0.116	0.021	0.121	0.025	1.00	0.144	0.018	0.381	0.323	0.491	0.150	2.455	0.386
	$\frac{9}{19} - \frac{9}{28} \text{ AM}$	3.25	2.889	0.250	0.120	2.116	0.041	0.361	0.125	0.023	0.131	0.027	0.50	0.072	0.009	0.191	0.161				
24	$\left\{ \begin{array}{l} \text{Percent} \\ \frac{9}{28} \text{ PM} \end{array} \right\}$			8.663%	4.444%	73.21%	1.708%	34.713%	6.290%	36.26%	8.185%		11.931%	2.132%	34.54%	37.025%		0.447	0.152	2.438	0.229
		none	none					none					none								
25	$\frac{9}{29} - \frac{10}{8}$	1.50	1.333	0.115	0.059	0.976	0.023	0.167	0.058	0.012	0.061	0.014	6.00	0.716	0.128	2.072	2.222	0.889	0.199	3.109	2.259
26	$\frac{10}{9} - \frac{10}{18}$	18.75	16.667	1.444	0.741	12.202	0.285	2.083	0.723	0.144	0.755	0.171	12.50	1.491	0.267	4.318	4.628	3.658	1.152	17.275	5.084
27	$\frac{10}{19} - \frac{10}{28}$	none											none					none	none	none	none
28	$\frac{10}{29} - \frac{11}{7}$	3.50	3.111	0.270	0.138	2.278	0.053	0.389	0.135	0.027	0.141	0.032	2.25	0.268	0.048	4.777	8.333	0.673	0.213	3.196	0.918
														10.144%	1.350%	34.80%	35.509%	0.387	0.123	1.770	0.418
29	$\frac{11}{8} - \frac{11}{17}$	2.25	2.000	0.173	0.089	1.464	0.034	0.250	0.087	0.017	0.091	0.020	1.25	0.127	0.017	0.435	0.444	0.382	0.123	1.990	0.498
30	$\frac{11}{18} - \frac{11}{27}$	21.50	19.111	1.656	0.849	13.991	0.325	2.389	0.830	0.166	0.866	0.196	4.00	0.406	0.054	1.392	1.420	2.892	1.069	16.249	1.941
31	$\frac{11}{28} - \frac{12}{7}$	11.50	10.222	0.886	0.454	7.484	0.175	1.278	0.444	0.089	0.463	0.105	3.25	0.330	0.044	1.131	1.154	1.660	0.587	9.078	1.434
32	$\frac{12}{8} - \frac{12}{10}$	none											none					none	none	none	none
Total																		15.894	4.728	75.914	21.110

(91)

Table VII Steer 48 Feed Analysis - 10 Day Periods (Maintenance Period).

Period	Inclusive Dates	Grain Consumed Pounds	Corn Consumed Pounds	Protein in Corn Pounds	Fat in Corn Pounds	Ratio of grain: 8 corn to 1 linseed. Nitrogen free Extract in Corn Pounds	Crude Fibre in Corn Pounds	Linseed Consumed Pounds	Protein in Linseed Pounds	Fat in Linseed Pounds	Nitrogen free Extract in Linseed Pounds	Crude Fibre in Linseed Pounds	Hay Consumed Pounds	Protein in Hay Pounds	Fat in Hay Pounds	Nitrogen free Extract in Hay Pounds	Crude Fibre in Hay Pounds
	1907	Per Cent.		8.100%	3.624%	72.120%	1.936%		34.713%	6.290%	36.30%	7.607%		13.106%	1.712%	36.949%	34.148%
1	$\frac{2}{1} - \frac{2}{10}$	58.00	51.56	4.176	1.870	37.18	0.10	6.44	2.24	0.41	2.34	0.49	58.00	7.602	0.993	21.430	19.806
2	$\frac{2}{11} - \frac{2}{20}$	60.00	53.33	4.320	1.935	38.46	1.03	6.67	2.31	0.42	2.42	0.51	27.50	3.604	0.471	10.161	9.390
3	$\frac{2}{21} - \frac{3}{2}$	60.00	53.33	4.320	1.935	38.46	1.03	6.67	2.31	0.42	2.42	0.51	25.00	3.277	0.428	9.237	8.537
4	$\frac{3}{3} - \frac{3}{12}$	69.50	61.78	5.004	2.241	44.55	1.20	7.72	2.68	0.49	2.80	0.59	25.00	3.277	0.428	9.237	8.537
5	$\frac{3}{13} - \frac{3}{22}$	75.00	66.67	5.400	2.418	48.08	1.29	8.33	2.89	0.52	3.03	0.63	29.50	3.866	0.505	10.900	10.074
6	$\frac{3}{23} - \frac{4}{1}$	77.50	68.89	5.58	2.497	49.68	1.33	8.61	2.99	0.54	3.13	0.66	31.25	4.096	0.535	11.547	10.671
7	$\frac{4}{2} - \frac{4}{11}$	80.00	71.11	5.76	2.577	51.28	1.38	8.89	3.09	0.56	3.23	0.68	32.50	4.259	0.556	12.008	11.098
8	$\frac{4}{12} - \frac{4}{21}$	80.00	71.11	5.76	2.577	51.28	1.38	8.89	3.09	0.56	3.23	0.68	30.00	3.932	0.514	11.085	10.244
9	$\frac{4}{22} - \frac{5}{1}$	80.00	71.11	5.76	2.577	51.28	1.38	8.89	3.09	0.56	3.23	0.68	32.50	4.259	0.556	12.008	11.098
10	$\frac{5}{2} - \frac{5}{11}$	78.50	69.98	5.65	2.529	50.32	1.35	8.72	3.03	0.55	3.17	0.66	31.75	4.161	0.544	11.731	10.842
11	$\frac{5}{12} - \frac{5}{21}$	70.50	62.67	5.08	2.275	45.20	1.21	7.83	2.72	0.49	2.84	0.60	27.75	3.637	0.475	10.253	9.476
12	$\frac{5}{22} - \frac{5}{31}$	70.00	62.22	5.04	2.256	44.87	1.20	7.78	2.70	0.49	2.82	0.59	8.25 10.663% 19.25	1.081 2.097% 2.050	0.141 2.097% 0.400	3.048 37.30% 7.18	2.817 37.253% 7.17
13	$\frac{6}{1} - \frac{6}{10}$	59.00	52.44	4.25	1.901	37.82	1.02	6.56	2.28	0.41	2.38	0.50	24.50	2.610	0.510	9.140	9.130
14	$\frac{6}{11} - \frac{6}{20}$	50.00	44.44	3.60	1.611	32.05	0.86	5.56	1.93	0.35	2.02	0.42	20.00	2.130	0.420	7.460	7.450
15	$\frac{6}{21} - \frac{6}{30}$	55.00	48.89	3.96	1.772	35.26	0.95	6.11	2.12	0.38	2.22	0.46	22.25	2.370	0.470	8.300	8.290

Table VII Steer 48 Feed Analysis - 10 Day Periods (Full Fed Period).

cont.

Ratio of grain: 8 corn to 1 linseed.

Period	Inclusive Dates	Cont.		Ratio of grain: 8 corn to 1 linseed.												Hay Offered Pounds	Protein in Hay Pounds	Fat in Hay Pounds	Nitrogen free Extract in Hay Pounds	Crude Fibre in Hay Pounds	Total Protein Offered Pounds	Total Fat Offered Pounds	Total Nitrogen free Extract Offered Pounds	Total Crude Fibre Offered Pounds
		Grain Offered Pounds	Corn Offered Pounds	Protein in Corn Pounds	Fat in Corn Pounds	Nitrogen free Extract in Corn Pounds	Crude Fibre in Corn Pounds	Linseed Offered Pounds	Protein in Linseed Pounds	Fat in Linseed Pounds	Nitrogen free Extract in Linseed Pounds	Crude Fibre in Linseed Pounds												
16	7/1 - 7/10	83.00	73.78	5.98	2.679	53.21	1.43	9.22	3.20	0.58	3.35	0.70	34.50	3.68	0.72	12.87	12.85	12.860	3.979	69.430	14.980			
17	7/11 - 7/20	113.50	100.89	8.17	3.656	72.76	1.95	12.61	4.38	0.79	4.58	0.96	46.00	4.91	0.96	17.16	17.14	17.460	5.406	94.500	20.050			
18	7/21 - 7/30	149.00	132.44	10.73	4.800	95.52	2.56	16.56	5.75	1.04	6.01	1.26	60.00	6.40	1.26	22.38	22.35	22.880	7.100	123.910	26.170			
			Per Cent	8.066%	2.322%	71.57%	1.825%																	
19	7/31 - 8/9	178.25	158.44	12.78	3.679	113.39	2.89	19.81	6.88	1.25	7.19	1.51	72.00	7.68	1.51	26.80	26.82	27.340	6.439	147.440	31.220			
20	8/10 - 8/19	187.50	166.67	13.44	3.870	119.28	3.04	20.83	7.23	1.31	7.56	1.58	75.00	8.00	1.57	27.98	27.94	28.670	6.750	154.820	32.560			
			Per Cent	8.644%	4.147%	73.23%	1.427%																	
21	8/20 - 8/25	193.50	172.00	14.87	7.132	125.95	2.45	21.50	7.46	1.35	7.80	1.64	45.50	4.85	0.95	16.97	16.95	32.840	10.122	163.290	29.500			
	8/26 - 8/29												Per cent	17.688%	2.170%	39.29%	26.443%							
22	8/30 - 9/8	200.00	177.78	15.37	7.373	130.27	2.54	22.22	7.71	1.40	8.07	1.69	80.00	14.15	1.74	31.43	21.15	37.230	10.513	169.770	25.380			
23	9/9 - 9/18	200.00	177.78	15.37	7.373	130.27	2.54	22.22	7.71	1.40	8.07	1.69	80.00	14.15	1.74	31.43	21.15	37.230	10.513	169.770	25.380			
24	9/19 - 9/28	201.25	178.89	15.46	7.418	130.99	2.55	22.36	7.76	1.41	8.12	1.70	76.50	13.53	1.66	30.06	20.23	39.140	11.852	179.460	27.770			
			Per Cent	8.663%	4.444%	73.21%	1.708%		34.725%	6.932%	36.26	8.185		13.769%	1.660%	35.75%	35.686%							
25	9/29 - 10/8	10.50	9.33	0.81	0.414	6.83	0.16	1.17	0.41	0.81	0.42	0.10	8.50	1.17	0.14	3.04	3.03							
26	10/9 - 10/18	221.75	197.11	17.08	8.750	144.30	3.37	24.64	8.56	1.71	8.93	2.02	89.00	12.25	1.48	31.82	31.76	37.890	11.940	185.050	37.150			
27	10/19 - 10/28	225.00	200.00	17.32	8.888	146.42	3.42	25.00	8.68	1.73	9.07	2.05	90.00	12.39	1.49	32.18	32.12	38.390	12.108	187.670	37.590			
28	10/29 AM	11.50	10.22	0.89	0.454	7.48	0.17	1.28	0.44	0.89	0.46	0.11	90.00	12.39	1.49	32.18	32.12	38.260	11.763	186.460	37.720			
			Per Cent	8.613%	4.298%	72.56%	1.792%		34.531%	6.598%	36.48%	8.095%												
	10/29 PM - 11/7	213.50	189.78	16.35	8.16	137.69	3.40	23.72	8.19	1.57	8.65	1.92												
29	11/8 AM	11.50	10.22	0.88	0.44	7.42	0.18	1.28	0.44	0.88	0.47	0.10	90.00	12.39	1.49	32.18	32.12	38.390	12.080	187.600	37.580			
			Per Cent	8.663%	4.444%	73.21%	1.708%		34.725%	6.932%	36.26%	8.185%												
	11/8 PM - 11/17	213.50	189.78	16.44	8.43	138.93	3.24	23.72	8.24	1.64	8.60	1.94												

Table VII Steer 48 Feed Analysis - 10 Day Periods (Full Fed Period).

Cont.

Period	Inclusive Dates	Grain Offered Pounds	Corn Offered Pounds	Protein in Corn Pounds	Fat in Corn Pounds	Nitrogen free Extract in Corn Pounds	Crude Fibre in Corn Pounds	Linseed Offered Pounds	Protein in Linseed Pounds	Fat in Linseed Pounds	Nitrogen free Extract in Linseed Pounds	Crude Fibre in Linseed Pounds	Hay Offered Pounds	Protein in Hay Pounds	Fat in Hay Pounds	Nitrogen free Extract in Hay Pounds	Crude Fibre in Hay Pounds	Total Protein Offered Pounds	Total Fat Offered Pounds	Total Nitrogen free Extract Offered Pounds	Total Crude Fibre Offered Pounds
30	$\frac{1}{4} - \frac{12}{27}$	170.25	151.33	13.11	6.72	110.79	2.58	18.92	6.57	1.31	6.86	1.55	66.00	9.09	1.10	23.60	23.55	28.770	9.130	141.250	27.680
31	$\frac{12}{28} - \frac{12}{17}$	146.25	130.00	11.26	5.77	95.18	2.22	16.25	5.64	1.13	5.89	1.33	59.00	8.12	0.98	21.09	21.05	25.020	7.880	122.160	24.600
32	$\frac{12}{18} - \frac{12}{17}$	150.00	133.33	11.55	5.92	97.62	2.28	16.67	5.79	1.16	6.04	1.36	63.00	8.66	1.05	22.52	22.48	26.000	8.130	126.180	26.120
33	$\frac{12}{18} - \frac{12}{27}$	150.00	133.33	11.55	5.92	97.62	2.28	16.67	5.79	1.16	6.04	1.36	81.00	11.15	1.34	28.96	28.91	28.490	8.420	132.620	32.550
34	$\left\{ \begin{array}{l} \frac{12}{28} - \frac{12}{29} \\ \frac{12}{30} - \frac{1}{1908} \end{array} \right\}$	150.00	133.33	11.55	5.92	97.62	2.28	16.67	5.79	1.16	6.04	1.36	$\left\{ \begin{array}{l} 18.00 \\ \text{Per Cent} \\ 63.00 \end{array} \right\}$	$\left\{ \begin{array}{l} 2.48 \\ 12.45\% \\ 7.85 \end{array} \right\}$	$\left\{ \begin{array}{l} 0.30 \\ 1.758\% \\ 1.11 \end{array} \right\}$	$\left\{ \begin{array}{l} 6.44 \\ 34.87\% \\ 21.97 \end{array} \right\}$	$\left\{ \begin{array}{l} 6.42 \\ 37.937\% \\ 23.96 \end{array} \right\}$	27.670	8.490	132.070	33.960
35	$\frac{1}{7} - \frac{1}{16}$	150.00	133.33	11.55	5.92	97.62	2.28	16.67	5.79	1.16	6.04	1.36	60.00	7.47	1.05	20.92	22.76	24.810	8.130	124.580	26.400
36	$\left\{ \begin{array}{l} \frac{1}{7} - \frac{1}{18} \text{ AM} \\ \frac{1}{18} \text{ PM} - \frac{1}{26} \end{array} \right\}$	157.50	$\left\{ \begin{array}{l} 20.00 \\ \text{Per Cent} \\ 120.00 \end{array} \right\}$	$\left\{ \begin{array}{l} 1.73 \\ 7.93\% \\ 9.52 \end{array} \right\}$	$\left\{ \begin{array}{l} 0.89 \\ 7.22\% \\ 8.66 \end{array} \right\}$	$\left\{ \begin{array}{l} 14.64 \\ 70.38\% \\ 84.46 \end{array} \right\}$	$\left\{ \begin{array}{l} 0.34 \\ 1.70\% \\ 2.04 \end{array} \right\}$	17.50	6.08	1.21	6.35	1.43	63.00	7.85	1.11	21.97	23.90	25.180	11.870	127.420	27.710
37	$\frac{1}{27} - \frac{2}{5}$	162.50	144.44	11.45	10.43	101.67	2.46	18.06	6.27	1.25	6.55	1.48	65.00	8.10	1.14	22.66	24.66	25.820	12.820	130.880	28.600
38	$\frac{2}{6} - \frac{2}{15}$	162.50	144.44	11.45	10.43	101.67	2.46	18.06	6.27	1.25	6.55	1.48	65.00	8.10	1.14	22.66	24.66	25.820	12.820	130.880	28.600
39	$\left\{ \begin{array}{l} \frac{2}{16} - \frac{2}{25} \\ \frac{2}{26} - \frac{2}{27} \text{ AM} \end{array} \right\}$	162.50	144.44	11.45	10.43	101.67	2.46	18.06	6.27	1.25	6.55	1.48	65.00	8.10	1.14	22.66	24.66	25.820	12.820	130.880	28.600
40	$\left\{ \begin{array}{l} \frac{2}{27} \text{ PM} - \frac{3}{6} \end{array} \right\}$	169.25	$\left\{ \begin{array}{l} 21.78 \\ \text{Per Cent} \\ 128.66 \end{array} \right\}$	$\left\{ \begin{array}{l} 1.73 \\ 8.24\% \\ 10.60 \end{array} \right\}$	$\left\{ \begin{array}{l} 1.57 \\ 6.23\% \\ 8.02 \end{array} \right\}$	$\left\{ \begin{array}{l} 15.33 \\ 68.65\% \\ 88.32 \end{array} \right\}$	$\left\{ \begin{array}{l} 0.37 \\ 1.43\% \\ 1.84 \end{array} \right\}$	18.81	6.53	1.30	6.82	1.54	68.00	8.47	1.20	23.71	25.80	27.330	12.090	134.180	29.550
41	$\frac{3}{11} - \frac{3}{16}$	175.00	155.56	12.82	9.69	106.78	2.22	19.44	6.75	1.35	7.05	1.59	70.00	8.72	1.23	24.41	26.55	28.290	12.270	138.240	30.360
42	$\left\{ \begin{array}{l} \frac{3}{17} - \frac{3}{26} \\ \frac{3}{27} \text{ AM} \end{array} \right\}$	176.75	157.11	12.95	9.79	107.86	2.25	19.64	6.82	1.36	7.12	1.61	71.00	8.84	1.25	24.76	26.93	28.610	12.400	139.740	30.790
43	$\left\{ \begin{array}{l} \frac{3}{27} \text{ PM} - \frac{4}{5} \end{array} \right\}$	187.50	$\left\{ \begin{array}{l} 8.67 \\ \text{Per Cent} \\ 158.00 \end{array} \right\}$	$\left\{ \begin{array}{l} 0.71 \\ 8.39\% \\ 13.26 \end{array} \right\}$	$\left\{ \begin{array}{l} 0.54 \\ 1.45\% \\ 2.29 \end{array} \right\}$	$\left\{ \begin{array}{l} 5.95 \\ 76.92\% \\ 121.53 \end{array} \right\}$	$\left\{ \begin{array}{l} 0.12 \\ 2.01\% \\ 3.18 \end{array} \right\}$	20.83	7.23	1.44	7.55	1.70	75.00	9.34	1.32	26.15	28.45	30.540	5.590	161.180	33.450
44	$\frac{4}{16} - \frac{4}{15}$	196.10	174.31	14.62	2.53	134.09	3.50	21.79	7.57	1.51	7.90	1.78	78.50	9.78	1.38	27.37	29.78	31.970	5.420	169.360	35.060
45	$\frac{4}{16} - \frac{4}{25}$	200.00	177.78	14.92	(24) 2.58	136.73	3.57	22.22	7.72	1.54	8.06	1.82	80.00	9.97	1.41	27.90	30.35	32.610	5.530	172.690	35.740

Table VII Steer 48 Feed Analysis - 10 Day Periods (Full Fed Period).

Period	Inclusive Dates	Grain Offered Pounds	Corn Offered Pounds	Protein in Corn Pounds	Fat in Corn Pounds	Nitrogen free Extract in Corn Pounds	Crude Fibre in Corn Pounds	Linseed Offered Pounds	Protein in Linseed Pounds	Fat in Linseed Pounds	Nitrogen free Extract in Linseed Pounds	Crude Fibre in Linseed Pounds	Hay Offered Pounds	Protein in Hay Pounds	Fat in Hay Pounds	Nitrogen free Extract in Hay Pounds	Crude Fibre in Hay Pounds	Total Protein Offered Pounds	Total Fat Offered Pounds	Total Nitrogen free Extract Offered Pounds	Total Crude Fibre Offered Pounds
46	4-5	200.00	177.78	14.92	2.58	136.73	3.57	22.22	7.72	1.54	8.06	1.82	80.00	9.97	1.41	27.90	30.35	32.610	5.530	172.690	35.740
47	5-5	200.00	177.78	14.92	2.58	136.73	3.57	22.22	7.72	1.54	8.06	1.82	80.00	9.97	1.41	27.90	30.35	32.610	5.530	172.690	35.740
48	6-10	186.75	166.00	13.93	2.41	127.68	3.34	20.76	7.21	1.44	7.52	1.70	74.00	9.22	1.30	25.80	28.07	30.360	5.150	161.000	33.110
49	11-15	11.267			2.07								39.00	4.86	0.69	13.60	14.79		4.460	138.870	28.980
	16-20	160.50	142.67	11.97	2.07	109.73	2.87	17.83	6.19	1.24	6.47	1.46	Percent	12.456%	1.758%	34.87%	37.937%	26.260	4.460	138.870	28.980
	21-25				2.07								26.00	3.24	0.46	9.07	9.86				
50	6-14	162.50	144.44	12.12	2.09	111.11	2.90	18.06	6.27	1.25	6.55	1.48	65.00	8.10	1.14	22.66	24.66	26.490	4.480	140.320	29.040
51	15-19	162.50	144.44	12.12	2.09	111.11	2.90	18.06	6.27	1.25	6.55	1.48	47.50	5.92	0.84	16.56	18.02	24.310	4.180	134.220	22.400
52	20-24	171.80	152.71	12.81	2.21	117.47	3.07	19.09	6.63	1.32	6.92	1.56	68.69	8.56	1.21	23.95	26.06	28.000	4.740	148.340	30.690
53	25-1/4	183.10	162.76	13.66	2.36	125.19	3.27	20.34	7.06	1.41	7.38	1.66	73.23	9.12	1.29	25.53	27.78	29.840	5.060	158.100	32.710
	1/5-1/4		Percent	8.71%	3.10%	74.90%	1.71%														
54	7-15	186.08	165.40	14.41	5.13	123.88	2.83	20.68	7.18	1.43	7.50	1.69	72.66	9.05	1.28	25.34	27.56	30.640	7.840	156.720	32.080
55	16-24	190.60	169.42	14.76	5.25	126.90	2.90	21.18	7.35	1.47	7.68	1.73	76.30	9.50	1.34	26.61	28.94	31.610	8.060	161.190	33.570
56	25-31	192.80	171.38	14.93	5.31	128.36	2.93	21.42	7.44	1.48	7.77	1.75	77.26	9.62	1.36	26.94	29.31	31.990	8.180	163.070	33.990
57	1-8	196.00	173.33	15.10	5.37	129.82	2.96	21.67	7.52	1.50	7.86	1.77	78.10	9.73	1.37	27.23	29.63	32.350	8.240	164.910	34.360
58	9-14												62.48	7.78	1.10	21.79	23.70				
	15-23	195.00	173.33	15.10	5.37	129.82	2.96	21.67	7.52	1.50	7.86	1.77	Percent	12.163%	2.58%	40.697%	32.26%	32.300	8.370	165.830	33.470
	24-31												15.62	1.90	0.40	6.36	5.04				
59	1-9	211.30	187.82	16.36	5.82	140.69	3.21	23.48	8.15	1.63	8.51	1.92	78.83	9.59	2.03	32.08	26.43	34.100	9.480	181.280	30.560
60	10-12	198.75	176.67	15.39	5.48	132.32	3.02	22.08	7.67	1.53	8.01	1.81	77.90	9.48	2.01	31.70	25.73	32.540	9.020	172.030	29.960
61	13-22	186.00	166.33	14.40	5.13	123.82	2.83	20.67	7.17	1.43	7.49	1.69	72.38	8.80	1.87	29.46	23.35	30.370	8.430	160.770	27.870
62	23-30	182.00	161.78	14.09	5.02	121.17	2.77	20.22	7.02	1.40	7.33	1.65	72.66	8.84	1.87	29.57	23.44	29.950	8.290	158.070	28.860
63	31-12	182.75	162.44	14.15	5.04	121.66	2.78	20.31	7.05	1.41	7.36	1.66	73.03	8.88	1.88	29.72	23.56	30.080	8.330	158.740	28.000
64	13-11	177.50	157.78	13.74	4.89	118.17	2.70	19.72	6.85	1.37	7.15	1.61	71.25	8.67	1.84	29.00	22.98	29.260	8.100	154.320	27.290

Table VII Steer 48 Feed Analysis - 10 Day Periods (Full Fed Period).

Series	Inclusive Dates	Cont.																			
		Grain Offered Pounds	Corn Offered Pounds	Protein in Corn Pounds	Fat in Corn Pounds	Nitrogen free Extract in Corn Pounds	Crude Fibre in Corn Pounds	Linseed Offered Pounds	Protein in Linseed Pounds	Fat in Linseed Pounds	Nitrogen free Extract in Linseed Pounds	Crude Fibre in Linseed Pounds	Hay Offered Pounds	Protein in Hay Pounds	Fat in Hay Pounds	Nitrogen free Extract in Hay Pounds	Crude Fibre in Hay Pounds	Total Protein Offered Pounds	Total Fat Offered Pounds	Total Nitrogen free Extract Offered Pounds	Total Crude Fibre Offered Pounds
65	$\frac{11}{2} - \frac{11}{11}$	177.50	157.78	13.74	4.89	118.17	2.70	19.72	6.85	1.37	7.15	1.61	71.26	8.67	1.84	29.00	22.98	29.260	8.100	154.320	27.290
66	$\frac{11}{12} - \frac{11}{21}$	177.50	157.78	13.74	4.89	118.17	2.70	19.72	6.85	1.37	7.15	1.61	68.26	8.30	1.76	27.78	22.02	28.890	8.020	153.100	26.330
67	$\frac{11}{22} - \frac{12}{1}$	172.80	153.33	13.35	4.75	114.84	2.62	19.17	6.66	1.33	6.95	1.57	69.76	8.49	1.50	28.39	22.50	28.500	7.880	150.180	26.690
68	$\frac{12}{2} - \frac{12}{10AM}$		130.44	11.36	4.04	97.70	2.23	19.17	6.66	1.33	6.95	1.57	68.75	8.86	1.77	27.98	22.18	28.350	7.950	149.350	26.460
	$\frac{12}{10PM} - \frac{12}{11}$	172.50		8.59%	3.52%	73.06%	2.10%														
			22.89	1.97	0.81	16.72	0.48														
69	$\frac{12}{12} - \frac{12}{21}$	171.00	152.00	13.06	5.36	111.05	3.19	19.00	6.60	1.32	6.89	1.56	63.50	9.72	1.64	25.84	20.48	27.380	8.320	143.780	25.230
70	$\frac{12}{22} - \frac{12}{31}$ 1909	177.50	157.78	13.55	5.56	115.27	3.31	19.72	6.85	1.37	7.15	1.61	61.50	9.48	1.59	25.03	19.84	27.880	8.520	147.450	24.760
71	$\frac{1}{4} - \frac{1}{10}$	175.00	155.56	13.37	5.48	113.65	3.27	19.44	6.75	1.35	7.05	1.59	67.50	8.21	1.74	27.47	21.77	28.330	8.570	148.170	26.630
72	$\frac{1}{11} - \frac{1}{17}$	127.50	113.33	9.74	3.99	82.80	2.38	14.17	4.90	0.98	5.12	1.16	51.50	6.26	1.33	20.96	16.61	20.900	6.300	108.880	20.150

Table VIII Steer 48 Refused Feed Analysis - 10 day Periods.

Inclusive Dates	Grain Refused Pounds	Corn Refused Pounds	Protein in corn Pounds	Fat in corn Pounds	Nitrogen free extract in corn Pounds	Crude fibre in corn Pounds	Linseed Refused Pounds	Protein in Linseed Pounds	Fat in Linseed Pounds	Nitrogen free Extract in Linseed Pounds	Crude Fibre in Linseed Pounds	Hay Refused Pounds	Protein in Hay Pounds	Fat in Hay Pounds	Nitrogen free Extract in Hay Pounds	Crude Fibre in Hay Pounds	Total Protein Refused Pounds	Total Fat Refused Pounds	Total Nitrogen free Extract Refused Pounds	Total Crude Fibre Refused Pounds
1907		See note	Table VI				Per Cent	10.138%	1.475%	36.23%	37.905%	Per Cent	10.138%	1.475%	36.23%	37.905%				
19 $\frac{7}{31} - \frac{8}{9}$		Percent	8.066%	2.322%	71.57%	1.825%		34.713%	6.290%	36.30%	7.607%	2.00	0.203	0.030	0.725	0.758	0.203	0.030	0.725	0.758
20 $\frac{8}{10} - \frac{8}{19}$	1.50	1.333	0.108	0.031	0.954	0.024	0.167	0.058	0.011	0.061	0.013	16.50	1.673	2.434	5.978	6.254	1.839	2.476	6.993	6.291
21 $\left\{ \begin{array}{l} \frac{8}{20} - \frac{8}{21} \\ \frac{8}{22} - \frac{8}{29} \end{array} \right\}$	1.00	Percent	8.644%	4.147%	73.23%	1.427%						1.50	0.152	0.221	0.543	0.569	0.340	0.274	1.425	0.751
		0.889	0.077	0.037	0.651	0.013	0.111	0.039	0.007	0.040	0.008	0.50	0.072	0.009	0.191	0.161				
22 $\frac{8}{30} - \frac{9}{8}$	0.50	0.444	0.038	0.018	0.325	0.006	0.056	0.019	0.004	0.020	0.004	0.50	0.072	0.009	0.191	0.161	0.129	0.031	0.536	0.171
23 $\frac{9}{7} - \frac{9}{18}$	none											none					none	none	none	none
24 $\frac{9}{19} - \frac{9}{28}$	5.00	4.444	0.384	0.184	3.254	0.063	0.556	0.193	0.035	0.202	0.042	none					0.577	0.219	3.456	0.105
25		Percent	8.663%	4.444%	73.21%	1.708%	Percent	34.725%	6.932%	36.26%	8.185%	Percent	11.931%	2.132%	34.54%	37.025%				
25 $\frac{9}{29} - \frac{10}{8}$	4.75	4.222	0.366	0.188	3.091	0.072	0.528	0.183	0.037	0.191	0.043	14.50	1.730	0.309	5.008	5.369	2.279	0.534	8.290	5.484
26 $\frac{10}{9} - \frac{10}{18}$	2.50	2.222	0.192	0.099	1.627	0.038	0.278	0.097	0.019	0.101	0.023	1.00	0.119	0.021	0.345	0.370	0.408	0.139	2.071	0.431
27 $\frac{10}{19} - \frac{10}{28}$	none											none					none	none	none	none
28 $\frac{10}{29} - \frac{11}{7}$	none											Percent	10.406%	1.542%	34.21%	41.153%				
												18.25	1.899	0.281	6.243	7.510	1.899	0.281	6.243	7.510
												Percent	10.144%	1.350%	34.80%	35.509%				
29 $\frac{11}{8} - \frac{11}{17}$	81.00	72.00	6.238	3.200	52.711	1.230	9.000	3.125	0.624	3.263	0.737	16.75	1.699	0.226	5.829	5.948	11.062	4.050	61.803	7.915
30 $\frac{11}{18} - \frac{11}{27}$	85.25	75.777	6.565	3.366	55.476	1.294	9.473	3.289	0.657	3.435	0.775	12.75	1.293	0.172	4.437	4.527	11.147	4.195	63.348	6.596
31 $\frac{11}{28} - \frac{12}{7}$	52.00	46.222	4.004	2.054	33.839	0.789	5.778	2.006	0.401	2.095	0.473						6.010	2.455	35.934	1.262
32 $\frac{12}{8} - \frac{12}{17}$	29.25	26.000	2.252	1.155	19.035	0.444	3.250	1.129	0.225	1.178	0.266	Percent	13.419%	2.475%	35.18%	34.672%	3.381	1.380	20.213	0.710
33 $\frac{12}{18} - \frac{12}{27}$	43.50	38.667	3.350	1.718	28.808	0.660	4.833	1.678	0.335	1.752	0.396	0.50	0.067	0.012	0.176	0.173	5.095	2.065	30.236	1.229
34 $\frac{12}{28} - \frac{1}{6}$ 1908	10.75	9.556	0.828	0.425	6.996	0.163	1.194	0.415	0.083	0.433	0.098	3.00	0.403	0.074	1.055	1.040	1.646	0.582	8.484	1.301

Table VIII
cont.

Steer 48

Refused Feed Analysis - 10 Day Periods.

Period	Inclusive Dates	Grain Refused Pounds	Protein in grain Pounds	Fat in grain Pounds	Nitrogen free Extract in grain Pounds	Crude Fibre in grain Pounds	Hay Refused Pounds	Protein in Hay Pounds	Fat in Hay Pounds	Nitrogen free Extract in Hay Pounds	Crude Fibre in Hay Pounds	Total Protein Refused Pounds	Total Fat Refused Pounds	Total Nitrogen free Extract Refused Pounds	Total Crude Fibre Refused Pounds
	1908	Per Cent	11.34%	3.47%	67.59%	2.15%									
35	$\frac{1}{7} - \frac{1}{16}$	17.25	1.956	0.599	11.659	0.371	none					1.956	0.599	11.659	0.371
36	$\frac{1}{17} - \frac{1}{26}$	3.25	0.369	0.113	2.197	0.070	none					0.369	0.113	2.197	0.070
37	$\frac{1}{27} - \frac{2}{5}$	26.75	3.033	0.928	18.080	0.575	none					3.033	0.928	18.080	0.575
38	$\frac{2}{6} - \frac{2}{15}$	0.75	0.085	0.026	0.507	0.016	none					0.085	0.026	0.507	0.016
39	$\frac{2}{16} - \frac{2}{25}$	none					none					none	none	none	none
40	$\frac{2}{26} - \frac{3}{6}$	13.75	1.559	0.477	9.294	0.296	none					1.559	0.477	9.294	0.296
41	$\frac{3}{7} - \frac{3}{16}$	3.25	0.369	0.113	2.174	0.070	none					0.369	0.113	2.197	0.070
42	$\frac{3}{17} - \frac{3}{26}$	none	11.29%	4.04%	70.91%	2.82%	none					none	none	none	none
43	$\frac{3}{27} - \frac{4}{5}$	5.00	0.565	0.202	3.546	0.141	none					0.565	0.202	3.546	0.141
44	$\frac{4}{6} - \frac{4}{15}$	none					none					none	none	none	none
45	$\frac{4}{16} - \frac{4}{25}$	1.50	0.169	0.061	1.064	0.042	none					0.169	0.061	1.064	0.042
46	$\frac{4}{26} - \frac{5}{5}$	12.50	1.411	0.505	8.864	0.353	none					1.411	0.505	8.864	0.353
47	$\frac{5}{6} - \frac{5}{15}$	30.75	3.472	1.242	21.805	0.867	none					3.472	1.242	21.805	0.867
48	$\frac{5}{16} - \frac{5}{25}$	32.75	3.697	1.323	23.223	0.924	Per Cent	10.350%	0.42%	35.32%	41.04%	3.697	1.323	23.233	0.924
49	$\frac{5}{26} - \frac{6}{4}$	30.25	3.415	1.222	21.450	0.853	3.00	0.311	0.013	1.060	1.231	3.726	1.235	22.510	2.084
50	$\frac{6}{5} - \frac{6}{14}$	34.75	3.923	1.404	24.641	0.980	6.75	0.699	0.028	2.384	2.770	4.622	1.432	27.025	3.750
51-52	$\frac{6}{15} - \frac{7}{4}$	none					none					none	none	none	none
53	$\frac{7}{5} - \frac{7}{14}$	7.77	0.877	0.314	5.510	0.219	none					0.877	0.314	5.510	0.219
54-58	$\frac{7}{15} - \frac{9}{2}$	none	10.375%	4.88%	72.885%	2.39%	none					none	none	none	none
59	$\frac{9}{3} - \frac{9}{12}$	1.56	0.162	0.076	1.137	0.037	none					0.162	0.076	1.137	0.037
60	$\frac{9}{13} - \frac{9}{22}$	9.01	0.935	0.440	6.567	0.215	none					0.935	0.440	6.567	0.215
61	$\frac{9}{23} - \frac{10}{2}$	19.89	2.064	0.971	14.497	0.475	none					2.064	0.971	14.497	0.475
62	$\frac{10}{3} - \frac{10}{12}$	0.75	0.078	0.037	0.547	0.018	none					0.078	0.037	0.547	0.018

Table VIII Steer 48 Refused Feed Analysis - 10 day Periods.

Inclusive Dates	cont. Grain Refused Pounds	Protein in grain Pounds	Fat in grain Pounds	Nitrogen free Extract in grain Pounds	Crude Fibre in grain Pounds	Hay Refused Pounds	Protein in Hay Pounds	Fat in Hay Pounds	Nitrogen free Extract in Hay Pounds	Crude Fibre in Hay Pounds	Total Protein Refused Pounds	Total Fat Refused Pounds	Total Nitrogen free Extract Refused Pounds	Total Crude Fibre Refused Pounds
63 $\frac{10}{13} - \frac{10}{22}$	7.76	0.805	0.379	5.656	0.185	none					0.805	0.379	5.656	0.185
	Per Cent	11.406%	6.19%	69.936%	2.465%	none								
64 $\frac{10}{23} - \frac{11}{1}$	6.13	0.699	0.379	4.287	0.151	none					0.699	0.379	4.287	0.151
65 $\frac{11}{2} - \frac{11}{11}$	1.18	0.135	0.073	0.825	0.029	none	17.188%	3.36%	47.132%	16.56%	0.135	0.073	0.825	0.029
66 $\frac{11}{12} - \frac{11}{21}$	10.64	1.214	0.659	7.441	0.262	0.50	0.086	0.017	0.236	0.083	1.300	0.676	7.677	0.345
	Per Cent	12.000%	5.19%	73.19%	2.545%									
67 $\frac{11}{22} - \frac{12}{7}$	2.76	0.331	0.143	2.020	0.070	none					0.331	0.143	2.020	0.070
68 $\frac{12}{2} - \frac{12}{11}$	17.89	2.147	0.929	13.094	0.455	2.75	0.473	0.092	1.296	0.455	2.620	1.021	14.390	0.910
69 $\frac{12}{12} - \frac{12}{21}$	2.88	0.346	0.149	2.108	0.073	none					0.346	0.149	2.108	0.073
70 $\frac{12}{22} - \frac{12}{31}$	none					none					none	none	none	none
71 $\frac{1}{1} - \frac{1909}{10}$	none					none					none	none	none	none
72 $\frac{1}{11} - \frac{1}{17}$	none					none					none	none	none	none

Table IX

Maintenance Requirements.
For Protein, Fat, Nitrogenfree Extract and Crude Fibre.

Weight of Feed pounds	% Protein	Weight Protein pounds	% Fat	Weight Fat pounds	% Nitrogenfree Extract	Weight Nitrogenfree Extract pounds	% Crude Fibre	Weight Crude Fibre pounds
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For 7.50 pounds grain and 3.75 pounds hay.

Corn	6.667	8.466	0.564	3.887	0.259	72.650	4.844	1.748	0.117
Linseed	0.833	34.478	0.287	6.784	0.057	36.766	0.306	8.017	0.067
Alfalfa	3.750	13.106	0.492	1.712	0.064	36.949	1.386	34.148	1.281
Total			1.343		0.380		6.536		1.465

For 7 pounds grain and 3.5 pounds hay.

Corn	6.222	8.466	0.527	3.887	0.242	72.650	4.520	1.748	0.109
Linseed	0.778	34.478	0.268	6.784	0.053	36.766	0.286	8.017	0.062
Alfalfa	3.500	13.106	0.459	1.712	0.060	36.949	1.293	34.148	1.195
Total			1.254		0.355		6.099		1.366
% of first Ration			93.37		93.42		93.31		93.24
Average Percent			93.3						

For 6.5 pounds grain and 3.25 pounds hay.

Corn	5.778	8.466	0.489	3.887	0.225	72.650	4.198	1.748	0.101
Linseed	0.722	34.478	0.249	6.784	0.049	36.766	0.265	8.017	0.058
Alfalfa	3.250	13.106	0.426	1.712	0.056	36.949	1.201	34.148	1.110
Total			1.164		0.330		5.664		1.269
% of First Ration			86.67		86.84		86.66		86.63
Average Percent.			86.7						

Table X Steer 121 Available Productive Consumption of Constituents.

Period	Weight of Animal for Period Maintenance Requirement per 1000 lbs per day		Maintenance Ratio and our Average Analyses.		Requirement Determined from Preliminary Maintenance Period.		Weight of Fat Consumed		Maintenance Ratio and our Average Analyses.		Requirement Determined from Preliminary Maintenance Period.		Weight of Nitrogen free Extract Consumed		Maintenance Ratio and our Average Analyses.		Requirement Determined from Preliminary Maintenance Period.		Weight of Crude Fibre Consumed		Maintenance Ratio and our Average Analyses.		Requirement Determined from Preliminary Maintenance Period.	
			Protein Requirement for given weight for Period	Excess Protein Above Requirement	Protein Requirement for given weight for Period	Excess Protein Above Requirement																		
			1.254		1.245				0.355		0.353				6.099		6.348		1.366				1.339	
17	778.0	13.241	9.756	3.485	9.686	3.555	4.105	2.762	1.343	2.746	1.359	71.655	47.450	24.205	49.387	22.268	15.246	10.621	4.619	10.418	4.828			
18	805.9	19.755	10.106	9.649	10.033	9.722	6.137	2.861	3.276	2.845	3.292	107.110	49.152	57.958	51.159	55.951	22.495	11.008	11.487	10.792	11.703			
19	858.6	23.482	10.767	12.715	10.689	12.793	5.548	3.048	2.500	3.031	2.517	127.139	52.366	74.773	54.503	72.636	26.889	11.728	15.161	11.497	15.392			
20	913.2	23.556	11.452	12.104	11.369	12.187	5.654	3.242	2.412	3.224	2.430	129.292	55.696	73.596	57.971	71.321	24.478	12.474	12.004	12.228	12.250			
		Maintenance Requirement per 1000 lbs per day	1.164		1.157			2.330		0.328			5.664		5.899		1.269		1.244					
21	933.8	30.536	10.869	19.667	10.804	19.732	9.399	3.082	6.317	3.063	6.336	151.379	52.890	98.489	55.084	96.295	27.046	11.850	15.196	11.618	15.428			
22	974.2	33.937	11.340	22.597	11.271	22.666	9.703	3.215	6.488	3.195	6.508	155.855	55.179	100.676	57.470	98.385	21.147	12.363	18.784	12.119	9.028			
23	997.8	36.740	11.614	25.126	11.545	25.195	10.355	3.293	7.062	3.273	7.082	167.229	56.515	110.714	58.862	108.367	24.994	12.663	12.331	12.413	12.581			
24	1056.3	38.692	12.295	26.397	12.221	26.471	10.971	3.486	7.485	3.465	7.506	176.031	59.828	116.209	62.310	113.721	27.541	13.404	14.137	13.141	14.400			
25	1097.4	36.996	12.774	24.222	12.697	24.299	11.746	3.621	8.125	3.599	8.147	181.947	62.157	119.790	64.740	117.207	34.885	13.927	20.958	13.653	21.232			
26	1133.3	34.740	13.192	21.548	13.112	21.628	10.963	3.740	7.223	3.717	7.246	170.385	64.190	106.195	66.853	103.532	32.496	14.383	18.113	14.100	18.396			
27	1132.7	34.153	13.185	20.968	13.105	21.048	10.739	3.738	7.001	3.715	7.024	166.473	64.156	102.317	66.819	99.654	33.735	14.374	19.361	14.092	19.643			
28	1190.3	37.725	13.855	23.870	13.772	23.953	11.902	3.928	7.974	3.904	7.998	184.464	67.419	117.045	70.216	114.248	36.662	15.105	21.557	14.808	21.854			
29	1211.9	38.011	14.107	23.904	14.022	23.989	10.992	3.999	6.993	3.976	7.017	185.670	68.642	117.028	71.489	114.181	37.082	15.379	21.703	15.076	22.006			
30	1208.9	32.694	14.072	18.622	13.987	18.707	10.175	3.989	6.186	3.965	6.210	157.849	68.472	89.377	71.313	86.536	32.752	15.341	17.411	15.039	17.113			
31	1258.1	32.472	14.645	17.827	14.556	17.916	10.181	4.152	6.029	4.127	6.054	157.731	71.260	86.471	74.217	83.514	31.970	15.965	16.005	15.651	16.319			
32	1261.3	10.241	4.405	5.836	4.379	5.862	2.814	1.249	1.565	1.241	1.573	50.043	21.432	28.611	22.325	27.718	10.022	4.802	5.220	4.708	5.314			
Total lbs	476.971		188.434	286.537	187.248	289.723	141.384	53.405	87.979	53.085	88.299	2340.252	916.804	1423.448	954.718	1365.534	439.440	205.393	234.047	201.353	238.087			
Total Ks.	216.349					131.415	64.130				40.052	1061.515				628.464	199.326				107.994			

Table <u>XI</u>	Steer 48	Available Productive Consumption of Constituents.
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		Maintenance Ration and our Average Analyses.				Requirement Deter- mined from Pre- liminary Mainte- nance Period.						Maintenance Ration and our Average Analyses.				Requirement Deter- mined from Pre- liminary Mainte- nance Period.						Maintenance Ration and our Average Analyses.				Requirement Deter- mined from Pre- liminary Mainte- nance Period.			
Weight of Animal For Period	Weight of Protein Consumed Pounds	Protein Requirement For Given Weight For Period	Excess Protein Above Require- ment.	Protein Requirement For Given Weight For Period	Excess Protein Above Require- ment.	Weight of Fat Consumed	Fat Requirement For Given Weight For Period	Excess Fat above Require- ment.	Fat Requirement For Given Weight For Period	Excess Fat above Require- ment.	Weight of Nitrogen Extract Consumed	Nitrogen Extract Requirement For Given Weight For Period.	Excess Above Require- ment.	Nitrogen Extract Requirement For Given Weight For Period.	Excess Above Require- ment.	Weight of Crude Fibre Consumed	Fibre Requirement For Given Weight For Period	Excess Fibre Above Require- ment.	Fibre Requirement For Given Weight For Period	Excess Fibre Above Require- ment.									
	Maintenance Require- ment per 1000 lbs for day 836.6	1.254		1.266			0.355		0.357		6.099		6.407			1.366		1.338											
16	849.9	12.860	10.658	2.202	10.709	2.151	3.979	3.017	0.962	3.034	0.945	69.430	51.834	17.596	54.455	14.975	14.980	11.610	3.370	11.372	3.608								
17	866.5	17.460	10.866	6.594	10.918	6.542	5.406	3.076	2.330	3.093	2.313	94.500	52.849	41.651	55.517	38.983	20.050	11.837	8.213	11.594	8.456								
18	917.5	22.880	11.506	11.374	11.560	11.320	7.100	3.257	3.843	3.276	3.824	123.910	55.959	67.951	58.784	66.126	26.170	12.533	13.637	12.276	13.894								
19	992.9	27.137	12.451	14.686	12.570	14.627	6.409	3.525	2.884	3.545	2.864	146.715	60.559	86.156	63.615	83.100	30.462	13.563	16.899	13.285	17.177								
	Maintenance Require- ment per 1000 lbs for day	1.164		1.170			0.330		0.332		5.664		5.954			1.269		1.243											
20	1012.3	26.831	11.784	15.047	11.845	14.986	4.274	3.341	0.933	3.361	0.913	147.827	57.337	90.490	60.272	87.555	26.269	12.847	13.422	12.584	13.685								
21	1012.6	32.500	11.788	20.712	11.848	20.652	9.848	3.342	6.506	3.362	6.486	161.865	57.354	104.511	60.290	101.575	28.749	12.850	15.899	12.588	16.161								
22	1054.1	37.101	12.270	24.831	12.333	24.768	10.482	3.478	7.004	3.500	6.982	169.234	59.706	109.528	62.760	106.474	25.209	13.377	11.832	13.102	12.107								
23	1076.6	37.230	12.532	24.698	12.597	24.633	10.513	3.553	0.960	3.574	6.939	169.770	60.980	108.790	64.099	105.671	25.380	13.662	11.718	13.382	11.998								
24	1118.7	38.563	13.023	25.540	13.090	25.473	11.633	3.692	7.941	3.714	7.919	176.004	63.365	112.639	66.607	109.397	27.665	14.196	13.469	13.906	13.759								
25	1150.8	35.611	13.395	22.216	13.465	22.146	11.406	3.798	7.608	3.821	7.583	176.760	65.183	111.577	68.520	108.240	31.666	14.603	17.063	14.305	17.361								
26	1188.9	37.982	13.839	24.143	13.911	24.071	11.969	3.924	8.045	3.947	8.022	185.599	67.341	118.258	70.787	114.812	37.159	15.087	22.072	14.779	22.380								
27	1233.2	38.390	14.356	24.034	14.429	23.961	12.108	4.070	8.038	4.094	8.014	187.670	69.848	117.822	73.422	114.248	37.590	15.650	21.940	15.329	22.261								
28	1241.3	36.361	14.450	21.911	14.524	21.837	11.482	4.097	7.385	4.121	7.361	180.217	70.318	109.899	73.907	106.310	30.210	15.752	14.458	15.430	14.780								
29	1242.7	27.328	14.465	12.863	14.540	12.788	8.030	4.101	3.929	4.126	3.904	125.797	70.382	55.415	73.990	51.807	29.665	15.770	13.895	15.448	14.217								
30	1210.1	17.623	14.086	3.537	14.159	3.464	4.935	3.993	0.942	4.017	0.918	77.902	68.540	9.362	72.050	5.852	21.084	15.355	5.729	15.041	6.043								
31	1181.4	19.010	13.752	5.258	13.823	5.187	5.425	3.899	1.526	3.922	1.503	86.226	66.920	19.306	70.341	15.885	23.338	14.992	8.346	14.685	8.653								
32	1193.2	22.619	13.889	8.730	13.961	8.658	6.750	3.938	2.812	3.962	2.788	105.967	67.591	38.376	71.043	34.924	25.410	15.143	10.267	14.831	10.579								
33	1198.6	23.395	13.952	9.443	14.024	9.371	6.355	3.955	2.400	3.979	2.376	102.384	67.890	34.494	71.364	31.020	31.321	15.210	16.111	14.899	16.422								
34	1220.9	26.024	14.212	11.812	12.285	11.739	7.908	4.029	3.879	4.054	3.854	123.586	69.152	54.434	72.694	50.892	32.659	15.493	17.166	15.176	17.483								

Table XI
Cont.
Steer 48

Serial	Weight of Animal For Period	Weight Protein Consumed	Protein Requirement	Excess Protein	Protein Requirement	Excess Protein	Weight Fat Consumed	Fat Requirement	Excess Fat	Fat Requirement	Excess Fat	N-free Extract Consumed	N-free Extract Requirement	N-free Extract Excess	N-free Extract Requirement	N-free Extract Excess	Crude Fibre Consumed	Fibre Requirement	Fibre Excess	Fibre Requirement	Fibre Excess
35	1242.6	22.854	14.463	8.391	14.539	8.315	7.535	4.101	3.430	4.125	3.406	112.921	70.381	42.540	73.984	38.937	26.029	15.769	10.260	15.444	10.585
36	1271.6	24.811	14.802	10.009	14.879	9.932	11.757	4.197	7.560	4.222	7.535	125.223	72.030	53.193	75.711	49.512	27.640	16.137	11.503	15.806	11.834
37	1265.3	22.787	14.729	8.058	14.805	7.982	11.892	4.176	7.716	4.201	7.691	112.800	71.673	41.127	75.336	37.464	28.025	16.057	11.968	15.727	12.298
38	1279.8	25.735	14.898	10.837	14.975	10.760	12.794	4.224	8.570	4.249	8.545	130.373	72.488	57.885	76.199	54.174	28.584	16.241	12.343	15.908	12.676
39	1303.9	25.820	15.177	10.643	15.257	10.563	12.820	4.303	8.517	4.329	8.491	130.880	73.857	57.023	77.634	53.246	28.600	16.547	12.053	16.208	12.392
40	1323.0	25.771	15.400	10.371	15.479	10.292	11.613	4.366	7.247	4.392	7.221	124.886	74.935	49.951	78.771	46.115	29.254	16.789	12.465	16.444	12.810
41	1349.3	27.921	15.707	12.214	15.787	12.134	12.157	4.453	7.704	4.480	7.677	136.043	76.432	59.611	80.337	55.706	30.290	17.122	13.168	16.772	13.518
42	1379.1	28.610	16.052	12.558	16.135	12.475	12.400	4.551	7.849	4.579	7.821	139.740	78.113	61.627	82.112	57.628	30.790	17.501	13.289	17.141	13.649
43	1399.1	29.975	16.286	13.689	16.370	13.605	5.388	4.617	0.771	4.645	0.743	157.634	79.246	78.388	83.302	74.332	33.309	17.754	15.555	17.490	15.819
44	1424.9	31.970	16.585	15.385	16.672	15.298	5.420	4.702	0.718	4.731	0.689	169.360	80.706	88.654	84.839	84.521	35.060	18.082	16.978	17.710	17.350
45	1453.0	32.441	16.913	15.528	17.000	15.441	5.469	4.793	0.674	4.824	0.645	171.626	82.300	89.326	86.512	85.114	35.698	18.439	17.259	18.060	17.638
46	1481.1	31.199	17.240	13.959	17.330	13.869	5.025	4.887	0.138	4.917	0.108	163.826	83.886	79.940	88.185	75.641	35.387	18.794	16.593	18.409	16.978
47	1488.6	29.138	17.327	11.811	17.417	11.721	4.298	4.912	-0.614	4.942	-0.644	150.885	84.315	66.570	88.631	62.254	34.873	18.890	15.983	18.502	16.371
48	1472.3	26.663	17.138	9.525	17.226	9.437	3.827	4.859	-1.032	4.888	-1.061	137.767	83.391	54.376	87.661	50.106	32.186	18.683	13.503	18.300	13.886
49	1480.0	22.534	17.227	5.307	17.316	5.218	3.225	4.884	-1.659	4.913	-1.684	116.360	83.827	32.533	88.119	28.241	26.896	18.780	8.116	18.395	8.501
50	1456.4	21.868	16.953	4.915	17.041	4.827	3.048	4.807	-1.759	4.836	-1.788	113.295	82.490	30.805	86.714	26.581	25.290	18.482	6.808	18.103	7.187
51	1440.2	24.310	16.764	7.546	16.851	7.459	4.180	4.753	-0.573	4.782	-0.602	134.220	81.572	52.648	85.750	48.470	22.400	18.276	4.124	17.901	4.499
52	1462.9	28.000	17.029	10.971	17.117	10.883	4.740	4.828	-0.088	4.857	-0.117	148.340	82.860	65.480	87.101	61.239	30.690	18.564	12.126	18.183	12.507
53	1487.9	28.963	17.319	11.644	17.409	11.554	4.746	4.910	-0.164	4.940	-0.194	152.590	84.274	68.316	88.589	64.001	32.491	18.881	13.610	18.482	14.009
54	1507.7	30.640	17.550	13.090	17.640	13.000	7.840	4.975	2.865	5.005	2.835	156.720	85.996	71.324	89.768	66.952	32.080	19.132	12.948	18.740	13.340
55	1536.3	31.610	17.883	13.727	17.975	13.635	8.060	5.070	2.990	5.101	2.959	161.190	87.018	74.172	91.471	69.719	33.570	19.495	14.075	19.095	14.475
56	1550.9	31.990	18.052	13.938	18.146	13.844	8.150	5.118	3.032	5.149	3.001	163.070	87.843	75.227	92.341	70.729	33.990	19.680	14.310	19.277	14.713
57	1574.7	32.350	18.331	14.019	18.424	13.926	8.240	5.197	3.043	5.228	3.012	164.910	89.191	75.719	93.758	71.152	34.360	19.983	14.377	19.573	14.787

Table XI Steer 48
cont.

Period	Weight Animal	Weight Consumed	Protein Requirement	Excess Protein	Protein Requirement	Excess Protein	Weight Consumed	Fat Requirement	Excess Fat	Fat Requirement	Excess Fat	N-free Extract Consumed	N-free Extract Requirement	N-free Extract Excess	N-free Extract Requirement	N-free Extract Excess	Crude Fibre Consumed	Fibre Requirement	Fibre Excess	Fibre Requirement	Fibre Excess
58	1589.4	32.300	18.502	13.798	18.599	13.701	8.370	5.246	3.124	5.277	3.093	165.830	90.024	75.806	94.633	71.197	33.470	20.171	13.299	19.755	13.715
59	1608.1	33.938	18.720	15.218	18.815	15.123	9.404	5.307	4.097	5.339	4.065	180.143	91.083	89.060	95.746	84.397	30.523	20.407	10.116	19.989	10.534
60	1643.7	31.605	19.133	12.472	19.232	12.373	8.580	5.425	3.155	5.457	3.123	165.463	93.100	72.363	97.866	67.597	29.745	20.858	8.887	20.431	9.314
61	1644.3	28.306	19.141	19.165	19.240	9.066	7.459	5.426	2.033	5.459	2.000	146.273	93.133	53.140	97.902	48.371	27.395	20.866	6.529	20.439	6.956
62	1660.5	29.872	19.329	10.543	19.429	10.443	8.253	5.480	2.773	5.513	2.740	157.523	94.051	63.473	98.866	58.657	27.842	21.072	6.770	20.640	7.202
63	1683.0	29.275	19.590	9.685	19.691	9.584	7.951	5.554	2.397	5.588	2.363	153.084	95.325	57.759	100.205	52.879	27.815	21.357	6.458	20.920	6.895
64	1707.8	28.561	19.878	8.683	19.981	8.580	7.721	5.636	2.085	5.670	2.051	150.033	96.730	53.303	101.682	48.351	27.139	21.672	5.467	21.227	5.912
65	1710.9	29.125	19.915	9.210	20.019	9.106	8.027	5.646	2.381	5.680	2.347	153.495	96.905	56.590	101.867	51.628	27.261	21.711	5.550	21.266	5.995
66	1720.6	27.590	20.027	7.563	20.132	7.458	7.344	5.678	1.666	5.711	1.633	145.423	97.455	47.968	102.445	42.978	25.985	21.834	4.151	21.387	4.598
67	1696.6	28.169	19.746	8.423	19.851	8.318	7.737	5.599	2.138	5.631	2.106	148.160	96.095	52.065	101.016	47.144	26.620	21.530	5.090	21.089	5.531
68	1718.2	25.730	20.001	5.729	20.103	5.627	6.929	5.670	1.259	5.704	1.225	134.960	97.319	37.641	102.302	32.658	26.550	21.803	3.747	21.357	4.193
69	1749.1	27.034	20.360	6.674	20.465	6.569	8.171	5.770	2.401	5.807	2.364	141.672	99.069	42.603	104.141	37.531	25.157	22.197	2.960	21.741	3.416
70	1746.8	27.880	20.334	7.546	20.439	7.441	8.520	5.765	2.755	5.800	2.720	147.450	98.939	48.511	104.004	43.446	24.760	22.167	2.593	21.713	3.047
71	1761.0	28.330	20.499	7.831	20.604	7.726	8.570	5.812	2.758	5.846	2.724	148.170	99.743	48.427	104.850	43.320	26.630	22.348	4.282	21.889	4.741
72	1797.4	20.900	14.645	6.255	14.723	6.177	6.300	4.152	2.148	4.177	2.123	108.880	71.263	37.617	74.912	33.968	20.150	15.966	4.184	15.639	4.511
Total lbs.		1603.480	916.919	686.561	921.644	681.836	449.968	259.936	190.032	261.496	188.472	8132.581	4461.566	3671.015	4689.779	3442.802	1638.67	999.567	639.003	979.164	659.406
Total Ks.		727.322				309.274	204.101					85.489	3688.857			1561.621	743.239				299.100

Table XII Slaughter House weights.			
Offal Parts.	Steer 18 grams	Steer 121 grams	Steer 48 grams

Liver at slaughtering	342,687	569,469	809,645	Bladder	124	149	261
Blood	15,599	24,433	25,634	Penis	199	176	319
Hide and Hair	25,954 ^a	29,564	41,164	Diaphragm	347	751	1,021
Circulatory System	2,594	4,293	6,780	Stomachs	7,645	14,253	14,113
Heart marketable	1,496	2,128	2,573	Kidneys	762	1,098	1,227
Heart lean	not separated	1,596	1,700	Offal fat	5,700	27,376	61,837
Respiratory System	3,079	4,631	10,970	Stomach fat	3,307	17,595	15,648
Lungs and wind pipe	3,079	4,631	10,970	Intestinal fat	2,393	9,781	28,735
Nervous System	722	710	774	Caul fat	not separated		17,454
Brain	417	426	445	Teeth right	341	278	356
Spinal Cord	305	284	329	Horn right	140 ^e	none	none
Digestive or Excretory System	2,206 ^b	40,071 ^b	40,455 ^b	Hoofs right	533	584	712
Tongue marketable	1,491	1,115	2,376	Foot fore with hoof right	1,823	2,013	2,246
Tongue Total (bones in)	2,664	3,345	4,333	Foot hind with hoof right	1,873	2,036	2,273
Tongue Bones total	243	298 ^c	514 ^d	Dew claws right	ε	156	128
Gullet	772	780	863	Forequarter right	53,977	93,440	135,581
Intestines	6,099	9,967	70,90	^{Incl. Kidney and Kidney Fat} Hindquarter right	47,411	79,492 78,943	123,816
Heart Sweetbread	not separated	not separated	741	A. Includes Dew Claws.			
Neck Sweetbread	not separated	691	428	B. Includes tongue bones which are analyzed with skeleton sample.			
Spleen	489	922	1,020	C. This ^{weight} includes cartilage and epiglottis at fauces.			
Pancreas	247	419	297	D. This weight includes larynx, 388 grams.			
Liver	2,625	7,035	8,166	E. Dew claws and stub of horn weighed together.			
Gall Bladder & Gall.	93	485	576				

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Table XII cont.

Carcass Parts	Steer 18 grams	Steer 121 grams	Steer 48 grams									
Shin	5216	7709	7973	Lean	61,69	10,620	12,125	Fat	224	636	720	
Lean	2340	4022	3989	Fat	711	3729	13,505	Bone	2483	2718	3262	
Fat	435	1011	954	Bone	2,356	2980	3647	Tail	342	372	414	
Bone	2382	2632	3004	Loin	16,556	30,731	48,003	Lean	110	127	95	
Head	5644	6360	6251	Wide Loin	11,345		23,870	Fat	none	29	36	
Lean	1484	1560	1499	Lean	12,345	16,843	21,577	Bone	232	216	283	
Fat	218	533	669	Fat	2221	10,229	21,913	Kidney fat ^{Right} Left	1222	3636	8585	
Bone	3942	4247	4214	Bone	2826	3,417	4684					
Neck	1588	1806	2418	Flank	2447	4355	12,764					
Lean	1143	981	1250	Flank steak	392	948	980					
Fat	none	395	736	Lean	1397	2015	3374					
Bone	390	427	429	Fat	1003	2317	9353					
Chuck	26,648	39,635	59,420	Bone	47	17	40					
Lean	19,029	24,884	34,956	Rump	3515	5963	9809					
Fat	1,832	8,468	16,534	Lean	1804	2667	3544					
Bone	5,611	5980	7642	Fat	668	1962	4499					
Plate	11,113	26,767	36,423	Bone	952	1325	1760					
Navel end		15,591	22,623	Round	19,278	29,411	38,244					
Briset end		11,176	13,800	Lean	15,242	21,224	25,142					
Lean	5,884	14,425	13,845	Fat	1415	5000	9760					
Fat	2,621	9,174	19,031	Bone	2543	2,700	3159					
Bone	2,490	3,071	3428	Shank	4026	4701	5779					
Rib	9,412	17,372	29,349	Lean	1242	1320	1785					

Table XIII

Percentage Composition. Steer 18

Description of Sample	Laboratory Number	% Moisture	% Dry Substance	% Fat	% Nitrogen	% Ash	% Phosphorus
Blood	07-11-56	81.290	18.710	0.429	2.909	0.688	0.022
Hide and Hair	07-11-57	65.365	34.635	2.883	5.096	0.868	0.068
Skeleton Composite	07-11-59	28.292	71.708	24.951			
Skeleton Air Dry	07-11-59	2.896	97.104	0.667	6.276	52.597	5.979
Circulatory System	07-11-67	56.503	43.497	30.068	1.996	0.751	0.123
Respiratory System	07-11-68	74.710	25.290	6.461	2.756	0.959	0.151
Nervous System	07-11-61	68.830	31.170	17.625	1.750	1.757	0.422
Digest. & Excret. System	07-11-66	66.510	33.490	18.128	2.093	1.634	0.129
Liver	07-11-62	68.990	31.010	3.469	3.026	1.253	0.311
Kidneys	07-11-89	75.046	24.954	8.736	2.373	1.085	0.211
Shin, Shank, Head, and Tail Lean and Fat	07-11-80	67.433	32.567	11.990	3.219	0.771	0.145
Round & Rump Lean & Fat	07-11-81	66.503	33.497	13.258	3.110	0.883	0.172
Loin Lean and Fat	07-11-82	59.900	40.100	21.719	2.866	0.788	0.157
Flank & Plate Lean & Fat	07-11-83	52.512	47.488	30.103	2.440	0.649	0.124
Rib Lean and Fat	07-11-84	62.790	37.210	18.037	3.076	0.821	0.161
Chuck & Neck Lean & Fat	07-11-85	66.480	33.520	14.068	3.019	0.818	0.154
Offal Fat	07-11-65	16.620	83.380	79.718	0.517	0.172	0.027
Kidney Fat	07-11-90	10.044	89.956	86.962	0.421	0.120	0.021

Table XIV Percentage Composition Steer 121

Description of Sample	Laboratory Number	% Moisture	% Dry Substance	% Fat	% Nitrogen	% Ash	% Phosphorus
Blood	07-12-50	77.971	22.029	none	3.255	0.248	0.028
Hide and Hair	07-12-62	59.764 54.420	40.236 45.580	4.969	5.534	0.758	0.056
Skeleton Composite	07-12-64	29.653	70.347	20.989			
Skeleton Air Dry	07-12-64	6.457	93.543	0.372	6.634	51.376	9.108
Circulatory System	07-12-55	27.420	72.580	65.274	0.954	0.205	0.039
Lean Heart	07-12-54	77.383	22.617	4.391	2.571	1.000	0.211
Respiratory System	07-12-56	63.955	36.045	19.692	2.308	0.808	0.176
Nervous System	07-12-57	68.357	31.643	19.499	1.676	1.562	0.395
Digest. & Excret. System	07-12-58	55.535	44.465	31.725	1.611	0.633	0.126
Tongue Marketable	07-12-53	60.397	39.603	25.272	2.225	0.642	0.132
Stomach	07-12-74	78.260	21.740	8.209	1.764	0.971	0.206
Liver	07-12-51	68.360	31.640	4.716	3.191	1.312	0.353
Kidneys	07-12-60	76.580	23.420	5.566	2.738	0.950	0.229
Shin, Shank, Head, and Tail Lean and Fat	07-12-65	62.295	37.705	18.183	2.929	0.733	0.142
Round and Rump Lean	07-12-66	69.963	30.037	8.183	3.283	0.957	0.191
Round and Rump Fat	07-12-67	14.410	85.590	80.605	0.617	0.153	0.030
Loin Lean	07-12-68	67.220	32.780	11.396	3.008	0.943	0.185
Loin Fat	07-12-69	9.075	90.925	87.840	0.396	0.133	0.024
Flank & Plate Lean & Fat	07-12-70	40.073	59.927	47.701	1.924	0.500	0.095
Rib Lean	07-12-71	60.980	39.020	20.874	2.786	0.777	0.153
Rib Fat	07-12-72	10.677	89.323	86.035	0.453	0.135	0.027
Chuck & Neck Lean & Fat	07-12-73	59.141	40.859	24.425	2.605	0.702	0.142
Kidney Offal Fat	07-12-61	4.484	95.516	94.670	0.181	0.070	0.012
Offal Fat (108)	07-12-59	9.517	90.483	88.015	0.273	0.129	0.022

Table XV Percentage Composition.

Steer 48

Description of Sample	Laboratory Number	% Moisture	% dry Substance	% Fat	% Nitrogen	% ash	% Phosphorus
Blood	09-1-101	79.410	20.590	(0.009) none	3.158	0.775	0.021
Hide and Hair	09-1-112	59.240	40.760	8.600	5.308	1.197	0.048
Skeleton	See table XVI for composition of skeleton samples.						
Circulatory System	09-1-104	10.070	89.930	88.450	0.284	0.145	0.026
Heart Marketable	09-1-105	65.830	34.170	19.450	2.126	0.835	0.158
Respiratory System	09-1-106	49.420	50.580	37.390	1.957	0.669	0.117
Nervous System	09-1-107	69.630	30.370	13.050	2.093	1.813	0.425
Digest. + Excret. System	09-1-108	64.160	35.840	22.410	1.778	0.697	0.128
Tongue Marketable	09-1-109	56.020	43.980	29.500	2.273	0.743	0.126
Stomach	09-1-110	74.750	25.250	11.940	1.757	1.073	0.227
Liver	09-1-102	69.730	30.270	7.260	2.893	1.392	0.307
Kidneys	09-1-111	70.750	29.250	12.160	2.446	1.154	0.199
Shin, Shank, Head, and Tail Lean and Fat	09-1-120	57.840	42.160	23.470	2.853	0.829	0.142
Pump Lean and Fat	09-1-123	36.910	63.090	52.670	1.587	0.509	0.093
Round Lean	09-1-124	64.430	35.570	13.420	3.278	1.015	0.192
Round Fat	09-1-125	27.750	72.250	67.350	0.765	0.251	0.027
Loin Lean	09-1-126	61.780	38.220	18.260	2.981	0.956	0.174
Loin Fat	09-1-127	12.600	87.400	84.760	0.426	0.146	0.023
Flank + Plate Lean + Fat	09-1-122	30.150	69.850	61.110	1.308	0.421	0.064
Rib Lean	09-1-128	56.860	43.140	24.790	2.679	0.827	0.150
Rib Fat	09-1-129	15.810	84.190	81.370	0.431	0.155	0.021
Chuck + Neck Lean + Fat	09-1-121	49.670	50.330	34.950	2.267	0.693	0.123
Offal Fat	09-1-135	6.220	93.780	92.090	0.182	0.093	0.012
Kidney Fat	09-1-134	3.760	96.240	94.710	0.239	0.126	0.016

Table XVI

Composited Systems.

	weight in grams	% H ₂ O	weight H ₂ O	% Dry Substance	weight Dry Substance	% Fat	weight Fat	% Nitrogen	weight Nitrogen	% Protein	weight Protein	% Ash	weight Ash	% Phos.	weight Phos.
Steer 18															
Digest. + Excret. System Part.	18436	66.510	12261.80	33.490	6174.20	18.128	3342.08	2.093	385.90	13.081	2411.60	1.634	301.24	0.129	23.78
Liver	2625	68.990	1811.00	31.010	814.00	3.469	91.06	3.026	79.43	18.913	496.50	1.253	32.89	0.311	28.16
Kidneys	762	75.046	571.85	24.954	190.15	8.736	66.57	2.373	18.08	14.831	113.00	1.085	8.27	0.211	1.61
Total Digest. + Excret. System	21823	67.106	14644.65	32.894	7178.35	16.037	3499.71	2.215	483.41	13.844	3021.10	1.569	342.40	0.154	33.55
Steer 121															
Circulatory System Part.	2677	27.420	734.03	72.580	1942.97	65.274	1747.38	0.954	25.54	5.960	159.63	0.205	5.49	0.039	1.04
Heart Lean	1596	77.383	1235.03	22.617	360.97	4.391	70.08	2.571	41.03	16.070	256.44	1.000	15.96	0.211	3.37
Total Circulatory System	4273	46.081	1969.06	53.919	2303.94	42.534	1817.46	1.558	66.57	9.738	416.07	0.502	21.45	0.103	4.41
Digest. + Excret. System Part	15525	55.535	8621.81	44.465	6903.19	31.725	4925.31	1.611	250.11	10.070	1563.19	0.633	98.27	0.126	19.56
Stomach	14253	78.260	11154.40	21.740	3098.60	8.209	1170.03	1.764	251.42	11.030	1571.38	0.971	138.40	0.200	28.51
Tongue Marketable	1862	60.397	1124.59	39.603	737.41	25.272	470.56	2.225	41.43	13.910	258.94	0.642	11.95	0.132	2.46
Liver	7035	68.360	4809.13	31.640	2225.87	4.716	331.77	3.191	224.49	19.940	1403.06	1.312	92.30	0.353	24.83
Kidneys	1098	76.580	840.85	23.420	257.15	5.560	61.05	2.738	30.06	17.110	187.88	0.950	10.43	0.229	2.51
Total Digest. + Excret. System	39773	66.756	26550.78	33.244	13222.22	17.496	6958.72	2.005	777.51	12.531	4984.44	0.883	351.35	0.196	77.87
Steer 48															
Circulatory System Part.	4207	10.070	423.64	89.930	3783.36	88.450	3721.09	0.284	11.95	1.775	74.69	0.145	6.10	0.026	1.09
Heart Marketable	2573	65.830	1693.80	34.170	879.20	19.450	500.45	2.126	54.70	13.288	341.88	0.835	21.48	0.158	4.07
Total Circulatory System	6780	31.231	2117.44	68.769	4662.56	62.265	4221.54	0.983	66.65	6.144	416.57	0.407	27.58	0.096	5.16
Digest. + Excret. System Part	14059	64.160	9020.25	35.840	5038.75	22.410	3150.60	1.778	249.97	11.113	1562.31	0.697	97.99	0.128	18.00
Liver	8166	69.730	5694.15	30.270	2471.85	4.260	347.90	2.893	236.24	18.081	1476.50	1.392	113.67	0.307	25.07
Stomach	14113	74.750	10549.47	25.250	3563.53	11.940	1685.10	1.757	247.97	10.981	1549.81	1.073	151.43	0.227	32.04
Kidneys	1227	70.750	868.10	29.250	358.90	12.160	149.20	2.446	30.01	15.288	187.56	1.154	14.16	0.199	2.44
Tongue Marketable	2376	56.020	1331.03	43.980	1044.97	29.500	700.90	2.273	54.01	14.206	337.56	0.743	17.65	0.126	2.99
Total Digest. + Excret. System	39941	68.759	27463.00	31.241	12478.00	15.107	6033.70	2.049	818.20	12.806	5113.75	0.989	394.90	0.202	80.54

Table XVII

Composition of Bones on Air Dry, Dry, and Fresh Bases.

Steer	Sample Number	% H ₂ O in fresh Bone	% Fat in fresh Bone	Sum	% Dry Fat Free Substance	% H ₂ O in Air dry Bone	% Dry Substance in Air dry Bone	% Fat in Air dry Bone	% Fat in Dry Bone	% Fat (from air dry Bone) in Fresh Bone	% N in Air dry Bone	% N in Dry Bone	% N in Fresh Bone	% Phos. in Air dry Bone	% Phos. in Dry Bone	% Phos. in Fresh Bone	% Ash in Air dry Bone	% Ash in Dry Bone	% Ash in Fresh Bone	% Total Fat in Fresh Bone
18	Composite 07-11-59	28.292	24.951	53.243	46.757	2.896	97.104	0.667	0.687	0.321	6.276	6.463	3.022	5.979 ^c	6.157	2.879	52.597	54.166	25.326	25.272
121	Composite 07-12-64	29.653	20.989	50.642	49.358	6.457	93.543	0.371	0.397	0.196	6.634	7.092	3.500	9.108	9.737	4.806	51.376	54.922	27.108	21.185
48	Feet, Head & Tail 09-1-113	37.050	11.519	48.569	51.431	7.763	92.237	none	—	—	6.150	6.668	3.429	a	9.012	4.635	a	47.660	24.570	b
48	Shin & Shank 09-1-142	20.710	24.344	45.054	54.946	7.845	92.155	none	—	—	5.370	5.827	3.202		11.234	6.173		60.130	33.040	
48	Round 09-1-114	23.160	32.479	55.639	44.361	7.280	92.720	none	—	—	4.440	4.789	2.124		11.316	5.020		61.020	27.070	
48	Rump 09-1-115	26.290	35.688	61.978	38.022	8.015	91.985	none	—	—	5.550	6.034	2.294		10.233	3.891		54.300	20.650	
48	Loin 09-1-116	21.550	29.603	51.153	48.847	7.348	92.652	none	—	—	5.350	5.774	2.820		9.836	4.805		53.420	26.090	
48	Chuck & Neck 09-1-117	27.780	18.665	46.435	53.565	7.955	92.045	none	—	—	6.060	6.584	3.527		9.470	5.073		51.400	27.530	
48	Flank & Plate 09-1-118	37.730	19.567	57.297	42.703	8.580	91.420	none	—	—	6.420	7.022	2.999		8.834	3.772		47.360	20.220	
48	Rib 09-1-119	26.750	18.359	45.109	54.891	7.423	92.577	none	—	—	5.570	6.017	3.303		9.867	5.416		53.580	29.410	

a Ash and phosphorus data on bones of steer 48 were calculated directly to dry bone.

b The first extraction for fat in bones of steer 48 was complete. See that column for this data.

c After the moisture and fat determinations on the air dry bone of steer 18 the mice destroyed all but one sample. This one sample was analyzed for ash and phosphorus. The percentage of ash is normal for this sample, but the percentage of phosphorus is about 60% of the normal. The phosphorus data is therefore questionable and partly vitiates all phosphorus data which includes the bones.

Table XVIII.

Steer 18 Lean.

	weight Grams	% moisture	weight moisture	% dry substance	weight dry substance	% Fat	weight of Fat	% nitrogen	weight nitrogen	% Protein	weight Protein	% Ash	weight of Ash Grams	% phos- phorus	weight of phos- phorus
Lean of Shins	4680	67.433	3155.86	32.567	1524.14	11.990	56.113	3.219	150.65	20.119	941.56	0.771	36.08	0.145	6.79
" " Glates	11768	52.512	6179.61	47.488	5588.39	30.103	3542.52	2.440	287.14	15.250	1794.63	0.649	76.37	0.124	14.59
" " Chucks	38058	66.480	25300.96	33.520	12757.04	14.068	5354.00	3.019	1148.97	18.869	7181.06	0.818	311.31	0.154	58.61
" " Necks	2286	66.480	1519.73	33.520	766.27	14.068	321.59	3.019	69.01	18.869	431.31	0.818	18.70	0.154	3.52
" " Ribs	12338	62.790	7747.03	37.210	4590.97	18.037	2225.41	3.076	379.52	19.225	2372.00	0.821	101.29	0.161	19.86
Lean of Forequarters	69130	63.508	43903.19	36.492	25226.81	17.367	12004.65	2.944	2035.29	18.400	12720.56	0.787	543.75	0.150	103.37
" " Shanks	2484	67.433	1675.04	32.567	808.96	11.990	297.83	3.219	79.96	20.119	499.75	0.771	19.15	0.145	3.60
" " Rounds	30484	66.503	20272.77	33.497	10211.23	13.258	4041.57	3.110	948.05	19.438	5925.31	0.883	269.17	0.172	52.43
" " Rumps	3608	66.503	2399.43	33.497	1208.57	13.258	478.35	3.110	112.21	19.438	701.31	0.883	31.86	0.172	6.21
" " Loins	22690	59.900	13591.31	40.100	9098.69	21.719	4928.04	2.866	650.30	17.913	4064.38	0.788	178.80	0.157	35.62
" " Flanks	2794	52.512	1467.19	47.488	1326.81	30.103	841.08	2.440	68.17	15.250	426.06	0.649	18.13	0.124	3.46
" " Hindquarters	62060	63.496	39405.74	36.504	22654.26	17.059	10586.87	2.995	1858.69	18.719	11616.81	0.833	517.11	0.163	101.32
" " Carcasses	131190	63.503	83308.93	36.497	47881.07	17.220	22591.52	2.968	3893.98	18.550	24337.37	0.809	1060.86	0.156	204.69
" " Heads	2968	67.433	2001.41	32.567	966.59	11.990	355.86	3.219	95.54	20.119	597.13	0.771	22.88	0.145	4.30
" " Tails	220	67.433	148.35	32.567	71.65	11.990	26.38	3.219	7.08	20.119	44.25	0.771	1.70	0.145	0.32
" " Animal.	134378	63.596	85458.69	36.404	48919.31	17.096	22973.76	2.974	3996.60	18.688	24978.75	0.808	1085.44	0.156	209.31

Table XIX.

Steer No. 18. Fat

	weight Grams	% moisture	weight moisture	% Dry Substance	weight Dry Substance	% Fat	weight Fat	% Nitrogen	weight Nitrogen	% Protein	weight Protein	% Ash	weight of Ash Grams	% Phos- phorus	weight of Phos- phorus Grams
Fat of Shins	870	67.483	58.667	32.567	242.83	11.990	104.31	3.219	28.01	20.119	175.06	0.771	6.71	0.145	1.26
" " P-latis	5242	52.512	2752.68	47.488	2489.32	30.103	1578.00	2.440	127.90	15.250	799.38	0.649	34.02	0.124	6.50
" " Chucks	3664	66.480	2435.83	33.520	1228.17	14.068	515.45	3.019	110.62	18.869	691.38	0.818	29.97	0.154	5.64
" " Necks	none														
" " Ribs	1422	62.790	892.87	37.210	529.13	18.037	256.49	3.076	43.74	19.225	273.38	0.821	11.67	0.161	2.29
" " Forequarters	11198	59.547	6668.05	40.453	4529.95	21.917	2454.25	2.771	310.27	17.319	1989.19	0.735	82.37	0.140	15.69
" " Shanks	448	67.433	302.10	32.567	145.90	11.990	53.72	3.219	14.42	20.119	90.19	0.771	3.45	0.145	0.65
" " Rounds	2830	66.503	1882.03	33.497	947.97	13.258	375.20	3.110	88.01	19.438	550.06	0.883	24.99	0.172	4.87
" " Rumps	1336	66.503	888.48	33.497	447.52	13.258	177.13	3.110	41.55	19.438	259.69	0.883	11.80	0.172	2.30
" " Loins	4462	59.900	2672.74	40.100	1789.26	21.719	969.10	2.866	127.88	17.913	799.25	0.788	35.16	0.157	7.01
" " Flanks	2006	52.512	1053.39	47.488	952.61	30.103	603.87	2.440	48.95	15.250	305.94	0.649	13.02	0.124	2.49
" " Kidney	2444	10.044	245.48	89.956	2198.52	86.962	2125.35	0.421	10.29	2.631	64.31	0.120	2.93	0.021	0.51
" " Hindquarters	13526	52.079	7044.22	47.921	6481.78	38.528	4304.37	2.448	331.10	15.300	2069.38	0.675	91.35	0.132	17.83
" " Carcasses	24724	55.461	13712.27	44.539	11011.73	27.337	6758.62	2.594	641.37	16.213	4608.57	0.763	173.72	0.136	33.52
" " Heads	436	67.433	294.01	32.567	141.99	11.990	52.28	3.219	14.03	20.119	87.69	0.771	3.36	0.145	0.63
" " Tails	none														
" " Animal	25160	55.669	14006.28	44.331	11153.72	27.071	6810.90	2.605	655.40	16.281	4096.26	0.704	177.08	0.136	34.15

Table XX.

Steer no. 18 Skeleton

	weight Grams	% moisture	weight of moisture	% of Dry Substance	weight of Dry Substance	% of Fat	weight of Fat	% Nitrogen	weight of Nitrogen	% Protein	weight of Protein	% Ash	weight of Ash	% phos- phorus	weight of Phos- phorus.
Bones of Shins	4764		1347.83		3416.17		1203.96		143.97		899.81		1206.53		187.16
" " Plates	4980		1408.94		3571.06		1258.55		150.50		940.63		1261.23		148.37
" " Chucks	11222		3174.93		8047.07		2836.02		339.13		2119.56		2842.08		323.08
" " Necks	780		220.68		559.32		197.12		23.57		147.31		197.54		22.46
" " Ribs	4712		1333.12		3378.88		1190.82		142.40		890.00		1193.36		135.66
" " Forequarters	26458		7485.50		18972.50		6686.47		799.57		4997.31		6700.74		761.73
" " Shanks	4966		1404.98		3561.02		1255.01		150.07		937.94		1257.69		142.97
" " Rounds	5086		1438.73		3647.27		1285.33		153.70		960.63		1288.08		146.43
" " Rumps	1904		538.68		1365.32		481.18		57.54		359.63		482.21		54.82
" " Loin	5652		1599.06		4052.94		1428.37		170.80		1067.50		1431.43		162.72
" " Flanks	94		26.59		67.41		23.76		2.84		17.75		23.81		2.71
" " Hindquarters	17702		5008.24		12693.76		4473.65		534.95		3343.45		4483.22		509.65
" " Carcass	44160		12493.74		31666.26		11160.12		1334.52		8340.75		11183.96		1271.38
" " Head	7311		2068.43		5242.57		1847.64		220.94		1380.88		1851.58		210.48
" " Tail	464		131.27		332.73		117.26		14.02		87.63		117.51		13.36
" " Feet	6326		1789.75		4536.25		1598.71		191.17		1194.81		1602.12		182.13
Skeleton of Animal.	58261	28.292	16483.19	71.708	41777.81	25.272	14723.73	3.022	1760.65	18.888	11004.07	25.826	14765.17	* 2.879	1677.35

* This destroyed all but one small sample. This one sample was ashed in a pt. dish which probably accounts for a low phosphorus.

Table XXI

Steer No. 121 Lean

	weight grams	% moisture	weight of moisture	% dry substance	weight of dry substance	% Fat	weight of Fat	% nitrogen	weight of nitrogen	% Protein	weight of Protein	% Ash	weight of ash grams	% Phosphorus	weight of Phosphorus grams.
Lean of Shins	8044	62.295	5011.01	37.705	3032.99	18.183	1462.64	2.929	235.61	18.310	1472.56	0.733	58.96	0.142	11.42
" " Plates	28,850	40.073	11,561.06	59.927	17,288.94	47.701	13,761.74	1.924	555.07	12.030	3469.19	0.500	144.25	0.095	27.41
" " Chucks	49,768	59.141	29,433.29	40.859	20,334.71	24.425	12,155.83	2.605	1296.46	16.280	8102.88	0.722	349.37	0.142	70.67
" " Neck	1962	59.141	1160.35	40.859	801.65	24.425	479.22	2.605	51.11	16.280	319.44	0.702	13.77	0.142	2.79
" " Ribs	21,240	60.980	12,952.15	39.020	8287.85	20.874	4433.64	2.786	591.75	17.410	3698.44	0.777	165.03	0.153	32.50
" " Fore quarters	109,864	54.720	60,117.86	45.280	49,746.14	29.394	32,293.07	2.485	2730.00	15.530	17,062.50	0.666	731.38	0.132	144.79
" " Shanks	2640	62.295	1644.59	37.705	995.41	18.183	480.03	2.929	77.33	18.310	483.31	0.733	19.35	0.142	3.75
" " rounds	42,448	69.963	29,697.89	30.037	12,750.11	8.183	3473.52	3.283	1393.57	20.520	8709.81	0.957	406.23	0.191	80.07
" " Rumps	5334	69.963	3731.83	30.037	1602.17	8.183	436.48	3.283	175.12	20.520	1094.50	0.957	51.05	0.191	10.19
" " Loins	33,686	67.220	22,643.73	32.780	11,042.27	11.396	3838.86	3.008	1013.27	18.800	6332.94	0.943	317.66	0.185	62.32
" " Shanks	4030	40.073	1614.94	59.927	2415.06	47.701	1922.35	1.924	77.54	12.030	484.63	0.500	20.15	0.095	3.83
" " Hindquarters	88,138	67.318	59,332.98	32.682	28,805.02	11.517	10,151.24	3.105	2736.83	19.410	17,105.19	0.924	814.44	0.182	160.16
" " Carcasses	198,002	60.328	119,450.84	39.672	78,551.16	21.436	42,444.31	2.761	5466.83	17.260	34,167.69	0.781	1545.82	0.154	304.95
" " Head	3120	62.295	1943.60	37.705	1176.40	18.183	567.31	2.929	91.38	18.310	571.13	0.733	22.87	0.142	4.43
" " Tails	254	62.295	158.23	37.705	95.77	18.183	46.19	2.929	7.44	18.310	46.50	0.733	1.86	0.142	0.36
" " Animal	201,376	60.361	121,552.67	39.639	79,823.33	21.382	43,057.81	2.764	5565.65	17.280	34,785.31	0.780	1570.55	0.154	309.74

Table XXII.

		Steer No. 121															
		Fat.		Fat.		Fat.		Fat.		Fat.		Fat.		Fat.		Fat.	
		weight	%	weight	%	weight	%	weight	%	weight	%	weight	%	weight	%	weight	%
		grams	moisture	of dry	substance	of dry	substance	of dry	substance	of dry	substance	of dry	substance	of dry	substance	of dry	substance
Fat of Shins		2022	62.295	1259.60	37.705	762.40	18.183	367.66	2.929	59.22	18.31	370.13	0.733	14.82	0.142	2.87	
" " plates		18,348	40.073	7352.59	59.927	10,995.41	47.701	8752.18	1.924	353.02	12.03	2206.38	0.500	91.74	0.095	17.43	
" " chucks		16,936	59.141	10,016.12	40.859	6919.88	24.425	4136.62	2.605	441.18	16.28	2757.38	0.702	118.89	0.142	24.05	
" " necks		790	59.141	467.21	40.859	322.79	24.425	192.96	2.605	20.58	16.28	128.63	0.702	5.55	0.142	1.12	
" " ribs		7,458	10.677	796.29	89.323	6661.71	86.035	6416.49	0.453	33.78	2.83	211.13	0.135	10.07	0.027	2.01	
" " Forequarters		45,554	43.666	19,891.81	56.334	25,662.19	43.610	19,865.91	1.993	907.78	12.456	5673.65	0.529	241.07	0.104	47.48	
" " shanks		1272	62.295	792.39	37.705	479.61	18.183	231.29	2.929	37.26	18.31	232.87	0.733	9.32	0.142	1.81	
" " rounds		10,000	14.410	1441.00	85.590	8559.00	80.605	8060.50	0.617	61.70	3.86	385.63	0.153	15.30	0.030	3.00	
" " rumps		3924	14.410	565.45	85.590	3358.55	80.605	3162.94	0.617	24.21	3.86	151.31	0.153	6.00	0.030	1.18	
" " loins		20,458	9.075	1856.56	90.925	18,601.44	87.840	17,970.31	0.396	81.01	2.48	506.31	0.133	27.21	0.024	4.91	
" " flanks		4634	40.073	1856.98	59.927	2777.02	47.701	2210.46	1.924	89.16	12.03	557.25	0.500	23.17	0.095	4.40	
" " kidneys		7272	4.484	326.08	95.516	6945.92	94.670	6884.40	0.181	13.16	1.13	82.25	0.070	5.09	0.012	.87	
" " hindquarters		47,560	14.378	6838.46	85.622	40,721.54	80.992	38,519.90	.644	306.50	4.025	1915.62	0.181	86.09	0.034	16.17	
" " carcass		93,114	28.707	26,730.28	71.293	66,383.73	62.701	58,385.81	1.304	1214.28	8.150	7589.27	0.351	327.16	0.068	63.65	
" " head		1,106	62.295	688.98	37.705	417.02	18.183	201.10	2.929	32.39	18.31	202.44	0.733	8.11	0.142	1.57	
" " tail		58	62.295	36.13	37.705	21.87	18.183	10.55	2.929	1.70	18.31	10.63	0.733	43	0.142	.08	
" " Animal		94,278	29.122	27,455.39	70.878	66,822.62	62.154	58,597.46	1.324	1248.37	8.275	7802.34	0.356	335.70	0.069	65.30	

Table XXIII.

Steer No. 121 Skeleton

		weight grams	% moisture	weight of moisture	% Dry substance	weight of Dry substance	% Fat	weight of Fat	% nitrogen	weight of nitrogen	% Protein	weight of Protein	% Ash	weight of ash	% Phosphorus	weight of Phosphorus
Bones of	Shins	5264		1560.93		3703.07		1115.18		184.24	11	1151.50		1426.97		252.99
"	" Plates	6142		1821.29		4320.71		1301.18		214.97		1343.56		1664.97		295.18
"	" Chucks	11,960		3546.50		8413.50		2533.73		418.60		2616.25		3242.12		574.80
"	" Necks	854		253.24		1600.76		180.92		29.89		186.81		231.50		41.04
"	" ribs	5960		1767.32		4192.68		1262.63		208.60		1303.75		1615.64		286.44
"	" forequarters	30,180		8949.28		21,230.72		6393.64		1056.30		6601.88		8181.20		1450.45
"	" shanks	5436		1611.94		3824.06		1151.62		190.26		1189.13		1473.59		261.25
"	" rounds	5400		1601.26		3798.74		1143.99		189.00		1181.25		1463.83		259.52
"	" rumps	2650		785.80		1864.20		561.40		92.75		579.69		718.36		127.36
"	" loins	6834		2026.49		4807.51		1447.78		239.19		1494.94		1852.56		328.44
"	" flanks	34		10.08		23.92		7.20		1.19		7.44		9.22		1.63
"	" hindquarters	20354		6035.57		14318.43		4311.99		712.39		4452.44		5517.56		978.20
"	" carcass	50,534		14,984.85		35,549.15		10,705.63		1768.69		11,054.31		13,698.76		2428.65
"	" head	8,495		2519.02		5975.98		1799.67		297.33		1858.31		2302.82		408.27
"	" tail	432		128.10		303.90		91.52		15.12		94.50		117.11		20.76
"	" feet	6930		2054.95		4875.05		1468.12		242.55		1515.94		1878.58		333.06
Skeleton of animal.		66,391	29.653	19,686.92	70.347	46,704.08	21.185	14,064.94	3.500	2323.69	21.875	14,523.06	27.108	17,997.27	4.806	3190.74

Table ~~XXIV~~

Steer no. 48 Lean

	weight grams	% moisture	weight of moisture	% Dry substance	weight of Dry substance	% Fat	weight of Fat	% Nitrogen	weight of Nitrogen	% Protein	weight of Protein	% Ash	weight of Ash	% Phos- phorus	weight of Phos- phorus
Lean of skins	7978	57.84	4614.48	42.16	3363.52	23.47	1872.44	2.853	227.61	17.831	1422.56	0.829	66.14	0.142	11.33
" " plates	27,690	30.15	8348.54	69.85	19341.46	61.11	16,921.36	1.308	362.19	8.175	2263.69	0.421	116.57	0.064	17.72
" " chunks	69,912	49.67	34,725.29	50.33	35,186.71	34.95	24434.24	2.267	1584.91	14.169	9905.69	0.693	484.49	0.123	85.99
" " neck	2,500	49.67	1241.75	50.33	1258.25	34.95	873.78	2.267	56.68	14.169	354.25	0.693	173.25	0.123	3.08
" " ribs	24,250	56.86	13788.55	43.14	10,461.45	24.79	6011.58	2.679	649.66	16.744	4070.38	0.827	200.55	0.150	36.38
" " forequarters	132,330	47.396	62,718.61	52.604	69,611.39	37.870	50,113.37	2.177	2881.05	13.606	18,006.56	0.787	1041.00	0.117	154.50
" " shanks	3570	57.84	2064.89	42.16	1505.11	23.47	837.88	2.853	101.85	17.831	636.56	0.829	29.59	0.142	5.07
" " rounds	50,284	64.43	32,397.98	35.57	17,886.02	13.42	6748.11	3.278	1648.31	20.488	10,301.94	1.015	510.38	0.192	96.55
" " rumps	7088	36.91	2616.18	63.09	4471.82	52.67	3733.25	1.587	112.49	9.919	703.06	0.509	36.08	0.093	6.59
" " loins	43154	61.78	26,669.54	38.22	16,493.46	18.26	7879.92	2.981	1286.42	18.631	8040.02	0.956	412.55	0.174	75.09
" " flanks	6748	30.15	2034.52	69.85	4713.48	61.11	4123.70	1.308	88.26	8.175	551.63	0.421	28.41	0.064	4.32
" " hindquarters	110,844	59.340	65,774.11	40.660	45,069.89	21.041	23,322.86	2.926	3237.33	18.288	20,233.31	0.918	1017.01	0.169	187.62
" " carcass	243,174	52.840	128,492.72	47.160	114,681.28	30.199	73,436.23	2.516	6118.38	15.725	38,239.88	0.846	2058.01	0.141	342.12
" " head	2998	57.84	1734.04	42.16	1263.96	23.47	703.63	2.853	85.53	17.831	534.58	0.829	248.5	0.142	4.26
" " tail	190	57.84	109.90	42.16	80.10	23.47	44.59	2.853	5.42	17.831	338.8	0.829	1.58	0.142	.27
" " animal	246,362	52.905	130,336.66	47.095	116,025.34	30.113	74,184.45	2.520	6209.33	15.750	38,808.31	0.846	2084.44	0.141	346.65

Table XXV

Steer No. 48. Fat.

	weight grams	% moisture	weight of moisture	% Dry substance	weight dry substance	% Fat	weight of Fat	% Nitrogen	weight of Nitrogen	% Protein	weight of Protein	% Ash	weight of Ash	% Phos- phorus	weight of Phos- phorus
Fat of skins	1908	57.84	1103.59	42.16	804.41	23.47	447.81	2.853	54.44	17.831	340.23	0.829	15.82	0.142	2.71
" " plates	38,062	30.15	11,475.69	69.85	26,586.31	61.11	23,259.69	1.308	497.85	8.175	3111.56	0.421	160.24	0.064	24.36
" " chucks	33,068	49.67	16,424.88	50.33	16,643.12	34.95	11,557.27	2.267	749.65	14.169	4685.31	0.693	229.16	0.123	40.67
" " neck	1,472	49.67	731.14	50.33	740.86	34.95	514.46	2.267	33.37	14.169	208.56	0.693	10.20	0.123	1.81
" " ribs	27,010	15.81	4270.28	84.19	22,739.72	81.37	21,978.04	0.431	116.41	2.694	727.56	0.155	41.87	0.021	5.67
" " forequarters	101,520	33.50	34,005.58	66.50	67,514.42	56.89	57,757.27	1.430	1451.72	8.938	9073.25	0.450	457.29	0.074	75.22
" " shanks	1440	57.84	832.90	42.16	607.10	23.47	337.97	2.853	41.08	17.831	256.75	0.829	11.94	0.142	2.04
" " rounds	19,520	27.75	5416.80	72.25	14,103.20	67.35	13,146.72	0.765	149.33	4.781	933.31	0.251	49.00	0.027	5.27
" " rumps	8998	36.91	3321.16	63.09	5676.84	52.67	4739.25	1.587	142.80	9.919	892.50	0.509	45.80	0.093	8.37
" " loins	43,826	12.60	5522.08	87.40	38,303.92	84.76	37146.92	0.426	186.70	2.663	1166.88	0.146	63.99	0.023	10.08
" " flanks	18,706	30.15	5639.86	69.85	13,066.14	61.11	11,431.24	1.308	244.67	8.175	1529.19	0.421	78.75	0.064	11.97
" " kidneys	17,170	3.76	645.59	96.24	16,524.41	94.71	16,261.71	0.239	41.04	1.494	256.50	0.126	21.63	0.016	2.75
" " hindquarters	109,660	19.50	21,378.39	80.50	88,281.61	75.75	83,063.81	0.735	805.62	4.594	5035.13	0.247	271.11	0.037	40.48
" " carcass	211,180	26.23	55,383.97	73.77	155,796.03	66.68	140,821.08	1.069	2257.34	6.681	14,108.36	0.345	728.40	0.055	115.70
" " head	1338	57.84	773.90	42.16	564.10	23.47	314.03	2.853	38.17	17.831	228.56	0.829	11.09	0.142	1.90
" " tail	72	57.84	41.64	42.16	30.36	23.47	16.90	2.853	2.05	17.831	12.81	0.829	0.60	0.142	.10
" " animal	212,590	26.44	56,199.51	73.56	156,390.49	66.396	141,152.01	1.081	2297.56	6.756	14,359.75	0.348	740.09	0.055	117.70

Table XXVI

Steer No. 48 Skeleton

	weight grams	% moisture	weight of moisture	% Dry substance	weight of Dry substance	% Fat	weight of Fat	% Nitrogen	weight of Nitrogen	% Protein	weight of Protein	% Ash	weight of Ash	% Phos- phorus	weight of Phos- phorus
Bones of shins	6008	20.71	1244.26	79.29	4763.74	24.344	1462.59	3.202	192.38	20.013	1202.38	33.04	1985.04	6.173	370.87
" plates	6856	37.73	2586.77	62.27	4269.23	19.567	1341.51	2.999	205.61	18.744	1285.06	20.22	1386.28	3.772	258.61
" chucks	15,284	27.78	4245.90	72.22	11,038.10	18.655	2851.23	3.527	539.07	22.044	3369.19	27.53	4207.69	5.073	775.36
" necks	858	27.78	238.35	72.22	619.65	18.655	150.06	3.527	30.26	22.044	189.13	27.53	236.21	5.073	43.53
" ribs	7294	26.75	1951.15	73.25	5342.86	18.359	1339.11	3.303	240.92	20.644	1505.75	29.41	2145.17	5.416	395.04
" forequarters	36,300	28.28	10,266.43	71.72	26,033.57	19.680	7144.50	3.328	1208.24	20.800	7551.50	27.43	9960.39	5.078	1843.41
" shanks	6524	20.71	1351.12	79.29	5172.88	24.344	1588.20	3.202	208.90	20.013	1305.63	33.04	2155.43	6.173	402.73
" rounds	6318	23.16	1463.25	76.84	4854.75	32.479	2052.02	2.124	134.19	13.275	838.69	27.07	1710.28	5.020	317.16
" rumps	3520	26.29	925.41	73.71	2594.59	35.688	1256.22	2.294	80.75	14.338	504.69	20.65	726.88	3.891	136.96
" loins	9368	21.55	2018.80	78.45	7349.20	29.603	2773.21	2.820	264.18	17.625	1651.13	26.09	2444.11	4.805	450.13
" flanks	80	37.73	30.18	62.27	49.82	19.567	15.65	2.999	2.40	18.744	15.00	20.22	16.18	3.772	3.02
" hindquarters	25,810	22.43	5788.76	77.57	20,021.24	29.776	7685.30	2.675	690.42	16.719	4315.13	27.32	7052.88	5.676	1310.00
" carcass	62,110	25.85	16,055.19	74.15	46,054.81	23.861	14,829.80	3.057	1898.66	19.106	10,866.63	27.39	27,013.27	5.077	3153.41
" head	8942	37.05	3313.01	62.95	5628.99	11.519	1030.03	3.429	306.62	21.431	1916.38	24.51	2191.88	4.635	414.46
" tail	566	37.05	209.70	62.95	356.30	11.519	65.20	3.429	19.41	21.431	121.31	24.51	138.73	4.635	26.23
" feet	7614	37.05	2820.99	62.95	4793.01	11.519	877.06	3.429	261.08	21.431	1631.75	24.51	1866.19	4.635	362.91
Skeleton of Animal	79,232	28.27	22,398.89	71.73	56,833.11	21.206	16802.09	3.137	2485.77	19.606	15,536.06	26.76	21209.87	4.982	3947.01

Forequarters

Table XXVII

Steer No. 18.

	Weight Grams	Per Cent Moisture	Weight of Moisture	Per Cent Dry Substance	Weight of Dry Substance	Per Cent Fat	Weight of Fat	Per Cent Nitrogen	Weight of Nitrogen	Per Cent Protein	Weight of Protein	Per Cent Ash	Weight of Ash	Per Cent Phosphorus	Weight of Phosphorus
Shins Lean	4 680	67.433.	3 155.86	32.567.	1 524.14	11.990.	561.13	3.219.	150.65	20.119.	941.56	.771.	36.08	.145.	6.79
Shins Fat	870	67.433.	586.67	32.567.	283.33	11.990.	104.31	3.219.	28.01	20.119.	175.66	.771.	6.71	.145.	1.26
Shins Bone	4 764.	28.292.	1 347.83	71.708.	3 416.17	25.272.	1 203.96	3.022.	143.97	18.888.	899.81	25.326.	1 206.53	2.879.	137.16
Total Cut of Shins	10 314.	49.354.	5 090.36	50.646.	5 223.64	18.125.	1 869.40	3.128.	322.63	19.550.	2 016.43	12.113.	1 249.32	1.408.	145.21
Plates Lean	11 768.	52.512.	6 179.61	47.488.	5 588.39	30.103.	3 542.52	2.440.	287.14	15.250.	1 794.63	.649.	76.37	.124.	14.59
Plates Fat	5 242.	52.512.	2 752.68	47.488.	2 489.32	30.103.	1 578.00	2.440.	127.90	15.250.	799.38	.649.	34.02	.124.	6.50
Plates Bone	4 980	28.292.	1 408.94	71.708.	3 571.06	25.272.	1 258.55	3.022.	150.50	18.888.	943.63	25.326.	1 261.23	2.879.	143.37
Total Cut of Plates	21 990	47.027.	10 341.23	52.973.	11 648.77	29.009.	6 379.07	2.572.	565.54	16.075.	3 537.63	6.237.	1 371.62	.748.	164.46
Chucks Lean	38 058.	66.480	25 300.96	33.520.	12 757.04	14.068.	5 354.00	3.019.	1 148.97	18.869.	7 181.06	.818.	311.31	.154.	58.61
Chucks Fat	3 664.	66.480	2 435.83	33.520.	1 228.17	14.068.	515.45	3.019.	110.62	18.869.	691.38	.818.	29.97	.154.	5.64
Chucks Bone	11 222.	28.292.	3 174.93	71.708.	8 047.07	25.272.	2 836.02	3.022.	339.13	18.888.	2 119.56	25.326.	2 842.08	2.879.	323.08
Total Cut of Chucks	52 944.	58.386.	30 911.72	41.614.	22 032.28	16.443.	8 705.47	3.020.	1 598.72	18.875.	9 992.00	6.013.	3 183.36	.732.	387.33
Necks Lean	2 286.	66.480	1 519.73	33.520.	766.27	14.068.	321.59	3.019.	69.01	18.869.	431.31	.818.	18.70	.154.	3.52
Necks Fat	none														
Necks Bone	780	28.292.	220.68	71.708.	559.32	25.272.	197.12	3.022.	23.57	18.888.	147.31	25.326.	197.54	2.879.	22.46
Total Cut of Neck	3 066.	56.765.	1 740.41	43.235.	1 325.59	16.918.	518.71	3.020.	92.58	18.875.	578.62	7.053.	216.24	.847.	25.98
Ribs Lean	12 338.	62.790.	7 747.03	37.210.	4 590.97	18.037.	2 225.41	3.076.	379.52	19.225.	2 372.00	.821.	101.29	.161.	19.86
Ribs Fat	1 422.	62.790.	892.87	37.210.	529.13	18.037.	256.49	3.076.	43.74	19.225.	273.38	.821.	11.67	.161.	2.29
Ribs Bone	4 712.	28.292.	1 333.12	71.708.	3 378.88	25.272.	1 190.82	3.022.	142.40	18.888.	890.00	25.326.	1 193.36	2.879.	135.66
Total Cut of Rib	18 472.	53.990	9 973.02	46.010.	8 498.98	19.883.	3 672.72	3.062.	565.66	19.138.	3 535.38	7.072.	1 306.32	.854.	157.81
Forequarters Lean	69 130	63.508.	43 913.19	36.492.	25 226.81	17.367.	12 004.65	2.944.	2 035.29	18.400.	12 720.56	.787.	543.75	.150.	103.37
Forequarters Fat	11 198.	59.547.	6 663.05	40.453.	4 529.95	21.917.	2 454.25	2.771.	310.27	17.319.	1 939.12	.735.	82.37	.140.	15.69
Forequarters Bone	26 458.	28.292.	7 485.50	71.708.	18 972.50	25.272.	6 686.47	3.022.	799.57	18.888.	4 997.31	25.326.	6 700.74	2.879.	761.73
Total Forequarters	106 786.	54.363.	58 056.74	45.632.	48 729.26	19.802.	21 145.37	2.945.	3 145.13	18.406.	19 656.99	6.861.	7 326.86	.825.	880.79

Hindquarters

Table XXVII, Cont'd. Steer No. 18.

	Weight Grams	Per Cent Moisture	Weight of Moisture	Per Cent Dry Substance	Weight of Dry Substance	Per Cent Fat	Weight of Fat	Per Cent Nitrogen	Weight of Nitrogen	Per Cent Protein	Weight of Protein	Per Cent Ash	Weight of Ash	Per Cent Phosphorus	Weight of Phosphorus
Shanks Lean	2 484.	67.433	1 675.04	32.567.	808.96	11.990.	297.83	3.219.	79.96	20.119.	499.75	.771.	19.15	.145.	3.60
Shanks Fat	448.	67.433	302.10	32.567.	145.90	11.990.	53.72	3.219.	14.42	20.119.	90.13	.771.	3.45	.145.	.65
Shanks Bone	4 966.	28.292	1 404.98	71.708.	3 561.02	25.272.	1 255.01	3.022.	150.07	18.888.	937.94	25.326.	1 257.69	2.879.	142.97
Total Cut of Shanks	7 898.	42.822	3 382.12	57.178.	4 515.88	20.341.	1 606.56	3.095.	244.45	19.344.	1 527.82	16.210.	1 280.29	1.864.	147.22
Rounds Lean	30 484.	66.503	20 272.77	33.497.	10 211.23	13.258.	4 041.57	3.110.	948.05	19.438.	5 925.31	.883.	269.17	.172.	52.43
Rounds Fat	2 830.	66.503	1 882.03	33.497.	947.97	13.258.	375.20	3.110.	88.01	19.438.	550.06	.883.	24.99	.172.	4.87
Rounds Bone	5 086.	28.292	1 438.93	71.708.	3 647.07	25.272.	1 285.33	3.022.	153.70	18.888.	960.63	25.326.	1 288.08	2.879.	146.43
Total Cut of Rounds	38 400.	61.442	23 593.73	38.558.	14 806.27	14.849.	5 702.10	3.098.	1 189.76	19.363.	7 436.00	4.120.	1 582.24	.531.	203.73
Rumps Lean	3 608.	66.503	2 399.43	33.497.	1 208.57	13.258.	478.35	3.110.	112.21	19.438.	701.31	.883.	31.86	.172.	6.21
Rumps Fat	1 336.	66.503	888.48	33.497.	447.52	13.258.	177.13	3.110.	41.55	19.438.	259.69	.883.	11.80	.172.	2.30
Rumps Bone	1 904.	28.292	538.68	71.708.	1 365.32	25.272.	481.18	3.022.	57.54	18.888.	359.63	25.326.	482.21	2.879.	54.82
Total Cut of Rumps	6 848.	55.879	3 826.59	44.121.	3 021.41	16.598.	1 136.66	3.086.	211.30	19.283.	132.63	7.679.	525.87	.925.	63.33
Loin Lean	22 690.	59.900	13 591.31	40.100.	9 098.69	21.719.	4 928.04	2.866.	650.30	17.913.	4 064.38	.788.	178.80	.157.	35.62
Loin Fat	4 462.	59.900	2 672.74	40.100.	1 789.26	21.719.	969.10	2.866.	127.88	17.913.	799.25	.788.	35.16	.157.	7.01
Loin Bone	5 652.	28.292	1 599.06	71.708.	4 052.94	25.272.	1 428.37	3.022.	170.80	18.888.	1 067.50	25.326.	1 431.43	2.879.	162.72
Total Cut of Loin	32 804.	54.454	17 863.11	45.546.	14 940.89	22.331.	7 325.51	2.893.	948.98	18.081.	5 931.13	5.016.	1 645.39	.626.	205.35
Flanks Lean	2 794.	52.512	1 467.19	47.488.	1 326.81	30.103.	841.08	2.440.	68.17	15.250.	426.06	.649.	18.13	.124.	3.46
Flanks Fat	2 006.	52.512	1 053.39	47.488.	952.61	30.103.	603.87	2.440.	48.95	15.250.	305.94	.649.	13.02	.124.	2.49
Flanks Bone	94.	28.292	26.59	71.708.	67.41	25.272.	23.76	3.022.	2.84	18.888.	17.75	25.326.	23.81	2.879.	2.71
Total Cut of Flanks	4 894.	52.047	2 547.17	47.953.	2 346.83	30.010.	1 468.71	2.451.	119.96	15.319.	749.75	1.123.	54.96	.177.	8.66
Fat of Kidneys	2 444.	10.044	245.48	89.956.	2 198.52	86.962.	2 125.35	.421.	10.29	2.631.	64.31	.120.	2.93	.021.	.51
Hindquarters Lean	62 060.	63.496	39 405.74	36.504.	22 654.26	17.059.	10 586.87	2.995.	1 858.69	18.719.	11 616.81	.833.	517.11	.163.	101.32
Hindquarters Fat	13 526.	52.079	7 044.22	47.921.	6 481.78	38.528.	4 304.37	2.448.	331.10	15.300.	2 069.38	.675.	91.35	.132.	17.83
Hindquarters Bone	17 702.	28.292	5 008.24	71.708.	12 693.76	25.272.	4 473.65	3.022.	534.95	18.888.	3 343.45	25.326.	4 483.22	2.879.	509.65
Total Hindquarters	93 288.	55.161	51 458.20	44.839.	41 829.80	20.758.	19 364.89	2.921.	2 724.74	18.256.	17 029.64	5.458.	5 091.68	.674.	628.80

Carcass.

Table XXVIII. Steer No. 18.

	Weight Grams	Per Cent Moisture	Weight of Moisture	Per Cent Dry Substance	Weight of Dry Substance	Per Cent Fat	Weight of Fat	Per Cent Nitrogen	Weight of Nitrogen	Per Cent Protein	Weight of Protein	Per Cent Ash	Weight of Ash	Per Cent Phosphorus	Weight of Phosphorus
Forequarters Lean	69 130.	63 50.	43 903.19	36 492.	25 226.81	17 367.00	12 004.65	2.944.	2 035.29	18.400	12 720.56	787.	543.75	.150.	103.37
Hindquarters Lean	62 060.	63 49.	39 405.74	36 504.	22 654.26	17 059.00	1 586.87	2.995.	1 858.69	18.719.	11 610.81	833.	517.11	.163.	101.32
Carcass Lean	131 190.	63 50.	83 308.93	36 497.	47 881.07	17 220.	22 591.52	2.968.	3 893.98	18.550	24 337.37	809.	1 060.86	.156.	204.69
Forequarters Fat	11 198.	59 54.	6 668.05	40 453.	4 529.95	21 917.	2 454.25	2.771.	310.27	17.319.	1 939.12	735.	82.37	.140.	15.69
Hindquarters Fat	13 526.	52 07.	7 044.22	47 921.	6 481.78	38 528.	4 304.37	2.448.	331.10	15.300	2 069.38	675.	91.35	.132.	17.83
Carcass Fat	24 724.	55 46.	13 712.27	44 539.	11 011.73	27 337.	6 758.62	2.594.	641.37	16.213.	4 008.57	703.	173.72	.136.	33.52
Forequarters Bone	26 458.	28 29.	7 485.50	71 708.	18 972.50	25 272.	6 686.46	3.022.	799.57	18.888.	4 997.31	25 326.	6 700.74	2.879.	761.73
Hindquarters Bone	17 702.	28 29.	5 008.24	71 708.	12 693.76	25 272.	4 473.65	3.022.	534.95	18.888.	3 343.45	25 326.	4 483.22	2.879.	509.65
Carcass Bone	44 160.	28 29.	12 493.74	71 708.	31 666.26	25 272.	11 160.12	3.022.	1 334.52	18.888.	8 340.75	25 326.	11 183.96	2.879.	1 271.38
Total Carcass	200 074.	54 73.	109 514.94	45 263.	90 559.06	20 248.	40 510.26	2.934.	5 869.87	18.338.	36 680.69	6 207.	12 418.54	.755.	1 509.59
Head Lean	2 968.	67 43.	2 001.41	32 567.	966.59	11 990.	355.86	3.219.	95.54	20.119.	597.13	771.	22.88	.145.	4.30
Head Fat	436.	67 43.	294.01	32 567.	141.99	11 990.	52.28	3.219.	14.03	20.119.	87.69	771.	3.36	.145.	63
Head Bone	7 311.	28 29.	2 068.43	71 708.	5 242.57	25 272.	1 847.64	3.022.	220.94	18.888.	1 380.88	25 326.	1 851.58	2.879.	210.48
Total Head (excl. Teeth and Horn)	10 715.	40 72.	4 363.85	59 273.	6 351.15	21 053.	2 255.78	3.085.	330.51	19.281.	2 065.69	17 524.	1 877.82	2.010.	215.41
Tail Lean	220.	67 43.	148.35	32 567.	71.65	11 990.	26.38	3.219.	7.08	20.119.	44.25	771.	1.70	.145.	32
Tail Bone	464.	28 29.	131.27	71 708.	332.73	25 272.	117.26	3.022.	14.02	18.888.	87.63	25 326.	117.51	2.879.	13.36
Total Tail	684.	40 88.	279.62	59 120.	404.38	21 000.	143.64	3.085.	21.10	19.281.	131.88	17 428.	119.21	2.000.	13.68
Feet Less Hoofs	6 326.	28 29.	1 789.75	71 708.	4 536.25	25 272.	1 598.71	3.022.	191.17	18.888.	1 191.81	25 326.	1 602.12	2.879.	182.13

Total Animal.

Table XXVIII, Continued, Steer No. 18.

	Weight Grams	Per Cent Moisture	Weight of Moisture	Per Cent Dry Substance	Weight of Dry Substance	Per Cent Fat	Weight of Fat	Per Cent Nitrogen	Weight of Nitrogen	Per Cent Protein	Weight of Protein	Per Cent Ash	Weight of Ash	Per Cent Phosphorus	Weight of Phosphorus
Total Animal Lean	134 378.	63.596.	85 458.69	36.404.	48 919.31	17.096.	22 973.76	2.974.	3 996.60	18.558.	24 978.75	.808.	1 085.44	.156.	209.31
Total Animal Fat (Less Offal Fat)	25 160.	55.669.	14 006.28	44.331.	11 153.72	27.071.	6 810.90	2.605.	655.40	16.281.	4 096.26	.704.	177.08	.136.	34.15
Total Animal Bone	58 261.	28.292.	16 483.19	71.708.	41 777.81	25.272.	14 723.73	3.022.	1 760.65	18.888.	11 004.07	25.326.	14 755.17	2.879.	1 677.35
Hair and Hide	25 674.	65.365.	16 781.81	34.635.	8 892.19	2.883.	740.18	5.096.	1 308.30	31.850.	8 177.20	.868.	222.85	.068.	17.46
Offal Fat	5 700.	16.620.	947.30	83.380.	4 752.70	79.718.	4 543.90	.517.	29.47	3.231.	184.20	.172.	9.80	.027.	1.54
Blood	15 599.	81.290.	12 680.40	18.710.	2 918.60	.429.	66.92	2.909.	453.77	18.181.	2 836.10	.688.	107.32	.022.	3.43
Circulatory System	2 594.	56.505.	1 465.60	43.497.	1 128.40	30.068.	779.96	1.996.	51.78	12.475.	323.60	.751.	19.48	.123.	3.19
Respiratory System	3 079.	74.710.	2 300.30	25.290.	778.70	6.461.	198.90	2.756.	84.86	17.225.	530.40	.959.	29.53	.151.	47
Nervous System	722.	68.830.	487.00	31.170.	225.00	17.625.	127.30	1.750.	12.64	10.938.	78.97	1.757.	12.69	.422.	3.05
Digestive and Excretory System	21 823.	67.106.	14 644.65	32.894.	7 178.35	16.037.	3 499.71	2.215.	483.41	13.844.	3 021.10	1.569.	342.40	.154.	33.55
Total Animal	292 996.	56.402.	165 255.22	43.598.	127 740.78	18.589.	54 465.26	3.016.	8 836.88	18.850.	55 230.60	5.721.	16 761.76	.677.	1 983.50

	Weight Grams	Per Cent Moisture	Weight of Moisture	Per Cent Dry Substance	Weight of Dry Substance	Per Cent Fat	Weight of Fat	Per Cent Nitrogen	Weight of Nitrogen	Per Cent Protein	Weight of Protein	Per Cent Ash	Weight of Ash	Per Cent Phosphorus	Weight of Phosphorus
Forequarters															
Shins Lean	8 044.	62.295	5 011.01	37.705.	3 032.99	18.183.	1 462.64	2.929.	235.61	18.310.	1 472.56	.733.	58.96	.142.	11.42
Shins Fat	2 022.	62.295	1 259.60	37.705.	762.40	18.183.	367.66	2.929.	59.22	18.310.	370.13	.733.	14.82	.142.	2.87
Shins Bone	5 264.	29.653	1 560.93	70.347.	3 703.07	21.185.	1 115.18	3.500.	184.24	21.875.	1 151.50	27.108.	1 426.97	4.806.	252.99
Total Cut of Shins	15 330.	51.086	7 831.54	48.914.	7 498.46	19.214.	2 945.48	3.125.	479.07	19.531.	2 994.19	9.790.	1 500.75	1.744.	267.28
Plates Lean	28 850.	40.073	11 561.06	59.927.	17 288.94	47.701.	13 761.74	1.924.	555.07	12.030.	3 469.19	.500.	144.25	.095.	27.41
Plates Fat	18 348.	40.073	7 352.59	59.927.	10 995.41	47.701.	8 752.18	1.924.	353.02	12.030.	2 206.38	.500.	91.74	.095.	17.43
Plates Bone	6 142.	29.653	1 821.29	70.347.	4 320.71	21.185.	1 301.18	3.500.	214.97	21.875.	1 343.56	27.108.	1 664.97	4.806.	295.18
Total Cut of Plates	53 340.	38.873	20 734.94	61.127.	32 605.06	44.648.	23 815.10	2.105.	1 123.06	13.156.	7 019.13	3.564.	1 900.96	.637.	340.02
Chucks Lean	49 768.	59.141	29 433.29	40.859.	20 334.71	24.425.	12 155.83	2.605.	1 296.46	16.280.	8 102.88	.702.	349.37	.142.	70.67
Chucks Fat	16 936.	59.141	10 016.12	40.859.	6 919.88	24.425.	4 136.62	2.605.	441.18	16.280.	2 757.38	.702.	118.89	.142.	24.05
Chucks Bone	11 960.	29.653	3 546.50	70.347.	8 413.50	21.185.	2 533.73	3.500.	418.60	21.875.	2 615.25	27.108.	3 242.12	4.806.	574.80
Total Cut of Chucks	78 664.	54.658	42 995.91	45.342.	35 668.09	23.932.	18 826.18	2.741.	2 156.24	17.131.	13 475.50	4.717.	3 710.38	.851.	669.52
Necks Lean	1 962.	59.141	1 160.35	40.859.	801.65	24.425.	479.22	2.605.	51.11	16.280.	319.44	.702.	13.77	.142.	2.79
Necks Fat	790.	59.141	467.21	40.859.	322.79	24.425.	192.96	2.605.	20.58	16.280.	123.63	.702.	5.55	.142.	1.12
Necks Bone	854.	29.653	253.24	70.347.	600.76	21.185.	180.92	3.500.	29.89	21.875.	185.81	27.108.	231.50	4.806.	41.04
Total Cut of Neck	3 606.	52.158	1 880.80	47.842.	1 725.20	23.658.	853.10	2.817.	101.58	17.606.	634.88	6.956.	250.82	1.247.	44.95
Ribs Lean	21 240.	60.980	12 952.15	39.020.	8 287.85	20.874.	4 433.64	2.786.	591.75	17.410.	3 693.44	.777.	165.03	1.153.	32.50
Ribs Fat	7 458.	10.677	796.29	89.323.	6 661.71	86.035.	6 416.44	.453.	33.78	2.830.	211.13	.135.	10.07	.027.	2.01
Ribs Bone	5 960.	29.653	1 767.32	70.347.	4 192.68	21.185.	1 262.63	3.500.	208.60	21.875.	1 303.75	27.108.	1 615.64	4.806.	286.44
Total Cut of Ribs	34 658.	44.768	15 515.76	55.232.	19 142.24	34.941.	12 112.71	2.407.	834.13	15.044.	5 213.31	5.167.	1 790.74	.926.	320.95
Forequarters Lean	109 864.	54.720	60 117.86	45.280.	49 746.14	29.394.	32 293.07	2.485.	2 730.00	15.530.	17 062.50	.666.	731.38	.432.	144.79
Forequarters Fat	45 554.	43.666	19 891.81	56.334.	25 662.19	43.610.	19 865.91	1.993.	907.78	12.456.	5 673.65	.529.	241.07	.404.	47.48
Forequarters Bone	30 180.	29.653	8 949.28	70.347.	21 230.72	21.185.	6 393.64	3.500.	1 056.30	21.875.	6 601.88	27.108.	8 181.20	4.806.	1 450.45
Total Forequarters	185 598.	47.931	88 958.95	52.069.	96 639.05	31.548.	58 552.62	2.529.	4 694.08	15.807.	29 338.01	4.932.	9 153.65	.885.	1 642.72
Steer No. 121															
TABLE XXIX															

Hindquarters

Table XXIX Continued, Steer No. 121.

	Weight Grams	Per Cent Moisture	Weight of Moisture	Per Cent Dry Substance	Weight of Dry Substance	Per Cent Fat	Weight of Fat	Per Cent Nitrogen	Weight of Nitrogen	Per Cent Protein	Weight of Protein	Per Cent Ash	Weight of Ash	Per Cent Phosphorus	Weight of Phosphorus
Shanks Lean	2 640.	62,295	1 644.59	37,705.	995.41	18,183.	480.03	2,929.	77.33	18,310.	483.31	733.	19.35	.142.	3.75
Shanks Fat	1 272.	62,295	792.39	37,705.	479.61	18,183.	231.29	2,929.	37.26	18,310.	232.87	733.	9.32	.142.	1.81
Shanks Bone	5 436.	29,653	1 611.94	70,347.	3 824.06	21,185.	1 151.62	3,500.	190.26	21,875.	1 189.13	27,108.	1 473.59	4,806.	261.25
Total Cut of Shanks	9 348.	43,313	4 048.92	56,687.	5 299.08	19,929.	1 862.94	3,261.	304.85	20,381.	1 905.31	16,070.	1 502.26	2,854.	266.81
Rounds Lean	42 448.	69,963	29 697.89	30,037.	12 750.11	8,183.	3 473.52	3,283.	1 393.57	20,520.	8 709.81	.957.	406.23	.191.	80.07
Rounds Fat	10 000.	14,410	1 441.00	85,590.	8 559.00	80,605.	8 060.50	.617.	61.70	3,860.	385.63	.153.	15.30	.030.	3.00
Rounds Bone	5 400.	29,653	1 601.26	70,347.	3 798.74	21,185.	1 143.99	3,500.	189.00	21,875.	1 181.25	27,108.	1 463.83	4,806.	259.52
Total Cut of Rounds	57 848.	56,597	32 740.15	43,403.	25 107.85	21,916.	12 678.01	2,842.	1 644.27	17,763.	10 276.69	3,259.	1 885.36	.591.	342.59
Rumps Lean	5 334.	69,963	3 731.83	30,037.	1 602.17	8,183.	436.48	3,283.	175.12	20,520.	1 094.50	.957.	51.05	.191.	10.19
Rumps Fat	3 924.	14,410	565.45	85,590.	3 358.55	80,605.	3 162.94	.617.	24.21	3,860.	151.31	.153.	6.00	.030.	1.18
Rumps Bone	2 650.	29,653	785.80	70,347.	1 864.20	21,185.	561.40	3,500.	92.75	21,875.	579.69	27,108.	718.36	4,806.	127.36
Total Cut of Rumps	11 908.	42,686	5 083.08	57,314.	6 824.92	34,941.	4 160.82	2,453.	292.08	15,331.	1 825.50	6,512.	775.41	1,165.	138.73
Loin Lean	33 686.	67,220	22 643.73	32,780.	11 042.27	11,396.	3 838.86	3,008.	1 013.27	18,800.	6 332.94	.943.	317.66	.185.	62.32
Loin Fat	20 458.	9,075	1 856.56	90,925.	18 601.44	87,840.	17 970.31	.396.	81.01	2,480.	506.31	.133.	27.21	.024.	4.91
Loin Bone	6 834.	29,653	2 026.49	70,347.	4 807.51	21,185.	1 447.78	3,500.	239.19	21,875.	1 494.94	27,108.	1 852.56	4,806.	328.44
Total Cut of Loin	60 978.	43,502	26 526.78	56,498.	34 451.22	38,140.	23 256.95	2,187.	1 333.47	13,669.	8 334.19	3,604.	2 197.43	.649.	395.67
Flanks Lean	4 030.	40,073	1 614.94	59,927.	2 415.06	47,701.	1 922.35	1,924.	77.54	12,030.	484.63	.500.	20.15	.095.	3.83
Flanks Fat	4 634.	40,073	1 856.98	59,927.	2 777.02	47,701.	2 210.46	1,924.	89.16	12,030.	557.25	.500.	23.17	.095.	4.40
Flanks Bone	34.	29,653	10.08	70,347.	23.92	21,185.	7.20	3,500.	1.19	21,875.	7.44	27,108.	9.22	4,806.	1.63
Total Cut of Flanks	8 698.	40,032	3 482.00	59,968.	5 216.00	47,597.	4 140.01	1,930.	167.89	12,063.	1 049.31	.604.	52.54	.113.	9.86
Fat of Kidneys	7 272.	4,484	326.08	95,516.	6 945.92	94,670.	6 884.40	.181.	13.16	1,131.	82.25	.070.	5.09	.012.	.87
Hindquarters Lean	88 138.	67,318	59 332.98	32,682.	28 805.82	11,517.	10 151.24	3,105.	2 736.83	19,410.	17 105.19	.924.	814.44	.182.	160.16
Hindquarters Fat	47 560.	14,378	6 838.46	85,622.	40 721.54	80,992.	38 519.90	.644.	306.50	4,025.	1 915.62	.181.	86.09	.034.	16.17
Hindquarters Bone	20 354.	29,653	6 035.57	70,347.	14 318.43	21,185.	4 311.99	3,500.	712.39	21,875.	4 452.44	27,108.	5 517.56	4,806.	978.20
Total Hindquarters	156 052.	46,271	72 207.01	53,729.	83 844.99	33,952.	52 983.13	2,407.	3 755.72	15,044.	23 473.25	4,113.	6 418.09	.740.	1 154.53

Carcass

Table XXX.

Steer No. 121.

	Weight Grams	Per Cent Moisture	Weight of Moisture	Per Cent Dry Substance	Weight of Dry Substance	Per Cent Fat	Weight of Fat	Per Cent Nitrogen	Weight of Nitrogen	Per Cent Pro- tein N x 6.25	Weight of Pro- tein N x 6.25	Per Cent Ash	Weight of Ash	Per Cent Phosphorus	Weight of Phosphorus
Forequarters Lean	109 864.	54.720	60 117.86	45.280.	49 746.14	29.394.	32 293.07	2.485.	2 730.00	15.530.	17 062.50	.666.	731.38	.132.	144.79
Hindquarters Lean	88 138.	67.318.	59 332.98	32.682.	28 805.02	11.517.	10 151.24	3.105.	2 736.83	19.410.	17 103.19	.924.	814.44	.182.	160.16
Carcass Lean	198 002.	60.328.	119 450.84	39.672.	78 551.16	21.436.	42 444.31	2.761.	5 466.83	17.260.	34 167.69	.781.	1 545.82	.154.	304.95
Forequarters Fat	45 554.	43.666.	19 891.81	56.334.	25 562.19	43.610.	19 865.91	1.993.	907.78	12.456.	5 673.65	.529.	241.07	.104.	47.48
Hindquarters Fat	47 560.	14.378.	6 838.46	85.622.	40 721.54	80.992.	38 519.90	.644.	306.50	4.025.	1 913.62	.181.	86.09	.034.	16.17
Carcass Fat	93 114.	28.707.	26 730.28	71.293.	66 383.73	62.701.	58 385.81	1.304.	1 214.28	8.150.	7 587.27	.351.	327.16	.068.	63.65
Forequarters Bone	30 180.	29.653.	8 949.28	70.347.	21 230.72	21.185.	6 393.64	3.500.	1 056.30	21.875.	6 601.88	27.108.	8 181.20	4.806.	1 450.45
Hindquarters Bone	20 354.	29.653.	6 035.57	70.347.	14 318.43	21.185.	4 311.99	3.500.	712.39	21.875.	4 452.44	27.108.	5 517.56	4.806.	978.20
Carcass Bone	50 534.	29.653.	14 984.85	70.347.	35 549.15	21.185.	10 705.63	3.500.	1 768.69	21.875.	11 054.32	27.108.	13 698.76	4.806.	2 428.65
Total Carcass	341 650.	47.175.	161 165.97	52.827.	180 484.03	32.646.	111 535.75	2.473.	8 449.80	15.456.	52 811.28	4.558.	15 571.74	.819.	2 797.25
Head Lean	3 120.	62.295.	1 943.60	37.705.	1 176.40	18.183.	567.31	2.929.	91.38	18.310.	571.13	.733.	22.87	.142.	4.43
Head Fat	1 106.	62.295.	688.98	37.705.	417.02	18.183.	201.10	2.929.	32.39	18.310.	201.44	.733.	8.11	.142.	1.57
Head Bone	8 495.	29.653.	2 519.02	70.347.	5 975.98	21.185.	1 799.67	3.500.	297.33	21.875.	1 858.31	27.108.	2 302.22	4.806.	408.27
Total Head (excl. teeth and horns)	12 721.	40.497.	5 151.60	59.503.	7 569.40	19.402.	2 468.08	3.310.	421.10	20.688.	2 631.88	18.341.	2 333.20	3.257.	414.27
Tail Lean	254.	62.295.	158.23	37.705.	95.77	18.183.	46.19	2.929.	7.44	18.310.	46.50	.733.	1.86	.142.	.36
Tail Fat	58.	62.295.	36.13	37.705.	21.87	18.183.	10.55	2.929.	1.70	18.310.	10.63	.733.	.43	.142.	.08
Tail Bone	432.	29.653.	128.10	70.347.	303.90	21.185.	91.52	3.500.	15.12	21.875.	91.50	27.108.	117.11	4.806.	20.76
Total Tail	744.	43.341.	322.46	56.659.	421.54	19.927.	148.26	3.261.	24.26	20.381.	151.63	16.048.	119.40	2.849.	21.20
Feet (Less Hoofs) Bone	6 930.	29.653.	2 054.95	70.347.	4 875.05	21.185.	1 468.12	3.500.	242.55	21.875.	1 515.94	27.108.	1 878.58	4.806.	333.06

Total Animal

Table XXX Continued

Steer No. 121

	Weight Grams	Per Cent Moisture	Weight of Moisture	Per Cent Dry Substance	Weight of Dry Substance	Per Cent Fat	Weight of Fat	Per Cent Nitrogen	Weight of Nitrogen	Per Cent Pro- tein N x 6.25	Weight of Pro- tein N x 6.25	Per Cent Ash	Weight of Ash	Per Cent Phosphorus	Weight of Phosphorus
Total Animal Bone	66 391.	29.653.	19 686.92	70.347.	46 704.08	21.185.	14 064.94	3.500.	2 323.69	21.875.	14 523.06	27.108.	17 997.27	4.806.	3 190.74
Total Animal Fat (Less Offal).	94 278.	29.122.	27 455.39	70.878.	66 822.62	62.154.	58 597.46	1.324.	1 248.37	8.275.	7 802.34	.356.	335.70	.069.	65.30
Total Animal Lean	201 376.	60.361.	121 552.67	39.639.	79 823.33	21.382.	43 057.81	2.764.	5 565.65	17.280.	34 785.31	.780.	1 570.55	.154.	309.74
Hair and Hide	29 662.	59.764.	17 727.20	40.236.	11 934.80	4.969.	1 473.90	5.534.	1 641.50	34.590.	10 259.38	.758.	224.84	.056.	16.61
Offal Fat	27 376.	9.517.	2 605.37	90.483.	24 770.63	88.105.	24 094.99	.273.	74.74	1.710.	4 67.13	.129.	35.32	.022.	6.02
Blood	24 433.	77.971.	19 050.65	22.029.	5 382.35	none	none	3.255.	795.29	20.340.	4 970.56	.248.	60.59	.028.	6.84
Circulatory System	4 273.	46.081.	1 969.06	53.919.	2 303.94	42.534.	1 817.46	1.558.	66.57	9.738.	4 16.06	.502.	21.45	.103.	4.41
Respiratory System	4 631.	63.953.	2 961.76	36.045.	1 669.24	19.692.	911.94	2.308.	106.88	14.430.	6 68.00	.808.	37.42	.170.	7.87
Nervous System	710.	68.357.	485.33	31.643.	224.67	19.499.	138.44	1.676.	11.90	10.480.	74.38	1.562.	11.09	.395.	2.80
Digestive and Excretory System	39 773.	66.756.	26 550.78	33.244.	13 222.22	17.496.	6 958.72	2.005.	797.51	12.531.	4 984.44	.883.	351.35	.196.	77.87
Total Animal	492 903.	48.700.	240 045.13	51.300.	252 857.87	30.658.	151 115.66	2.563.	12 632.10	16.019.	78 950.63	4.189.	20 645.58	.748.	3 688.20

Forequarters

Table XXXI

Steer No. 48.

	Weight Grams	Per Cent Moisture	Weight of Moisture	Per Cent Dry Substance	Weight of Dry Substance	Per Cent Fat	Weight of Fat	Per Cent Nitrogen	Weight of Nitrogen	Per Cent Pro- tein N x 6.25	Weight of Pro- tein N x 6.25	Per Cent Ash	Weight of Ash	Per Cent Phosphorus	Weight of Phosphorus
Shins Lean	7 978.	57.840.	4 614.48	42.160.	3 363.52	23.470.	1 872.44	2.853.	227.61	17.831.	1 422.56	.829.	66.14	.142.	11.33
Shins Fat	1 908.	57.840.	1 103.59	42.160.	804.41	23.470.	447.81	2.853.	54.44	17.831.	340.25	.829.	15.82	.142.	2.71
Shins Bone	6 008.	20.710.	1 244.26	79.290.	4 763.74	24.344.	1 462.59	3.202.	192.38	20.013.	1 202.38	33.040.	1 985.04	6.173.	370.87
Total Cut of Shins	15 894.	43.805.	6 962.33	56.195.	8 931.67	23.800.	3 782.84	2.985.	474.43	18.656.	2 965.19	13.005.	2 067.00	2.422.	384.91
Plates Lean	27 690.	30.150.	8 348.54	69.850.	19 341.46	61.110.	16 921.36	1.308.	362.19	8.175.	2 263.69	.421.	116.57	.064.	17.72
Plates Fat	38 062.	30.150.	11 475.69	69.850.	26 586.31	61.110.	23 259.69	1.308.	497.85	8.175.	3 111.56	.421.	160.24	.064.	24.36
Plates Bone	6 856.	37.730.	2 586.77	62.270.	4 269.23	19.567.	1 341.51	2.999.	205.61	18.744.	1 285.06	20.220.	1 386.28	3.772.	258.61
Total Cut of Plates	72 608.	30.866.	22 411.00	69.134.	50 197.00	57.187.	41 522.56	1.468.	1 065.65	9.175.	6 660.31	2.291.	1 663.09	.414.	300.69
Chucks Lean	69 912.	49.670.	34 725.29	50.330.	35 186.71	34.950.	24 434.24	2.267.	1 584.91	14.169.	9 905.69	.693.	484.49	.123.	85.99
Chucks Fat	33 068.	49.670.	16 424.88	50.330.	16 643.12	34.950.	11 557.27	2.267.	749.65	14.169.	4 685.31	.693.	229.16	.123.	40.67
Chucks Bone	15 284.	27.780.	4 245.90	72.220.	11 038.10	18.655.	2 851.23	3.527.	539.07	22.044.	3 369.19	27.530.	4 207.69	5.073.	775.36
Total Cut of Chucks	118 264.	46.841.	55 396.07	53.159.	62 867.93	32.844.	38 842.74	2.430.	2 873.63	15.188.	17 960.19	4.161.	4 921.34	.763.	902.02
Necks Lean	2 500.	49.670.	1 241.75	50.330.	1 258.25	34.950.	873.75	2.267.	56.68	14.169.	354.25	.693.	173.25	.123.	3.08
Necks Fat	1 472.	49.670.	731.14	50.330.	740.86	34.950.	514.46	2.267.	33.37	14.169.	208.56	.693.	10.20	.123.	1.81
Necks Bone	858.	27.780.	238.35	72.220.	619.65	18.655.	150.06	3.527.	30.26	22.044.	189.13	27.530.	236.21	5.073.	43.53
Total Cut of Neck	4 830.	45.781.	2 211.24	54.219.	2 618.76	31.848.	1 538.27	2.491.	120.31	15.569.	751.94	8.689.	419.66	1.002.	48.42
Ribs Lean	24 250.	56.860.	13 788.55	43.140.	10 461.45	24.790.	6 011.58	2.679.	649.66	16.744.	4 070.38	.827.	200.55	.150.	36.38
Ribs Fat	27 010.	15.810.	4 270.28	84.190.	22 739.72	81.370.	21 978.04	0.431.	116.41	2.694.	727.56	.155.	41.87	.021.	5.67
Ribs Bone	7 294.	26.750.	1 951.15	73.250.	5 342.86	18.359.	1 339.11	3.303.	240.92	20.644.	1 505.75	29.410.	2 145.17	5.416.	395.04
Total Cut of Rib	58 554.	34.174.	20 009.98	65.826.	38 544.03	50.088.	29 328.73	1.720.	1 006.99	10.750.	6 293.69	4.078.	2 387.59	.748.	437.09
Forequarter Lean	132 330.	47.396.	62 718.61	52.604.	69 611.39	37.870.	50 113.37	2.177.	2 881.05	13.606.	18 006.56	.787.	1 041.00	.117.	154.50
Forequarter Fat	101 520.	33.500.	34 005.58	66.500.	67 505.42	56.890.	57 757.27	1.430.	1 451.72	8.938.	9 073.25	.450.	457.29	.074.	75.22
Forequarter Bone	36 300.	28.280.	10 266.43	71.720.	26 033.57	19.682.	7 144.50	3.328.	1 268.24	20.800.	7 551.50	27.439.	9 960.39	5.078.	1 843.41
Total Forequarters	270 150.	39.604.	106 990.62	60.396.	163 159.39	42.575.	115 015.14	2.073.	5 601.01	12.956.	35 006.31	4.242.	11 458.68	.767.	2 073.13

Hindquarters Table XXXI Continued, Steer No. 48.

	Weight Grams	Per Cent Moisture	Weight of Moisture	Per Cent Dry Substance	Weight of Dry Substance	Per Cent Fat	Weight of Fat	Per Cent Nitrogen	Weight of Nitrogen	Per Cent Pro- tein N x 6.25	Weight of Pro- tein N x 6.25	Per Cent Ash	Weight of Ash	Per Cent Phosphorus	Weight of Phosphorus
Shanks Lean	3 570.	57.840	2 064.89	42.160	1 505.11	23.470	837.88	2.853	101.85	17.831	636.56	.829	29.59	.142	5.07
Shanks Fat	1 440.	57.840	832.90	42.160	607.10	23.470	337.97	2.853	41.08	17.831	256.75	.829	11.94	.142	2.04
Shanks Bone	6 524.	20.710	1 351.12	79.290	5 172.88	24.344	1 588.20	3.202	208.90	20.013	1 305.63	33.040	2 155.43	6.173	402.73
Total Cut of Shanks	11 534.	36.838	4 248.91	63.162	7 285.09	23.964	2 764.05	3.050	351.83	19.063	2 198.94	19.047	2 196.96	3.553	409.84
Rounds Lean	50 284.	64.430	32 397.98	35.570	17 886.02	13.420	6 748.11	3.278	1 648.31	20.488	10 301.94	1.015	510.38	.192	96.55
Rounds Fat	19 520.	27.750	5 416.80	72.250	14 103.20	67.350	13 146.72	.765	149.33	4.781	933.31	.251	49.00	.027	5.27
Rounds Bone	6 318.	23.160	1 463.25	76.840	4 854.75	32.479	2 052.02	2.124	134.19	13.275	838.69	27.070	1 710.28	5.020	317.16
Total Cut of Rounds	76 122.	51.590	39 278.03	48.401	36 843.97	28.831	21 946.85	2.539	1 931.83	15.869	12 073.94	2.982	2 269.66	.550	418.98
Rumps Lean	7 088.	36.910	2 616.18	63.090	4 471.82	52.670	3 733.25	1.587	112.49	9.919	703.06	.509	36.08	.093	6.59
Rumps Fat	8 998.	36.910	3 321.16	63.090	5 676.84	52.670	4 739.25	1.587	142.80	9.919	892.50	.509	45.80	.093	8.37
Rumps Bone	3 520.	26.290	925.41	73.710	2 594.59	35.688	1 256.22	2.294	80.75	14.338	504.69	20.650	726.88	3.891	136.96
Total Cut of Rumps	19 606.	35.000	6 862.75	64.997	12 743.25	49.621	9 728.72	1.714	336.04	10.713	2 100.25	4.125	808.76	.775	151.92
Loin Lean	43 154.	61.780	26 660.54	38.220	16 493.46	18.260	7 879.92	2.981	1 286.42	18.631	8 040.02	.956	412.55	.174	75.09
Loin Fat	43 826.	12.600	5 522.08	87.400	38 303.92	84.760	37 146.92	.426	186.70	2.663	1 166.88	.146	63.99	.023	10.08
Loin Bone	9 368.	21.550	2 018.80	78.450	7 349.20	29.603	2 773.21	2.820	264.18	17.625	1 651.13	26.090	2 444.11	4.805	450.13
Total Cut of Loin	96 348.	35.490	34 201.42	64.502	62 146.58	49.612	47 800.05	1.803	1 737.30	11.269	10 858.03	3.031	2 920.65	.556	535.30
Flanks Lean	6 748.	30.150	2 034.52	69.850	4 713.48	61.110	4 123.70	1.308	88.26	8.175	552.63	.421	28.41	.064	4.32
Flanks Fat	18 706.	30.150	5 639.87	69.850	13 066.14	61.110	11 431.24	1.308	244.67	8.175	1 529.19	.421	78.75	.064	11.97
Flanks Bone	80.	37.730	30.18	62.270	49.82	19.567	15.65	2.999	2.40	18.744	15.00	20.220	16.18	3.772	3.02
Total Cut of Flanks	25 534.	30.174	7 704.57	69.826	17 829.44	60.980	15 570.59	1.313	335.33	9.206	2 095.82	.483	123.34	.076	19.31
Fat of Kidneys	17 170.	3.760	645.59	96.240	16 524.41	94.710	16 261.71	.239	41.04	1.494	256.50	.126	21.63	.016	2.75
Hindquarters Lean	110 844.	59.340	65 744.11	40.660	45 069.89	21.041	23 322.86	2.926	3 237.33	18.288	20 235.31	.918	1 017.01	.169	187.62
Hindquarters Fat	109 660.	19.500	21 378.39	80.500	88 281.61	75.750	83 063.81	.735	805.62	4.594	5 035.13	.247	271.11	.037	40.48
Hindquarters Bone	25 810.	22.430	5 788.76	77.570	20 021.24	29.776	7 685.30	2.675	690.42	16.719	4 315.13	27.326	7 052.88	5.076	1 310.00
Total Hindquarters	246 314.	37.721	92 941.26	62.279	153 372.74	46.312	114 071.97	1.922	4 733.37	12.013	29 580.56	3.386	8 341.00	.624	1 538.10

Car case.

TABLE XXXII.

Steer no. 48.

5

	Weight Grams	Per Cent Moisture	Weight of Moisture	Per Cent Dry Substance	Weight of Dry Substance	Per Cent Fat	Weight of Fat	Per Cent Nitrogen	Weight of Nitrogen	Per Cent Pro- tein N x 6.25	Weight of Protein	Per Cent Ash	Weight of Ash	Per Cent Phosphorus	Weight of Phosphorus
Forequarters Lean	132 330.	47 39	62 718.61	52,604.	69 611.39	37,870.	50 113.37	2,177.	2 881.05	13,606.	18 056	,787.	1 041.00	,117.	154.50
Hindquarters Lean	110 844.	59 34	65 744.11	40,660.	45 069.89	21,041.	23 322.86	2,926.	3 237.33	18,288.	20 231	,918.	1 017.01	,169.	187.62
Carcass Lean	243 174.	52 84	128 492.72	47,160.	114 681.28	30,199.	73 436.23	2,516.	6 118.38	15,725.	38 238	,846.	2 058.01	,141.	342.12
Forequarters Fat	101 520.	33 50	34 005.58	66,500.	67 514.42	56,890.	57 757.27	1,430.	1 451.72	8,938.	9 025	,450.	457.29	,074.	75.22
Hindquarters Fat	109 660.	19 50	21 378.39	80,500.	88 281.61	75,750.	83 063.81	,735.	805.62	4,594.	5 013	,247.	271.11	,037.	40.48
Carcass Fat	211 180.	26 23	55 383.97	73,770.	155 796.03	66,680.	140 821.08	1,069.	2 257.34	6,681.	14 138	,345.	728.40	,055.	115.70
Forequarters Bone	36 300.	28 28	10 266.43	71,720.	26 033.57	19,682.	7 144.50	3,328.	1 268.24	20,800.	7 550	27,439.	9 960.39	5,078.	1 843.41
Hindquarters Bone	25 810.	22 43	5 788.76	77,570.	20 021.24	29,776.	7 685.30	2,675.	690.42	16,719.	4 013	27,326.	7 052.88	5,076.	1 310.00
Carcass Bone	62 110.	25 85	16 055.19	74,150.	46 054.81	23,861.	14 829.80	3,057.	1 898.66	19,106.	11 863	27,392.	17 013.27	5,077.	3 153.41
Total Carcass	516 464.	38 71	199 931.88	61,288.	316 532.12	44,357.	229 087.11	1,989.	10 274.38	12,431.	64 238	3,834.	19 799.68	,699.	3 611.23
Head Lean	2 998.	57 84	1 734.04	42,160.	1 263.96	23,470.	703.63	2,853.	85.53	17,831.	8	,829.	24.85	,142.	4.26
Head Fat	1 338.	57 84	773.90	42,160.	564.10	23,470.	314.03	2,853.	38.17	17,831.	6	,829.	11.09	,142.	1.90
Head Bone	8 942.	37 05	3 313.01	62,950.	5 628.99	11,519.	1 030.03	3,429.	306.62	21,431.	1 918	24,510.	2 191.68	4,635.	414.46
Total Head (excl. teeth and horns)	13 278.	43 83	5 820.95	56,161.	7 457.05	15,422.	2 047.69	3,241.	430.32	20,256.	2 652	16,777.	2 227.62	3,168.	420.62
Tail Lean	190.	57 84	109.90	42,160.	80.10	23,470.	44.59	2,853.	5.42	17,831.	88	,829.	1.58	,142.	27
Tail Fat	72.	57 84	41.64	42,160.	30.36	23,470.	16.90	2,853.	2.05	17,831.	81	,829.	60	,142.	10
Tail Bone	566.	37 05	209.70	62,950.	356.30	11,519.	65.20	3,429.	19.41	21,431.	1 31	24,510.	138.73	4,635.	26.23
Total Tail	828.	43 62	361.24	56,372.	466.76	15,301.	126.69	3,246.	26.88	20,288.	1 00	17,018.	140.91	3,213.	26.60
Feet, Less hoofs.	7 614.	37 05	2 820.99	62,950.	4 793.01	11,519.	877.06	3,429.	261.08	21,431.	1 675	24,510.	1 866.19	4,635.	352.91

Total Animal

Table XXXII Continued, Steer No. 48.

	Weight Grams	Per Cent Moisture	Weight of Moisture	Per Cent Dry Substance	Weight of Dry Substance	Per Cent Fat	Weight of Fat	Per Cent Nitrogen	Weight of Nitrogen	Per Cent Pro- tein N x 6.25	Weight of Pro- tein N x 6.25	Per Cent Ash	Weight of Ash	Per Cent of Phosphorus	Weight of Phosphorus
Total Animal Bone	79 232.	28.270	22 398.89	71.730	56 833.11	21.206.	16 802.09	3.137.	2 485.77	19.606.	15 536.06	26.769.	21 209.87	4.982.	3 947.01
Total Animal Fat (Less Offal)	212 590.	26.440	56 199.51	73.560	156 390.49	66.396.	141 152.01	1.081.	2 297.56	6.756.	14 359.75	.348.	740.09	.055.	117.70
Total Animal Lean	246 362.	52.905	130 336.66	47.095.	116 025.34	30.112.	74 184.45	2.520.	6 209.33	15.750.	38 804.31	.846.	2 084.44	.141.	346.65
Hair and Hide	41 164.	59.240	24 385.55	40.760.	16 778.45	8.600.	3 540.10	5.308.	2 184.99	33.175.	13 656.19	1.197.	492.73	.048.	19.76
Offal Fat	61 837.	6.220	3 846.26	93.780.	57 990.74	92.090.	56 945.69	.182.	112.54	1.138.	7 03.38	.093.	57.51	.012.	7.42
Blood	25 634.	79.410	20 355.96	20.590.	5 278.04	none	none	3.158.	809.52	19.738.	5 059.50	.775.	198.66	.021.	5.38
Circulatory System	6 780.	31.231	2 117.44	68.769.	4 662.56	62.265.	4 221.54	.983.	66.65	6.144.	4 16.47	.407.	27.58	.076.	5.16
Respiratory System	10 970.	49.420	5 421.37	50.580.	5 548.63	37.390.	4 101.68	1.957.	214.68	12.231.	1 341.75	.669.	73.39	.117.	12.83
Nervous System	774.	69.631	538.94	30.370.	235.06	13.050.	101.01	2.093.	16.20	13.081.	1 01.25	1.813.	14.03	.425.	3.29
Digestive and Excretory System	39 941.	68.759	27 463.00	31.241.	12 478.00	15.107.	6 033.70	2.049.	818.20	12.806.	5 113.75	.989.	394.90	.202.	80.54
Total Animal	725 284.	40.407	293 063.58	59.593.	432 220.42	42.340.	307 082.27	2.098.	15 215.44	13.113.	95 006.50	3.487.	25 293.20	.627.	4 545.74

TABLE 33.

PERCENTAGE COMPOSITION OF
SAMPLES (AS FOR STEER 18).

	% Moisture	% Dry Substance	% Fat	% Protein	% Ash	% Phosphorus	% Moisture	% Dry Substance	% Fat	% Protein
Blood.	81.290.	18.710.	.429.	18.181.	.688.	.022.	77.971.	22.029.	.000.	20.340.
Hide and Hair.	65.365.	34.635.	2.883.	31.850.	.868.	.068.	59.764.	40.236.	4.969.	34.590.
Total Skeleton.	28.292.	71.708.	25.272.	18.888.	25.326.	2.879.	29.653.	70.347.	21.185.	21.875.
Circulatory System.	56.503.	43.497.	30.068.	12.475.	.751.	.123.	46.081.	53.919.	42.534.	9.738.
Respiratory System.	74.710.	25.290.	6.461.	17.225.	.959.	.151.	63.955.	36.045.	19.692.	14.430.
Nervous System.	68.830.	31.170.	17.625.	10.938.	1.757.	.422.	68.357.	31.643.	19.499.	10.480.
Total Digest. and Excret. System.	67.106.	32.894.	16.037.	13.844.	1.569.	.154.	66.756.	33.244.	17.496.	12.531.
Liver.	68.990.	31.010.	3.468.	18.913.	1.253.	.311.	68.360.	31.640.	4.716.	19.940.
Kidneys.	75.046.	24.954.	8.736.	14.831.	1.085.	.211.	76.580.	23.420.	5.560.	17.110.
Offal Fat.	16.620.	83.380.	79.718.	3.231.	.172.	.027.	9.517.	90.483.	88.015.	1.710.
Kidney Fat.	10.044.	89.956.	86.962.	2.631.	.120.	.021.	4.484.	95.516.	94.670.	1.131.
Shin, Shank, Head and Tail Lean and Fat.	67.433.	32.567.	11.990.	20.119.	.771.	.145.	62.295.	37.705.	18.183.	18.310.
Round and Rump Lean and Fat.	66.503.	33.497.	13.258.	19.438.	.883.	.172.	57.427.	42.573.	24.525.	16.756.
Chuck and Neck Lean and Fat.	66.480.	33.520.	14.068.	18.869.	.818.	.154.	59.141.	40.859.	24.425.	16.280.
Rib Lean and Fat.	62.790.	37.210.	18.037.	19.225.	.821.	.161.	47.907.	52.093.	37.808.	13.625.
Loin Lean and Fat.	59.900.	40.100.	21.719.	17.913.	.788.	.157.	45.250.	54.750.	40.280.	12.631.
Flank and Plate Lean and Fat.	52.512.	47.488.	30.103.	15.250.	.649.	.124.	40.073.	59.927.	47.701.	12.030.
Total Animal Analyzed.	56.402.	43.598.	18.589.	18.850.	5.721.	.677.	48.379.	51.621.	30.658.	16.019.

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STEER 182
STEER 21

STEER 21

STEER 48

% Phosphorus	% Moisture	% Dry Substance	% Fat	% Protein	% Ash	% Phosphorus	% Moisture	% Dry Substance	% Fat	% Protein	% Ash	% Phosphorus
.022.	77.971.	22.029.	.000.	20.340.	.248.	.028.	79.410.	20.590.	.000.	19.738.	.775.	.021.
.068.	59.764.	40.236.	4.969.	34.590.	.758.	.056.	59.240.	40.760.	8.600.	33.175.	1.197.	.048.
2.879.	29.653.	70.347.	21.185.	21.875.	27.108.	4.806.	28.270.	71.730.	21.206.	19.606.	26.769.	4.982.
.123.	46.081.	53.919.	42.534.	9.738.	.502.	.103.	31.231.	68.769.	62.265.	6.144.	.407.	.076.
.151.	63.955.	36.045.	19.692.	14.430.	.808.	.176.	49.420.	50.580.	37.390.	12.231.	.669.	.117.
.422.	68.357.	31.643.	19.499.	10.480.	1.562.	.395.	69.630.	30.370.	13.050.	13.081.	1.813.	.425.
.154.	66.756.	33.244.	17.496.	12.531.	.883.	.196.	68.759.	31.241.	15.107.	12.806.	.989.	.202.
.311.	68.360.	31.640.	4.716.	19.940.	1.312.	.353.	69.730.	30.270.	4.260.	18.081.	1.392.	.307.
.211.	76.580.	23.420.	5.560.	17.110.	.950.	.229.	70.750.	29.250.	12.160.	15.288.	1.154.	.199.
.027.	9.517.	90.483.	88.015.	1.710.	.129.	.022.	6.220.	93.780.	92.090.	1.138.	.093.	.012.
.021.	4.484.	95.516.	94.670.	1.131.	.070.	.012.	3.760.	96.240.	94.710.	1.494.	.126.	.016.
.145.	62.295.	37.705.	18.183.	18.310.	.733.	.142.	57.840.	42.160.	23.470.	17.831.	.829.	.142.
.172.	57.427.	42.573.	24.525.	16.756.	.776.	.153.	50.940.	49.060.	33.027.	14.938.	.747.	.136.
.154.	59.141.	40.859.	24.425.	16.280.	.702.	.142.	49.670.	50.330.	34.950.	14.169.	.693.	.123.
.161.	47.907.	52.093.	37.808.	13.625.	.610.	.119.	35.230.	64.770.	54.603.	8.125. 9.360.	.473.	.082.
.157.	45.250.	54.750.	40.280.	12.631.	.637.	.124.	37.000.	63.000.	51.767.	10.588.	.548.	.098.
.124.	40.073.	59.927.	47.701.	12.030.	.500.	.095.	30.150.	69.850.	61.110.	8.175.	.421.	.064.
.677.	48.379.	51.621.	30.658.	16.019.	4.189.	.748.	40.407.	59.593.	42.340.	13.019. 113.	3.487.	.627.

TABLE 34.

DISTRIBUTION OF CONSTITUENTS

IN ENTIRE ANIMAL.

		MOISTURE.			DRY SUBSTANCE.			FAT.		
		Steer 18.	Steer 121.	Steer 48.	Steer 18.	Steer 121.	Steer 48.	Steer 18.	Steer 121.	Steer 48.
Wt. of	constituent in animal analysed, kilos	165 235.22	240 045.13	293 063.58	127 740.78	252 857.87	432 220.42	54 465.26	151 115.66	307 082.27
Wt. of	" " blood, kilos	12 687.40	19 050.65	20 355.96	2 918.60	5 382.35	5 278.04	66.92	000.	1 000.
% of	" " compared to animal.	7.673	7.936	6.946	2.285	2.129	1.221	.123	.000	.000
Wt. of	" in hide and hair, kilos.	16 781.81	17 727.20	24 385.55	8 892.19	11 934.80	16 778.45	740.18	1 473.90	3 540.10
% of	" in hide and hair compared to animal.	10.153	7.385	8.321	6.961	4.720	3.882	1.359	.974	1.153
Wt. of	" in circulatory system, kilos.	1 465.60	1 969.06	2 117.44	1 128.40	2 303.94	4 662.56	779.96	1 817.46	4 221.54
% of	" " compared to animal.	.887	.820	.723	.883	.911	1.078	1.432	1.203	1.375
Wt. of	" in respiratory system, kilos.	2 300.30	2 961.76	5 421.37	778.70	1 669.24	5 548.63	198.90	911.94	4 101.68
% of	" " compared to animal.	1.392	1.234	1.850	.610	.660	1.284	.365	.603	1.336
Wt. of	" in nervous system, kilos.	487.00	485.33	538.94	225.00	224.67	235.06	127.30	138.44	101.01
% of	" " compared to animal.	.289	.202	.184	.176	.089	.054	.234	.092	.033
Wt. of	" in total digest. and excret. system, kilos.	14 644.65	26 550.78	27 463.00	7 178.35	13 222.22	12 478.00	3 499.71	6 958.72	6 033.70
% of	" " total digest. and excret. system compared to animal.	8.862	11.061	9.371	5.619	5.229	2.887	6.426	4.605	1.965
Wt. of	" in liver, kilos.	1 811.00	4 809.13	5 694.15	814.00	2 225.87	2 471.85	91.06	331.77	347.90
% of	" " compared to animal.	1.090	2.003	1.943	.637	.880	.572	.167	.220	.113
Wt. of	" in kidneys, kilos.	572.85	840.85	868.10	190.15	257.15	358.90	66.57	61.05	149.20
% of	" " compared to animal.	.342	.350	.296	.149	.102	.083	.122	.044	.049
Wt. of	" in offal fat, kilos.	947.30	2 605.37	3 846.26	4 752.70	24 770.63	57 990.74	4 543.90	24 094.99	56 945.69
% of	" " compared to animal.	.573	1.085	1.312	3.721	9.796	13.417	8.343	15.945	18.544
Wt. of	" in kidney fat, kilos.	245.48	326.08	645.59	2 198.52	6 945.92	16 524.41	2 125.35	6 884.40	16 261.71
% of	" " compared to animal.	.148	.136	.220	1.721	2.747	3.823	3.902	4.556	5.296
Wt. of	" in skeleton, kilos.	16 482.19	19 686.92	22 398.89	41 777.81	46 704.08	56 833.11	14 723.73	14 064.94	16 802.09
% of	" " compared to animal.	9.97	8.201	7.643	32.705	18.470	13.149	27.033	9.307	5.472
Wt. of	" in lean and fat of shin, shank, head and tail, kilos.	8 167.44	11 534.53	11 275.34	3 942.56	6 981.47	8 218.66	1 451.51	3 366.77	4 575.25
% of	" in lean and fat of shin, shank, head, and tail compared to animal.	4.94	4.805	3.847	3.086	2.761	1.901	2.665	2.228	1.490
Wt. of	" in lean and fat of round and rump, kilos.	25 447.71	35 436.17	43 752.12	12 815.29	26 269.83	42 137.88	5 072.25	15 133.44	28 367.33
% of	" in lean and fat of round and rump compared to animal.	15.39	14.762	14.929	10.032	10.389	9.749	9.313	10.014	9.238
Wt. of	" in lean and fat of chuck and neck, kilos.	29 251.52	41 076.97	53 123.06	14 751.48	28 379.03	53 828.94	6 191.04	16 964.63	37 379.72
% of	" in lean and fat of chuck and neck compared to animal.	17.70	17.112	18.127	11.543	11.223	12.454	11.367	11.226	12.173
Wt. of	" in lean and fat of rib, kilos.	8 631.90	13 748.44	18 058.83	5 120.10	14 949.56	33 201.17	2 481.90	10 850.08	27 989.62
% of	" " compared to animal.	5.22	5.727	6.162	4.008	5.912	7.682	4.557	7.180	9.115
Wt. of	" in lean and fat of loin, kilos.	16 261.05	24 500.29	32 182.62	10 887.95	29 643.71	54 797.38	5 897.14	21 809.17	45 026.84
% of	" " compared to animal.	9.84	10.207	10.981	8.523	11.723	12.678	10.827	14.432	14.663
Wt. of	" in lean and fat of flank and plate, kilos.	11 452.87	22 385.57	27 498.61	10 357.13	33 476.43	63 707.39	6 565.47	26 646.73	55 735.99
% of	" in lean and fat of flank and plate compared to animal.	6.93	9.326	9.383	8.108	13.239	14.740	12.054	17.633	18.150

DRY SUBSTANCE.		FAT.			PROTEIN.			ASH.			PHOSPHORUS.		
Steer 12I.	Steer 48.	Steer 18.	Steer 12I.	Steer 48.	Steer 18.	Steer 12I.	Steer 48.	Steer 18.	Steer 12I.	Steer 48.	Steer 18.	Steer 12I.	Steer 48.
252 857.87	432 220.42	54 465.26	151 115.66	307 082.27	55 230.50	78 950.63	95096.50 94 478.66	16 761.76	20 645.58	25 293.20	1 983.50	3 688.20	4 545.14
5 382.35	5 278.04	66.92	000.	1 000.	2 836.10	4 970.56	5 059.50	107.32	60.59	198.66	3.43	6.84	53.8
2.129.	1.221.	.123.	000.	1 000.	5.135.	6.296.	5.320	.640.	.293.	.785.	.173.	.186.	.118
11 934.80	16 778.45	740.18	1 473.90	3 540.10	8 177.20	10 259.38	13 656.19	222.85	224.84	492.73	17.46	16.61	19.76
4.720.	3.882.	1.359.	.974.	1.153.	14.806.	12.994.	14.360.	1.330.	1.089.	1.948.	.880.	.450.	.435.
2 303.94	4 662.56	779.96	1 817.46	4 221.54	323.60	416.06	416.47	19.48	21.45	27.58	3.19	4.41	5.16
.911.00	1.078.	1.432.	1.203.	1.375.	.586.	.527.	.438	.116.	.104.	.109.	.161.	.120.	.114.
1 669.24	5 548.63	198.90	911.94	4 101.68	530.40	668.00	1 341.75	29.53	37.42	73.39	.47	7.87	12.83
.660.	1.284.	.365.	.603.	1.336.	.960.	.846.	1.411	.176.	.131.	.290.	.024.	.213.	.282
224.67	235.06	127.30	138.44	101.01	78.97	74.38	101.25	12.69	11.09	14.03	3.05	2.80	3.29
.089.	.054.	.234.	.092.	.033.	.143.	.094.	.106.	.076.	.034.	.055.	.154.	.076.	.072.
13 222.22	12 478.00	3 499.71	6 958.72	6 033.70	3 021.10	4 984.44	5 113.75	342.40	331.35	394.90	33.55	77.87	80.54
5.229.	2.887.	6.426.	4.605.	1.965.	5.470.	6.313.	5.377	2.043.	1.702.	1.561.	1.691.	2.111.	1.772
2 225.87	2 471.85	91.06	331.77	347.90	496.50	1 403.06	1 476.50	32.89	42.30	113.67	8.16	24.83	25.07
.880.	.572.	.167.	.220.	.113.	.899.	1.777.	1.553.	.196.	.447.	.449.	.411.	.673.	.552
257.15	358.90	66.57	61.05	149.20	113.00	187.88	187.56	8.27	10.43	14.16	1.61	2.51	2.44
.102.	.083.	.122.	.044.	.049.	.205.	.238.	.197	.049.	.051.	.056.	.081.	.068.	.054
24 770.63	57 990.74	4 543.90	24 094.99	56 945.69	184.20	467.13	703.38	9.80	15.32	57.51	1.54	6.02	7.42
9.796.	13.417.	8.343.	15.945.	18.544.	.334.	.592.	.740	.058.	.172.	.227.	.078.	.166.	.162
6 945.92	16 524.41	2 125.35	6 884.40	16 261.71	64.31	82.25	256.50	2.93	5.09	21.63	.51	.87	2.75
2.747.	3.323.	3.902.	4.556.	5.296.	.116.	.104.	.270	.017.	.025.	.086.	.026.	.024.	.060.
46 704.08	56 833.11	14 723.73	14 064.94	16 802.09	11 004.07	14 523.06	15 536.06	14 755.17	17 997.27	21 209.87	1 677.35	3 190.74	3 947.01
18.470.	13.149.	27.033.	9.307.	5.472.	19.924.	18.395.	16.337	88.029.	87.173.	83.856.	84.565.	86.512.	86.829
6 981.47	8 218.66	1 451.51	3 366.77	4 575.25	2 435.56	3 389.56	3 475.94	93.33	135.73	161.34	17.55	26.29	27.68
2.761.	1.901.	2.665.	2.228.	1.490.	4.410.	4.293.	3.655	.557.	.657.	.638.	.885.	.713.	.609.
26 269.83	42 137.88	5 072.25	15 133.44	28 367.33	7 436.38	10 341.25	12 830.81	337.82	478.58	641.76	65.81	94.44	116.78
10.389.	9.749.	9.313.	10.014.	9.238.	13.464.	13.098.	13.442.	2.015.	2.318.	2.538.	3.318.	2.561.	2.569
25 379.63	53 828.94	6 191.04	16 964.63	37 379.72	8 303.75	11 308.31	15 153.82	359.98	487.58	897.10	67.77	98.63	131.55
11.223.	12.454.	11.367.	11.226.	12.173.	15.035.	14.323.	15.935	2.148.	2.362.	3.547.	3.417.	2.674.	2.894
14 949.56	33 201.17	2 481.90	10 850.08	27 989.62	2 645.38	3 909.56	4 722.24 4 165.56	112.96	175.10	242.42	22.15	34.51	42.05
5.912.	7.682.	4.557.	7.180.	9.115.	4.790.	4.952.	5.215	.674.	.848.	.958.	1.117.	.936.	.925.
29 643.71	54 797.38	5 897.14	21 809.17	45 026.84	4 863.63	6 839.25	9 207.00	213.96	344.87	476.54	42.63	67.23	85.17
11.723.	12.678.	10.827.	14.432.	14.663.	8.806.	8.663.	9.682	1.276.	1.670.	1.884.	2.149.	1.823.	1.874.
33 476.43	63 707.39	6 565.47	26 646.73	55 735.99	3 326.00	6 717.44	7 456.06	141.54	219.31	383.97	27.04	53.07	58.37
13.239.	14.740.	12.054.	17.633.	18.150.	6.022.	8.508.	7.841	.844.	1.363.	1.518.	1.363.	1.439.	1.284

Table XXXV
Distribution of Offal Parts in Live and Empty Animal.

	Steer 18	Steer 121	Steer 48
Live weight at slaughtering, pounds.	755.500.	1 255.490.	1 784.970.
Live weight at slaughtering, kilos.	342.687.	569.469.	809.645.
Empty warm weight at slaughtering, lbs.	666.193.	1 121.469.	1 641.783.
Empty warm weight at slaughtering, k.	302.183.	508.513.	744.708.
% empty weight to live weight.	88.180	89.296.	91.980
(135) Weight carcass cooled 48 hours, lbs.	447.040.	762.500.	1 143.720.
Weight carcass cooled 48 hours, kilos.	202.773.	345.862.	518.780
% carcass to live weight.	59.171.	60.734.	64.075.
% carcass to empty weight.	67.103.	68.014.	69.661.
Weight hide and hair, pounds.	56.605.	65.870.	90.750.
Weight hide and hair, kilos.	25.674.	29.876.	41.164.
% hide and hair to live weight.	7.492.	5.246.	5.084.
% hide and hair to empty weight.	8.496.	5.875.	5.528.
Weight offal fat, pounds.	12.566.	60.352.	136.326.
Weight offal fat, kilos.	5.700.	27.376.	61.837.
% offal fat to live weight.	1.663.	4.807.	7.638.
% offal fat to empty weight.	1.886.	5.386.	8.304.
Weight of blood, kilos.	15.599.	24.433.	25.634.
% blood to live weight.	4.552.	4.290.	3.166.
% blood to empty weight.	5.162.	4.805.	3.442.
Weight of heart lean, kilos.	1.496. <i>entire</i>	1.596.	1.700.
% heart lean to live weight.	.436.	.280.	.210.
% heart lean to empty weight.	.495.	.314.	.228.
Weight respiratory system, kilos.	3.079.	4.631.	10.970.
% respiratory system to live weight.	.898.	.813.	1.355.
% respiratory system to empty weight.	1.019.	.911.	1.473.
Weight of stomach, kilos.	7.645.	14.253.	14.113.
% stomach to live weight.	2.231.	2.503.	1.743.
% stomach to empty weight.	2.530.	2.803.	1.895.
Weight of intestines, kilos.	6.099.	9.967.	7.090.
% intestines to live weight.	1.780.	1.750.	.876.
% intestines to empty weight.	2.018.	1.960.	.952.
Length of intestines, feet.		188.000.	184.300.
Length intestines per 100# live weight.		14.974.	10.325.
Length intestines per 100# empty weight.		16.766.	11.222.
Weight of liver, kilos.	2.625.	7.035.	8.166.
% liver to live weight.	.766.	1.235.	1.009.
% liver to empty weight.	.869.	1.383.	1.097.
Weight gall bladder & gall, kilos.	.093.	.485.	.576.
% gall to live weight.	.027.	.085.	.071.
% gall to empty weight.	.031.	.095.	.077.
Weight of spleen, kilos.	.489.	.922.	1.020.
% spleen to live weight.	.143.	.162.	.126.
% spleen to empty weight.	.162.	.181.	.137.
Weight of pancreas, kilos.	.247.	.419.	.297.
% pancreas to live weight.	.072.	.074.	.037.
% pancreas to empty weight.	.082.	.082.	.040.

Table XXXVI
Distribution of Cuts of Meat in Carcass and Empty Animal.

	Steer 18	Steer 121	Steer 48
Live weight at slaughtering, kilos.	342.687.	569.469.	809.645.
Empty warm weight at slaughtering, k.	302.183.	508.513.	744.708.
Carcass cooled, kilos.	202.773.	345.862.	518.780.
Weight of forequarters, kilos.	107.954.	186.880.	271.162.
Weight of forequarters, pounds.	238.000.	412.000.	597.800.
¹³ % forequarters to live weight.	31.502.	32.817.	33.491.
% forequarters to empty weight.	35.725.	36.750.	36.412.
% forequarters to carcass.	53.239.	54.033.	52.288.
Weight hindquarters, kilos.	94.822.	158.984.	247.632.
Weight hindquarters, pounds.	209.040.	350.500.	545.920.
% hindquarters to live weight.	27.670.	27.918.	30.585.
% hindquarters to empty weight.	31.379.	31.264.	33.252.
% hindquarters to carcass.	46.763.	45.967.	47.734.
Weight of shins.	10.432.	15.418.	15.946.
% of shins to empty weight.	3.452.	3.032.	2.141.
% of shins to carcass.	5.145.	4.458.	3.074.
Weight of plates, kilos.	22.226.	53.534.	72.846.
% plates to empty weight.	7.355.	10.528.	9.782.
% plates to carcass.	10.961.	15.479.	14.040.
Weight of chucks, kilos.	53.296.	79.270.	118.840.
% chucks to empty weight.	17.637.	15.589.	15.958.
% chucks to carcass.	26.284.	22.920.	22.908.
* Necks see below Weight of ribs, kilos.	18.824.	34.744.	58.698.
% ribs to empty weight.	6.229.	6.832.	7.882.
% ribs to carcass.	9.283.	10.046.	11.315.
Weight of shanks kilos.	8.052.	9.402.	11.558.
% shanks to empty weight.	2.665.	1.849.	1.551.
% shanks to carcass.	3.971.	2.718.	2.228.
Weight of rounds, kilos.	38.556.	58.822.	76.488.
% rounds to empty weight.	12.759.	11.567.	10.271.
% rounds to carcass.	19.014.	17.007.	14.744.
Weight of rumps, kilos.	7.030.	11.926.	19.618.
% rumps to empty weight.	2.326.	2.345.	2.634.
% rumps to carcass.	3.467.	3.448.	3.782.
Weight of loins, kilos.	33.112.	61.462.	96.006.
% loins to empty weight.	10.958.	12.087.	12.892.
% loins to carcass.	16.330.	17.771.	18.506.
Weight of flanks, kilos.	4.894.	8.710.	25.528.
% flanks to empty weight.	1.620.	1.713.	3.428.
% flanks to carcass.	2.414.	2.518.	4.921.
Weight kidney fat & kidneys, kilos.	3.178.	8.370.	18.398.
% kidney fat & kid. to empty weight.	1.052.	1.646.	2.470.
% kidney fat & kidney to carcass.	1.567.	2.420.	3.546.
Weight of necks, kilos.	3.176.	3.612.	4.836.
% necks to empty weight.	1.051.	.710.	.649.
% necks to carcass.	1.566.	1.044.	.932.

Distribution of Table XXXVII Constituents in Animal Analyzed and in Empty Animal (less horns, hoofs, & dew claws).

	Steer 18	Steer 121	Steer 48
Warm empty weight of animal, kilos.	302.183.	508.513.	744.708.
Animal analyzed, kilos.	292.996.	492.903.	721.284.
Horns, hoofs, teeth, dew claws, kilos.	2.028.	2.036.	2.387.
Total animal for analysis, kilos.	295.024.	494.939.	723.671.
Loss on cooling & sampling, kilos.	7.159.	13.574.	21.037.
(137) % loss to empty weight.	2.369.	2.669.	2.825.
Empty animal analyzed less horn, hoofs teeth & d.c. k.	300.155.	506.477.	742.321.
Weight of moisture determined.	165.255.	240.045.	293.064.
Weight of moisture as loss.	7.159.	13.574.	21.037.
Total weight moisture in warm empty an. analyzed. k.	172.414.	253.619.	314.101.
% total moisture in empty animal (less horns, etc.)	57.450.	50.075.	42.312.
% moisture in animal analyzed.	56.402.	48.700.	40.407.
% dry subst. (less horns, etc) to empty animal.	42.550.	49.925.	57.688.
% dry substance to animal analyzed.	43.598.	51.300.	59.593.
Weight of protein in animal analyzed.	55.231.	78.951.	95.997 94.472
% protein to empty animal less horns etc.	18.401.	15.588.	12.787 811
% protein to animal analyzed.	18.850.	16.019.	13.049 113
Weight of fat in animal analyzed.	54.465.	151.116.	307.082.
% fat to empty animal less horns etc.	18.146.	29.837.	41.366.
% fat to animal analyzed.	18.589.	30.658.	42.340.
Weight of ash in animal analyzed.	16.762.	20.646.	25.293.
% ash to empty animal less horns etc.	5.584.	4.076.	3.407.
% ash to animal analyzed.	5.721.	4.189.	3.487.
Weight of phosphorus in animal analyzed.	1.984.	3.688.	4.546.
% phosphorus in empty animal less horns etc.	.661.	.728.	.612.
% phosphorus in animal analyzed.	.677.	.748.	.627.
Weight of carcass (built up), kilos.	200.074.	341.650.	516.464.
Live weight at slaughtering, kilos.	342.687.	569.469.	809.645.
Weight of skeleton, K.	58.261.	66.391.	79.232.
% skeleton to live weight.	17.001.	11.658.	9.786.
% skeleton to warm empty weight.	19.280.	13.056.	10.638.
Weight of skeleton in carcass.	44.160.	50.534.	62.110.
% skeleton of carcass to carcass.	22.072.	14.791.	12.026.
Weight of lean meat in animal.	134.378.	201.376.	246.362.
Weight of lean meat in carcass.	131.190.	198.002.	243.174.
% lean meat in animal to live weight.	39.213.	35.362.	30.428.
% lean meat in animal to warm empty weight.	44.469.	39.601.	33.082.
% of carcass lean to weight of carcass.	65.571.	57.955.	47.084.
Weight fat (hand sep. excl. offal fat) in anim.	25.160.	94.278.	212.590.
Weight fat (hand sep.) in carcass.	24.724.	93.114.	211.180.
% fat of anim. (excl. offal fat) to live weight.	7.342.	16.555.	26.257.
% fat of anim. (excl. offal fat) to empty wgt. (hand sep.)	8.326.	18.540.	28.547.
% fat (hand sep.) of carcass to wgt. of carcass.	12.357.	27.254.	40.890.

Table XXXVII
Comparison of Constituents in Skeleton to Constituents in Animal and in Carcass.

	Steer 18	Steer 121	Steer 48
Weight of moisture in animal			
Grand total.	172.414.	253.619.	314.101.
Weight of moisture in skeleton.	16.483.	19.687.	22.399.
% of moisture in skeleton.	28.292.	29.653.	28.270.
% moisture of skeleton to moisture in animal.	9.560.	7.762.	7.131.
Weight of dry substance in animal, grznd total.	127.741.	252.858.	432.220.
Weight of dry substance in skeleton.	41.778.	46.704.	50.833.
% of dry substance in skeleton.	71.708.	70.347.	71.730.
% dry substance of skeleton to dry substance in animal.	32.705.	18.470.	13.149.
(38) Weight of fat in Animal.	54.465.	151.116.	307.082.
Weight of fat in skeleton.	14.724.	14.065.	16.802.
% of fat in skeleton.	25.272.	21.185.	21.206.
% of fat of skeleton to fat in animal.	27.034.	9.308.	5.472.
Weight of protein in animal.	55.231.	78.951.	95.077 94.472.
Weight of protein in skeleton.	11.004.	14.523.	15.536.
% of protein in skeleton.	18.888.	21.875.	19.606.
% of protein of skeleton to protein of animal.	19.924.	18.395.	40.337 40.443.
Weight of ash of animal.	16.762.	20.646.	25.293.
Weight of ash of skeleton	14.755.	17.997.	21.210.
% of ash ⁱⁿ skeleton.	25.326.	27.108.	26.769.
% of ash of skeleton to ash in animal.	88.026.	87.169.	83.857.
Weight of phosphorus of animal.	1.984.	3.688.	4.589.
Weight of phosphorus of skeleton.	1.677.	3.191.	3.947.
% of phosphorus ⁱⁿ skeleton.	2.879.	4.806.	4.982.
% of phosphorus of skeleton to phosphorus in animal	84.526.	86.524.	86.010.
Weight of moisture in carcass.	109.515.	161.166.	199.932.
Weight of moisture in skeleton of carcass.	12.494.	14.985.	16.055.
% of moisture in skeleton of carcass.	28.292.	29.653.	25.850.
% moisture of carcass skeleton to moisture in carcass	11.409.	9.298.	8.030.
Weight of dry substance in carcass.	90.559.	180.484.	316.532.
Weight of dry substance in skeleton of carcass.	31.666.	35.549.	46.055.
% of dry substance in skeleton of carcass.	71.708.	70.347.	74.150.
% of dry substance of carcass skel. to dry substance in carcass.	34.967.	19.696.	14.550.
Weight of fat in carcass.	40.510.	111.536.	229.087.
Weight of fat in carcass skeleton.	11.160.	10.706.	14.830.
% of fat in carcass skeleton.	25.272.	21.185.	23.861.
% of fat of carcass skeleton to fat in carcass.	27.549.	9.599.	6.474.
Weight of protein in carcass.	36.687.	52.811.	64.215 63.590.
Weight of protein in carcass skeleton.	8.341.	11.054.	11.867.
% protein in carcass skeleton.	18.888.	21.875.	19.106.
% protein of carcass skeleton to protein in carcass.	22.736.	20.931.	18.480 18.480.
Weight of ash in carcass.	12.419.	15.572.	19.800.
Weight of ash in skeleton.	11.184.	13.699.	17.013.
% of ash in skeleton.	25.326.	27.108.	27.392.
% of ash of carcass skeleton to ash of carcass.	90.055.	87.972.	85.924.
Weight of phosphorus in carcass.	1.510.	2.797.	3.611.
Weight of phosphorus in carcass skeleton.	1.271.	2.429.	3.153.
% of phosphorus in carcass skeleton.	2.879.	4.806.	5.077.
% phosphorus of carcass skeleton to phosphorus of carcass.	84.172.	86.843.	87.317.

Table ~~XXXIX~~ Fat Distribution - Totals.

Steer 13

Steer 121

Steer 48

Total weight of analytical fat in Animal. 1	54.465.	151.116.	307.082.
Weight of fat in skeleton. 2	14.724.	14.065.	16.802.
Weight of fat in offal fat. 3	4.544.	24.095.	56.946.
Weight of fat in kidney fat. 4	2.125.	6.884.	16.262.
Sum of fat in skeleton, offal & kidney fat. 5 (2+3+4)	21.393.	45.044.	90.010.
Fat in flesh & internal organs of animal. 6 (1-5)	33.072.	106.072.	217.072.
Weight of fat in offal fat. 7	4.544.	24.095.	56.946.
Weight of fat in kidney fat. 8	2.125.	6.884.	16.262.
Sum of fat in offal & kidney fat. (7+8) 9	6.669.	30.979.	73.208.
Weight of fat in lean of animal. 10	22.974.	43.058.	74.184.
Weight of fat in fat of carcass + head & tail. 11	6.811.	58.597.	141.152.
Fat in lean & fat of animal (less internal organs) + K.F. 12 (10+11)	29.785.	101.655.	215.336.
Weight of fat in kidney fat. 13	2.125.	6.884.	16.262.
Weight of fat in lean & fat flesh (less kidney fat). 14 (12-13)	27.660.	94.771.	199.074.
% fat in entire animal analyzed. 15	18.589.	30.658.	42.340.
% fat in skeleton. 16	25.272.	21.185.	21.206.
% fat in flesh & internal organs to fat in animal. 17 6/7	60.722.	70.198.	70.689.
% fat in offal & kidney fat to fat of animal. 18 2/7	12.244.	20.501.	23.840.
% fat in offal & kidney fat to bal. fat in animal. 19 2/21	13.953.	25.786.	31.302.
% fat in offal & kidney fat to flesh fat (less kidney fat). 20 2/21	24.111.	32.688.	36.774.
Total anim. fat less sum of offal & kidney fat. 21 (1-9)	47.796.	20.137.	233.874.
% flesh fat (less kidney fat) to total fat. 22 14/17	50.785.	62.714.	64.828.
% fat of skeleton to total fat. 23 2/17	27.034.	9.307.	5.472.
% fat of adipose tissue (excl. offal fat and kidney fat) to fat of animal. 24 12.505	12.505.	38.776.	45.966.
Total animal lean. 25	134.378.	201.376.	246.362.
Total animal fat (less offal fat). 26	25.160.	94.278.	212.590.
Total fleshy part of animal 27	159.538.	295.654.	458.952.
Kidney fat. 28	2.444.	7.272.	17.170.
Lean & adipose tissue of an. (excl. kidney & offal fat). 29	157.094.	288.382.	441.782.

Steer No.	Productive Grain Consumed During Full Fed Period, Pounds.	Productive Corn Consumed (8/9ths of Grain)	Digestible Protein in Productive Corn, Pounds.	Energy in Productive Corn, Therms.	Productive Linseed Consumed (1/9th of Grain)	Digestible Protein in Productive Linseed, Pounds.	Energy in Productive Linseed, Therms.	Productive Alfalfa Consumed, Pounds.	Digestible Protein in Productive Alfalfa, Pounds.	Energy in Productive Alfalfa, Therms.	Total Productive Digestible Protein Consumed, Pounds.	Total Productive Energy Consumed, Therms.	Total Productive Digestible Protein Consumed, Kilograms.
121.	1 754.116.	1 559.214.	105.715.	1 385.206.	194.8.	53.676.	153.817.	577.183.	39.999.	198.609.	199.390.	1 737.632.	90.441.
43.	4 482.029.	3 984.026.	270.117.	3 539.409.	498.005.	137.150.	393.024.	1 412.773.	97.905.	486.135.	505.172.	4 418.563.	229.141.
(140)													

Steer No.	Average Weight at End of Full Fed Period. Pounds.	Length of Period, Days.	Total Grain Consumed. During Period. Pounds.	Maintenance Requirement in Grain for Period. Pounds.	Total Productive Grain for Period. Pounds.	Total Hay Consumed During Period, Pounds.	Hay Required for Maintenance, Pounds	Total Productive Hay for Period, Pounds.
121.	1 261.30	153.	2 806.250.	1 052.134.	1 754.116.	1,103.250.	526.067.	577.183.
43.	1 797.40	567.	9 602.060.	5 120.031.	4 482.029.	3,972.660.	1 559.887.	1 412.773.

TABLE XII

Steer No.	Average Wt. During Maintenance.	Period Length, Days.	Average Daily Consumption of Grain. Pounds.	Average Daily Consumption of Corn, Pounds.	Digestible Protein in Corn. Pounds.	Energy in Corn, Therms.	Average Daily Consumption of Linseed Pounds.	Digestible Protein in Linseed Pounds.	Energy in Linseed, Therms.	Average Daily Consumption of Alfalfa Pounds.	Digestible Protein in Alfalfa Pounds.	Energy in Alfalfa, Therms.	Total Digestible Protein Pounds.	Total Energy. Therms.	Armby's Requirement Digestible Protein Pounds.	Armby's Requirement Energy Value Therms.
18	767.30	284.	5.75	5.110.	.347.	4.540	.630.	.176.	.505.	2.430.	.168.	.836.	.691.	5.881.	.400.	4.950.
121	758.87	160.	6.103.	5.425.	.368.	4.820.	.630.	.187.	.535.	2.681.	.186.	.923.	.741.	6.278.	.400.	4.950.
48	836.60	150.	6.820.	6.062.	.412.	5.385.	.738.	.209.	.598.	2.967.	.206.	1.021.	.827.	7.004.	.435.	5.314.

TABLE XI

TABLE XLII

	Weight of Moisture, Kilos.	Weight of Dry Substance Kilos.	Weight of Fat Kilos.	Weight of Protein, Kilos.	Weight of Ash Kilos.	Weight of Phosphorus, Kilos.	Therms Stored in Protein.	Therms Stored in Fat.	Total Therms Stored.	Weight of Animal at Slaughtering Kilos.	Weight of Animal at Beginning of Full Fed Period.	Gain in Wt.
Weight in Steer I8	165.255.	127.741.	54.465.	55.131.	16.762.	1.984.						
Weight in Steer I2I	240.045.	252.858.	151.116.	77.951.	20.646.	3.688.						
Excess in Steer I2I	74.790.	125.117.	96.651.	22.720.	3.884.	1.704.	134.374.	920.407.	1 054.781.	569.469.	344.216.	225.253.
					nitrogen free extract	Crude fibre.						
Total Wt. in Feed			64.130.	215.349.	1 061.515.	199.326.						
Wt. in Feed above Maintenance			40.052.	131.415.	628.464.	107.994.						
Productive(Digestible) in Feed				9.441.					1 737.632.			

TABLE XLIII

	Weight of Moisture, Kilos.	Weight of Dry Substance, Kilos.	Weight of Fat, Kilos.	Weight of Protein, Kilos.	Weight of Ash, Kilos.	Weight of Phosphorus, Kilos.	Therms Stored in Protein.	Therms Stored in Fat.	Total Therms Stored.	Weight of Animal at Slaughtering, Kilos.	Weight of Animal at Beginning of Full Fed Period.	Gain in Wt.
Weight in Steer I8	165.255.	127.741.	54.465.	55.231.	16.635.	1.984.						
Weight in 3I.434 lbs. additional of Steer I8	17.730.	13.704.	5.843.	5.927.	1.785.	.213.						
Weight in Steer I8 at 836.6 lbs.	182.985.	141.445.	60.308.	61.158.	18.420.	2.197.						
Weight in Steer 48	293.064.	432.220.	307.082.	5.097	25.293.	4.546						
Excess in Steer 48	110.079.	290.775.	246.774.	5.939.	6.873.	2.349.	192.264	2 350.029.	2 536.755.	809.645.	379.473.	430.172.
				Nitrogen free extract	Crude fibre.		108.724.					
Wt. in Feed above Maintenance			85.489.	3 9.274.	1 561.621.	299.100.						
Total Wt. in Feed			204.101.	7 7.322.	3 688.857.	743.239.						
Productive(Digestible) in Feed				2 9.141.					4 418.568.			