FEEDING COLTS.

C. F. CURTISS.

In the winter of 1891 and '92 an experiment was made by this station in determining the value of different methods of wintering weanling colts. As the experiment here reported is of the same character, made with the same colts, and supplementary to the former, we here repeat the description of the animals under experiment. "The colts used in making the trials consisted of six head of imported filleys, two Percherons, Victoreuse (37255) 16080, and Miss (37162) 16079, two English Shires, Stuntney Victoria 3925, and Stuntney Alexandria 3924, and two French Coach, Neomie 1117 and Normandie 1118. The Percherons are both grand-daughters of Gilbert 5451 (461), and the Shires and Coachers are respectively half sisters, thus making a comparatively uniform lot. All were foaled in the spring of 1891."

The results obtained in the former trial of ground *vs.* unground feed, the former mixed with a small amount of moistened cut hay, although not striking, were clearly in favor of the grinding, the advantage being more than sufficient to cover the additional expense. (See Bulletin 19 of the Iowa Experment Station, August, 1892.)

The plan of this experiment was similar to the one conducted last year, and the object to substantiate former results. The experiment covered two test periods of 40 days each—February 1st to March 13th, and March 29th to May 8th.

February 1st the colts were divided into two lots, containing one of each breed, as follows: Normandie, Stuntney Victoria and Miss, weighing 1080, 1180 and 1475 respectively, aggregating 3735 pounds, constituting lot I; and Neomie, Stuntney Alexandria and Victoreuse, weighing 995, 1135 and 1372 respectively, aggregating 3502 pounds, constituting lot II. Lot I was 233 pounds heavier than lot II, but the division was made on the basis of previous gain instead of aggregate weight, and as the conditions were reversed at the end of the first period the comparison was not disturbed.

During the month of January, previous to the beginning of the experiment, the colts were all fed alike, a ration consisting of corn, oats and oil meal, and mixed timothy and clover hay. The gains made were as follows: Normandie 30, Stuntney Victoria 18, Miss 30, aggregating 78 pounds for lot I; Neomie 30, Stuntney Alexandria 35, Victoreuse 32, aggregating 97 pounds for lot II.

During the first period the daily grain ration at the beginning of the trial was six pounds of ground oats, six pounds of corn and cob meal, two pounds of bran, one pound of oil meal and five pounds of cut hay, to each colt in lot I. The daily ration to each colt in lot II was the same, with the exception of the substitution of like amounts of ear corn, unground oats and uncut hay. On February 13th the total grain ration to each lot was increased to 16 pounds per day by increasing the daily allowance of oats one pound, and continued the same to the close of the experiment.

The following table shows the feed of all kinds consumed by each colt, and the individual weights and gains for the first period:

FEED, WEIGHTS, AND GAINS, PERIOD I, FEBRUARY 1ST TO MARCH 13TH.

Lot I.	Ground oats.	Corn and cob meal.	Unground oats.	Ear corn.	Bran.	Oil meal.	Cut hay.	Uncut hay.	Aver'ge of weights Mar. 31, Feb. 1, 2.	Aver'ge of weights Mar. 12, 13, 14.	Gains made in Period I.
Normandie	269	240	....	....	80	40	....	....	1080	1119	39
Stuntney Victoria	269	240	....	....	80	40	....	....	1168	1218	50
Miss	269	240	....	....	80	40	....	....	1475	1535	60
Totals	807	720	....	....	240	120	1530	....	....	....	149
Lot II.											
Neomie	....	....	269	240	80	40	....	....	995	1041	46
Stuntney Alexandria	....	....	269	240	80	40	....	....	1135	1166	31
Victoreuse	....	....	269	240	80	40	....	....	1372	1422	50
Totals	....	....	807	720	240	120	....	1392	....	....	127

It will be seen that lot I, having gained 19 pounds less than lot II in the month of January under the same conditions and on the same feed, this month showed a gain of 22 pounds in excess of lot II.

All of the colts were tied up at feeding time and grain fed separately. No grain was left by any colt while under experiment, and, as equal amounts were fed, the amount consumed is in all cases the same.

Each lot had a large box stall with a long manger and three feed boxes. After the evening feed of grain was eaten, the colts were let loose for the night, and ate hay in common until morning, when they were tied up and received the morning grain feed, followed by hay and water usually an hour or an hour and a half later. When the weather was favorable each lot had the run of a yard from 8:00 or 9:00 A. M. to 4:00 or 5:00 P. M., when they were again brought in for evening feed.

The weights at the beginning and end of each period were determined by taking the average of three successive days' weighings at the same hour and under like conditions. Colts seem to vary less in weights from day to day than cattle. The aggregate weights of lot I on March 12, 13 and 14 were 3,875, 3,868 and 3,873, and lot II 3,625, 3,627 and 3,625. The greatest individual variation in the three weights of any colt was only five pounds. An individual variation of twenty to forty pounds in weights of cattle from day to day is not uncommon, although the aggregate weight of five or ten steers under uniform conditions does not change much from day to day.

The feed, weights and gains of the second period are presented in the following table.

FEED, WEIGHTS, AND GAINS, PERIOD II, MARCH 29TH TO MAY 8TH.

LOT I.	Ground oats.	Corn and cob meal.	Unground oats.	Ear corn.	Bran.	Oil meal.	Cut hay.	Uncut hay.	Average of weights March 28, 29, 30.	Average of weights May 7, 8, 9.	Gains made in Period II.
Normandie	....	....	280	240	80	40	....	....	1135	1170	35
Stuntney Victoria	....	....	280	240	80	40	....	....	1235	1287	52
Miss	....	....	280	240	80	40	....	....	1555	1525	—30
Totals	....	...	840	720	240	120	....	1590	....	....	57
LOT II.											
Neomie	280	240	....	....	80	40	....	....	1045	1093	48
Stuntney Alexandria	280	240	....	....	80	40	....	....	1162	1175	13
Victoreuse	280	240	....	....	80	40	....	....	1423	1470	47
Totals	840	720	....	....	240	120	1638	....	....	....	108

The feed during this period was the same as that of the first, except that the conditions were reversed, and lot I had unground feed and uncut hay, and lot II *vice versa.*

In this period the largest gains again followed the ground and cut feed. Lot I, on whole feed, made a gain of 57 pounds, and lot II, on ground feed, gained 108 pounds; a difference of 51 pounds in favor of the latter. Not all of this difference, however, can be attributed to the methods of feeding The weather was cold, rainy and disagreeable, and the gains in both lots averaged less than for the previous period. The stalls in which the colts were stabled, as before stated, were roomy but had dirt floors, and although deeply bedded with straw, were on account of faulty drainage of the barnyard, quite damp at times during heavy rains. Doubtless this condition also had something to do with the shrinkage of the colt "Miss" during this period, as a part of the time she appeared stiff and sore as if afflicted with rheumatism, although she continued well and hearty, and at no time left any feed. How much of this loss can be attributed to change of feed and how much to other causes cannot be determined. Stuntney Alexandria also made a light gain during this period, which may have been due, to some extent at least, to

the same unfavorable conditions, although she gave no decided evidence of it. The change in feeds between test periods was effected gradually and occupied ten days; after the change of rations was made both lots were given six days longer to get accustomed and adjusted to the new ration. Another circumstance occurred that may have influenced the results to some extent: On April 17th, "Neomie," in lot II, had a front pastern quite badly injured by the skin being torn from one side. How the accident occurred the attendant was not able to discover. The wound was bandaged and carefully dressed each day, but did not heal until after the close of the experiment. The gain made by this colt—48 pounds—however, is quite satisfactory, and it is not certain that the results were interfered with by the accident to any considerable extent.

There is a small variation in the amount of hay consumed, which is due to the difference in amounts eaten and wasted. Substantially the same was fed to each lot, all of which was weighed at the time of feeding, and all that was left weighed back and deducted.

The barn used in conducting this experiment, although a fairly good building, was rather loose sided and too cold to permit of moistening the feed in the fore part of the experiment without it becoming chilled before eaten. Consequently all feed was given dry except during the last half of the second period, when a part of the cut hay was moistened and mixed with the ground grain before feeding.

While the investigation during the last period was rather unsatisfactory, for reasons stated, the results in general may be said to substantially confirm those of the former experiment in comparing ground and unground feed. In period I we find that it required an average of eleven pounds of grain for each pound of increase in the weight of the colts. The increased gain of lot I, on ground feed, over lot II was 22 pounds, or the equivalent of 242 pounds of grain, which is more than sufficient to pay the expense of grinding and cutting feed. This increased gain in consideration of the fact that the same colts during the previous month made 21 pounds less gain under the same conditions as lot II, and 51 pounds less the following month under reversed condi-

tions, would seem to indicate that the advantage was even greater than the difference in the gains of this period indicated.

An interesting feature brought out in these two experiments is shown in the amount of feed required for a pound of increase in weight at different stages in the colts' development. From April 1 to May 18, 1892, growth was made by these colts at the rate of one pound for each 7½ pounds of grain, while in February, 1893, the same colts, stabled in the same stalls, and under substantially the same conditions except as to temperature, required 11 pounds of grain for each pound of increased weight. The amount of hay eaten was practically the same this year as last. The milder and more favorable weather of April and May over February will, perhaps, account for a part of this difference, but as the stabling and bedding were good, it is not likely that this variation produced any considerable difference in the growth of the colts. The difference seems to indicate rather the application of the law of growth, that the amount of feed required to produce gain in a young animal increases with the age of the animal. It is generally estimated that it costs more to winter a weanling colt than a yearling, and under average western farm conditions this assumption is correct, but when this is the case it is probably the result of the fact that the yearling colt is capable of making better use of the rougher and cheaper feeds of the farm, and not to superior digestive and assimilative power in utilizing feed of the best quality. The weanling colt requires palatable and nutritious feed of a high quality, and is capable of rendering a good account for such a ration.

The present wide range of prices in the horse market indicates the necessity of producing horses of the highest excellence. A recent quotation of Chicago sales showed a range of prices from $12.00 per head for western range horses to $1,000.00 for a pair of fine matched drivers; $12.00 to $500.00 is fairly illustrative of the difference in value of horses, due to right methods and skillful handling. In this connection the following remarks made in a previous bulletin are applicable and are here repeated:

"The value of a horse depends upon the aggregate of all of his qualities at maturity. If by changing any of our methods we can add even a little to the superiority of the finished horse, that little will have relatively a high value. For this reason it is difficult and practically impossible to decide during a brief trial whether increased growth is always made at a profit or not. It does not follow in feeding colts if ground grain costs a given per cent more than unground, that the growth must be an equal per cent more rapid in order to return a profit. The excellence of the finished product will determine value, and profits will be large or small in proportion as the value of this product exceeds the cost of production. A certain degree of excellence makes the common horse, with which our markets are over-stocked."

Clearly, it is the highest excellence that commands the highest price and almost invariably returns most profit in horse raising. The present demand is for better horses, and whatever methods that will enable the producer to meet this demand deserve consideration.