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AGRICULTURAL EXPERIMENT STATION

KANSAS STATE AGRICULTURAL COLLEGE

GROWING DRAFT COLTS.

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The problems of draft-horse production most urgent on Kansas farms are indicated by the following three questions, on which information is repeatedly sought from the animal husbandry department of the Experiment Station:

1. Can good draft colts be grown without the use of oats ?
2. What does it cost to develop a draft horse under average Kansas conditions ?
3. What type of colt usually develops into the largest horse?

In an effort definitely to answer these questions an experiment was inaugurated January 14, 1913. Ten purebred and ten grade colts. were purchased, the grades being produced by farmers of Clay, Riley, Pottawatomie and Wabaunsee counties. The grade colts were sired by purebred draft stallions averaging approximately 1900 pounds in weight, and were out of ordinary farm mares averaging 1380 pounds in weight and valued at \$150 each. All of the colts were about eight months of age, and the investigations were continued until January 4, 1915, a period of 720 days.

The colts were divided into two lots, care being exercised to have those of each lot as nearly alike as possible in size, type, and quality. Lot 1 received a grain ration of oats with alfalfa hay, straw, corn stover, and pasture. Lot 2 received a grain ration consisting of 70 percent of corn, 25 percent of bran, and 5 percent of oilmeal, with alfalfa hay, straw, corn stover, and pasture. The individual colts of each lot received the same amount of grain and the same amount and kind of roughage. One half of the daily grain ration was fed at 6 a.m.; the other half at 4:30 p.m. The daily hay ration was fed at 4:30 p. m. Each colt was weighed individually three days in succession at the end of each thirty-day period, and the average of the three weights was considered the correct one. The object of the test was to secure maximum growth and good condition without overloading with fat. All colts were pastured together both summer and winter, being protected from storms by a shed open to the south.

FIRST YEAR'S RESULTS.

During the early part of the first year two colts from Lot 1 died, one from distemper and the other from a ruptured intestine, leaving only eight colts.

From January 1, 1913, to May 1, 1913, and from October 1, 1913, to January 9, 1914, a total period of 207 days, the daily ration per colt averaged as follows: grain, 10.05 pounds; alfalfa hay, 9.22 pounds; corn stover, 2.55 pounds. During the summer, or pasture months, May 1, 1913, to October 1, 1913, a period of 153 days, the daily ration per colt averaged: grain, 4.85 pounds; alfalfa hay, 4.68 pounds. This made the average daily ration for the whole year, grain, 7.85 pounds; alfalfa hay, 7.29 pounds. The colts were given daily all the corn stover or straw they would "clean up" during the winter months. Straw was substituted for a short period when corn stover was not available. During 1913 pasture suffered considerably because of the extremely dry weather, hence more grain and roughage were used than would be required under normal conditions.

The kinds, quantity and cost of feeds consumed during the first year (from January 14, 1913, to January 9, 1914) are shown in the following table:

FEED RECORD FOR FIRST YEAR.

Lot No.	RATION.	Amount consumed per colt.	Cost of each kind of feed consumed per colt.	Total cost of feed consumed per colt.		Total expense per colt.	Total expense per colt per day.
				Per year.	Per day.		
		<i>Pounds.</i>					
1	Oats	2,828.5	\$37.56				
	Alfalfa hay	2,625.2	16.466				
	Corn stover	528.0	.479				
	Straw	183.15	.549				
	Pasture		2.50	\$57.554	\$0.1598	\$68.66	\$0.1910
2	Corn	1,979.95	\$22.303				
	Bran	707.125	6.734				
	Oilmeal	141.425	2.189				
	Alfalfa hay	2,625.2	16.466				
	Corn stover	528.0	.469				
	Straw	183.15	.549				
Pasture		2.50	\$51.22	\$0.1422	\$62.22	\$0.1730	

From January 14, 1913, to July 1, 1913, corn cost 50 cents per bushel; oats, 40 cents per bushel; bran, \$18 per ton; lin-

seed oilmeal, \$32 per ton; alfalfa hay, \$10 per ton; corn stover, \$1.50 per ton; and pasture, 60 cents per month. From July 1, 1913, to January 9, 1914, corn cost 75 cents per bushel; oats, 45 cents per bushel; bran, \$20 per ton; corn stover, \$3 per ton; straw, \$6 per ton; and pasture, 50 cents per month. Veterinary fees were \$12.33 and labor was \$120.

The fact that the feed cost \$6.33 per colt less where corn, bran, and linseed oilmeal were fed instead of an equal weight of oats is particularly noteworthy, since this ration made more rapid growth.

GROWTH RECORD FOR THE FIRST YEAR.

	Lot 1. Grades.	Lot 2. Grades.	Lot 1. Purebreds.	Lot 2. Purebreds.	Lot 1. Grades and purebreds.	Lot 2. Grades and purebreds.
Number in lot.....	4	5	4	5	8	10
	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>
Average weight January 14, 1913.....	834.9	798.00	866.76	854.66	850.83	826.23
Average weight January 9, 1914.....	1,263.3	1,297.3	1,355.86	1,347.36	1,309.58	1,322.33
Growth per colt first year..	428.3	499.3	489.1	492.7	458.75	496.0
Growth per colt per day...	1.19	1.39	1.35	1.37	1.27	1.38
Feed cost of 1 lb. growth..	\$0.1336	\$0.1029	\$0.1177	\$0.1036	\$0.1252	\$0.1029
Total cost of 1 lb. growth..	\$0.1605	\$0.1253	\$0.1414	\$0.1262	\$0.1504	\$0.1253

The significant fact in the preceding table is that the feed cost of a pound of growth was 12.52 cents where oats were fed, and 10.29 cents where corn, bran and oilmeal were fed. Moreover, the latter colts began shedding earlier and shed their coats more quickly, seemed more thrifty, showed better condition and carried more flesh than the oat-fed colts. The results of the first year's feeding seemed to show that yearling colts can be developed more economically and more satisfactorily upon a grain ration of corn, bran and oilmeal than upon oats, when conditions and feed- prices are similar to those of 1913.

THE PUREBRED STALLIONS.

The purebred stallion yearlings were eliminated from the experiment on January 9, 1914, the closing date of the first year's feeding, in order to grow and fatten them as rapidly as possible. This was necessary because both the stallion buyer and his patron demand fat horses. At this time they averaged 1332 pounds in weight. On January 4, 1915, they averaged 1865 pounds in weight, having made a gain of 533 pounds in

360 days. The purchase value of these colts at weaning time was \$210, and the cost of feed and care was \$165, making the total cost at the age of two years and eight months, \$375. Three of the colts were sold at an average price of \$733.33, and the remaining stallion, valued at \$800, has been standing for public service at a fee of \$20 to insure a living foal. These results tend to show that the production of young stallions for sale is a profitable business if they are properly selected, fed, fitted, and handled. Of course the owner must have the ability to interest buyers in his animals.

SECOND YEAR'S RESULTS.

The experiment, after eliminating the purebred stallions and mares, was continued through the second year. Four grade colts were left in Lot 1 and five in Lot 2. During the winter months of the second year, from January 9, 1914, to May 1, 1914, and from October 20, 1914, to January 4, 1915, a period of 187 days, the daily ration per colt was as follows: Grain, 11.16 pounds; alfalfa hay, 10.95 pounds; and straw, 2.1 pounds. During the pasture season of the second year, from May 1, 1914, to October 1, 1914, a period of 173 days, no alfalfa or straw was fed. An average of 3.33 pounds of grain was allowed each lot from May 1, 1914, to July 24, 1914, a period of 85 days, because of the slow development of the pasture grasses. The average daily ration for the year was grain, 6.58 pounds, and hay (during winter), 10.95 pounds. From January 9, 1914, to October 20, 1914, corn cost 75 cents per bushel; oats, 45 cents per bushel; bran, \$20 per ton; linseed oilmeal, \$30 per ton; alfalfa hay, \$15 per ton; corn stover, \$3 per ton; straw, \$6 per ton; and pasture, 50 cents per month. From October 20, 1914, to January 4, 1915, corn cost 65 cents per bushel; oats, 45 cents per bushel; bran, \$20 per ton; oilmeal, \$30 per ton; alfalfa hay, \$10 per ton; and straw, \$2 per ton. Fifteen dollars per month was charged for the labor involved in caring for the colts.

FEEDING RECORD FOR THE SECOND YEAR

Lot No.	No. Colts.	Ration.	Amount consumed per colt.	Cost each kind of feed consumed.	Total cost of feed consumed.		Total expense per colt.	Total expense per colt per day.
					Per year.	Per day.		
1	4	Oats	<i>Pounds.</i> 2,370.0	\$33.3279				
		Alfalfa hay	2,047.5	13.5675				
		Corn stover						
		Straw	392.6	.4482				
		Pasture		2.8333	\$50.1769	\$0.1366	\$60.1769	\$0.167
2	5	Corn	1,659.0	\$21.129				
		Bran	592.5	5.925				
		Oilmeal	118.5	1.7775				
		Alfalfa hay	2,047.5	13.5675				
		Corn stover						
		Straw	392.6	.4482				
		Pasture		2.8333	\$45.68	\$0.1269	\$55.68	\$0.155

During the second year the oat ration cost \$4.4969 more per colt than the mixed ration. The growth records for these colts appear in the following table:

GROWTH RECORDS OF COLTS FOR THE SECOND YEAR.

Lot No.	No. of colts.	Average weight January 9, 1914.	Average weight January 4, 1915.	Growth per colt.		Cost of 1 lb. of growth.	
				Per year.	Per colt.	Feed cost.	Total cost.
1	4	<i>Pounds.</i> 1,263.3	<i>Pounds.</i> 1,527.5	<i>Pounds.</i> 264.2	<i>Pounds.</i> .733	\$0.1863	\$0.2278
2	5	1,297.3	1,535.0	237.7	.666	\$0.1905	\$0.2327

These figures show that the colts in Lot 1 made not only more rapid but cheaper growth than the colts in Lot 2. The feed cost of one pound of growth was \$0.163 in Lot 1, where corn, bran and oilmeal were fed, and \$0.1905 in Lot 2 where oats were fed. The colts in Lot 1 showed more thrift and nicer coats of hair than those in Lot 2.

THE RESULTS FOR THE TWO-YEAR PERIOD.

The summary of the entire experiment, grade colts alone considered, is as follows:

FEED RECORD OF THE GRADE COLTS DURING THE ENTIRE EXPERIMENT.

Lot No.	No. of colts.	Ration.	Amount consumed.	Cost of each kind of feed consumed.	Total cost of feed consumed.		Total expense per colt.	Total expense per colt per day.
					For two years.	Per day.		
1	4	Oats.....	<i>Pounds.</i> 5,193.5	\$70.8979				
		Alfalfa hay.....	4,672.7	30.0335				
		Corn stover.....	528.0	.479				
		Straw.....	575.75	.9972				
		Pasture.....		5.3333	\$107.7309	\$0.1496	\$128.8369	\$0.1789
2	5	Corn.....	3,638.95	\$43.432				
		Bran.....	1,299.625	12.659				
		Oilmeal.....	259.925	3.9665				
		Alfalfa hay.....	4,672.7	30.0335				
		Corn stover.....	528.0	.479				
		Straw.....	575.75	.9972				
Pasture.....		5.3333	\$96.90	\$0.1346	\$117.90	\$0.1637		

GROWTH RECORD OF GRADE COLTS DURING THE ENTIRE PERIOD.

Lot No.	No. of colts.	Average weight January 14, 1913.	Average weight January 4, 1915.	Growth per colt.		Cost of 1 lb. of growth.	
				Whole period.	Per day.	Feed cost.	Total cost.
				<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>
1	4	834.9	1,527.5	692.6	.962	\$0.1555	\$0.1960
2	5	798.0	1,535.0	737.0	1.023	\$0.1316	\$0.1504

These tables show that under conditions of depleted pastures and high-priced feeds, such as existed in 1913-1914, the feed cost of raising a colt from weaning time until it is two years and eight months old is approximately \$100. The cost of a good draft colt to weaning time out of a working brood mare has been estimated by several authorities at about \$50 when feed prices correspond to those of 1913-1914. This cost is divided as follows: service fee, \$15; feeding mare during idleness due to breeding and parturition, one month, \$5; extra feed for colt while suckling, \$10; labor, \$5. When totaled the cost of raising until two and one-half to three years of age, when the colt should be ready to work, amounts to approximately \$150, under such conditions as prevailed in 1913-1914.

GENERAL OBSERVATIONS.

The results of this experiment are in keeping with the expectation based on a chemical study of the rations used, for more size, bone and weight were secured in Lot 2 than in Lot 1. Bone contains 65 percent of mineral matter, of which about 85 percent is calcium phosphate. The principal mineral matter in flesh is potassium phosphate; hence the ration supplying the most calcium (lime), phosphorus and potassium (potash) is most desirable. Lime is found rather plentifully in most feeds, alfalfa hay furnishing a larger percentage than any other feed, either concentrate or roughage. Oats is generally considered to be the best bone- and flesh-forming grain available, but the combination of corn, bran and oilmeal contains practically 90 percent more potassium; hence there is another advantage in these grains for developing draft colts. The proportions of protein, carbohydrates and fat in the two rations are practically alike.

As has been learned by the observation of draft-horse men in general, the colts showing the most bone and stretch at weaning time developed into the largest horses. The plump, compact types seemed to lack the possibilities of development possessed by the other animals, and although their conditions of development were as favorable, they still remained plump, compact types at the end of the experiment.

The dams of the colts used in this experiment were valued at \$150 each. An offer of \$200 each was received for their colts at two and one-half years of age. The fact that the influence of good purebred sires and good feeding made these colts worth \$50 more at two and one-half years than their dams were at maturity is the most significant practical result of the experiment, as far as the farmer is concerned.

SUMMARY.

1. The colts receiving a grain ration of 70 percent of corn, 25 percent of bran and 5 percent of oilmeal made a daily growth of 1.023 pounds during the entire period of 720 days, while the colts receiving oats made a daily growth of only .926 pounds.

2. Each pound of growth during the entire period made by the colts receiving corn, bran and oilmeal cost \$0.1504, while each pound made by the colts receiving oats cost \$0.186.

3. The colts made more rapid growth during the first year after weaning than during the second year. The first year's daily growth averaged 1.285 pounds and the second year's daily growth .7 pounds.

4. Although the total cost of feeds consumed during the first year was greater than that during the second year, the growth was cheaper. The average cost of each pound of growth during the first year was \$0.142, and during the second year \$0.230.

5. The average total cost of developing the grade colts from the time they were approximately eight months old until they were ready to work (two and one-half years) was \$123.37. The cost of raising a draft colt to the age of eight months is about \$50, making the total cost (including the labor) until the colt is ready to work approximately \$175, under conditions and prices similar to those of 1913-1914.

6. The colts showing considerable bone and stretch at weaning time developed into the largest horses. The plump, mature-looking weanlings are still plump little horses.

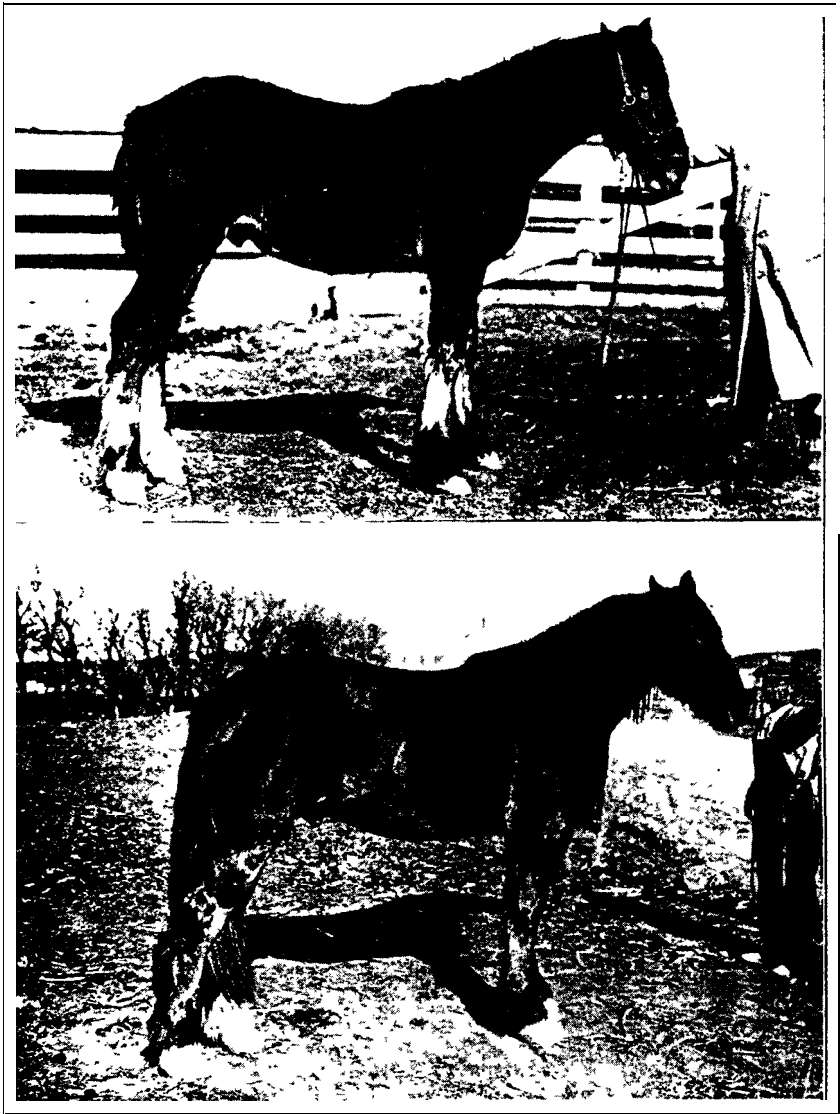


FIG. XIV. GLENN.

Upper picture taken January 14, 1913; weight, 764 lbs.
Lower picture taken January 4, 1915; weight, 1550 lbs.
Grain ration during the experiment: Corn, 70% ; bran, 25% ; oilmeal, 5%.



FIG. XV. PROCKINE.

Upper picture taken January 14, 1913; weight, 764 lbs.
lower picture taken January 4, 1915; weight, 1510 lbs
Grain ration during the experiment: Corn, 70%; bran, 25%; oilmeal, 5%.

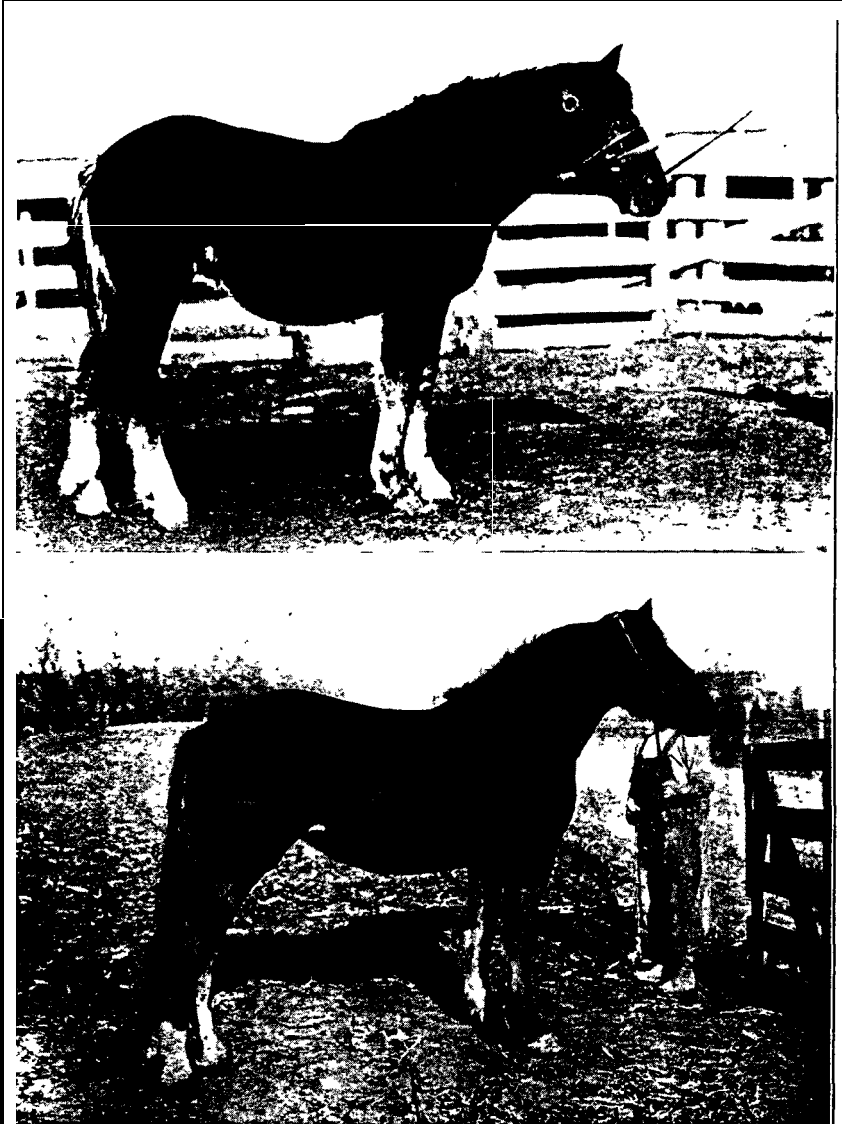


FIG. XVI. PROOKIE.

Upper picture taken January 124, 1913; weight, 764 lbs.
Lower picture taken January 4, 1915; weight, 1475 lbs.
Grain ration during the experiment: Corn, 70%; bran, 25%; oilmeal, 5%.

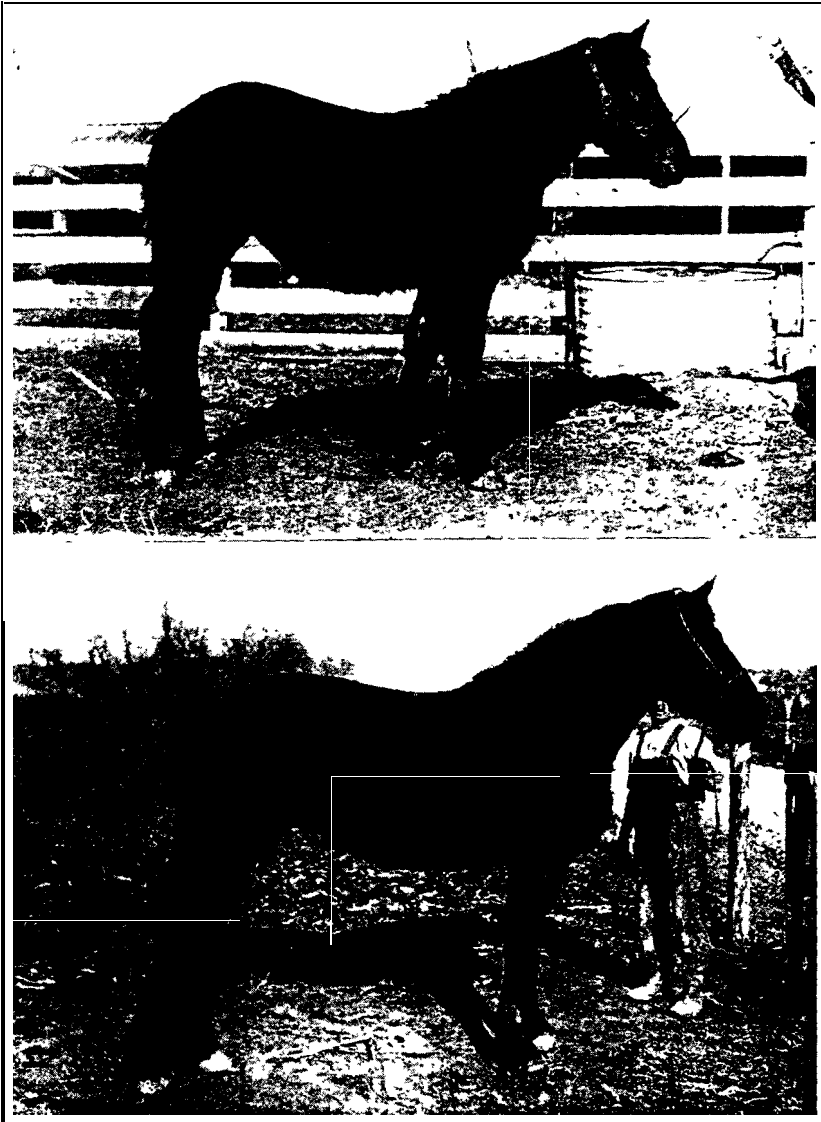


FIG XVII. HARDY.

Upper picture taken January 14, 1913; weight, 727 lbs.
Lower picture taken January 4, 1915; weight, 1560 lbs.
Grain ration during the experiment: Corn, 70% ; bran, 25%; oilmeal, 5%.

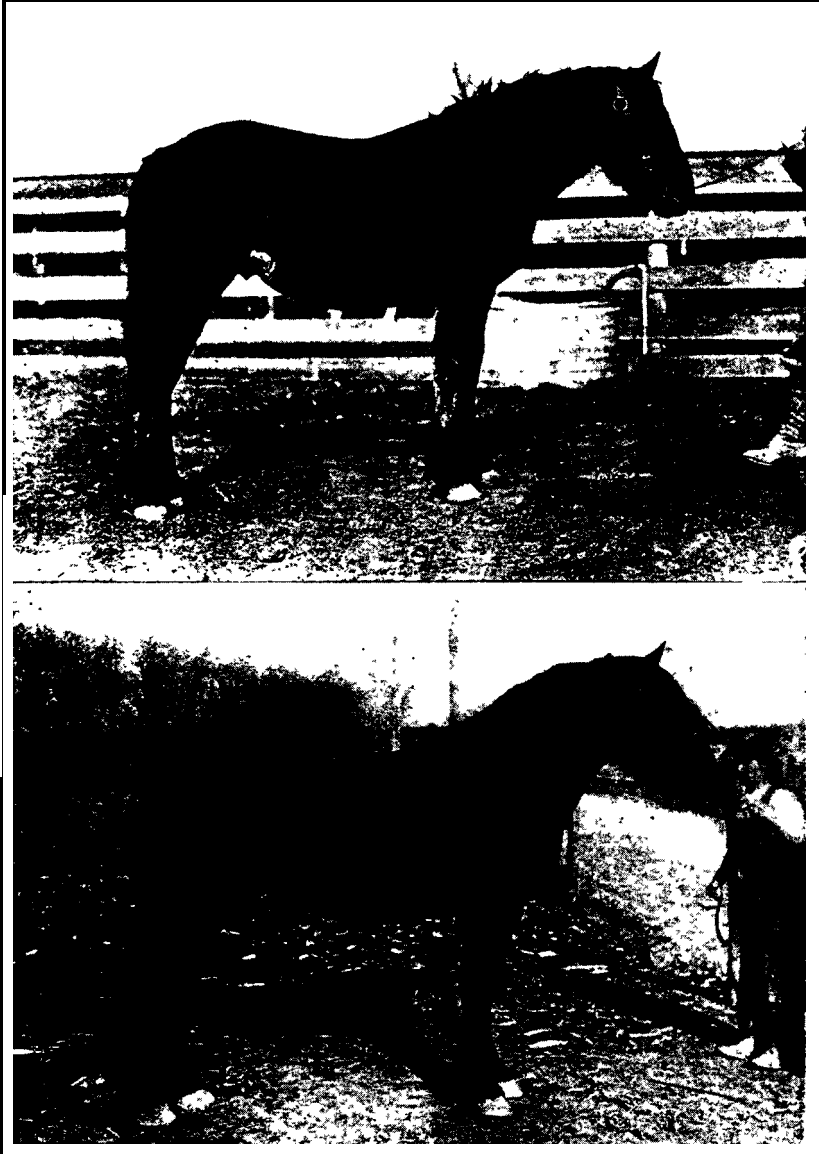


FIG. XVIII. LEMONADE.

Upper Picture Taken January 14, 1913; Weight, 820 lbs.
Lower picture taken January 4, 1915 ;weight, 1540 lbs.
Grain ration during the experiment, oats.

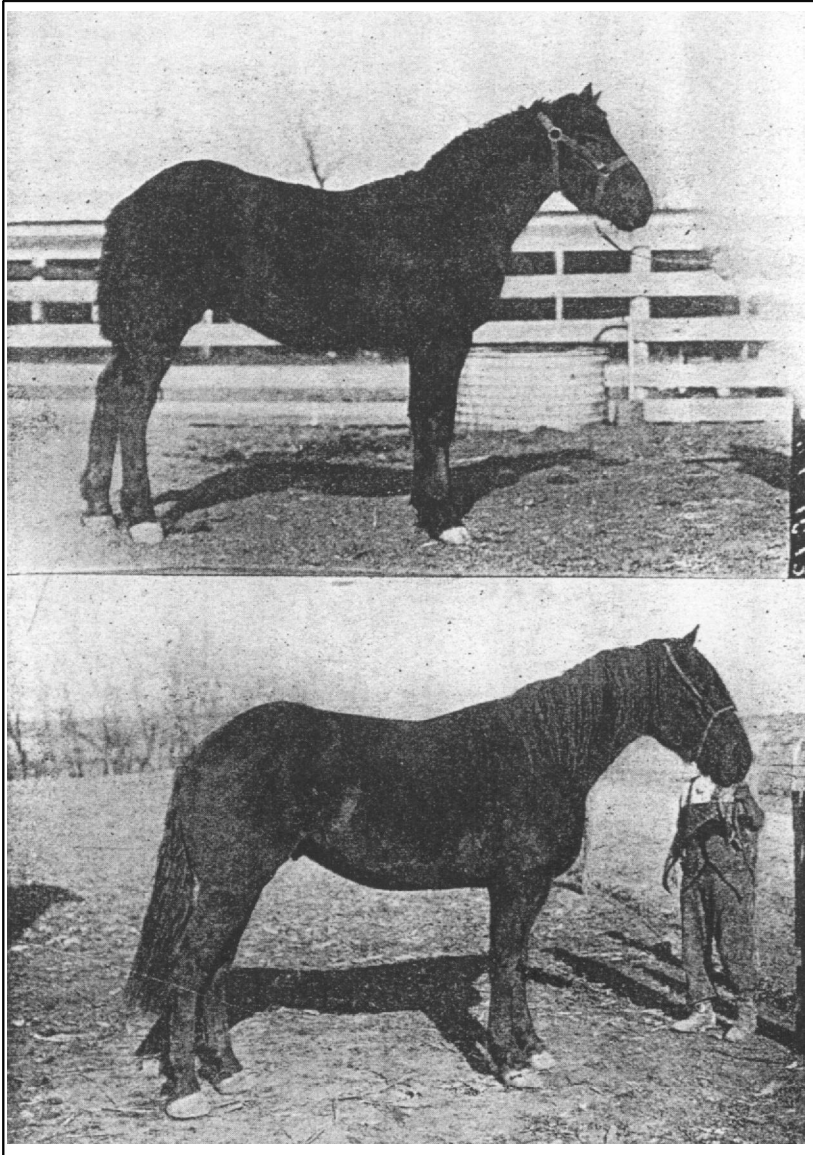


FIG. XIX. JACK.
Upper picture taken January 14, 1913 weight, 1113 lbs.
Lower picture taken January 4, 1915; weight, 1,680.7lbs.
Grain ration during the experiment, oats.

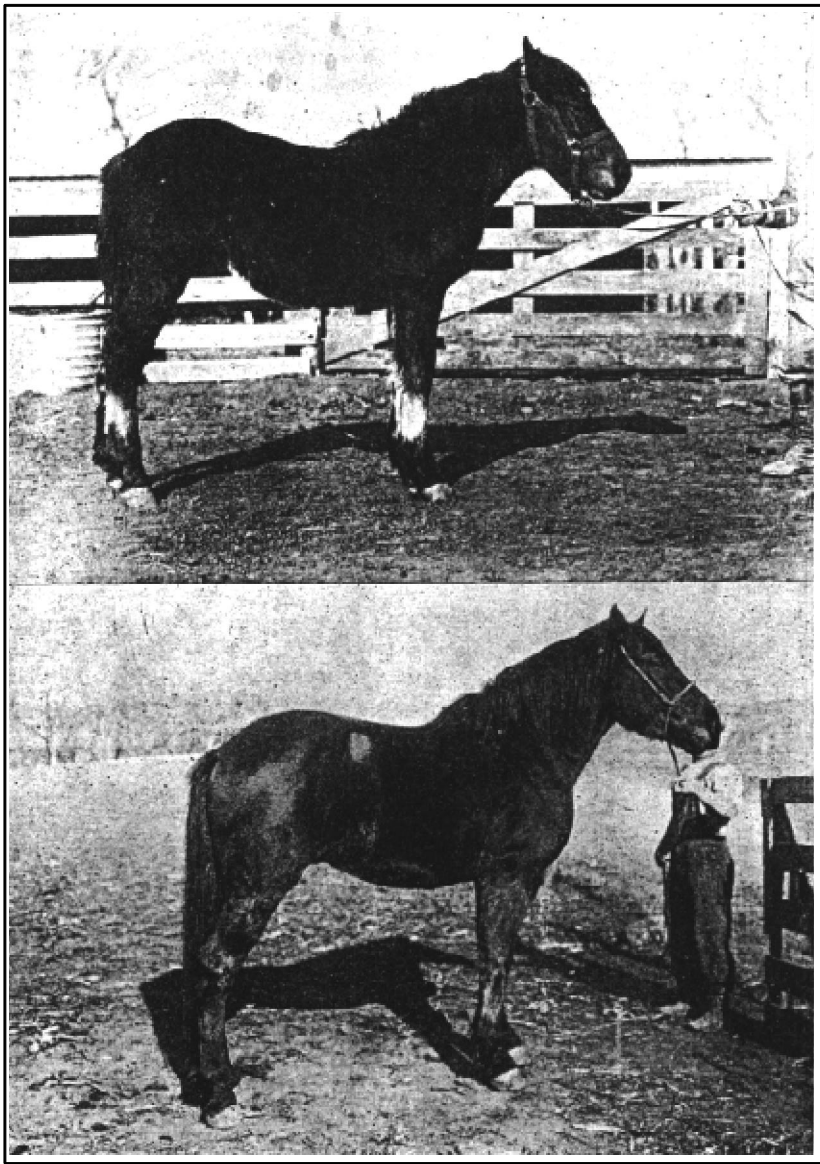


FIG. XX. HENRY.
Upper picture taken January 14, 1913; weight, 770 lbs
Lower picture taken January 4, 1915; weight, 1420 lbs.
Grain ration during the experiment, oats.

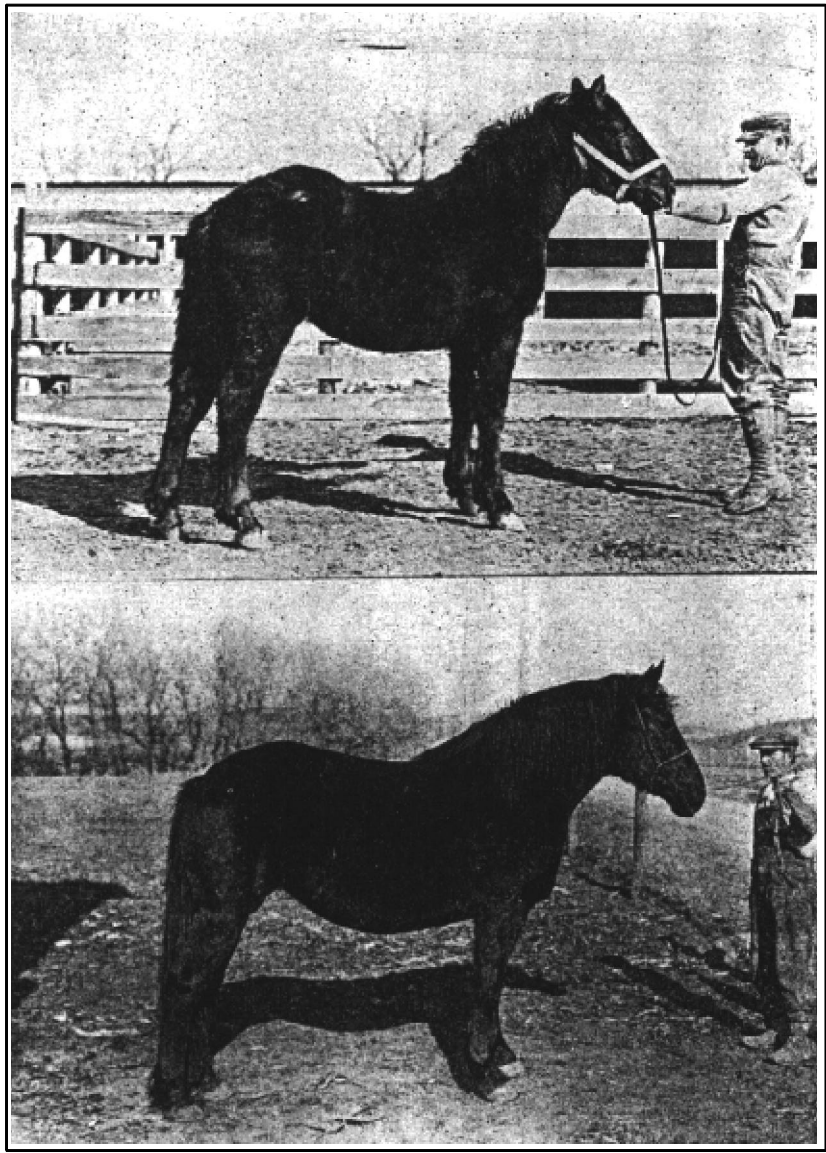


FIG. XXI. HAZEL.
Upper picture taken January 14, 1913; weight 637 lbs.
Lower picture taken January 4, 1915; weight, 1470 lbs.
Grain ration during the experiment, oats.

