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University of Tennessee Agricultural Experiment Station

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OF THE

UNIVERSITY OF TENNESSEE



THESE LITTLE PIGS WENT TO MARKET

VOL. XV

JANUARY 1902

No. 1

THE VALUE OF CORN, SKIM MILK AND WHEY FOR FATTENING SWINE

KNOXVILLE, TENNESSEE

THE AGRICULTURAL EXPERIMENT STATION

OF THE UNIVERSITY OF TENNESSEE

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THE VALUE OF CORN, SKIM MILK AND WHEY FOR FATTENING SWINE

ANDREW M. SOULE AND JOHN R FAIN

INTRODUCTION

Fattening hogs is both a new and an old industry in Tennessee, though it has never attained the popularity the natural conditions would seem to justify. It is an old industry because many farmers practised it in the ante-bellum days when it was the custom to drive large numbers of fattened hogs along the highways of the state to their destination in Georgia or other points further south. Before the war the industry had assumed considerable proportions and if it had not been interrupted by the civil strife, it would in all probability have attained great importance. The interruption of the business during that period seemed to have practically destroyed it for many years and accounts for the present inconsiderable development of an industry so important to the welfare of the state.

SUITABLE ENVIRONMENTS

Some of the more important reasons why swine husbandry should prove especially attractive to southern farmers are summed up in the following paragraph. First, there is a mild climate so that the hogs require but little housing. There are springs and running streams of water everywhere, a splendid natural range and an abundance of mast in the large forest areas still existing in the state. Corn and other cereals so commonly and successfully used in the production of pork are easily and cheaply produced, and a variety of forage crops, including the clovers and many other legumes thrive remarkably well. Rape, the plant which has been successfully used for hog production throughout the northern states but whose qualities we are only beginning to appreciate, takes kindly to our soil and climate. Red clover finds in our red clays a natural heritage. Sorghum, soja beans, hairy vetch, artichokes, the velvet bean, the cowpea and Spanish peanuts all thrive well singly and some of them in combinations, producing as rich and fine mixtures for hog pasture as can be produced anywhere.

The soja bean and cowpea are worthy of special mention as they will both grow on poor soil, and besides producing vines that are much relished by the hog, the fruit is abundant and the grain highly nutritious, producing a fine admixture of fat and lean in the pork, while the quality and flavor imparted are unsurpassed. Owing to the mild and open weather of autumn, these crops may be pastured off and the grain gathered by the

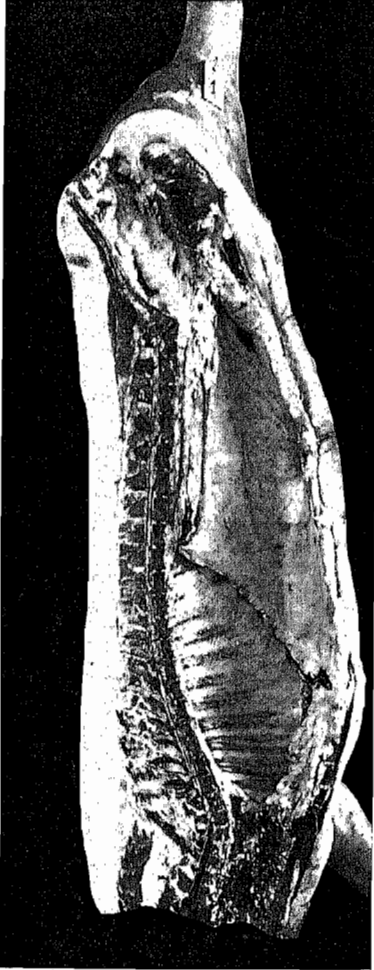
fattening hogs. Hogs can be successfully pastured from the middle of August until December, if so long a fattening period were necessary. If very rapid fattening is desired, the addition of corn to the ration will prove advantageous.

The question of how to harvest the cowpea crop is frequently raised.

Why should it remain such a vexed problem, considering the present remunerative prices of pork and the fact that the hogs will harvest the peas, growing, fattening and enriching the soils at the same time? Surely nature has made generous provisions for the development of the swine husbandry on a phenomenal scale in the south. Why should not our people avail themselves of these natural advantages? It must be due to a failure to fully comprehend the splendid opportunities which environment has placed at their disposal.

WHY NOT PRODUCE OUR OWN HOG PRODUCTS

The quality of stock generally possessed by the farmer may have something to do with this, for hogs deficient in blood will not make money. Hogs of inferior blood are not so prolific, they do not thrive so well, and as they neither make the quality of pork nor the gains desired from a given supply of food, the profits from feeding as generally figured up by the farmer have not been entirely satisfactory. It is safe to say that with a better quality of stock and with the employment of more modern ideas and business methods in handling and fattening the hogs that satisfactory profits are assured. The lack of



A representative side from I. of I. Too short.
Ham too light.

packing houses, at least until quite recently, and high freight rates have been detracting influences. Hog cholera has also been a dreaded scourge, though no worse here than elsewhere. It has been wantonly spread by permitting diseased hogs to lie where they died and be feasted upon by buzzards. Hog cholera is not a serious question with our farmers if they

will burn or destroy diseased carcasses and thus prevent the buzzards from spreading the disease and the small streams and springs from becoming contaminated.

STATISTICS OF HOG PRODUCTION

According to the census of 1900, there are 63,297,249 hogs in the United States. Of this number 1,885,000 are found in Tennessee. The population of Tennessee is about 2,020,000, so that there is less than one hog owned for each citizen. Tennessee leads all the south Atlantic and south central states in the number of hogs held on farms with the exception of Kentucky. The number of hogs held on southern farms is therefore inadequate to supply the needs of the population. At the present time the south is paying a heavy tribute to the farmers of the central west for hog products, and this in the face of the finest natural environments for pork production; in spite of the possession of a splendid home market and the ability to produce the highest quality of pork at a very low cost. Surely the outlook for the development of swine husbandry in the south is very bright. The population of the United States in round numbers is 76,500,000 and rapidly increasing. The market for pork products at home and abroad never was better than it is today. There is less than one hog held on the farms for each citizen, and especially is this true of the south. The southern farmer ought to supply his home markets with their meat; he ought to have more hogs to sell, and keep at home the millions of dollars now annually sent north for hog products.

WHY DEVELOP THE SWINE BUSINESS

There are many good business reasons why our farmers should develop swine husbandry. It is easier for the poor farmer or the small farmer to get a start in the hog business than in any other line of animal husbandry. His breeding stock to commence with costs him comparatively little and he can start on a small scale and develop a greater business in less time than with any other class of farm stock. Hogs are remarkably prolific if well treated. Then, a herd of hogs should be kept on every farm to consume the waste products, such as the kitchen slops, the skim milk, buttermilk, and the fruits from the orchard. It is safe to say that there is enough food wasted on the average farm to successfully fatten a large number of hogs every year. Swine breeding and feeding, all things taken into consideration, is one of the most profitable lines of husbandry to engage in. The returns from the capital invested come quickly and the per cent of gain under good management is very large.

PROBLEMS IN HOG FEEDING

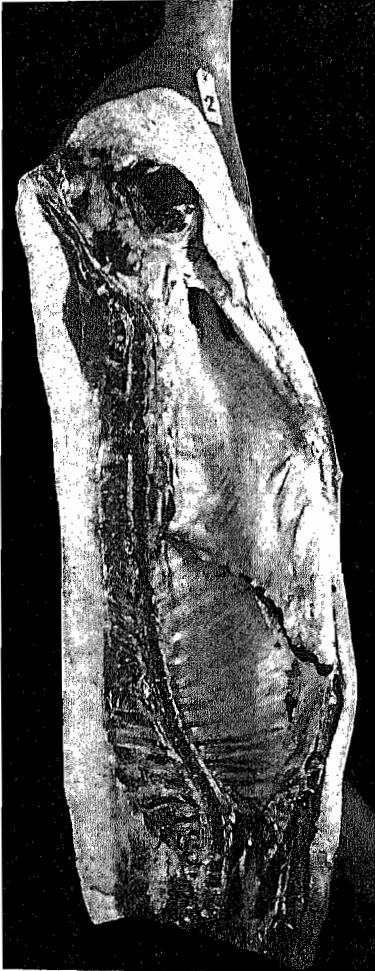
The present bulletin is an initial attempt to solve some of the problems most closely associated with successful pork production. Comparatively little has been done along this line in the south, and it is evident from the results shown in the present report that it is a field worthy of the most careful investigation. Hitherto hogs have been principally fattened on whole corn, or crushed corn and cob meal and water. Forage crops have only been used to a limited extent, and cereals and legumes virtually not at all. The question of producing a fine quality of bacon as compared with the soft and over-fattened lard pork generally put on the market has never received any attention. It appears that the field of investigation is comprehensive and intensely interesting and that a better knowledge of the proper combi-

nation and utility of the leading food products will show where large profits previously lost sight of may be obtained in the future.

PURPOSE OF THE EXPERIMENT

The stock used in these experiments consisted of 11 high grade Chester White hogs. Other breeds, as the Berkshire, Poland China or Duroc-Jersey, might have been appropriately used had they been available as they

are all well adapted to the state. The 11 hogs were divided into four groups, each group receiving a special ration, the object being to test the relative economy of four different methods of feeding swine. The hogs were confined in large pens and the meal and other foods fed from troughs. They were not permitted to take any exercise beyond that obtained in the pens. One side of the building was practically open, admitting plenty of light and air. The hogs were fed regularly twice a day, the food being weighed to them and the refuse if any cleaned out of the troughs and weighed and deducted from the total food fed. The hogs were weighed once every 10 days, and the ration was adjusted as far as possible to suit the needs of the different groups.



Typical side from Lot II. Too fat on the back and belly, and too thick through the shoulder.

SUMMARY OF RATIONS USED

Lot I Water 10 pounds, corn meal 6 pounds at the beginning of feeding period.

Water 16 pounds, corn meal 8 pounds at the end of feeding period.

Lot II Skim milk 18 pounds, corn meal 6 pounds at the beginning of feeding period.

Skim milk 40 pounds, corn meal 8 pounds at the end of feeding period.

*There were only two hogs in Lot IV. Circumstances prevented this Lot from being made uniform with the others.

Lot III Skim milk 12 pounds, corn meal 4 pounds for first 15 days.

Whey 40 pounds, corn meal 6.25 pounds, wheat meal 1.75 pounds at the end.

(An effort was made to feed this lot some sorghum silage, but they only consumed 5 pounds in 15 days. In working up the results no account was taken of this at all.)

Lot IV Skim milk 8 pounds, pea hay 4 pounds, corn meal 2.66 pounds at the beginning.

Skim milk 26.75 pounds, pea hay 1.5 pounds, corn meal 5.5 pounds at the end.

The hogs were fed for 60 days, the time being divided into two periods of thirty days each. The rations as given were for a *single feed* in each Lot and as the hogs were fed both morning and night each Lot consumed twice the amount of food indicated. The accompanying tables give the summarized data of the experiments and their perusal should prove instructive to all persons interested in hog feeding:

TABLE I Gain in Live Weight, Cost of Food, Etc.

PERIOD I

Lot	Lbs. Gain			Cost of Feed		Value of Gain	Profit on Feeding
	Total Lbs.	Per Group	Per Head	Total	Per Lb. of Gain--Cts.		
I	98	3.2	.....	\$3.32	3.3	\$5.39	\$2.07
II	214	7.1	.....	8.26	3.8	11.77	3.51
III	206	6.8	.....	6.84	3.3	11.33	4.49
IV	123	4.1	.....	6.22	5.0	6.77	.55

PERIOD II

I	88	2.9	.....	\$4.07	4.6	\$4.84	\$.77
II	199.5	6.6	.....	9.35	4.6	10.97	1.62
III	195.5	6.5	.....	7.00	3.5	10.75	3.75
IV	122.5	4.0	.....	6.75	5.5	6.75	.00

SUMMARY OF WHOLE PERIOD

I	186	3.0	1.0	\$7.39	3.9	\$10.23	\$2.84
II	413.5	6.9	2.3	17.61	4.2	22.74	5.13
III	401.5	6.7	2.2	13.84	3.4	22.08	8.24
IV	245.5	4.1	2.0	12.97	5.2	18.52	.55

VALUE OF FOOD STUFFS

The foodstuffs used in the experiment were valued as follows:

	Ton.
Corn meal	\$17 00
Pea hay	13 50
Wheat meal	25 00
	Per 100 lbs.
Skim milk	22 cts.
Whey	11 cts.

GAIN IN LIVE WEIGHT

Table I shows the gain in live weight, the cost of food, the value of the gain and the profit therefrom for period I and II and for the whole period. The best gains were made by each lot in period I, both per lot and per head. This is as would be expected, the ratio of gain decreasing as the experiment progressed and with the advancing age of the swine. Lot I consisting of three hogs made a gain of 186 pounds in 60 days, or 1 pound per head per day. Lot II made a gain of 413.5 pounds, or 2.3 pounds per head per day; Lot III, 401.5 pounds or 2.2 pounds per head per day; and Lot IV, 245.5 pounds, or 2 pounds per head per day. It cost more to feed the hogs during the second period than the first period. Owing to the smaller increase made in period II, the profit was much less than in period I. The cost of the feed of Lot I was \$7.39, or 3.9 cents per pound of gain; \$17.61 with Lot II, or 4.2 cents per pound of gain; \$13.84 with Lot III, or 3.4 cents per pound of gain; and \$12.97 with Lot IV, or 5.2 cents per pound of gain. The profit on feeding with Lot I was \$2.84; Lot II, \$5.13; Lot III, \$8.24; and with Lot IV, 55 cents.

COST OF THE FOOD

Table II, besides showing the cost of the food per day and per head, exhibits the profit on the original weight of the hogs and the profit on feeding. It is observed that with Lots I, II and III, a gain of between \$4.32 and \$4.38 was made on the original purchase weight by reason of the feeding. The profit made on the actual foods consumed varied, as already indicated, from 55 cents to \$8.24. *The results demonstrate beyond all question the importance of putting hogs and all other classes of stock in the best possible market condition.*

TABLE II Showing the Profit on Feeding by Groups

Lot	Cost of Feed Per Day		Profit on		Total Profit
	Per Lot—Cts.	Per Head—Cts.	Original Weight	Feeding	
I	12.3	4.1	\$4.32	\$2.84	\$7.16
II	29.3	9.7	4.84	5.13	9.47
III	23.0	7.6	4.38	8.24	12.62
IV	21.6	10.8	2.95	.55	3.50

Farmers often say that there is but little profit in feeding hogs as the food consumed so frequently just about equals the cost of the gain obtained, but they overlook the fact that the whole carcass is improved and

made more valuable by reason of the feeding. If they consider the matter from this standpoint, they could afford to feed hogs without profit on the food consumed by reason of the satisfactory profit they would make on the whole animal. In figuring out the profits it should be borne in mind that skim milk is more or less of a waste product on the average farm. Unfortunately, it is not ordinarily fed to hogs for two reasons: first, because its full value is not often appreciated, and second, because it is not available. More cows ought to be kept on the average farm and all the skim milk and waste products fed to hogs.

TABLE III Food Consumed
PERIOD I

Lot	Corn Meal		Wheat Meal		Skim Milk		Total Am't of Food Consumed Per Lb. of Gain
	Total Lbs.	Per Lb. of Gain	Total Lbs.	Per Lb. of Gain	Total Lbs.	Per Lb. of Gain	
I	391	3.9	.....	.....	.....	.....	3.9
II	393	1.8	.....	.....	2238	10.4	12.2
III	342.5	1.6	43.5	.2	993.7	4.8	11.9
IV	258.	2.1	*125.	*1.0	†1102.5	†5.8	14.9

PERIOD II

I	479	5.4	.....	.....	.....	.....	5.4
II	479	2.4	.....	.....	2400	12.0	14.4
III	372.3	1.8	104.8	.5	†2301	†11.7	14.0
IV	331.5	2.7	*59.5	*.4	1612.5	13.0	16.1

SUMMARY OF WHOLE PERIOD

I	870	4.6	.....	.....	.....	.....	4.6
II	872	2.1	.....	.....	4638	11.2	13.3
III	714.8	1.7	148.8	.4	993.7	2.5	13.1
IV	718.5	2.9	*247.	*1.0	†3403.5	†8.5	16.4

* Chopped cowpea hay.

† Whey.

THE RELATIVE VALUE OF THE FOODS

The food consumed is shown in Table III and for the convenience of the reader is presented by periods. It took 4.6 pounds of corn meal to make a pound of gain with Lot I; 2.1 pounds of corn meal and 11.2 pounds of skim milk per pound of gain with Lot II; 1.7 pounds of corn meal, .4 pounds of wheat meal, 2.5 pounds of skim milk and 8.5 pounds of whey with Lot III per pound of gain; and with Lot IV 2.9 pounds of corn meal, 1 pound of chopped pea hay, and 12.5 pounds of skim milk to make a pound of gain. A measure of corn meal weighing 56 pounds would thus produce 12.1 pounds of gain, which at the selling price of the hogs, 5.5 cents a pound, would make it worth 66.7 cents per weighed bushel. Farmers ordinarily sell their corn in the ear for 40 cents a bushel. According to these results they are losing about 25 cents per

bushel by not feeding it to hogs. By the addition of 11.2 pounds of skim milk per day to the ration of Lot II, the amount of corn meal consumed was reduced to 2.1 pounds, or considerably less than one-half of the amount required for a pound of gain in Lot I. Figured on the basis of the gain shown in Lot I where corn meal was shown to be worth 66.7 cents per



This side from Lot III while showing less fat than Lot II, is too short and thick.

bushel, the substitution of 11.2 pounds of skim milk effected a saving of 3.17 cents worth of corn meal, which would give the skim milk an approximate feeding value of 28.3 cents per 100 pounds. Owing to both skim milk and whey being used in Lot III, the feeding value of whey can not be worked out, but it is quite evident from the results that it had a higher feeding value in these experiments than was accorded to it in the paragraph showing the estimated value of the foodstuffs consumed. The fact that the largest profit was made by Lot III shows that the addition of wheat meal and whey to the ration was very effective. It is evident that by the use of skim milk, which is practically a by-product on the farm, the amount of corn meal required to produce a good gain can be greatly reduced and a large saving effected thereby, so that where skim milk, whey and other dairy by-products are available, a much larger number of hogs could be fattened on a given supply of corn, a factor of the utmost importance to the farmer.

By the use of 2.5 pounds of skim milk and 8.5 pounds of whey coupled with .4 pounds of wheat meal, the amount of corn meal required for a pound of gain was reduced to 1.7 pounds. From the large increase in weight and profit made by this

lot (See Table I), it is evident that better results will be obtained by substituting wheat meal for a portion of the corn meal contained in the average farm ration. Corn is exceedingly rich in carbohydrates and produces fat

very rapidly, but the addition of a small quantity of wheat meal, rich in protein, seems to have had a very favorable effect on the rate and cost of gain in these experiments. Whey which is ordinarily believed to have a very low feeding value, will probably give better results with hogs than any other class of stock, because of its high sugar content which makes it a good fat former. The addition of the small amount of protein contained in the wheat meal and in 2.5 pounds of skim milk seems to have been very effective.

UTILIZE THE BY-PRODUCTS OF THE FARM

It is plain from the foregoing statements that the small and imperfect grains of wheat and the waste from cleaning the grain for market should be ground and might then be very profitably used in hog feeding, thereby reducing the amount of corn needed for a pound of gain. It also appears that kitchen slops which are frequently overlooked and which will often have as high a feeding value as whey can be utilized to advantage with a small quantity of skim milk. Thus, by the use of the waste wheat and the kitchen slops the amount of corn needed may be considerably reduced and a given amount of corn and skim milk made to go much further in pork production.

These are matters of grave importance to the farmers and ones that should favorably effect the production of pork. The importance of reducing the corn consumption for a pound of gain and substituting waste and perishable products is a matter of dollars and cents to every farmer.

As hogs have made such fine gain on pea vines in the field and as pea vine hay is rich in protein, besides containing a considerable amount of grain, it was thought that by the addition of some chopped pea vine hay to the ration the amount of corn fed could be lessened and the cost of producing a pound of gain reduced. The hogs could not be induced to eat the chopped hay satisfactorily and this may account for the poor showing of the ration. Unless better results can be obtained in the future, it must remain an unsatisfactory food for fattening swine.

TABLE IV Consumption of Dry and Digestible Matter

Lot	Dry Matter Consumed in			Digestible Matter Consumed in			Dry and Digestible Matter Consumed per Lb. of Gain	
	Period I	Period II	Whole Period	Period I	Period II	Whole Period	Dry Lbs.	Digestible Lbs.
I	348.4	426.8	775.2	308.5	377.9	686.4	4.16	3.69
II	560.4	652.4	1212.8	498.1	579.5	1077.6	2.93	2.60
III	510.3	579.5	1089.8	462.9	514.0	976.9	2.71	2.43
IV	516.9	500.0	1016.9	388.6	427.0	815.6	4.14	3.32

CONSUMPTION OF DRY AND DIGESTIBLE MATTER

Table IV shows the consumption of dry and digestible matter for a pound of gain. Lot I consumed 4.16 pounds of dry matter; Lot II, 2.93 pounds; Lot III, 2.71 pounds and Lot IV, 4.14 pounds of dry matter for a pound of gain. It is apparent that the lot consuming the smallest amount of dry matter made the largest and most uniform gain.

Lot I consumed 3.69 pounds of digestible matter for a pound of gain; Lot II, 2.60 pounds; Lot III, 2.43 pounds and Lot IV, 3.32 pounds of digestible matter. It thus appears that the largest number of pounds of gain and the largest profit were made by Lot II and III though consuming much less digestible matter for a pound of gain than the other Lots.

COST OF THE HOGS

The hogs used in the experiments were bought from a farmer and at the time weighed between 130 and 145 pounds. They were bought at the regular market price ruling for hogs at that age and condition on the Knoxville market. They cost \$71.94, or 4.5 cents per pound. They were sold at 5.5 cents per pound and netted \$153.72. They were fed on bought grain and on waste products, and the gross profits made, as shown by the experiment, amount to \$81.78 on the 11 hogs. *If such satisfactory results could be obtained by the station, is it not strange that the farmer who grows his own products at less cost than the foods purchased and fed by the station should not be able to feed hogs at a good profit?* He most assuredly can, and his failure to do so must be because he does not realize the profits to be made from the business. Hogs are a useful adjunct on every farm; they are especially so on a dairy farm as borne out by the utilization of the skim milk and whey in these tests. With these facts before him and with the necessity of making every dollar of profit on the farm, can the farmer any longer afford to neglect such a profitable line of stock husbandry.



A characteristic side from Lot IV, showing too much fat on back and belly.

NUTRITIVE RATIOS

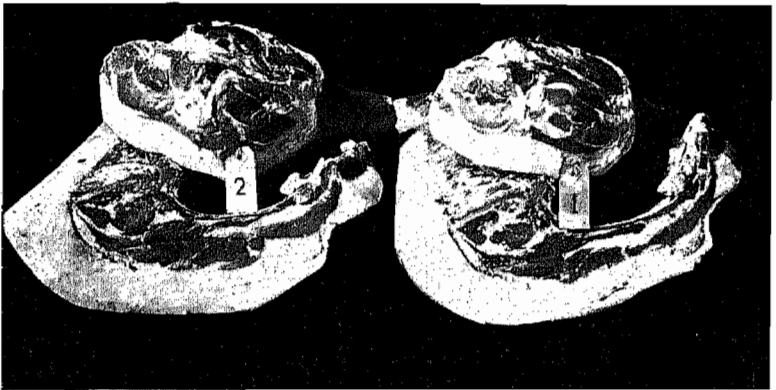
The nutritive ratios of the food consumed by Lots I, II, III and IV in period I and period II and the whole period are shown in the accompanying table. It is interesting to examine these because it is seen that similar ratios may vary widely in

composition and will accordingly have a very different effect on both the rate of gain and the profit derived therefrom. It is only necessary to compare the four rations and refer to the tables showing the pounds of gain and the profits to arrive at a clear understanding of the importance of

NUTRITIVE RATIOS

Lot	Period I	Period II	Whole Period
I	1:9.8	1:9.8	1:9.8
II	1:4.5	1:4.7	1:4.6
III	1:4.6	1:7.1	1:6.9
IV	1:8.4	1:4.3	1:4.4

considering carefully the nature and character of the foods entering into the composition of a ration. A moderately wide ration containing considerable protein, as that fed to Lots II and III, gave better results than the wide ration fed to Lot I, whereas the narrow ration of Lot IV was not as satisfactory as a wider one though the difference noted may very properly be attributed to the use of pea vine hay in the ration of Lot IV.



Lot II Corn Meal and Skim Milk.

Lot I Corn Meal and Water.

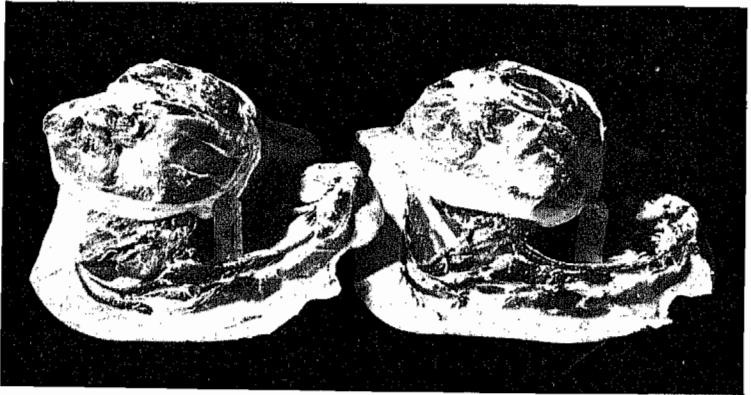
These rations produced too much fat. Notice the thickness of the fat on both the ham and side meat.

TABLE V Showing the Net Profit on Feeding

Lot	Profit from Feeding	Value of Manure	Total Profit	Cost of Care	Net Profit
I	\$ 7.16	\$2.06	\$ 9.22	\$1.53	\$ 7.69
II	9.47	4.12	13.59	1.53	12.06
III	12.62	3.80	16.42	1.53	14.89
IV	3.50	2.15	5.65	1.53	4.12

THE PROFIT ON FEEDING

Table V shows the net profit from feeding, the value of the manure, the total profit, the cost of care and the net profit. The value of the manure was highest with Lot II, being \$4.12, and lowest with Lot I, or \$2.06. The cost of care figured on the basis of the time required by the man to feed and handle the hogs was \$1.53 per lot. The net profit on feeding and the improvements of the carcass combined was \$4.12 with Lot IV, \$7.69 with Lot I, \$12.06 with Lot II and \$14.89 with Lot III. These results can not be emphasized too strongly as they show beyond question the importance of considering the rations used in feeding hogs where the rapid and economical production of pork is the object kept in view. If the 11 hogs had been fed as in Lot IV, the profit would have been \$16.48; if as in Lot I, the profit would have been \$30.76; if as in Lot II, \$48.24; and if as in Lot III, \$59.56. *The difference in profit in feeding an ordinary bunch of 11 hogs on an average farm may amount in an extreme case to \$43.08, according to these figures.* Is it any wonder considering how hogs are generally fed that it is frequently not regarded as a profitable business? Intelligent thought and study must be given the problem of hog feeding to get the most out of it. As a matter of fact, Lot I received the rations ordinarily fed on the average southern farm, yet if feed as in the case of Lot II the profit might have been \$48.24 and with Lot III, \$59.56. Surely these matters are of vital



Lot IV Corn Meal, Pea Vine Hay
and Skim Milk.

Lot III Corn Meal, Wheat Meal
and Whey.

These rations produced a much better blending of the fat and lean meat, and consequently a better quality of bacon, and a ham showing less fat.

importance and the question of feeding hogs rationally and intelligently worthy of careful consideration. The actual total profit on 11 hogs for 60 days, as shown by these experiments, is \$38.76. The actual per cent made on the investment of \$71.94 was 53.9. There is certainly a business aspect to pork production which is all too frequently overlooked. If the station can go out and buy 11 hogs at the prevailing market price and feed them for 60 days at a profit of \$38.76, surely the farmer who raises his own foodstuff can make a greater gain. The farmer should

not sell his animals when they are half finished unless in a very exceptional case. The finished animal brings a higher price and a larger profit.

TABLE VI Slaughter Test

Lot	Live Weight —Lbs.	Dressed Weight—Lbs.	Loss in Slaughtering —Lbs.	% of Good Meat %	Intestinal Fat—Lbs.
I	618	455	163	73.6	13
II	847.5	667	180.5	78.5	16
III	839.5	640	199.5	76.2	16
IV	535.	416	119.0	77.7	9

THE SLAUGHTER TESTS

Table VI shows the results of the slaughter test. The loss in slaughtering in Lot I was 163 pounds; in Lot II, 180.5 pounds; in Lot III, 199.5 pounds; and in Lot IV, 119 pounds. The per cent of good meat ranged from 73.6 with Lot I to 78.5 with Lot II. Lot IV was second with a percentage of 77.7. The increased percentage of valuable meat made by Lot II over Lot I amounts to 4.9 per cent, a matter of material importance where a considerable number of hogs are being fed. The percentage of dressed meat that a number of hogs will make is of course a matter of prime importance to the buyer, and when a farmer demonstrates that his hogs will dress out better than the average hog he is certain to get a better price for his animals. The money in pork production as in every other legitimate business is made by giving the closest attention and study to the little details which in the aggregate measure the per cent of profit or loss. *The half tones shown in the text indicate the influence of the different rations on the flesh and fat of the several Lots.*

SUMMARY OF RESULTS

1 According to the census of 1900 there are 1,885,000 hogs on Tennessee farms. The population of the state is about 2,020,000, so there is less than one hog owned for each citizen.

2 Lot I made a gain of 186 pounds in 60 days; Lot II, 413.5 pounds; Lot III, 401.5 pounds; and Lot IV, 245.5 pounds. The gains per head per day were respectively 1, 2.3, 2.2 and 2 pounds.

3 The cost of the food for Lot I was \$7.39; Lot II, \$17.61; Lot III, \$13.84; and Lot IV, \$12.97. The respective cost of a pound of gain was 3.9, 4.2, 3.4 and 5.2 cents.

4 The profit on feeding with Lot I was \$2.84; Lot II, \$5.13; Lot III, \$8.24; and with Lot IV, 55 cents.

5 It required 4.6 pounds of corn meal to make a pound of gain with Lot I; 2.1 pounds of corn meal and 11.2 pounds of skim milk with Lot II; 1.7 pounds of corn meal, .4 pounds of wheat meal, 2.5 pounds of skim milk and 8.5 pounds of whey with Lot III; and 2.9 pounds of corn meal, 1 pound of chopped pea hay and 12.5 pounds of skim milk to make a pound of gain with Lot IV.

6 According to these results when pork sells for 5.5 cents a pound,

corn meal is worth 66.7 cents per bushel of 56 pounds. This is 26.7 cents per bushel more than farmers ordinarily get for their ear corn.

7 The results of these experiments indicate that skim milk has an approximate feeding value of 28.3 cents per 100 pounds.

8 Corn is exceedingly rich in carbohydrates and the addition of a small amount of wheat meal which is high in protein to the ration of Lot III seemed to have a very favorable effect on the rate and cost of gain. In these tests they had a considerably higher feeding value than is generally accorded it.

9 The consumption of dry matter per pound of gain with Lot I was 4.16 pounds; with Lot II, 2.93 pounds; with Lot III, 2.71 pounds; and with Lot IV, 4.14 pounds. There was no relation between the consumption of dry matter and a pound of gain, though it is apparent that the elements entering into the composition of the dry matter materially effected both the rate and the cost of gain.

10 It appears from these experiments that the farmer should finish his animals before placing them on the market. The 11 hogs used in these experiments were bought from a farmer but half finished. They cost \$71.94, or 4.5 cents per pound; they were sold at 5.5 cents per pound and brought \$153.72. This left us a gross profit of \$81.78 on the 11 hogs which the farmer who sold them might as well have made.

11 The net profit on the four lots of hogs was \$4.12 with Lot IV; \$7.69 with Lot I; \$12.06 with Lot II and \$14.89 with Lot III. These results emphasize the importance of paying particular attention to the ration fed, for if all the hogs had been fed on the ration given Lot III the total gain would have been \$59.56, compared with \$16.48 if fed as in Lot IV, indicating a loss of \$43.08.

12 The actual profits on feeding the 11 hogs for 60 days was \$38.76 or 53.9 per cent on an investment of \$71.94.

13 The food consumed effects the slaughter tests very considerably. Lot II dressed 78.5 per cent; Lot IV, 77.7 per cent; Lot III, 76.2 and Lot I, 73.6, or a difference of 4.9 per cent in favor of Lot II, as compared with Lot I.

14 These experiments indicate that hog feeding can be made a profitable business on Tennessee farms; that there is ordinarily enough food permitted to waste on the farm to fatten a good bunch of hogs; that intelligent methods of feeding bring a fair profit and that the farmer should ordinarily finish his own animals as they will then bring the highest market prices.