BULLETIN No. 166 NOVEMBER, 1912

ALABAMA

Agricultural Experiment Station

OF THE

Alabama Polytechnic Institute

AUBURN

CURING MEAT ON THE FARM

BY

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and

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Opelika, Ala.
Post Publishing Company
1912

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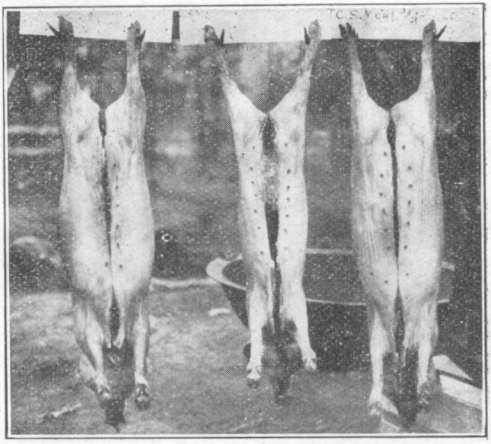


Curing Meat on the Farm

BY

DAN T. GRAY AND L. W. SUMMERS.

INTRODUCTION.

This Station has published several bulletins on the subject of raising and feeding hogs; it has shown that they can be produced at an exceedingly satisfactory profit when proper methods of feeding are followed. However, when the meat is produced only the first part is completed; after the hog is raised the farmer should then know how part of the hog crop can be saved for family use.

While it is more difficult to cure meat on the farm in the South than in the North, yet it is always of very great importance for the southern farmer to know safe and sure methods of curing meat for his family use; when markets are unsatisfactory it is sometimes advisable, too, for all of the meat to be cured at home and sold as cured meats to the neighbors and other consumers. The development of the big packing plants has caused the majority of our farmers to look to them for their supply of cured meats. As a matter of fact, in

many parts of the State it is practically impossible to find a farmer who cures his own meat. In some parts of the State, however, it is coming to be a very rare sight to see a farmer buy cured meats from the grocer or packers. In some cases it may be wise to buy meat from the packer rather than produce and cure it at home, but such cases are extremely rare. Many of our large planters would prefer to cure all of their meat and sell it to the tenants as cured meat if they were sure that no losses would be sustained during the curing process; in fact, there is room in the South for considerable business of this character. Even now many farmers in the State are profitably converting some or all of their hogs into cured meats and lards; ready markets are always at hand for these home-cured meats. Many of our small farmers who do not even produce meat for home use would produce it if they felt reasonably sure that it could be saved after it was made.

OBJECTS OF WORK.

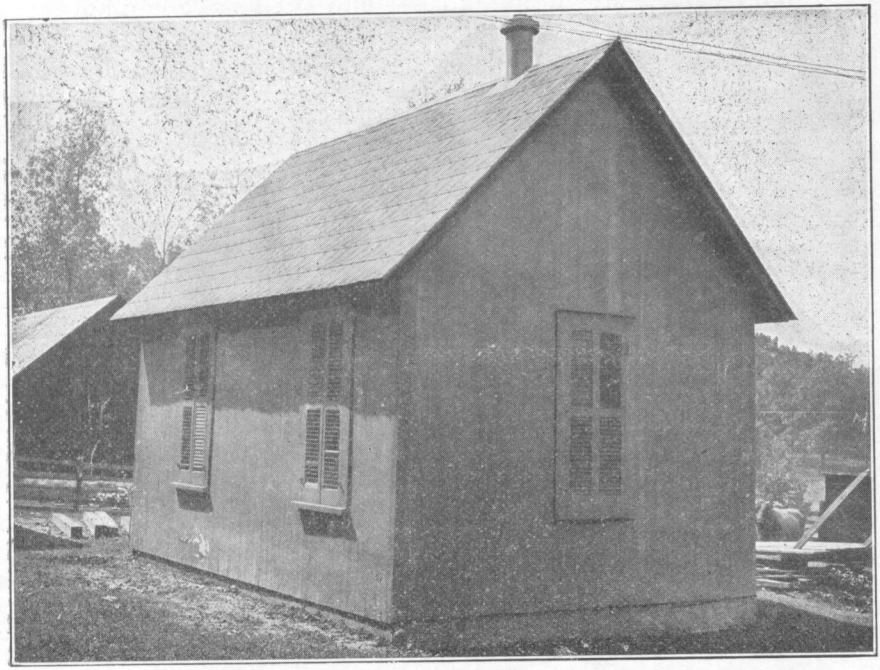
This experimental work was outlined with the following objects in view:—

1. To determine, if possible, a safe and sure method of curing meats without the use of ice. When ice is available it is, of course, a very simple matter to cure meat, but the average farmer will probably never be in position to secure ice for this purpose, so any method developed which involves the use of ice will necessarily have a very limited practical application.

2. To study the shrinkage which takes place in meat during the curing process. Even when the farmer feels that he can cure his meat with absolute safety, he is often in doubt as to whether it is more profitable to sell the hogs on foot or slaughter them on the farm, cure the meat, and sell the cured meats to the neighbors and tenants; this doubt arises largely from the fact that he has a very indefinite conception of the amount of shrinkage in weight which takes place during the curing period.

3. To study the influence of feeds upon the total shinkage during the curing process. The general opinion prevails that meat made from hogs which have been fed upon such grazing crops as peanuts, cowpeas, and soy beans, shrinks very much more during the curing process than that which is made from hogs which have been fed altogether upon dry feeds. Many buyers discriminate sharply against hogs which have been fattened upon peanuts and soy beans, believing that the meat loses in weight excessively when hung in the cooler or smoke house.

When this work was inaugurated in September 1910, a small farm smoke house was built on the Animal Industry farm. The accompanying photograph gives the reader a general idea of the building. Of course, the farmer may not need a house exactly similar to the one



The Smoke House on the Station Farm

shown in the photograph, as this house was built for experimental purposes and is larger than necessary for the average farm. But if meat is to be kept pure, sweet, and free from "skippers" a cement floor is almost an absolute necessity, as such a floor can be easily and completely cleaned; at the same time, it does not furnish places for the "skippers" to live during their resting periods. And too, if the meat is to be smoked correctly and evenly the house should be built high enough so that the meat, after it is hung, is 7 or 8 feet above the floor. When the meat is hung low, the fire underneath many times heats it too much and the first steps towards spoiling are thus begun. Furthermore, when the meat is hung close to the fire the smoke discolors and gives it a very unattractive appearance. While it is not absolutely necessary, it is far better to have the fire entirely outside the smoke house,, and the smoke conducted in by means of a pipe. When this plan is followed the meat is never overheated by accidental flaring up of the fire; the danger of accidental fires is also almost altogether eliminated when the fire is in a stove on the outside of the house. A good farm smoke house should meet the following requirements:—

(a)—Have a cement floor.

(b)—Be not less than 10 feet to the eaves.

(c)—Be made in such a way that the smoke can be held within the building.

(d)—Have the fire entirely outside the building.

(e)—Have an opening near the top for ventilation.

GENERAL PLAN OF THE WORK.

The hams, shoulders, and sides used in the work were taken from hogs which had been finished, or at least partly finished, on various feeds. In order that the effects of feeds on the lards and bodies might be determined the plan of killing one or more hogs from each experimental lot was adopted several years ago. When these individuals were taken from their lots and slaughtered certain pieces of meat were taken from

each animal and introduced into the meat-curing experiment. In this way many direct comparisons were made as to the effect of various feeds upon the keeping quality of the meat and the lard and the subsequent shrinkage during the curing process. As a result of following this plan many of the hogs were small and unfinished at slaughtering time, but the comparisons are nevertheless entirely correct. Some of the hams weighed only 10 pounds gross weight. It is probable that the heavy shrinkage in weight during the curing process was due in part, at least, to the small size of the hams.

On account of the fact that the periods of feeding ended at stated times the killing could not be done during cold times. When a feeding period ended the hogs were slaughtered without regard to weather conditions. On account of this fact several killings were made during extremely warm weather. The farmer, however, can select cold days. On page 190 will be found a summary statement which shows the temperature at each butchering period.

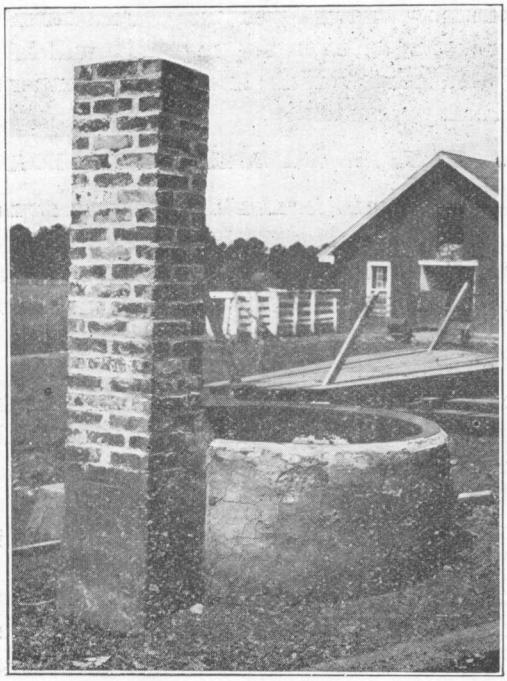
SLAUGHTERING AND DRESSING THE HOGS.

Killing:—To prevent fermentation in the stomach and intestines while the animal is being dressed it is wise to deprive the hog of all feed, except water, for about 24 hours before killing. When fermentation arises the meat is always tainted, as the warm body of the hog takes up objectionable odors very rapidly. The peculiar odors which often-times accompany home-cured meats are very largely due to fermentations which arise in the stomach and intestines after the hogs are slaughtered.

To insure complete and rapid bleeding the hog should be as quiet as possible several hours previous to being killed, and should never be excited or exercised violently immediately before slaughtering. Many farmers stun the hogs with a heavy instrument of some kind before bleeding, but it is thought that more complete bleeding

is accomplished when the hog is simply turned on the back and the heart pierced, or the main artery leading from it severed with a long-bladed knife. If this operation is performed accurately the blood spurts out in a stream and insensibility and death result quickly. The novice may insert the knife into one of the shoulders rendering the piece practically unfit for curing. A blood-shot piece of meat, or one which has not been thoroughly bled, is a very undesirable piece for curing.

Scalding:—Before the hog is killed the scalding water should be ready, as no accidents or unnecessary delays should occur after the hog is killed; the internal organs should be promptly removed. The average farmer can make use of a barrel for holding the hot water; it may be heated in kettles, or hot stones and irons may be placed in the barrel of water. In this experimental



work a larger iron kettle mounted on a brick furnace was employed. When large numbers of hogs are to be dressed it will pay to build a scalding vat similar to the one shown in the accompanying picture.

As soon as the animal is dead the body should be placed in hot water and kept there until the bristles along the back and the hair on the feet slip readily and easily, keeping the body in constant motion all the while. The time required for the hair to slip varies with the temperautre of the water, the higher the temperature of the water the quicker the hair becomes loosened. It is usually stated that the water should be at 190° F. but it is wise to have the water much below this temperature. The water should be as low in temperature as possible and at the same time cause the hair to loosen within a reasonable length of time. If the temperature is as high as 190° there is danger of "setting" the hair when accidents, which cause the body to remain in the water a few seconds too long, occur. When the temperature of the water is low the operators have ample time to arrange matters after accidents or slips. The following data have been collected on this point since the meat curing work was inaugurated:

TABLE 1.—*Relationship Between Temperature of Water and Loosening of Hair.*

Temperatures	Average number of seconds for hair to slip.	Number of hogs.
150° - 155°	72.5	10
156° - 160°	55.0	6
161° - 165°	49.3	11
166° - 170°	38.0	24
171° - 175°	39.4	10
176° - 180°	31.9	7
181° - 185°	32.0	3
186° - 190°	23.7	3
191° - 195°	20.0	1

A temperature of 150° to 155° loosens the hair and makes it slip readily but the body of the animal must be held in the water more than one minute; this, however, is a very great advantage as the danger of "setting" the hair is very small indeed. Ten hogs were scalded at temperatures ranging from 150° to 155° and, on the average, the hair became loose in 72.5 seconds. Three hogs were put in water with temperatures ranging from 186° to 190°; in these cases the bodies remained in the water an average of only 23.7 seconds. For the sake of safety a temperature not higher than 175° should be used.

Dressing:—As soon as the hair was thoroughly removed the bodies were hung up, washed with clean, cold water, and the internal organs removed. This was done before gases developed in the intestinal track. After the hogs were dressed the carcasses were opened as wide as possible in front and hung in as cool a place as possible until the following morning when the cuts to be used in the experimental work were secured and the remaining parts sold to the local butcher. The carcasses were not, therefore, cut up until the morning following the killing; many good farmers, however, cut the bodies into rough pieces very soon after the hog is dressed. The experimental pieces were made ready and immersed in the brine very early the next morning, before the warm part of the day. If the weather is unusually cold the day following the killing it is probably wise to rub the pieces of meat with salt and let them stand over one day before putting in the brine or salt; in this work, however, the meat was always placed in the brine or salt the morning following the killing.

The Brine:—The average farmer will not introduce complicated and tedious methods into his work, so exceedingly simple and straight-forward plans were used in curing the meat and making the brine. As the brine must be perfectly cool when the meat is immersed it should be made the day before using. The following

receipt was employed to make the brine for the meat which was cured in the salt peter solution:

To each 100 pounds of meat:—

12 pounds of common salt,
3 pounds of brown sugar,
3 ounces of salt peter,
6 gallons of water.

Ordinary syrup may be used in place of the brown sugar. These articles were all placed in a kettle and boiled gently for about two hours, then set aside until ready for use. Any kind of a clean vessel, as a jar or barrel, may be used for holding the brine and hams, but clean syrup barrels were used in this work. Extreme care was exercised to obtain new and thoroughly clean barrels; no old and tainted barrels were used. After the pieces of meat were neatly trimmed into the proper shape and size they were laid in barrels with the meat side up, a heavy weight placed upon them, and the brine poured in. The brine was examined every few days; it sometimes became "ropy," and spoiled completely in one or two cases. When the brine showed signs of becoming "ropy" or tainted the trouble was usually checked by removing the meat, dropping in a small amount of common soda, and stirring well. Once or twice, however, it was necessary to make an entirely new brine. When this was done the meat was taken out, thoroughly washed, and put down in new brine and barrels.

Some meat was cured in a brine where no salt peter was employed, but with that exception the second brine was made exactly as outlined above.

Subsequent tables show the number of days the meat was kept in the brine and salt.

Smoking:—When the meat had been in the brine or salt a sufficient length of time it was taken out, hung up, allowed to drip for two or three days, and the smoke applied. The first year corn cobs were used for producing the smoke, but green hickory chips were em-

ployed the following year. The meat was hung approximately 8 feet above the fire. Of course, the fire was not permitted to blaze; it was kept closely smothered so that a satisfactory volume of smoke would be produced and the meat would not be heated. Many farmers smoke their meat at irregular intervals for 20 to 40 days, but in this work it was smoked, on the average, probably 48 hours. At the end of this time it seemed that the proper color had been secured, and no reason could be seen for continuing the process.

As stated before, it is advisable to have the fire completely outside the smoke house, but on account of nearby inflammable material it was impossible for an outside fire to be made in these tests, so the fire was made in the house and directly under the meat. In order to afford a means of escape for the excessive smoke and heat a small ventilator was made at the top of the house. When the fire was low the ventilator was closed; when it was burning freely the ventilator was usually open.

Sacking the Meat:—The majority of our farmers permit the meat to hang in the smoke house, unprotected from flies and other insects, during the spring and summer months. This is an unwise thing to do unless the house has a cement floor, is dark, and all openings thoroughly protected by wire screening. Meat which hangs unprotected in the average smoke house is almost sure to become infested with "skippers." In these tests the meat was allowed to hang unprotected in the smoke house for one or two days after smoking; it was then taken down and prepared for the summer season. The individual pieces of meat were first wrapped closely with old newspapers or wrapping paper. They were then placed in strong sacks and each bag tightly tied at the top. The sacks were then given a thick coat of paint on the outside. This paint solution was made of the following substances:—

0.6 pounds of barium sulphate
0.1 pound of common glue
0.2 pound lead chromate
0.1 pound common flour.

The flour was dissolved in about 4 gallons of water, while the lead chromate was dissolved in about two quarts of water in a separate vessel. The lead chromate solution, together with the glue, were now added to the flour solution, when the whole mixture was brought to a boil and the barium sulphate added slowly while stirring. This solution should be made the day before using. It may be applied with a brush, or the sack, before placing the meat in it, may be dipped in the solution. The meat is ready to be hung up for the summer just as soon as the above solution is applied to the bags and should not be molested until ready for sale or use.

All of the above chemicals may be obtained at the local drug store. Some drug houses, however, do not have the barium sulphate in stock, but the proprietor can secure it on a short notice. It is very important that the barium sulphate be in the solution; our experience has taught us that when it is left out beetles and skippers are very apt to attack some of the pieces.

RELATION BETWEEN TEMPERATURE AT KILLING TIME AND SAVING THE MEAT.

As previously stated, cold days were not selected when the hogs were slaughtered; no attention whatever was given to weather conditions. Even with this entire neglect of weather conditions it is seen that the meat which was put away early in the winter kept perfectly.

TABLE 2.—*Effect of Temperature on the Saving of Meat.*

Date of Killing 1910-1911	TEMPERATURE		NOTES
	When hogs were slaughtered	Following morning before sunup	
Nov. 15	58° F. (In sun) 46° F. (In shade)	54° F.	All meat kept perfectly.
Dec. 13	58° F. (In sun) 46° F. (In shade)	35° F.	All meat kept perfectly.
Dec. 19	52° F. (In sun) 48° F. (In shade)	42° F.	All meat kept perfectly.
Jan. 4	31° F. (In sun) 29° F. (In shade)	26° F.	All meat kept perfectly.
Jan. 19	54° F. (In sun) 48° F. (In shade)	44° F.	All meat kept perfectly.
Jan. 27	72° F. (In sun) 70° F. (In shade)	56° F.	One ham spoiled while in brine.
May 10	102° F. (In sun) 92° F. (In shade)	69° F.	All meat spoiled by May 15th.
May 17	110° F. (In sun) 95° F. (In shade)	83° F.	All meat spoiled within 4 days.
March 29	64° F. (In shade)	54° F.	All meat spoiled soon after smoking.
April 26	62° F. (In shade)	60° F.	All meat spoiled by May 9th.
May 3	78° F. (In shade)	60° F.	All meat spoiled while in brine.
Dec. 8	70° F. (In shade)	(?)	All meat kept perfectly.
Jan. 11	41° F. (In shade)	48° F.	All meat kept perfectly.
Feb. 15	65° F. (In shade)	45° F.	All meat kept perfectly.
Feb. 18	(?)	45° F.	All meat kept perfectly.
March 15	48° F. (In shade)	(?)	All meat kept perfectly.

From the above notes it may be seen that no trouble was experienced in keeping meat when the hogs were slaughtered during the winter months, no matter how warm the day on which the animals were killed. On January 4, 1911, the thermometer registered 31° F. in the sun; this was the only day during the whole series of tests when the temperature was down to freezing. On December 8, 1911, the temperature was 70° F. in the shade but the meat all kept perfectly. All of the meat which was put down in April and May, and a part of that prepared in March, spoiled within a few days after the curing process began. The tests clearly show that it is not absolutely necessary to have freezing weather when the hogs are killed and the meat packed down. As a matter of farm practice, however, it is seldom necessary to kill hogs during the warm days; cold days can almost always be selected for this work, and when such days are selected there is absolutely no reason why the meat should not be kept perfectly.

SHRINKAGE DURING THE CURING PROCESS.

Total Shrinkage:—Many buyers are under the impression that the meat of a hog which has been fed on peanut and similar pastures shrinks very much more during the curing process than that from an animal which has been fed nothing during the fattening period except dry feeds, as corn or corn and tankage. This opinion is so well grounded in the minds of both the buyer and the farmer that a very great discrimination is often made against the peanut-fed hog. The following table shows the shrinkage which occured in meats which had been taken from hogs fed upon widely different rations, some of the rations being made up entirely of green pasture crops:

TABLE 3.—*The Total Loss in Weight of Meat Made from Hogs fed upon Various Rations.*

Year	Part of hog.	Foundation Ration	Finishing Ration	Total Shrinkage %
1910-11	Ham	Soy Bean Pasture, plus, Corn, 1-4 ration		35.82
	"	"	Corn	39.66
	"	"	"	28.53
	"	"	"	36.49
	"	"	"	31.72
			Average	32.64
	"	Soy Bean pasture, plus, Corn, 1-2 ration		28.03
	"	"	C. S. Meal / Corn Meal	37.08
	"	"	"	35.42
	"	"	"	36.31
	"	"	"	30.25
			Average	33.41
	"	Soy Bean Pasture, plus, Corn, 3-4 ration		30.20
	"	"	C. S. Meal / Corn Meal	29.32
	"	"	"	26.85
	"	"	"	29.56
	"	"	"	30.68
			Average	29.32
	"	Corn 9-10 / Cottonseed Meal	Corn, 9-10 / C. S. Meal, 1-10	26.63
	"	"	"	40.34
	"	"	"	42.39
	"	"	"	36.67
			Average	36.50

TABLE 3.—*The Total Loss in Weight of Meat Made from Hogs Fed Upon Various Rations.—Continued.*

Year	Part of hog	Foundation Ration	Finishing Ration	Total Shrinkage %
	Ham	Corn 9-10 Tankage 1-10	Corn, 9-10 Tankage, 1-10	33.53
	"	"	"	36.42
	"	"	"	30.00
	"	"	"	31.25
	"	"		34.44
			Average	34.44
	"	Corn alone	Corn	32.14
	"	"	"	28.10
			Average	30.24
1911-12	"	Peanut Pasture, plus, Corn, 1-2 ration		19.03
	"	"		19.84
	"	"		19.51
	"	"		18.18
	"	"		20.00
	"	"		23.53
	"	"		20.21
			Average	20.04
	"	Peanut Pasture, plus, Corn 4-5 Tank'ge 1-5 1-2 ration		20.31
	"	"		18.68
	"	"		17.57
	"	"		31.33
	"	"		14.06
	"	"		17.90
	"	"		20.54
	"	"		17.60
			Average	19.74

TABLE 3.—*The Total Loss in Weight of Meat Made from Hogs fed upon Various Rations.—Continued.*

Year	Part of Hog	Foundation Ration	Finishing Ration	Total Shrinkage %
	Ham	Peanut Pasture alone		21.15
	"	"		20.37
	"	"		21.51
	"	"		18.25
	"	"		20.35
	"	"		16.75
	"	"		23.26
	"	"		26.25
			Average	20.69
	"	Soy Bean hay Corn, ½ ration		31.54
	"	"	Soy Bean hay Corn, ½ ration	31.85
	"	"	"	27.37
	"	"	"	24.71
			Average	28.87
	"	Corn ⅘ Tankage ⅕		20.93
	"	"	Corn ⅘ Tankage ⅕	19.00
	"	"	"	23.90
			Average	21.28
	"	Corn ⅘ Cowpeas ⅕		25.90
	"	"	Corn ⅘ Cowpeas ⅕	27.78
			Average	26.84
	"	Corn alone		25.97
	"	"	Corn alone	16.83
	"	"	"	18.45
	"	"	"	19.64
	"	"	"	23.48
			Average	20.88

The above table shows conclusively that there is no foundation for the belief that meat from peanut-fed or soy bean-fed hogs shrinks more while going through the curing process than that from dry-lot-fed hogs. In 1910–11, the hams which were cured from hogs which were fattened, or partly fattened, on soy bean pastures plus concentrated supplements shrank, on the average, 32.64 per cent, 33.41 per cent, and 27.3. per cent in Lots 1, 2, and 3, respectively. When the hogs were fed in a dry lot on corn and cottonseed meal the average shrinkage was 36.5 per cent, when fed in a dry lot on corn and tankage 33.13 per cent, and when fed on corn alone 30.24 per cent. The shrinkage on all of the above pieces of meat was greater than would be experienced by the average farmer; this is accounted for by the fact that the meat was carried completely through the summer months before being taken down to determine the total shrinkage; the last weights were taken the first week in October. The farmer, as a rule, has either sold or consumed the meat by the middle of the summer. Attention should also be directed to the fact that those hams which were taken from the hogs which were killed directly off the pastures did not shrink more than the hams which were taken from the same lot after the hogs had been finished on the various concentrates for different lengths of time; this in spite of the fact, too, that the hams which were cured from hogs which came directly off pastures had been in the curing process much longer than the others.

In 1911-12, certain lots of hogs were fattened on peanut pastures while other lots were finished on dry feeds. It was found that the meat made from hogs which were fattened, or partly fattened, on peanut pastures shrank no more, in fact not so much, as the meat cured from animals which were fattened in dry lots upon dry feeds altogether. The hams in Lots 1, 2, and 3, where peanut pastures were grazed all or part of the time, shrank, on the average, only 20.04 per cent, 19.74 per cent, and

20.69 per cent, respectively. The pigs in one of these lots (Lot 3) were fed nothing but peanut pasture during the first period. The hams made from the hogs which were fed on corn alone shrank, on the average, 20.88 per cent, those which fed upon soy bean hay and corn 28.87 per cent, those on corn and tankage 21.28 per cent, and those on corn and cowpeas (the grain) 26.85 per cent.

A sufficient number of individuals were not employed in some cases, however, to warrant definite conclusions; the preceding table gives the individual records.

The two year's work does warrant the statement, however, that meat which is cured from hogs which are fattened upon green pastures does not shrink any more during the process than that from animals which are fattened upon dry feeds altogether.

(*b*) *Per cent of loss in weight during different curing periods:*—When meat is cured there are usually four different periods or stages in the process. The first is the brine or salt period, the second the dripping period, the third the smoking period, and the fourth the sacked period. It will be seen in the subsequent tables that there is a very great difference in the loss in weight during these various periods; the loss in weight during some of the stages is very small. Of course, the length of some of the periods determines to a large extent the total shrinkage during the period.

TABLE 4.—*Per Cent of Loss in Weight During Various Periods.*
(1910-11)

Year	Part of hog	BRINE PERIOD			DRIPPING PERIOD		
		No. of Days	Per cent of shrinkage	Per cent of shrinkage daily	No. Days	Total per cent of shrinkage	Per cent shrinkage daily
1910-11	Hams. (Average 38 pieces)	52	4.59	.088	5	5.33	1.06

Year	Part of hog	SMOKING PERIOD		SACKED PERIOD		
		No. Hours	Total per cent shrinkage	No. Days	To per cent of shrinkage	Per cent of shrinkage daily
1910-11	Hams. (Average 38 pieces)	31	5.33	255	21.89	.097

The complete periodical records of shrinkage have been collected so far for only one year; a partial record by periods has also been secured for the year 1911-12. On examining the above table it may be seen that the average total shrinkage during the brine period was not very great—only 4.59 per cent. These hams were in the brine an average of 52 days, so the average daily loss in weight during the first period was only .088 of one per cent. As a matter of fact, some few of the hams actually gained slightly in weight while in the brine; this was due, of course, to the fact that they absorbed water. It will be seen later on that the pieces of meat which were put down in dry salt sustain heavy losses in weight during the salt period, due no doubt to the fact that the dry salt extracted water from the meat.

It should be noted in passing that these small hams were in the brine too many days; the meat was somewhat too salty. Fifty-two days is not, however, too long a brine period for large hams.

Following the brine period was a short period of 5 days called the dripping period. During this time the meat was simply hanging in the smoke house with the large end down to give the surplus water an opportunity to run off or evaporate. The total loss in weight was greater during this short period than during the long brine period, being 5.33 per cent as compared to 4.59 per cent during the brine period. The average daily loss in weight during the dripping period was 1.06 per cent. Of course, the total loss in weight during this period depends upon the length, but it is seen that the daily shrinkage is very great. No method of reducing this loss is at present known to the authors.

In these particular tests the hams were smoked an average of 31 hours. These hours do not, however, represent the whole smoking period, as the smoke was not continuously applied. The whole smoking period is probably represented by five days, as the hams were hanging a part of the time without smoke. It was necessary for the meat to hang a day after the application of the smoke was discontinued so that it would be thoroughly cooled before being wrapped and sacked. Smoke was applied continuously for an average of 31 hours; no reason could be seen for continuing the process as the meat had assumed the proper color. The total shrinkange during this short period was large, being 5.33 per cent.

The greatest total loss in weight was experienced during the sacked period. This loss, of course, depends on the length of the period, but a considerable loss will be sustained under average farm conditions. In these tests the sacked period was 225 days; the farmer would probably not keep the meat more than one-half this number

of days. The pieces were finally taken down and weighed the first week in October when the total summer loss in weight was found to be 21.89 per cent. The average daily loss in weight was .097 per cent. The farmer having cured meat to sell should, therefore, sell it as early as possible to avoid the very heavy loss in weight during the dry summer months.

Losses in weight when meat is cured in different curing solutions:—During the winter of 1911-1912 three different curing solutions or substances were tested. The work has not proceeded a sufficient length of time to draw definite conclusions, but the authors believe they are justified in presenting the information so far collected. Some hams, shoulders, and sides were cured in a brine solution similar to that used the previous year. Other pieces of meat were cured in a solution with the salt peter left out; some object to the salt peter on the ground that it may be injurious to the health.

Still other pieces of meat were simply packed in a good and clean grade of common salt; the bottoms of the boxes were first covered with a layer of salt two inches deep, the pieces of meat packed in so that no pieces touched, and the whole covered well with salt. This is a very simple method of keeping meat but not altogether a desirable one.

The following table shows the shrinkage in weight under the various methods of curing:

TABLE 5—*Losses in weight in Different Curing Solutions.*

Solution	Piece of meat.	Per cent of loss while in curing solution.	Per cent of loss during the different periods immediately following the curing solution.	Total Loss
		%	%	%
Salt -------	Shoulders--(6)	16.15	5.09	26.80
	Sides----- (13)	9.61	5.93	20.30
	Hams- ----(6)	24.76	5.08	23.20
Saltpetre brine -----	Shoulders--(8)	4.99	11.28	20.70
	Sides------(3)	.55	10.03	17.18
	Hams ----(22)	2.80	5.49	20.08
No saltpetre brine -----	Shoulders--(2)	7.07	9.98	23 29
	Hams ----(23)	4.02	4.92	22.30

A casual glance at the above table shows that the pieces of meat which were put in common salt shrank very much more during this first period than the pieces which were cured in the brine solutions. The six shoulders lost 16.15 per cent. in weight, while the shoulders which were cured in the salt peter and no salt peter brines shrank 4.99 per cent. and 7.07 per cent., respectively. The salt probably drew the water more completely from the pieces of meat than did the brine solutions.

Thirteen sides were cured in salt; they shrank 9.61 per cent in weight during this period. Only three sides were cuerd in salt peter brine but they lost only .55 of one per cent. in weight. Six hams were put down in salt and during the 60 days lost 24.96 per cent. of their weight, while the 22 which were cured in salt peter brine lost only 2.80 per cent. of their original weight, and the 13 which were cured in brine to which no salt peter had been added lost 4.02 per cent.

According to the above data it may be noted that those pieces of meat which sustained the greatest loss in

weight during the brine or salt periods record the smallest depreciation in weight during the subsequent dripping period. That is, the meat which had been cured in salt, therefore undergoing a very great loss in weight during the first period, record a small loss in weight during the subsequent dripping period. On the other hand the pieces which were put down in the brines, not losing very materially in weight during the brine period, sustained relatively heavy depreciation in weight during the dripping period. The pieces of meat which were cured in salt lost approximately 5 per cent in weight during the subsequent dripping periods. When the last column of Table 5 is examined it is seen that the meat which was cured in salt finally shrank somewhat more in weight than those pieces put down in one of the brines, but the difference is not very marked. The table also brings out the fact that the sides do not shrink as much as the hams and shoulders. Practically no differences appear in the percentage of losses when the shoulders and hams are compared. The thirteen sides which were cured in salt lost 20.30 per cent of their original weight; the 6 shoulders and hams lost 26.8 per cent and 23.2 per cent respectively of their weights. The 3 sides which were put down in the salt peter solution suffered a total loss of 17.18 per cent, while the shoulders and hams lost respectively 20.7 per cent and 20.08 per cent of their original weights. The last column represent weights taken June 21, 1912.

On September 2, 1912, all of this meat was taken out of the sacks and weighed again to determine the losses in weight during the two summer months of July and August. It will be seen from the accompanying table that there is considerable loss in weight even after the cured meat is relatively old.

TABLE 6.—*Losses in Weight During the Summer Months of July and August.*

Solution	Part of hog	Number of Pieces	Average per cent of Shrinkage %
Saltpetre brine	Hams	15	3.96
	Shoulders	8	5.62
	Sides	7	7.70
No-saltpetre brine	Hams	12	4.02
Salt	Hams	4	4.98
	Shoulders	5	3.83
	Sides	10	5.59

The above table again emphasizes the fact that cured meats continue to lose rapidly in weight throughout the summer months and if they are to be sold it is wise to dispose of them as early as possible after being smoked. A piece of cured meat will lose approximately one-fifth of its total weight from January to September.

As far as the authors have been able to determine, common salt is just as efficient as salt peter brine for preserving the meat, but the quality of the meat is very greatly injured by the salt. Meat which is cured in salt becomes very hard and dry; this, of course, is exceedingly objectionable.

SUMMARY STATEMENTS.

1. The following general plan was carried through in curing the meat;

(a) The animals were killed by bleeding.

(b) The slaughtering was done during the afternoons.

(c) They were dressed as promptly as possible after death.

(d) The carcasses were permitted to hang intact until early the following morning, when they were cut up, trimmed, and put in the brine or salt.

(e) The meat which was cured in salt was simply packed in boxes, while those pieces which were put down in the brines were first placed in clean barrels with the meat side up and the brine poured in. (See page 186).

(f) The meat remained in the salt and brine from 40 to 60 days. A small ham should not remain in the salt or brine for more than 40 days, while a large one will not be sufficiently permeated by the salt in less than 55 to 60 days.

(g) After the proper length of time the meat was taken out of the salt or brine, allowed to drip for a day or so, and rapidly smoked for approximately three days. After the fire was removed the meat was permitted to hang an additional day before being wrapped and sacked for the summer.

(h) The meat was then thoroughly wrapped with paper, placed in a sack, the sack whitewashed (for solution see page 188) and hung in the smoke house for the summer.

2. For the sake of safety the temperature of the scalding water should not be above 175° F. When this temperature is not exceeded there is very little danger of "setting" the hair.

3. Although it is not absolutely necessary to have freezing weather to save the meat, the farmer can usually select a cold day for slaughtering the hogs and it is wise to do so. In these experiments meat kept perfectly when the thermometer registered as high as 70° F. in the shade the middle of the afternoon of the day on which the hogs were killed.

4. The data collected and reported in this bulletin show conclusively that there is no foundation for the old notion that meat from peanut-fed and soy bean-fed hogs shrinks more while going through the curing process than that from dry-lot-fed hogs.

5. Meat cured in common salt shrinks very much in weight during the salt period when compared to that cured in the brine solutions, but by the end of the summer the total loss in weight by the two processes is found to be practically equal. The salt-cured meat sustains a very heavy loss in weight during the salt period but does not shrink so much during subsequent periods as that which is cured in brine solutions.

6. The side pieces did not lose as much in weight as the shoulders and hams. The hams and shoulders lose in weight approximately the same during the curing process.