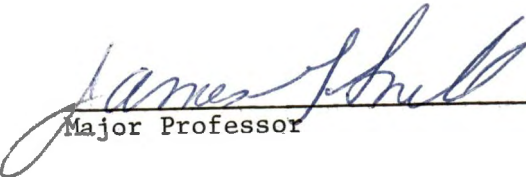


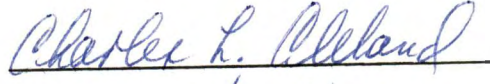
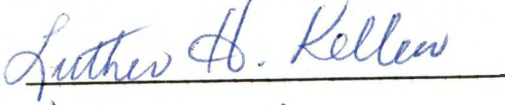
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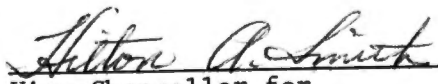
I am submitting herewith a dissertation written by Robert John Hopkins entitled "The Wholesome Meat Act and the Tennessee Livestock-Meat Industry." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Agricultural Economics and Rural Sociology.


Major Professor

We have read this dissertation
and recommend its acceptance:


Accepted for the Council:


Vice Chancellor for
Graduate Studies and Research

THE WHOLESOME MEAT ACT AND THE TENNESSEE
LIVESTOCK-MEAT INDUSTRY

A Dissertation
Presented to
the Graduate Council of
The University of Tennessee

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

by
Robert John Hopkins
December 1972

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ABSTRACT

The objectives of this study were: (1) to determine the increases in investment incurred by selected plants in complying with the new inspection regulations, and (2) to determine the change in number and size of the livestock slaughter and processing plants in Tennessee since the passage of the Wholesome Meat Act of 1967 and the Tennessee Meat and Poultry Inspection Act.

Certain study plants in the state were selected for close analysis of the improvements that they had to make in order to meet the requirements of the new inspection programs. A combination of in-plant data and economic engineering data were used to determine the increase in cost.

Data concerning the size, number, and location of plants in the state were obtained from the Tennessee Department of Agriculture. The kill data were available from both state and federal sources. The changes that took place in the structural variables of plant size, number of plants, size distribution of plants, location of plants, concentration of production in largest plants, and patterns of entry and exit were analyzed to determine what changes did occur in the industry.

All plants contacted through the survey made some type of improvement in their plant and/or equipment. The plants selected for closer analysis made changes in their operation and improvements in their plants which were similar to all plants, but naturally some of the improvements made by these plants were unique to the individual

plants. Four plants were chosen for closer analysis with the representative A(1) plant spending a total of \$98,944.00, the two A(2) plants spending \$87,624.32 and \$64,476.32, and the representative A(3) plant spending \$59,874.60. These expenditures covered a wide range of improvements including building a completely new plant; building or remodeling kill floors, processing rooms, coolers, freezers, or holding pens; purchasing stainless steel tables, rubber cutting boards, paunch trucks; and other similar items. The range of expenditures found in the commercial plants contacted was from \$15,000 to well over \$1,000,000.

The improvements that these four plants made can be considered similar to the changes made by all slaughtering plants in the state. Also, the changes can be considered similar to changes made by the processing plants if the kill floor is excluded. Thus, costs for both slaughter and processing plants were similar.

The implementation of the Wholesome Meat Act of 1967 and the Tennessee Meat and Poultry Inspection Act in Tennessee has caused no drastic changes in the structure of the Tennessee Livestock-Meat Industry. Only slight changes have occurred in the structural variables. The number of processing plants increased slightly and the number of slaughter plants decreased slightly. Location of plants in the state became somewhat more concentrated in the metropolitan areas, but this cannot be considered strictly a result of the new laws. This was especially true for those plants which accounted for the major portion of the production. The number of people employed in the industry in the state has increased due to the expansion of some of the larger slaughter plants and the establishment of more processing facilities.

Procurement and distribution patterns have undergone little change.

Although there may have been a slight decline in the number of slaughter plants, the competition for slaughter animals has not decreased. Therefore, the livestock producers and the marketing sector have not been adversely affected by the new inspection laws. The number of suppliers of carcasses and processed meat has not changed which means that no retailers have been left without a supplier.

The movement in and out of the industry during the period which this study covered was not impaired by the Wholesome Meat Act and the Tennessee Meat and Poultry Inspection Act. There was no major exodus of plants. The distribution of slaughter among the slaughter plants has stayed relatively constant since the enactment of the new laws. Slaughter capacity for the industry has not been significantly altered. There has been no move toward specialization in the slaughter of any particular species.

Other than a major one-shot increase in the investment expenditures to improve the plant and equipment, little change has taken place in the industry. Therefore, it can be said of the meat-packing industry in Tennessee that the operation of the new inspection laws has not altered the structure of the industry to any measurable extent.

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CHAPTER I

INTRODUCTION

The passage of the Meat Inspection Act of 1906 brought all slaughtering and processing plants involved in interstate or foreign commerce in meat and meat products under comprehensive federal meat inspection. The Federal Inspection Service was charged by the 1906 Act with the responsibility of regulating transportation of meat in interstate and foreign commerce, of requiring sanitary conditions and equipment for slaughter and processing, and of prohibiting the use of harmful ingredients or misleading labels in such operations (Williams and Stout, p. 624). The Wholesome Meat Act of 1967 extended these inspection requirements to plants operating in intrastate commerce in meat and meat products. The Wholesome Meat Act applied a uniform standard of wholesomeness to all meat and meat products and required that all meat sold in the United States be inspected either by the federal government or an adequate state program that was at least equal to the federal inspection program.

In anticipation of the passage of the Wholesome Meat Act, the Tennessee legislature enacted the Tennessee Meat and Poultry Inspection Act in April of 1967. Both of these acts were to become effective January 1, 1968. Since the passage of these two acts, all slaughtering, eviscerating, and processing of meat and poultry has been performed under the regulations of a state or federal agency with those plants engaged in interstate commerce being regulated by the Consumer and Marketing Service of the United States Department of Agriculture and intrastate

plants being regulated by the Meat and Poultry Inspection Section of the Food and Drug Division of the Tennessee Department of Agriculture. In both cases the facilities are continually inspected for sanitary requirements with the animal given both an antemortem and a postmortem inspection.

The Tennessee legislation offered existing slaughter and processing plants in Tennessee three choices. These were: (1) meet the requirements of state inspection, (2) confine slaughter and processing operations to strictly custom operations since these operations were exempt, or (3) cease slaughter operations entirely. The meat packers in Tennessee were given two years to comply with the provisions of the act (Tennessee Department of Agriculture, 1968, p. 1). As of January 1, 1970, all meat packers in Tennessee should have been in compliance with the act.¹

The amount of capital required to gain entry or to remain in the meat packing sector of the Livestock-Meat Industry has been increased. For those plants which met the requirements of these acts, the passage of these acts required them to incur additional expense in replacing or remodeling their present facilities. Those firms which cannot afford to remodel or replace old facilities will be forced to close or severely curtail their operations. For those entering into slaughtering and/or processing the construction costs will reflect the requirements of the new laws. As a result of this increase in costs, new firms may be hesitant to enter the industry, and some of the older ones may be forced

¹Appendix A contains a statement concerning inspection procedures in individual plants after the new inspection regulations went into effect.

out of the industry. In other words, the conditions of entry and exit have been altered through these increased costs which revolve around the requirements of the Wholesome Meat Act.

I. PURPOSE AND OBJECTIVES

This study was undertaken to determine the changes that took place in the Tennessee Livestock-Meat Industry after the passage of the Tennessee Meat and Poultry Inspection Act and the Wholesome Meat Act of 1967. The primary concern of this study was the changes that took place in the slaughter and processing sector of the industry.

The objectives of this study were:

1. To determine the increased investments incurred by selected plants in complying with the new inspection regulations.
2. To determine the change in number and size of the livestock slaughter and processing plants in Tennessee since the passage of the Wholesome Meat Act and the Tennessee Meat and Poultry Inspection Act.

Objective I

The approach used to investigate this objective required selecting certain study plants within the state of varying sizes and design. The increase in plant investment was determined by using a combination of in-plant data and economic engineering data. The plants were divided into the following departments: holding pens, kill floor, chill and holding coolers, processing rooms, freezers and processed product coolers, equipment cleanup and dry storage, rendering, dock and apron,

employee dressing, and office and parking space. Budgets were developed for each department which showed the increase in costs associated with meeting the requirements of the Tennessee Meat and Poultry Inspection Act.

In order to obtain information concerning changes which individual plants have made, a survey of packing and processing plants within the state was conducted. A stratified random sample of plants was used to obtain a complete representative sample of plants. Those plants which were selected for detailed analysis were chosen after a careful consideration of the information obtained from the survey. Further, the survey provided information concerning size and capacity of the industry, acceptance of the new meat inspection programs, and the structural changes which have taken place.

The type of plant upon which this analysis concentrated was the independent state inspected livestock slaughterer and/or meat processor. The federally inspected plants were generally ignored.²

Objective II

The structural changes which have taken place in the industry since 1968 were examined. The structural attributes considered include concentration of production in the largest plants, size distribution of plants, size of plants, number of plants, location of plants, and patterns of entry and exit.

²The federally inspected plants were ignored because they were already operating under comprehensive federal inspection and it was assumed that the new laws would not alter their operations.

Data used for the examination of this objective were obtained from the Tennessee Department of Agriculture and the Statistical Reporting Service. The data for size, number, and location of plants were available for 1968 through 1971. The kill data were available for 1968 and 1970. Therefore, by comparing these two sets of data, the extent of the changes was determined.

II. USEFULNESS OF RESULTS

The results should be useful as an orientation for future research involving the structure, conduct, and performance of the Livestock-Meat Industry. This study should also be useful as an aid to compare and predict results of other policy measures which are designed to deal with the Livestock-Meat Industry as a whole or parts of it. These other measures could include pollution legislation, Occupation Safety and Hazard Act, Egg Products Inspection Act, and others.

III. THEORETICAL FRAMEWORK

Market structure has been defined for practical purposes to mean ". . . those characteristics of the organization of a market which seem to influence the nature of competition and pricing within the market" (Bain, 1959, p. 7). The characteristics most emphasized are the following:

1. The degree of seller concentration, described by the number and size distribution of sellers in the market.
2. The degree of buyer concentration, defined in the same fashion.
3. The degree of product differentiation as among the outputs of the various sellers--that is the extent to which their outputs (though similar) are viewed as nonidentical by buyers.

4. The condition of entry to the market--referring to the relative ease or difficulty with which new sellers may enter the market, as determined by the advantages which established sellers have over potential entrants (Bain, 1959, p. 8).

This study will provide information on the degree of buyer and seller concentration by determining the number, location, and size of plants in the livestock slaughter and processing sector. Buyer and seller concentration within a market plays a significant role in the effectiveness of competition in the market. The structural variables of number, size, and location play an important role in determining the degree of competition in the market. The effect that the Wholesome Meat Act of 1967 and the Tennessee Meat and Poultry Inspection Act had upon these variables could significantly alter the effectiveness of competition within a market.

The degree of competition between plants in a sector is influenced by the degree of product differentiation. The closer the products of different plants resemble each other, or the more homogenous the output of these plants, the less the degree of product differentiation. This characteristic is important because if a plant can produce a product with some advantageous characteristic, the firm can isolate a part of that sector's market for itself. The grading of livestock is standardized by the United States Government so there is little product differentiation faced by the buyers of slaughter animals. To a large extent the slaughtering and processing sector sell a homogenous product. But prior to the passage of the Wholesome Meat Act and the Tennessee Meat and Poultry Inspection Act there was a difference in the competitive position of the federally inspected plants and the nonfederally

inspected plants. Federally inspected plants were at a disadvantage in terms of cost in competing with nonfederally inspected plants due to the stringent requirements on ingredients, specific recipes, and adherence to specific sanitary practices (Williams and Stout, 1964, p. 628). But the federally inspected plants could move their products across state lines. The passage of the two inspection acts extended the same requirements to all plants and did away with the nonfederally inspected plants' advantage. But it probably did not enhance the federally inspected plants' competitive position. It just required plants to perform under equal requirements. Therefore, product differentiation will not enter to a great extent in this study.

The last characteristic listed referred to the relative ease of entry by firms into the market. A barrier to entry is evidence of some source of disadvantage to potential entrants as compared with established firms. In general, these barriers to entry are of three types (Bain, 1959, pp. 239-241). The first one is the degree of product differentiation, where the existing firms have an established market and new entrants in the market will have difficulty in establishing a market for their product. Because of the homogeneity of the products sold, this factor will not be restrictive in this study.

The barrier which deals with the cost and/or technique of production will be more important in this study. The requirements made on present and future firms by the Wholesome Meat Act and the Tennessee Meat and Poultry Inspection Act is a good example of this factor. In order to meet the requirements of these acts, increasing costs in construction and operation will be incurred. Also, the

techniques used may be altered by the necessity of timing slaughtering and maintaining sanitary equipment and facilities. The extent to which the requirements of these acts are enforced will have a bearing on the cost that will be incurred by the various plants which are trying to enter and those which are attempting to remain in the industry. Thus, the condition of entry and exit is affected by the costs of construction of plant, new equipment expense, and renovation of existing plant.

The last barrier to entry is concerned with the economies of large scale production and distribution. This characteristic is important in determining size, number, and location. The location of firms slaughtering and/or processing animals or meat is determined by the cost of transportation of the inputs and for distribution of the outputs. If the unit cost of transportation can be reduced by expanding the volume, then economies of size are present. If increasing the volume of production results in a per unit decrease in costs, there are economies of size in production. A substantive cost advantage occurs for large plants relative to small slaughtering plants (National Commission on Food and Marketing, 1966, p. 22). Economies of size exist for smaller firms in this sector. Therefore, by placing additional restrictions on firms, such as the Wholesome Meat Act and the Tennessee Meat and Poultry Inspection Act do, may result in the decline in the number of firms but increase the size of the firms that remain. The cost of remodeling a facility may not be economically feasible at the present volume of output; economies of size may permit the firm to expand and remain in business.

An examination of the change in structural variables between 1968

and 1971 allows for a consideration of the impact that the Tennessee Meat and Poultry Inspection Act and the Wholesome Meat Act had upon the Tennessee Livestock-Meat Industry. While the total answer may not be given by this type of analysis, trends can be ascertained.³

The conduct and performance of a market are also highly affected by the structural variables. In defining a theoretical model underlying market structure analysis, Clodius and Mueller attributed market structure, conduct, and performance as the key concepts (1961, p. 516). These concepts were said to be interrelated with the causation running from structure through conduct to performance. While threads of this interrelationship may appear throughout this analysis, this study will concentrate upon the market structure aspect of the industry. For a further discussion of conduct and performance one may turn to such authors as Bain, Clodius and Mueller, Chamberlina, Clark, Nichols, and others (1959 and 1956, 1961, 1956, 1940, 1948).

This section attempted to present the concepts associated with the market structure approach and the importance of the structural variables were emphasized. This study will be primarily concerned with the structural changes that have taken place in the industry since the passage of the Wholesome Meat Act and the Tennessee Meat and Poultry Inspection Act. Since the livestock production, livestock marketing, and

³It is recognized that other forces were operating in the industry and the economy between 1968 and 1970 which could have affected the Tennessee Livestock-Meat Industry. But since this period is so short, it is assumed that these factors did not have any major impact upon the industry. It is further assumed that any major change in the structure of the industry in this short period would have been stimulated by the requirements of the Wholesome Meat Act and the Tennessee Meat and Poultry Inspection Act.

meat retail sectors interact with the livestock slaughter and processing sector to form the Livestock-Meat Industry, implications concerning the first three sectors will be made by considering the structural changes in the livestock slaughter and processing sector.

CHAPTER II

NUMBER, SIZE, AND LOCATION OF SLAUGHTERING AND PROCESSING PLANTS IN TENNESSEE, 1968-1971

An examination was made of the changes in the structural variables size, number, and location of slaughtering and processing plants in Tennessee from 1968 to 1971. The changes in these variables gave an indication of the trends that have developed in the livestock slaughter and processing industry in Tennessee since the passage of the Wholesome Meat Act and the Tennessee Meat and Poultry Inspection Act.

The Tennessee Meat and Poultry Inspection Act classified slaughtering and processing plants as follows:

I. Slaughtering Plants

- A. Nonfederally inspected plants. These plants were restricted to intrastate sales of animal products and were classified by the number of animals slaughtered per year. These plants were to be state inspected.
 - 1. Slaughtering over 4,000 animals per year.
 - 2. Slaughtering 1,000 to 4,000 animals per year.
 - 3. Slaughtering less than 1,000 animals per year.
- B. Federally inspected plants. These plants slaughtered animals or poultry and their products can move interstate. (Any number.)
- C. Custom slaughter. These plants provide the service of slaughtering and processing for a fee, but are not permitted to sell meat. The animals and birds slaughtered are not

inspected. However, the plant is periodically inspected by the state for sanitary procedures and facilities.

II. Meat and Poultry Processing Plants

- A. Nonfederally inspected plants processing meat. These state inspected plants engaged in intrastate sales of meat and were divided into the following categories by annual gross receipts.
 - 1. Annual gross receipts in excess of \$1,000,000.
 - 2. Annual gross receipts \$500,000 to \$1,000,000.
 - 3. Annual gross receipts less than \$500,000.
- B. Nonfederally inspected poultry eviscerating and processing plants. These plants are also state inspected and are engaged in the intrastate sale of poultry. They were divided into the following categories by gross annual receipts.
 - 1. Annual gross receipts in excess of \$1,000,000.
 - 2. Annual gross receipts \$1,000,000 or less.
- C. Federally inspected plants. This category includes plants which are engaged only in processing meat or poultry. The processed product will move in interstate trade. (Any size.)
- D. State inspected meat or poultry processing plants with gross annual receipts less than \$10,000.

Each plant is required to buy a license which indicates its particular size and type of business.⁴

⁴ A particular plant may slaughter any number of animals within its

I. NUMBER AND SIZE

State inspected slaughtering plants were grouped by size, number of animals slaughtered annually for 1968 and 1971 (Table 1). In 1968 there were 164 slaughtering plants and 113 processing plants licensed in Tennessee. Of these 277 plants, 18 slaughtering and 9 processing plants were operating under federal inspection. Of the remaining 250 plants which were under state regulation, 104 were processing plants and 146 were slaughtering plants. Included in the slaughtering sector were 54 custom slaughter operations.

In 1968 the 54 custom slaughter plants accounted for 33 percent of all plants in the slaughter sector but accounted for less than 1 percent of each specie slaughtered in Tennessee (Table 2). The commercial slaughter plants accounted for approximately 67 percent of the total number of plants. Those plants slaughtering less than 1,000 animals per year accounted for approximately 29 percent of the commercial plants but less than 1 percent of each specie slaughtered in Tennessee during 1968. The 29 plants which slaughtered 1,000 to 4,000 animals per year accounted for less than 3 percent of each specie slaughtered in Tennessee. State regulated plants which slaughtered more than 4,000 animals per year accounted for approximately 10 percent of the plants. These 16 plants accounted for approximately 12 percent of the cattle, .7 percent of the calves, 14 percent of the sheep, and 13 percent of

licensing category and it may range above or below its prescribed boundaries. The classes presented here do not have hard and fast boundaries. Plants discussed later in this paper may have slaughter reports which do not fall into the class for which they have a license, yet they are considered to operate in the class for which they are licensed.

Table 1. The Number of Plants, by Size, Which Slaughtered or Processed Meat and Poultry in Tennessee in 1968 and 1971^a

	1968		1971	
	State	FIS ^b	State	FIS ^b
<u>Slaughter Plants</u>				
A(1) Slaughtering more than 4,000 animals per year	16	2	11	3
A(2) Slaughtering 1,000 to 4,000 animals per year	29	0	31	2
A(3) Slaughtering less than 1,000 animals per year	47	0	32	0
A(4) Slaughtering animals or poultry under USDA inspection (any number)	0	16	0	12
Custom slaughter only	<u>54</u>	<u>0</u>	<u>61</u>	<u>0</u>
Total slaughter plants	146	18	135	17
<u>Processing Plants</u>				
B(1) Processing meat with gross annual sales in excess of \$1,000,000	7	0	8	9
B(2) Processing meat with gross annual sales between \$500,000 and \$1,000,000	7	0	19	2
B(3) Processing meat with gross annual sales of \$500,000 or less	87	0	65	3
C(1) Poultry eviscerating and processing with gross annual sales of \$1,000,000 or more	1	0	0	0
C(2) Poultry eviscerating and processing with gross annual sales of \$1,000 or less	2	0	2	0

Table 1 (continued)

	1968		1971	
	State	FIS ^b	State	FIS ^b
C(3) Processing only, meat or poultry USDA (any size)	0	9	0	24
D(1) Processing, meat or poultry, gross annual receipts less than \$10,000	<u>0</u>	<u>0</u>	<u>56</u>	<u>0</u>
Total processing plants	104	9	150	38
Total number of slaughtering and processing plants	250	27	285	55

^aThese categorizations may not correspond exactly with the listing given previously, but each category can be found in the list. These categories will be used throughout the paper to refer to various groups of plants.

^bFederally inspected slaughtering plants.

Source: Tennessee Department of Agriculture, Directory 1968, Division of Foods and Drugs, Nashville, Tennessee, 1968; Tennessee Department of Agriculture, Directory 1971, Division of Foods and Drugs, Nashville, Tennessee, 1971.

Table 2. Distribution of Slaughter Among FIS, A(1), A(2), A(3), and Custom Plants, 1968

Species	FIS			A(1)			A(2)			A(3)			Custom			Total
	Head	% of Total		Head	% of Total		Head	% of Total		Head	% of Total		Head	% of Total		
Cattle	509,665	84.1		70,030	11.6		17,620	2.9		4,136	.7		4,549	.7		606,000
Calves	138,765	98.2		1,015	.7		511	.4		409	.3		600	.4		141,000
Sheep	30,212	85.6		4,939	14.0		118	.3		2	.0*		29	.1		35,300
Hogs	2,634,398	85.4		397,568	12.9		36,652	1.2		9,356	.3		6,026	.2		3,084,000
	Lbs.	% of Total		Lbs.	% of Total		Lbs.	% of Total		Lbs.	% of Total		Lbs.	% of Total		Total Lbs.
Cattle	490,407,920	86.1		61,150,004	10.7		11,971,889	2.1		3,152,455	.6		3,045,453	.5		569,738,000
Calves	40,216,653	98.1		173,771	.4		187,979	.5		186,185	.5		218,412	.5		40,983,000
Sheep	2,829,644	90.1		297,333	9.5		12,987	.4		192	.0*		1,853	.1		3,142,000
Hogs	623,839,737	85.0		92,195,369	12.5		13,330,820	1.8		3,181,847	.4		1,869,227	.3		734,417,000

* Less than .10%.

Source: "Slaughter Reports," Tennessee Crop Reporting Service, unpublished data, Nashville, Tennessee, 1968; United States Department of Agriculture, Livestock Slaughter 1968 (Washington: Government Printing Office, 1969).

the hogs slaughtered in Tennessee during 1968. The 12 federally inspected plants, which made up only 11 percent of the number of plants, accounted for approximately 84 percent of the cattle, 98 percent of the calves, 86 percent of the sheep, and 85 percent of the hogs slaughtered in Tennessee during 1968.

In 1971 there were 152 slaughter plants and 188 processing plants licensed in Tennessee (Table 1). The number of federally inspected plants rose from 27 to 55 due to three state inspected slaughtering plants being reclassified from state inspected to federally inspected, the establishment of 9 new federally inspected processing plants, and the reclassification of 17 processing plants from state inspection to federal inspection. Also, one federally inspected slaughter plant closed.

The remaining 286 plants were operating under state regulation. Of these 286 plants, 136 were slaughter plants and 150 were processing plants. Included in the 1971 directory of the Meat and Poultry Inspection Section of the Food and Drug Division of the Tennessee Department of Agriculture were 61 custom slaughterers and 56 meat processing plants with average gross annual sales of \$10,000 or less.⁵

The number of custom slaughterers had increased by 1971. This category accounted for 40 percent of the slaughter plants in Tennessee while the commercial plants accounted for 60 percent. The breakdown of plants for the year 1970 was very similar to that of 1971. In 1970 the custom slaughterers accounted for less than 1 percent of the slaughter

⁵The licensing category of processing plants with gross annual receipts of \$10,000 or less has been added since 1968.

of each species (Table 3). The A(3) plants accounted for less than 1 percent of the slaughter of each species slaughtered in 1970 while accounting for 21 percent of the total number of plants. The A(2) plants which accounted for 21 percent of the plants slaughtered less than 3 percent of each species slaughtered in Tennessee during 1970. The A(1) plants which made up 7 percent of the plants slaughtered approximately 6 percent of the cattle, .5 percent of the calves, .25 percent of the sheep, and 10 percent of the hogs in 1970. The 14 federally inspected plants accounted for approximately 89 percent of the cattle, 98 percent of the calves, 99 percent of the sheep, and 88 percent of the hogs slaughtered in Tennessee.

II. LOCATION

The location of state inspected commercial slaughter plants for 1968 and 1971, respectively, is shown in Figures 1 and 2. In 1968 there were 92 plants with 34 in East, 26 in Middle, and 34 in West Tennessee. By 1971 This number had dropped to 74 total plants with 24 in East, 28 in Middle, and 22 in West Tennessee. This drop in number of state inspected plants was due to 3 plants shifting to USDA inspection and 15 plants closing their commercial slaughter operations.

The location of state and federally inspected meat processing plants for 1968 and 1971, respectively, is shown in Figures 3 and 4.⁶ In 1968 there were 100 state inspected processing plants with 33 in East, 37 in Middle, and 30 in West Tennessee. The four metropolitan counties

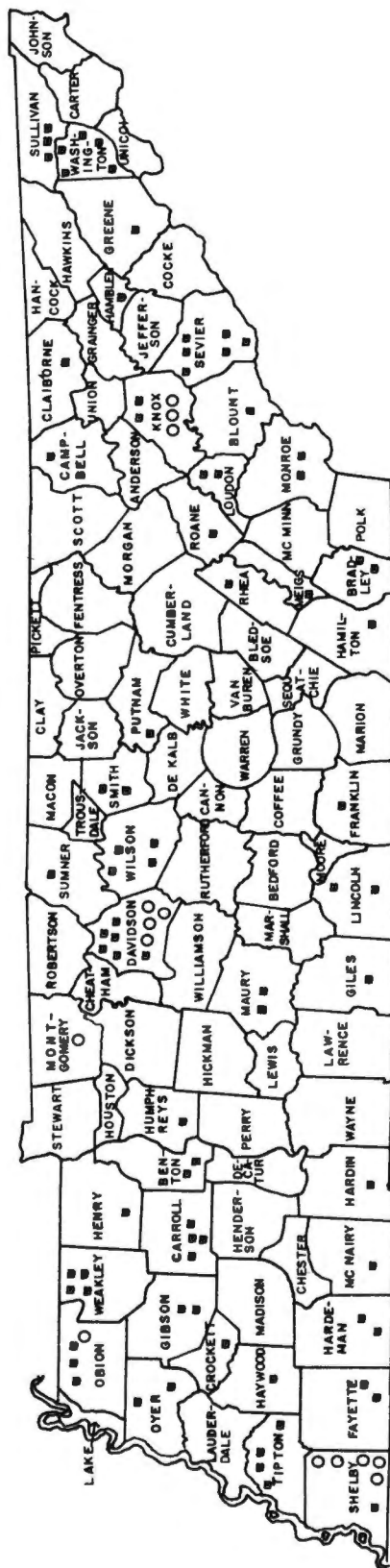
⁶The location of federally inspected meat and poultry processing plants are presented in Figures 5 and 6.

Table 3. Distribution of Slaughter Among FIS, A(1), A(2), A(3), and Custom Plants, 1970

	FIS			A(1)			A(2)			A(3)			Custom		
	Head	% of Total		Head	% of Total		Head	% of Total		Head	% of Total		Head	% of Total	Total
Cattle	512,051	89.3		36,978	6.4		18,086	3.2		4,720	.8		1,665	.3	573,500
Calves	91,960	98.2		560	.6		564	.6		291	.3		225	.3	93,600
Sheep	21,854	98.9		51	.2		167	.8		8	.0*		20	.1	22,100
Hogs	2,550,463	88.2		294,266	10.2		35,521	1.2		8,867	.3		2,883	.1	2,892,000
	Lbs.	% of Total		Lbs.	% of Total		Lbs.	% of Total		Lbs.	% of Total		Lbs.	% of Total	Lbs.
Cattle	509,935,796	90.7		32,413,544	5.8		15,198,841	2.7		3,639,910	.6		1,222,909	.2	562,411,000
Calves	28,417,898	97.9		220,764	.8		191,720	.7		111,224	.4		84,394	.3	29,026,000
Sheep	2,109,713	99.2		5,343	.3		10,854	.5		797	.0*		1,293	.1	2,129,000
Hogs	622,129,158	88.1		67,807,055	9.6		12,644,104	1.8		2,535,746	.4		904,943	.1	706,021,000

*Less than .10%.

Source: "Slaughter Reports," Tennessee Crop Reporting Service, unpublished data, Nashville, Tennessee, 1970; United States Department of Agriculture, Livestock Slaughter 1970 (Washington: Government Printing Office, 1971).



Legend: ○ Federally Inspected Livestock Slaughtering Plants
 ■ State Inspected Livestock Slaughtering Plants

Figure 1. The location by county of all federal and state inspected livestock slaughtering plants in Tennessee, 1968.

Source: Tennessee Department of Agriculture, Directory 1968, Division of Food and Drugs, Nashville, Tennessee, 1968.

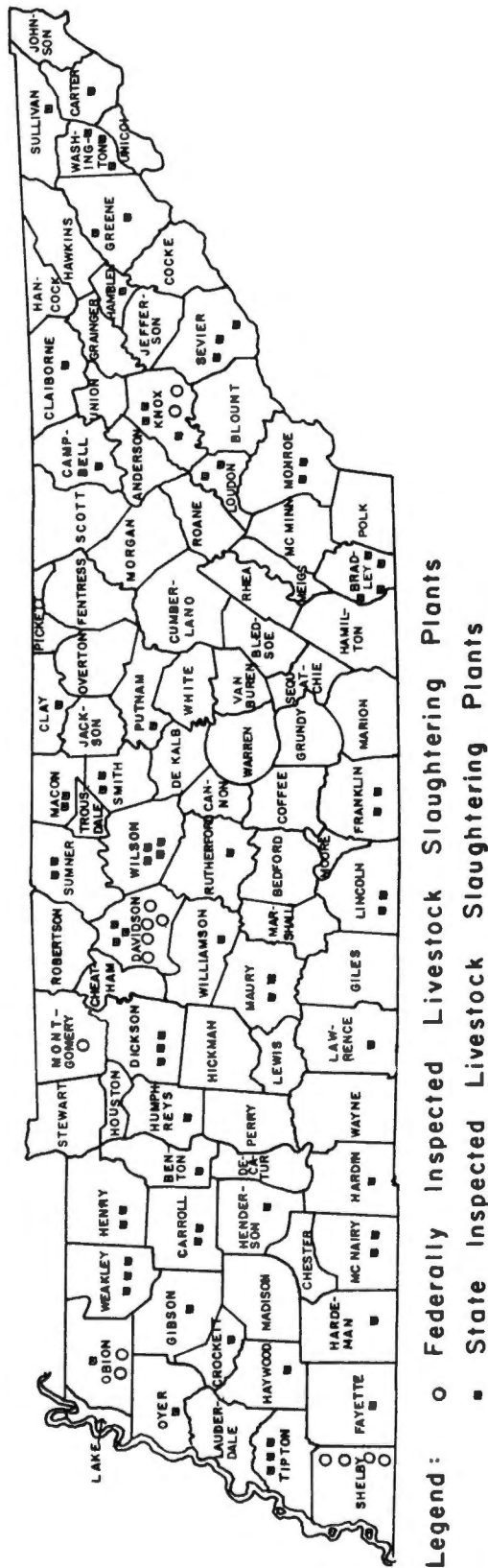
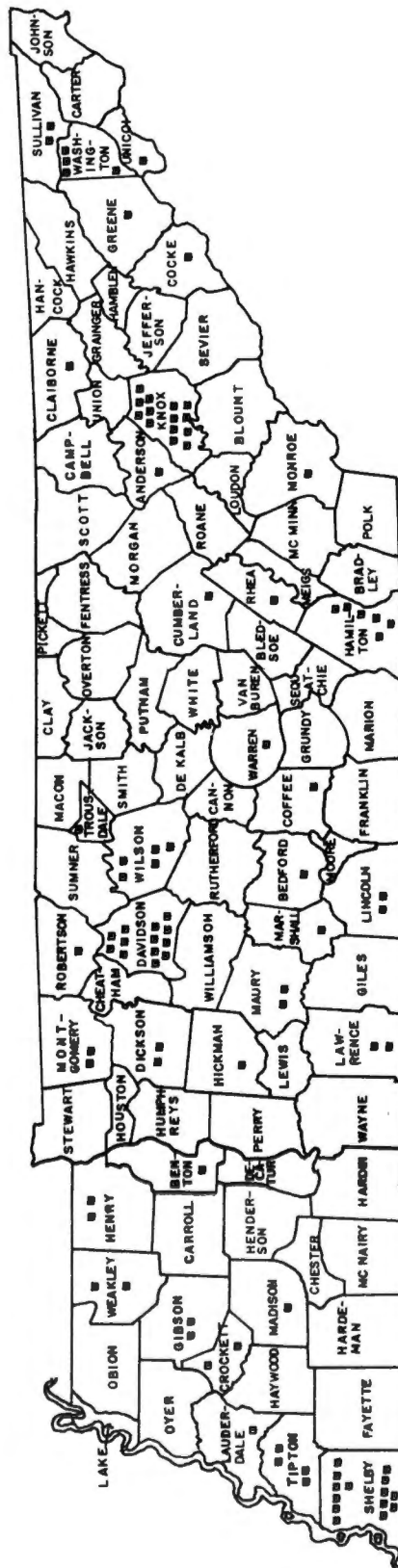


Figure 2. The location by county of all federal and state inspected livestock slaughtering plants in Tennessee, 1971.

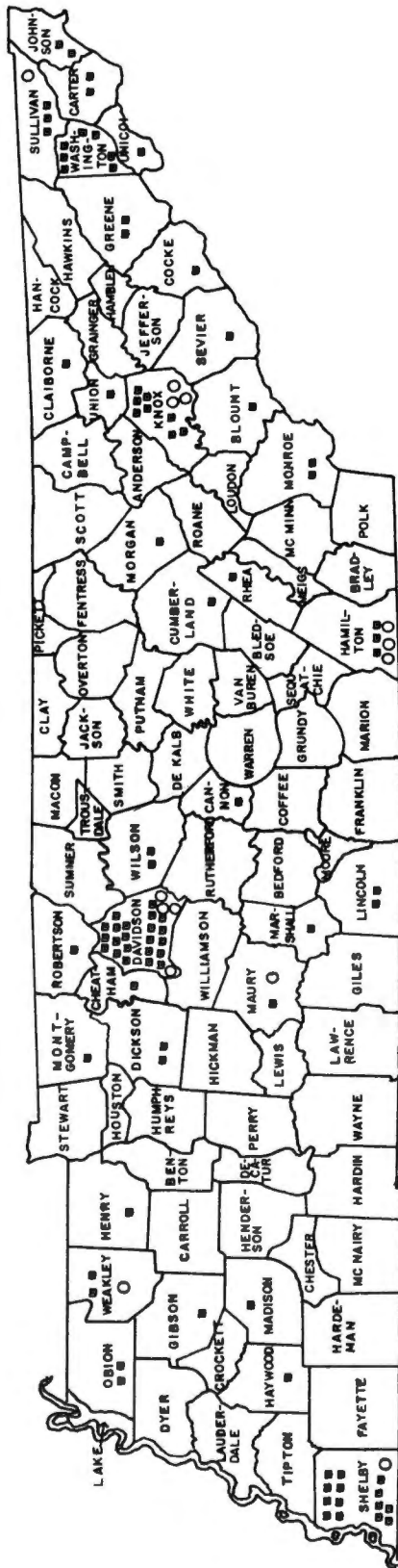
Source: Tennessee Department of Agriculture, Directory 1971, Division of Food and Drugs, Nashville, Tennessee, 1971.



Legend: ○ Federally Inspected Meat Processing Plants
 ■ State Inspected Meat Processing Plants

Figure 3. The location by county of all state and federally inspected meat processing plants in Tennessee, 1968.

Source: Tennessee Department of Agriculture, Directory 1968, Division of Food and Drugs, Nashville, Tennessee, **1968**.



Legend: ○ Federally Inspected Meat Processing Plants

 ■ State Inspected Meat Processing Plants

Figure 4. The location by county of all state and federally inspected meat processing plants in Tennessee, 1971.

Source: Tennessee Department of Agriculture, Directory 1971, Division of Food and Drugs, Nashville, Tennessee, 1971.

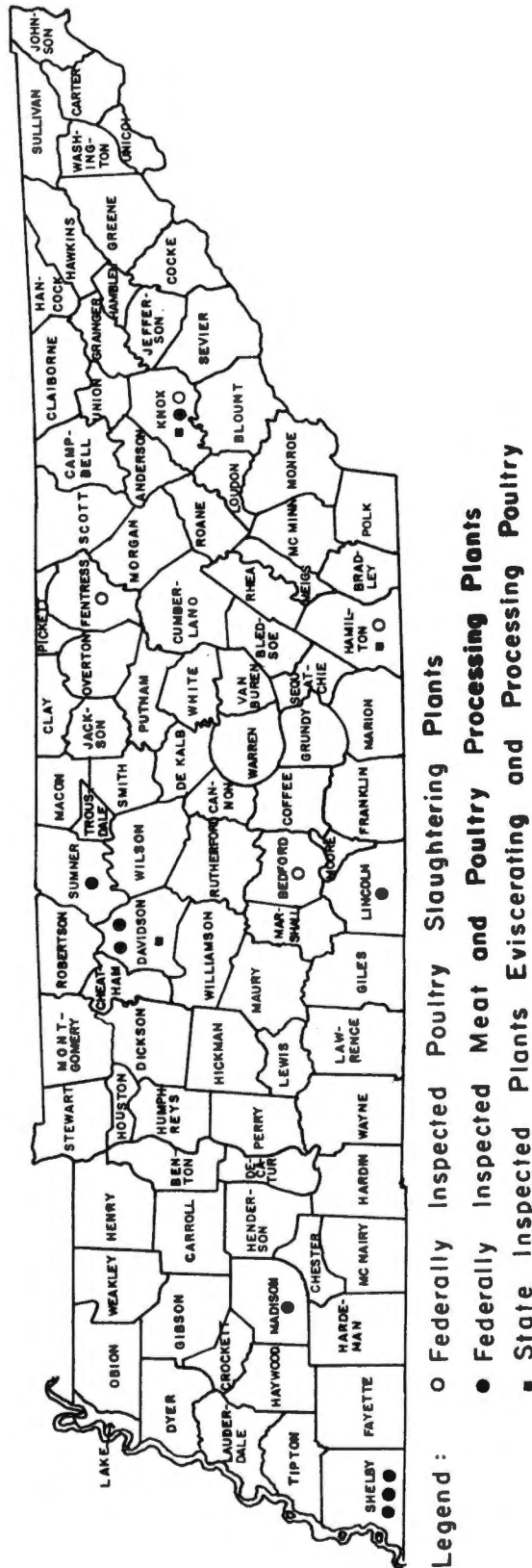
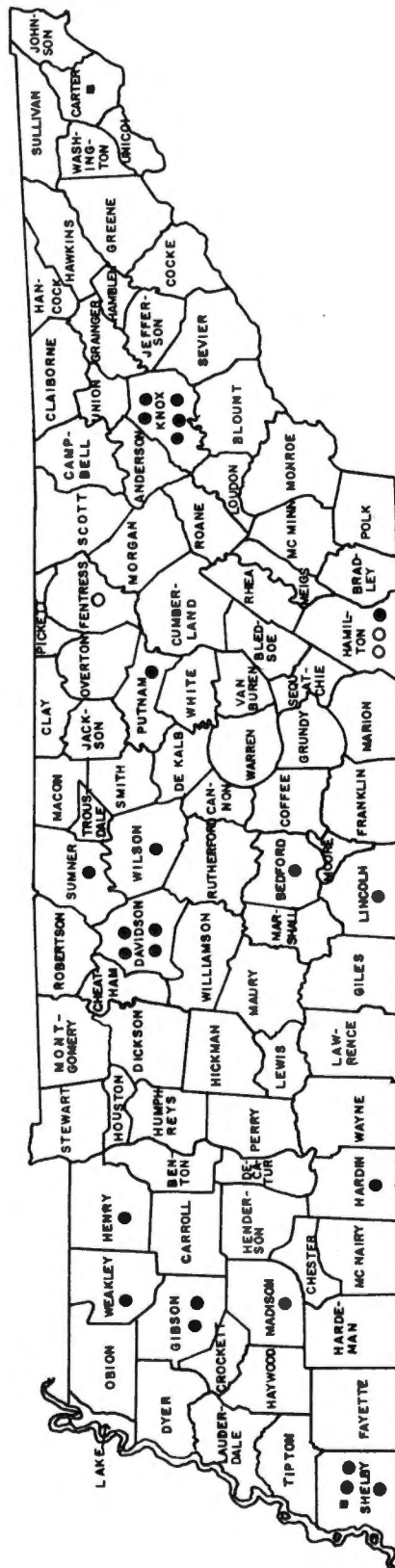


Figure 5. The location by county of all state inspected poultry eviscerating and processing plants, federally inspected poultry slaughtering plants, and federally inspected plants which processed meat or poultry in Tennessee, 1968.

Source: Tennessee Department of Agriculture, Directory 1968, Division of Food and Drugs, Nashville, Tennessee, 1968.



- Legend:
- Federally Inspected Poultry Slaughtering Plants
 - Federally Inspected Meat or Poultry Processing Plants
 - State Inspected Plants Eviscerating and Processing Poultry

Figure 6. The location by county of all state inspected poultry eviscerating and processing plants, federally inspected slaughtering plants, and federally inspected plants which processed meat or poultry in Tennessee, 1971.

Source: Tennessee Department of Agriculture, Directory 1971, Division of Food and Drugs, Nashville, Tennessee, 1971.

of Shelby, Davidson, Hamilton, and Knox accounted for approximately one-half of these plants. In 1971 this number had dropped to 94 plants with 37 in East, 35 in Middle, and 32 in West Tennessee. The major metropolitan areas still accounted for approximately one-half of the plants.

Even though there was a decline of only six plants, there were numerous other changes among the state inspected processing plants. Of the 94 plants that were state inspected in 1971, only 53 were licensed in these categories in 1968. This means that 47 plants had either left the industry or had their licensing classification changed. Of these 47 plants, 29 did go out of business. Ten became classified as D(1) plants; that is, plants processing meat or poultry with gross annual receipts of less than \$10,000. Three plants became custom slaughterers and one plant moved into commercial slaughter class A(3). Forty-one new plants entered the state inspected processing category from 1968 to 1971.

By excluding those plants which fall into the D(1) category the total number of plants engaged in the meat processing and livestock slaughter industry in Tennessee increased by 14 plants from 271 plants in 1968 to 285 plants in 1971. The simple addition of 14 plants to the industry does not tell the whole story about the entrants and exits from the industry. It has been noted that plants have left the industry, plants have changed their classification and stayed in the industry, and others have entered the industry. The location of plants within the state has stayed fairly constant even with the change in numbers of plants. The slaughtering plants are spread out fairly well over the state. But the federally inspected plants and the larger state inspected

plants are located in the major metropolitan areas. The processing plants became even more concentrated in the metropolitan areas from 1968 to 1971. The importance of the federally inspected slaughter plants increased in every case except for a slight drop in the number of pounds of calves slaughtered from 1968 to 1970. The custom slaughterers whose total number of plants increased lost ground in percentage of slaughter accounted for among all plants. The A(1) plants which fell in number from 16 to 14 from 1968 to 1970 had the biggest decline in the percentage of slaughter for which they accounted. The A(3) plants which dropped from 29 percent to 21 percent in number of plants held their own in percentage share of the slaughter. The only group of state inspected plants which increased their share of slaughter were A(2) plants. Their share of slaughter increased slightly from 1968 to 1970.

CHAPTER III

IMPROVEMENTS REQUIRED TO CONFORM TO THE WHOLESOME MEAT ACT

I. INTRODUCTION

When the Tennessee Meat and Poultry Inspection Act along with the Wholesome Meat Act went into effect, many plants which had been operating successfully for a number of year suddenly found themselves operating under new rules and regulations. Two choices were open: they could ignore the law and eventually close down; or they could make the needed changes in their plant, equipment, and operating practices and stay in business. In many cases the plants had to change their technique of production. The changes that the plants had to make were in most instances quite costly in terms of investment and production alterations. Changes such as these plants had to make effect the degree of competition within an industry by altering the conditions of entry and exit. First, the management had to decide whether the required changes could be made and still have a profitable business. Secondly, a determination had to be made whether to increase, decrease, or have no change in the size of the plants' capacity. All of these considerations manifest themselves in two of the characteristics of barriers to entry discussed earlier. These are the barriers which dealt with the cost and/or technique of production and the barrier which is concerned with the economies of large scale production and distribution. In this chapter an examination will be made of the costs associated with making the improvements required to meet the regulations of the Tennessee Meat and Poultry

Inspection Act and the Wholesome Meat Act.

All plants did not have to meet the same physical requirements in terms of plant construction. Therefore, we find different plants incurring different costs. In reporting what was to become the Wholesome Meat Act out of a Congressional committee, it was stated that federal standards must be required of all meat and meat products sold for human consumption in this country. The committee added, however, that some of the federal standards for plant construction may sometimes be unrealistic and it would be unreasonable to arbitrarily apply them when the operational practices of a smaller facility enables them to meet federal or equal state standards. According to the Department of Agriculture, the eligibility of an establishment for federal inspection is based upon a combined evaluation of the operating procedures used by the establishment and the building construction and physical facilities rather than upon a separate evaluation of these factors. Thus, if the operating procedures are patterned so as to insure the sanitary handling of product within the establishment and result in wholesome food, the establishment could be declared eligible for federal or equal state inspection. The committee went on to say, however, that it should be clearly understood that the requirements on wholesomeness, additives, labeling, and the other federal regulations are not to be compromised and must be at least equal to federal standards (Small Business Administration, 1971, p. 19).

The Senate report stressed that stringent federal standards for the construction of meat plants would be used by the Secretary of Agriculture only as they are necessary to insure sanitary conditions in

the light of operating procedures used in the establishment. Further, after many requests, a guide to plant construction and equipment was put together for use by industry operators, architects, engineers, and other government officials interested in the sanitary handling of products within an establishment. The guide was a collection of recommended minimum standards. However, a great variety of arrangements, building materials, and equipment have been considered acceptable so long as they lend themselves to the production of a clean wholesome product.

The only mandatory construction requirements were set forth in general terms in the regulations. These requirements relate directly to maintenance of sanitary conditions for the production of wholesome meat. For example, the floors, walls, ceilings, partitions, posts, doors, and other parts of all structures shall be of such materials, construction, and finish as will make them susceptible of being readily and thoroughly cleaned (Small Business Administration, 1971, p. 20).

The Secretary has responsibility under the statutory authority to insure that meat and meat food products are produced under sanitary conditions which will result in the production of wholesome food. Therefore, the only building construction and equipment requirements mandatorily prescribed under or contemplated by the statute are such as are necessary to insure sanitary conditions in the light of operating procedures which are to be used in the establishment.

The Congress felt assured that the regulations drawn up for small meat firms would be reasonable and that the emphasis would be placed upon the end result, wholesome meat, and not strict adherence to every rule in the book. "The rule of reason" was the new byword for the new meat

inspection. The new law declared it essential in the public interest that the health and welfare of consumers be protected by assuring that meat and meat food products distributed to them are wholesome, not adulterated, and properly marked, labeled, and packaged (Small Business Administration, 1971, p. 21).

These provisions are set forth through the Wholesome Meat Act. When the states established their own laws as did Tennessee, their provisions could add to those of the Wholesome Meat Act, but it could not lessen them.

These provisions set forth in the Wholesome Meat Act as perceived by Congress would allow each individual meat plant to be judged individually. The results of the inspections would be based upon the individual plant's conditions and not on an overall situation. But the provisions that were set forth by the Wholesome Meat Act had to be interpreted by many different individuals before the inspector arrived at the meat plant.

The individual plants found that there would be changes to make, and no two plants would have the same set of changes to make. This has led to a wide variation in costs that the plants have incurred. And no workable guidelines have evolved that can be applied to all plants. Each plant can only rely on the even and just interpretations of the rules and regulations by all inspectors at all levels. Each plant's situation is unique.

II. IMPROVEMENTS MADE BY INDIVIDUAL PLANTS AND THEIR COSTS

Four plants which represented the various size groups were selected in an attempt to determine the costs incurred by the various

plants in the state. The changes that these individual plants made between 1968 and 1971 were studied in detail. The changes and their costs were determined using both in-plant information and synthesized data. For the most part the cost figures given will be from actual accounting records.

The four study plants chosen include one A(1) plant, two A(2) plants, and one A(3) plant. These particular plants were chosen because they were examples of industry participants, their kill and associated operations represented a broad spectrum of operations, and they were willing to participate in this phase of the study. These particular plants were chosen after a survey of 63 slaughter and processing plants in the state had been surveyed. The survey was conducted in order to obtain information as to the effect that the new inspection laws had upon the individual plants. The plants were contacted personally in the fall of 1971.

A(1) Study Plant

The A(1) plant chosen for this part of the study (hereafter referred to as plant A) was located in Middle Tennessee, and its sales area included 12 Middle Tennessee counties. This plant slaughtered 1,373 head of cattle, 1 calf, and 4,003 head of hogs in 1968 and 1,076 head of cattle, 31 calves, and 4,426 head of hogs in 1970. Between 1968 and 1970 the total number of animals slaughtered by this plant increased slightly by some 256 head. The number of production workers employed by this plant in 1971 was the same as that employed in 1968. Slaughter took place in this plant five days per week in 1971, but the

was operating below capacity. One hundred hogs per eight-hour day and 30 cattle per day was the capacity for the plant in 1971, but only 113 hogs per week and 45 cattle per week were actually being slaughtered. Ownership category of this plant was single proprietorship. This plant could be considered a full line slaughter and processing plant with little or no meat being sold to breakers or jobbers. The plant's operations included country ham and bacon curing, a sausage kitchen, and full processing of its own meat for sale to grocery stores, restaurants, and institutions.

Plant A spent a total of \$62,500 on new plant (Table 4). This included a completely new sausage kitchen, waste treatment plant, and new parking area. A new sausage kitchen was required to be built separate and apart from the slaughtering facilities. Most plants contacted had to modify or improve their sewage facilities, but plant A had to build a complete sewage pretreatment plant. It also included new sewage lines within the plant, as more water was used to clear the plant, creating more sewage. This led to demands both from the city and the inspectors to better handle the sewage. Another building requirement led to paving of the driveway and parking area. This was done to reduce the amount of dust which came into the plant.

A total of \$30,244.00 was spent by plant A on renovation of its existing plant. These expenditures included work carried out on the holding pens, kill floor, chill cooler, processing room, processed product cooler, loading dock, and the inspector's office. Improvements in these areas included painting, removal of all wood surfaces, covering existing wood doors with metal or replacing them with metal ones,

Table 4. Expenditures by Plant A for Improvements to Conform to the New Inspection Requirements

Type of Expense	New Plant	Renovation of Existing Plant	New Equipment
	\$		
Sausage kitchen	23,000.00		
Parking	4,500.00		
Waste treatment	35,000.00		
Holding pen		3,500.00	
Kill floor		4,924.00	675.00
Chill cooler		8,772.00	
Processing room		4,200.00	5,575.00
Processed product cooler		6,348.00	
Loading dock		2,000.00	
Inspector's office		500.00	
Total	62,500.00	30,244.00	6,250.00

covering water pipes, adding lights, and other similar improvements.

New equipment purchased by plant A amounted to \$6,250.00. These expenditures included such things as stainless steel tables, refrigeration units for work areas, lavatories with foot pedals and sterilizers, and other such items.

A(2) Study Plants

Two plants were selected to represent the A(2) category. One plant represented primarily a sausage manufacturing establishment and the other plant exemplifies a boneless beef operation. The A(2) plant (hereafter referred to as plant B) which specializes in boneless beef slaughtered 2,388 head of cattle, 27 calves, and 77 sheep in 1968 and 2,895 head of cattle, 4 calves, and 39 sheep in 1970. Slaughter output for this plant increased by 446 head between 1968 and 1970. This plant was located in upper East Tennessee and had a sales area which covered primarily upper East Tennessee counties and especially the Tri-Cities metropolitan area. This plant slaughtered primarily boner cattle and sold its product in the form of frozen boneless beef, but a significant portion of its operation included custom slaughter of beef. In 1971 this plant began slaughter five days per week under inspection, but it was operating below capacity. The capacity of the plant was considered to be 125 cattle per week, but only 60 head were being slaughtered. Two persons were added to the production staff of this plant between 1968 and 1971. The ownership category for this plant was single proprietorship.

Plant B spent a total of \$55,869.00 on a new plant (Table 5). This included a new kill floor, new freezer, and pavement of parking

Table 5. Expenditures by Plant B for Improvements to Conform to the New Inspection Requirements

Type of Expense	New Plant	Renovation of Existing Plant	New Equipment
	\$		
Parking	4,250.00		
Kill floor	24,071.00		6,206.00
Freezer	27,548.00		
Holding pen		3,482.00	
Chill cooler		2,384.90	653.00
Processing room		6,495.89	2,678.00
Processed product cooler		1,000.00	
Inspector's office		2,260.00	
Rewire building		2,600.00	
Paint		576.00	
Holding cooler			853.00
Welfare room			25.00
Miscellaneous			<u>2,538.00</u>
Total	<u>55,869.00</u>	<u>18,798.00</u>	<u>12,955.00</u>

area. Plant B was faced with a small cramped kill floor which did not provide enough room for the workers to move around easily, and there was not enough room to build a lavatory, head rack, and other sanitation and inspection devices. Also, the ceiling was not high enough. The old kill floor was completely razed and a new one was built in its place. Since this plant was in the business of selling boneless beef, it had to have adequate freezer space. The existing freezer space was not well lighted, the floors did not meet specifications, the walls were in poor shape, and drainage was nonexistent. The old freezers were converted to coolers. The parking area and driveway had to be improved for the same reasons as plant A.

A total of \$18,798.82 was spent on the renovation of parts of plant B. This included work done in the holding pens, chill cooler, processing room, processed product cooler, inspector's office, rewiring the building, and painting. Expenditures for new equipment and supplies totaled \$12,955.77. These expenditures were for equipment and supplies for the kill floor, processing room, chill cooler, processed product freezer, lockers, and other miscellaneous items.

The other A(2) study plant (hereafter referred to as plant C) was located in central East Tennessee with a sales area that included a 10-county area of middle East Tennessee. This plant slaughtered 97 head of cattle, 2 calves, and 1,340 hogs in 1968 and 474 head of cattle, 30 calves, and 1,485 head of hogs in 1970. Between 1968 and 1970 the total kill by this plant increased by 550 head. The plant slaughtered two days per week with inspection, but it was operating below capacity in 1971. It was only killing 45 hogs and 13 cattle per

week while its capacity was 75 hogs and 35 head of cattle. The plant was operated under a single proprietor type of ownership. It depended primarily upon its sausage manufacturing business, but it also sold other pork and beef cuts with a small proportion of its kill being custom slaughter.

A total of \$38,144.21 was spent by the management of plant C on new plant (Table 6). These expenditures included a new holding pen, new chill cooler, new processing room, processed product cooler, and pavement of parking area. This plant's holding pen was not properly curbed and drained and the location conflicted with plans to add the processing room. The holding pen was relocated, and it was constructed according to the regulations of the new inspection laws. The existing processing room in 1968 was small, ceilings were low, drainage was poor, and the walls and floor was not easy to keep clean. A new processing room was added to the plant and at the same time a holding cooler and loading dock were added. Also, the driveway and parking area were paved.

A total of \$15,231.63 was spent on plant C for renovation of existing parts of the plant. The kill floor had to be completely remodeled. This included pouring more concrete, raising the roof, adding railing, improving drainage, and other items. Plant C spent a total of \$11,100.00 on new equipment for its kill floor and processing room.

A(3) Study Plant

The fourth plant selected was an A(3) plant (hereafter referred to as plant D) located in West Tennessee and had a sales area which included eight West Tennessee counties. This plant slaughtered 76 head of cattle,

Table 6. Expenditures by Plant C for Improvements to Conform to the New Inspection Requirements

Type of Expense	New Plant	Renovation of Existing Plant	New Equipment
	\$		
Holding pen	3,000.00		
Parking	2,000.00		
Chill cooler	7,200.00		
Processing room	25,944.21		4,348.00
Kill floor		10,879.00	6,752.00
Rewire building		2,017.57	
Paint		1,005.00	
Sewage		<u>1,330.60</u>	
Total	38,144.21	15,231.63	11,100.00

5 calves, and 363 head of hogs in 1968 and 76 head of cattle, 21 calves, and 446 head of hogs in 1970. The production staff was increased by two over this period. This plant sells both beef and pork with sausage being a big seller. Some curing operations are carried on and some custom slaughter is performed. This is a single proprietor type of ownership with a great deal of family labor employed.

The expenditure on the construction of a new plant amounted to \$49,863.10 (Table 7). This included a holding pen, kill floor, chill cooler, processing room, processed product cooler, dry storage, welfare room, office space, loading dock, and a retail outlet. This particular plant was required to completely close down its old facility and build the new one if it was to stay in business. A total of \$10,011.50 was spent by plant D on new equipment and supplies for the kill floor, processing room, coolers, dry storage, and retail sales area. These expenditures included such things as stainless steel tables, lavatories with sterilizers, paunch trucks, head racks, head washing cabinets, cooling units, fly fans, compressors, and other additions which were necessary to meet the requirements of the Tennessee Meat and Poultry Inspection Act and the Wholesome Meat Act.

III. TOTAL EXPENDITURES

The total expenditures made by each plant between 1968 and 1971 to bring the particular plants in line with the new inspection guidelines are presented in Table 8. Plant A spent a total of \$98,944.00, plant B spent a total of \$87,624.32, plant C spent a total of \$64,476.32, and plant D spent a total of \$59,874.60.

Table 7. Expenditures by Plant D for Improvements to Conform to the New Inspection Requirements

Type of Expense	New Plant	New Equipment
	\$	
Kill floor	25,484.00	6,823.00
Chill cooler	7,324.50	300.00
Processing room	2,769.50	2,673.00
Processed product cooler	2,574.60	
Dry storage	692.40	165.00
Welfare	628.50	
Office space	3,590.80	
Retail outlet	2,865.00	50.00
Loading dock	<u>1,303.80</u>	
Total	49,863.10	<u>10,011.50</u>

Table 8. Estimates of Average Costs of Improvements Required Per Selected Establishment

Improvement Required	Plant			
	A	B	C	D
	\$			
New plant	62,500.00	55,869.73	38,144.21	49,863.10
Renovation of existing plant	30,244.00	18,798.82	15,231.21	
New equipment and supplies	<u>6,250.00</u>	<u>12,955.82</u>	<u>11,100.48</u>	<u>10,011.50</u>
Total	98,994.00	87,624.32	64,476.32	59,874.60

This consideration of costs for the four selected plants indicated the extent of the changes that these plants had to undergo in their physical plant in order to stay in business after the new inspection laws went into effect. The range of expenditures of the commercial plants contacted was from \$15,000 to well over a million dollars. But the average expenditures in each class were approximated by the four plants chosen for this study.⁷

Twenty-six commercial slaughtering plants were contacted in the fall of 1971. This figure represented approximately one-third of all commercial slaughter plants which were state inspected. These 26 plants were made up of 8 A(1) plants, 9 A(2) plants, and 9 A(3) plants. Each of the 26 plants contacted had to rework their plant in some manner in order to qualify for inspection under the new laws. Not all plants had to do the same thing. Seven of the A(1) plants contacted had renovated or remodeled their existing plants (Table 9). Nine of the A(2) plants and seven of the A(3) plants had remodeled or renovated portions of their existing plant. Eight of the A(1) plants, eight of the A(2) plants, three of the A(3) plants had expenditures on new equipment and supplies. Two A(1) plants, two A(2) plants, and two A(3) plants had constructed new buildings or plants entirely. Only one of the plants contacted had constructed a completely new plant.

All plants that decided to try to stay in the industry readily made improvement in their plants. But the small plants were more reluctant to engage in major construction or remodeling projects than

⁷ Appendix B contains an itemized list of improvements that were required in these four plants.

Table 9. Number of Sampled Plants Reporting Expenditures Required to Improve Their Plants to Qualify for Inspection

Improvement Required	Number of Plants		
	A(1)	A(2)	A(3)
Renovation of existing plants	7	9	7
New equipment and supplies	8	8	3
New plant	2	2	2

were the larger plants. In the previous chapter it was pointed out that there was much greater change in numbers of plants, entrants and exits, in the A(3) category than in the A(1) category. The smaller plants found it much more difficult to make the needed changes in their plant and operation than did the larger plants.

CHAPTER IV

CHANGES IN THE DISTRIBUTION OF SLAUGHTER AMONG STATE REGULATED PLANTS

The full force of the Wholesome Meat Act and subsequently the Tennessee Meat and Poultry Inspection Act is assumed to have fallen upon those plants engaged only in intrastate commerce. Therefore, this chapter will be concerned with the changes that have taken place among the state inspected plants since the passage of these acts, even though the state regulated plants' share of total slaughter is small relative to the federally inspected plants (Appendix C, Tables 15 and 16). While the federally inspected plants have increased their share of livestock slaughtered in Tennessee since 1968, the distribution of slaughter among state inspected plants has changed as well as the distribution of slaughter among the various size plants. This chapter will be concerned with the distribution of state regulated slaughter plants, size of the plants, number of plants, patterns of entry and exit, and concentration of slaughter in the largest plants.

I. A(1) PLANTS

The number of head and percentage of total state inspected slaughter for A(1) plants in 1968 and 1970 is shown in Tables 10 and 11. From 1968 to 1970 the A(1) state inspected category's share of the livestock slaughter among state inspected plants declined with the exception of calves, where slaughter increased from 22 percent to 36 percent on a

Table 10. Slaughter Records for State Regulated Plants for 1968 by Head

Species	Yearly Total-1968							
	A(1)		A(2)		A(3)		Custom	
	Head	% of Total	Head	% of Total	Head	% of Total	Head	% of Total
Cattle	70,030	72.69	17,620	18.30	4,136	4.29	4,549	4.72
Calves	1,015	40.05	511	20.15	409	16.14	600	23.36
Sheep	4,939	97.10	118	2.31	2	.03	29	.56
Hogs	297,568	88.42	36,652	8.15	9,356	2.08	6,026	1.35
Average Per Plant-1968								
Cattle	A(1)		A(2)		A(3)		Custom	
	4,376.88		607.58		114.88		142.16	
	63.44		17.62		11.36		18.75	
	308.69		4.07		---a		---	
	24,848.00		1,263.86		259.88		188.31	
Number of plants	16		29		36		32	

^aNumber less than one.

Source: "Slaughter Reports," Tennessee Crop Reporting Service, unpublished data, Nashville, Tennessee, 1968.

liveweight basis.⁸ The biggest decline came in the slaughter of sheep. In 1968 A(1) plants slaughtered 97 percent of the sheep, but by 1970 sheep slaughter by A(1) plants dropped to 21 percent. The area in which the A(1) plants fell the least was in the slaughter of hogs where A(1) plants dropped two percentage points, 88 percent in 1968 to 86 percent in 1970.

There was no real change in the size of the largest A(1) plant between 1968 and 1970 (Appendix C, Table 19). But the size of the smallest and the median plant shifted. The smallest A(1) plant in 1970 was larger by some 1,000 head than the smallest A(1) plant in 1968. The median plant was smaller in 1970 than the median A(1) plant in 1968. The average number of animals slaughtered by A(1) plants remained essentially the same in 1970 as it was in 1968 (Table 10 and 11). Even though there were some changes in the makeup of class A(1), the plants remaining did not reorganize and produce a greater output. The smallest plant in 1970 was larger than the smallest plant in 1968 indicating that plants on the smaller end of the scale found it advantageous to increase their output. But with the median plant becoming smaller from 1968 to 1970 this trend was not widespread among the plants. Overall the plants which remained in the A(1) state regulated class did not change their output significantly between 1968 and 1970.

No A(1) plant slaughtered a large number of calves in either 1968 or 1970 (Appendix C, Table 20). The slaughter of sheep was concentrated in one plant in 1968, but in 1970 no plant slaughtered a large number of

⁸The slaughter records for state inspected plants for 1968 and 1970 by liveweight are presented in Appendix C, Tables 17 and 18.

sheep. Sixty-seven percent of the cattle slaughtered in 1968 by A(1) plants were slaughtered in four plants while two plants accounted for 54 percent of the cattle slaughtered by A(1) plants in 1970. Three plants slaughtered 71 percent of the hogs in 1968 while 83 percent of the hogs slaughtered in 1970 were in two plants.

From 1968 to 1970 no new A(1) plants were established in Tennessee, but this category lost five plants. Two of these plants chose to operate under USDA inspection; the other three ceased slaughter operations.⁹

The total output of the three A(1) plants that went out of business was 32,197 head of cattle, 619 head of calves, 4,495 head of sheep, and 126,548 head of hogs in 1968. This was a significant loss in state inspected slaughter capacity in that these three plants alone slaughtered almost as many cattle in 1968 as did all A(1) plants in 1970. Further they slaughtered more calves than all plants in 1970. These three plants accounted for all but a small number of sheep slaughtered in 1968 and approximately one-third of all hogs slaughtered by A(1) plants in 1970. It can be seen that these plants which chose to close down after 1968 were not small insignificant plants but were those that played a substantial part in the industry. These three plants closed because, among other reasons, the management indicated that they could not afford to renovate their old plants or build new ones

⁹ The plants which chose to change to USDA inspection were primarily sausage manufacturing establishments and chose federal inspection so they could move their product across state lines. The effects of state regulations under the Wholesome Meat Act of 1967 were perceived by the management of these plants as being no different from federal inspection.

to meet the requirements of the new inspection regulations. Two of these plants left the industry entirely, the other stayed in the industry as a processor in the area of portion controlled products.

A(2) PLANTS

The number of head and percentage of total state inspected slaughter for A(2) plants in 1968 and 1970 are shown in Tables 10 and 11, pages 47 48. Between 1968 and 1970 the A(2) plants' share of state inspected slaughter increased for all livestock both on a liveweight basis and a per head basis. The biggest increase came in the slaughter of sheep. In 1968 the A(2) plants slaughtered only 2 percent of the sheep slaughtered by state regulated plants, but in 1970 the A(2) plants slaughtered 67 percent of the sheep. The smallest increase was in the slaughter of hogs. The A(2) plants went from 8 percent of the hogs to 10 percent in 1970. The increase in cattle and calves was the most substantial increase in terms of more business and work for the plants.

There was little change in the size of the largest A(2) plants between 1968 and 1970 (Appendix C, Table 21). The smallest A(2) plant in 1970 slaughtered fewer animals than did the smallest A(2) plant in 1968. The output of the median plant from 1968 to 1970 was roughly the same. The average number of animals slaughtered by A(2) plants was about the same for 1968 and 1970 (Tables 10 and 11). The A(2) plants grew very little in size between 1968 and 1970. There was no movement from the smaller side of the class to the larger side. There was no move among A(2) plants to increase their size after 1968.

No one A(2) plant slaughtered a large number of sheep in either 1968 or 1970 (Appendix C, Table 22). One plant slaughtered 50 percent of those calves slaughtered by A(2) plants in 1968, but in 1970 56 percent

of the calves were slaughtered by two plants. The four largest A(2) plants in 1968 slaughtered 43 percent of the cattle while in 1970 the three largest plants slaughtered only 38 percent of the cattle. Four plants slaughtered 38 percent of the hogs in 1968 while six plants slaughtered 58 percent of the hogs slaughtered by A(2) plants in 1970.

Even though there were 29 plants in the A(2) category for both 1968 and 1970, there was some movement in and out of this category. One of the plants that had an A(2) license in 1968 chose to change to USDA inspection. This plant was in the sausage manufacturing business and was located such that it could serve two states other than Tennessee.¹⁰ Two other plants left the industry.

Of the three plants that were new in this category for 1970, one had operated under a different license classification in 1968. This plant was the largest plant in the A(2) class for 1970. But it only operated for seven months in 1970 and then went out of business. The other two plants primarily slaughtered hogs. These three plants accounted for 8.12 percent of all cattle, 36.34 percent of all calves, and 28.40 percent of all hogs slaughtered by A(2) plants in 1970.

III. A(3) PLANTS

The number of head and percentage of state inspected slaughter for A(3) plants for 1968 and 1970 are shown in Tables 10 and 11, pages

¹⁰ This particular plant found that the corrections that it had to make in order to meet state regulations were practically the same as those needed to meet federal inspection. This plant had been constructed with an anticipation of someday becoming federally inspected. This plant had to construct welfare rooms and extra sewage lines in order to meet the federal regulations.

47 and 48. From 1968 to 1970 the A(3) plants increased their share of slaughter slightly among state inspected plants. The average number of hogs and cattle slaughtered per plant rose slightly from 1968 to 1970. The percentage share of cattle rose from 4 percent in 1968 to 7 percent in 1970. The A(3) plants held their own in terms of the percentage share of slaughter from 1968 to 1970.

There was no real change in the size of the largest, smallest, and median size plants in the A(3) category from 1968 to 1970 (Appendix C, Table 23). There was no rush to increase the size of the plants to the upper end of the scale after 1968. By referring to Tables 10 and 11 on pages 47 and 48, one can determine that the average number of animals slaughtered by A(3) plants increased only slightly from 1968 to 1970.

No plant slaughtered a large number of calves or sheep in 1968 or 1970 (Appendix C, Table 24). The two plants which slaughtered the most cattle among the A(3) plants in 1968 accounted for 27 percent of the total while two plants accounted for 32 percent of the cattle slaughtered in 1970. Three plants slaughtered 34 percent of the hogs slaughtered by A(3) plants in 1968 and in 1970 three plants slaughtered 37 percent of the hogs. It can be seen that no one plant dominated the A(3) category in either year. The slaughter of livestock by A(3) plants is distributed among all the plants.

Of the 36 plants which had an A(3) license in 1968, 15 of these plants did not report in this category in 1970. These plants had left the industry. Of the 33 plants that reported in the A(3) category in 1970, 12 were new to the category. These were either new entrants or

their license classification had changed since 1968. The 15 plants that left the slaughter industry after 1968 slaughtered 1,098 head of cattle, 7 calves, 1 sheep, and 1,698 head of hogs in 1968. This accounted for 26 percent of the cattle and 18 percent of the hogs slaughtered by A(3) plants in 1968. The 12 plants that were new to the A(3) category in 1970 slaughtered a total of 1,671 head of cattle, 45 calves, 2 sheep, and 1,948 head of hogs. These totals accounted for 35 percent of the cattle, 15 percent of the calves, 25 percent of the sheep, and 22 percent of the hogs slaughtered by A(3) plants in 1970. Of the 12 plants which were new to the A(3) category in 1970, only 4 can be considered as newly established since 1968. This means that they were in the business of slaughtering livestock but were not operating under an A(3) license. Six of these seven were custom slaughterers in 1968 and the other one was in category A(2) during 1968. The other plant of the 12 was in business in 1968 but there was no slaughter report for that plant in that year. The four plants that were new to the industry in 1970 slaughtered 1,256 head of cattle, 25 calves, 2 sheep, and 1,128 head of hogs. Therefore, it can be seen that there was a big change in the makeup of category A(3) during the three years that this study considered.

IV. CONCENTRATION OF SLAUGHTER AMONG STATE INSPECTED PLANTS

It has been pointed out that plants in the various categories grew little between 1968 and 1970. For this period there was no major increase in concentration of output within the various categories. The structural attribute of concentration will be considered in this section.

The purpose of this measurement is to ascertain to what extent large plants in the industry dominate output. The stability of patterns of plant size may indicate competitive ability of small plants to survive side by side with the larger units.

The cumulative percentage device is an indicator of size inequality. If all firms were of equal size, cumulative percentage of firms would equal cumulative percentages of the market held by those firms. The fact that these percentages are not equal indicates that larger firms account for relatively greater proportion of slaughter than they do of firm numbers (Anthony, 1966, p. 6). Also, if there had been any major change in industry makeup through exits and entrants, it would be indicated by changes in the cumulative percentage.

Measurements of slaughter concentration for state inspected plants are presented in Tables 12 and 13. Concentration ratios of shares held by the 4 and 10 largest plants are in Table 12. Cumulative percentages of slaughter by successively larger plants, ordered by size, are presented in Table 13.

Cattle Slaughter

In 1968 the four largest plants accounted for 50 percent of total slaughter among state regulated plants (Table 12). By 1970 their share had declined to 44 percent. During the same period the next six plants increased their share of state inspected slaughter from approximately 18 percent to 22 percent. The total share held by the 10 largest plants dropped from 68 to 65 percent. The change in the share came about when two of the larger plants left the industry after 1968. In 1970 the

Table 12. Percentages of Slaughter by Four Largest, Fifth to Tenth Largest, and Ten Largest State Inspected Plants in Tennessee, By Species, 1968 and 1970

Species and Size Rank of Firm	1968 Percent	1970 Percent
Cattle		
1-4	49.97	43.94
5-10	18.44	21.50
1-10	68.41	65.44
Calves		
1-4	46.79	42.62
5-10	28.67	19.69
1-10	75.46	63.31
Sheep		
1-4	97.52	62.60
5-10	1.45	19.69
1-10	98.97	89.43
Hogs		
1-4	72.06	78.32
5-10	12.39	8.92
1-10	84.45	87.24
Total		
1-4	67.45	72.35
5-10	13.48	9.37
1-10	80.93	81.72

Source: "Slaughter Reports," Tennessee Crop Reporting Service, unpublished data, Nashville, Tennessee, 1968; "Slaughter Reports," Tennessee Crop Reporting Service, unpublished data, Nashville, Tennessee, 1970.

Table 13. Share of State Inspected Slaughter by Cumulative Percentage of Plants by Species 1968 and 1970

1968		1970	
Cumulative Percentage of Firms	Percentage of Markets	Cumulative Percentage of Firms	Percentage of Markets
%			
<u>Cattle</u>			
0	0	0	0
10	68	10	62
20	85	20	81
30	92	30	91
40	95	40	95
50	97	50	97
60	98	60	98
70	99	70	99
80	100 ^a	80	100 ^a
90	100	90	100
100	100	100	100
<u>Calves</u>			
0	0	0	0
10	47	10	46
20	69	20	62
30	80	30	73
40	86	40	81
50	91	50	87
60	95	60	92
70	97	70	96
80	98	80	98
90	99	90	99
100	100	100	100
<u>Sheep</u>			
0	0	0	0
10	95	10	39
20	97	20	62
30	98	30	73
40	99	40	84
50	100 ^a	50	89
60	100	60	90
70	100	70	93
80	100	80	96
90	100	90	97
100	100	100	100

Table 13 (continued)

1968		1970	
Cumulative Percentage of Firms	Percentage of Markets	Cumulative Percentage of Firms	Percentage of Markets
%			
<u>Hogs</u>			
0	0	0	0
10	72	10	85
20	84	20	93
30	92	30	96
40	95	40	97
50	97	50	98
60	98	60	99
70	99 ^a	70	100 ^a
80	100 ^a	80	100
90	100	90	100
100	100	100	100
<u>Total</u>			
0	0	0	0
10	82	10	81
20	89	20	90
30	93	30	94
40	96	40	97
50	97	50	98
60	98	60	99
70	99 ^a	70	100 ^a
80	100 ^a	80	100
90	100	90	100
100	100	100	100

^a Remaining firms have less than 1.0 percent.

Source: "Slaughter Reports," Tennessee Crop Reporting Service, unpublished data, Nashville, Tennessee, 1968; "Slaughter Reports," Tennessee Crop Reporting Service, unpublished data, Nashville, Tennessee, 1970.

medium size plants accounted for more of the slaughter.

In 1968 the largest 10 percent of the cattle slaughter plants accounted for 68 percent of total state inspected slaughter (Table 13). This share declined to 62 percent in 1970. The cumulative share of the largest 20 percent of the plants declined from 1968 to 1970. But the total share of one-half of the plants stayed the same at 97 percent.

Many state inspected plants slaughter small numbers of cattle. In fact, 50 percent of the plants slaughtered only 3 percent of the total number of cattle slaughtered in both 1968 and 1970.

Even though there were some changes in the number of plants and entrants and exits from 1968 to 1970, the relative share of each size category stayed practically the same. The larger plants still dominate. The smaller plants play a minor role in total amount slaughtered.

Calf Slaughter

State inspected calf slaughter is less concentrated in large plants than cattle slaughter. This holds true for the percentage of state inspected slaughter held by the largest plants and for the percentage of plants accounting for virtually all slaughter.

In 1968 the four largest plants accounted for 47 percent of the calf slaughter. By 1970 their share fell to 42 percent. The share of the next six plants fell from 28 percent to 19 percent. The concentration of calf slaughter in the largest 10 plants fell from 1968 to 1970. The share accounted for by the largest 10 fell from 75 percent to 63 percent.

During the period 1968 to 1970, 10 percent of the plants accounted for approximately 46 percent of the slaughter. Concentration of slaughter

among the largest 30 percent of the plants fell from 80 percent to 73 percent from 1968 to 1970. Fifty percent of the plants accounted for 95 percent of the slaughter in 1968 while the same group accounted for 92 percent in 1970. The concentration of calf slaughter was less than that of cattle and it decreased somewhat between 1968 and 1970.

Sheep Slaughter

In 1968 the state inspected sheep slaughter was the most concentrated of all livestock slaughter. The share of slaughter accounted for by the four largest plants in 1968 was 97.5 percent (Table 12, page 56). The next six plants had only 1.4 percent which gave the 10 largest firms 98.9 percent of the total number of sheep slaughtered by state inspected plants. But by 1970 the four largest plants only accounted for 42.6 percent of the sheep slaughtered. And the 10 largest plants only had 63 percent of the total. This change was brought about when one of the plants left the industry. This one plant slaughtered a great majority of the sheep that were slaughtered by state plants in 1968.

Cumulative concentration of sheep slaughter changed drastically from 1968 to 1970. The share slaughtered by the largest 10 percent of the plants fell from 95 percent to 39 percent (Table 13, page 57). The share of state inspected slaughter by the top 30 percent fell from 98 to 73 percent. In 1968 50 percent of the plants slaughtered less than 1 percent of the state inspected sheep. By 1970 the smallest 50 percent accounted for 10 percent of the sheep.

The drastic change in concentration of sheep slaughter points out what can happen when plants close that have a considerable impact upon

the slaughter of a particular species. The slaughter of state inspected sheep was concentrated in one plant in 1968. When this plant went out of business, no plant increased its number of sheep slaughtered.

Hog Slaughter

Concentration of state inspected hog slaughter increased from 72 to 78 percent of the slaughter being done in the four largest plants from 1968 to 1970 (Table 12, page 56). But the share of the next six largest plants decreased slightly. The 10 largest firms still managed to increase their share of slaughter. The 10 largest plants' share increased from 84 percent in 1968 to 87 percent in 1970. This increase was due to a decline in the importance of small commercial plants in hog slaughter. It was also due to the decline in importance of custom slaughters. Some of the larger medium size plants shifted from state to federal inspection between 1968 and 1970 which also aided the increase in share by the smaller plants.

Share of state inspected hog slaughter by cumulative percentage have also shown an increase. The percentage of state inspected hog slaughter by the largest 10 percent of the plants increased from 72 percent in 1968 to 85 percent in 1970 (Table 13, page 57). However, the increase of slaughter among the top 50 percent amounted only to 2 percent. This group increased its share from 97 to 98 percent. The smallest 50 percent's share fell over this period.

Total Slaughter

There was an increase in concentration among the four largest plants from 67.4 percent in 1968 to 72.4 percent in 1970 (Table 12,

page 56). But the next six largest plants showed a decrease from 13 to 9 percent during the same period. Because of the decline of the 5 to 10 largest, the 10 largest plants increased their share only slightly from 1968 to 1970.

There has been little change in the cumulative concentration of livestock slaughter in Tennessee during the period 1968 to 1970. In 1968 the largest 10 percent slaughtered 82 percent of the livestock (Table 13, page 57). In 1970 the largest 10 percent share was 81 percent. In 1968 the largest 50 percent's share was 97 percent and in 1970 it was 98 percent. So, there has been very little change in the distribution of livestock slaughter in Tennessee since 1968 among state inspected plants.

Therefore, other than for a decline in total number of animals slaughtered by state inspected plants and a slight decline in number of plants from 1968 to 1970 little change took place in the structure of the slaughter sector of the Tennessee Livestock-Meat Industry. The structural variables analyzed in this chapter showed primarily the same responses in the implementation phase of the Tennessee Meat and Poultry Inspection Act as they did in the effective phase of the program. The regulations imposed by the 1967 Acts did little to affect the overall distribution of slaughter in Tennessee.

CHAPTER V

CONCLUSIONS AND IMPLICATIONS

I. INTRODUCTION

At the time that this study began the Wholesome Meat Act of 1967 and the Tennessee Meat and Poultry Inspection Act had been in operation almost four years with two of those years being the implementation period and two being a period in which the laws were in full effect. By waiting a period of time before looking at the changes which came about after the laws became effective, the researcher was able to draw certain conclusions with reference to the Tennessee Livestock-Meat Industry. These conclusions are based upon the analysis presented in this study, the results gained from the survey of slaughter and processing plants, and certain insights which the researcher was able to gain while visiting and talking with members of the industry. While the results of the survey were somewhat sketchy and rangy primarily due to the type of record keeping employed by the plants visited, there is enough evidence to draw certain pertinent conclusions.

II. TANGIBLES

Jobs

Although some plants did cease operations and thereby put a number of people out of work, there appeared to have been enough expansion by those plants which remained or entered the industry after 1968 to offset this loss of jobs. A sample of 26 livestock slaughtering

plants reported a total of 830 production workers employed in 1967 and 876 production workers employed in 1971. A sample of 21 meat processing plants reported a total of 364 production workers employed in 1967 and 382 in 1971.

Procurement and Distribution

There were few, if any, changes in the procurement and distribution patterns of the plants in the slaughter and processing industry, the only exception being the increase in the number of processing plants which chose to operate under USDA inspection after 1968. These plants were in a position to move their product across state lines and enlarge their distribution area. Also, these plants, after becoming federally inspected processing plants, had to purchase their carcasses from federally inspected slaughtering plants either within Tennessee or from some other state. But this was not an important change since most processing plants with state inspection purchase a large portion of their carcasses from federally inspected plants. As for the slaughter plants, there appeared to be no decrease in the competition between these plants in purchasing slaughter stock.

Number, Concentration, and Location

The structure of the industry was altered little, if any, by the Wholesome Meat Act of 1967 and the Tennessee Meat and Poultry Inspection Act. The federally inspected plants increased their share of slaughter from 1968 through 1970, but this has been an observed phenomenon for a number of years and not just associated with the new laws. There was little change in the share of slaughter accounted for by the various

groups of state inspected plants. The only group that suffered a substantial loss in slaughter numbers were the strict custom slaughterers. But this may have been due to the fact that more of the commercial slaughterers have expanded their custom slaughter operations and are successfully competing with the strict custom slaughter operations for business. It is true that the state inspected plants account for only a small share of the total slaughter in Tennessee. But if one compares the location of state inspected plants and federally inspected plants, one finds that the state inspected plants are more evenly distributed throughout the state thereby serving more smaller localities both as a source of red meat and as an important outlet for local farmers' livestock. The concentration of slaughter in the larger plants in the state has changed little from 1968 to 1970. Slaughter reports have tended to be rather constant. But if one observes the output of two of the state inspected plants (one located in Middle Tennessee and one in East Tennessee), one finds that these two plants controlled 65 percent of the total number of animals slaughtered by state regulated plants in 1970. They slaughtered 25 percent of the cattle and 71 percent of the hogs slaughtered in Tennessee in 1970. Therefore, with only a few more plants of this size or if these plants were to approximately double their output, the total output of state inspected plants could be confined to a small number of plants.

The number of processing plants in the state did not increase greatly if those plants with an average gross annual sales of \$10,000 or less are ignored. The location of processing plants became somewhat more concentrated in the major metropolitan areas. But this movement

was not to be unexpected since this type of business needs to be close to its customers.

Custom Slaughter Operations

By allowing the custom slaughter operations to be exempt from the full force of the new law, a number of plants were allowed to remain in business. Actually there was a growth in the number of custom slaughter operations in the state, but their share of total slaughter declined. Another important point concerning custom slaughter is that five of the eight A(3) plants visited during the survey were only performing custom slaughter operations. If this ratio holds true for all A(3) plants, a large number of plants are surviving by holding onto custom slaughter status.

Specialization

Between 1968 and 1970, the period for which kill data were available, there was little increase in specialization of species slaughtered among the slaughter plants in Tennessee, although for processors the situation is somewhat different. Those plants which were already into specialty items have increased their output and were some of the first to move from state to federal inspection.

Capacity

The capacity of the slaughter industry in Tennessee was not decreased by the requirements of the new inspection laws. Based on a sample of 24 plants the state regulated livestock slaughter plants in Tennessee were operating at 90 percent of capacity in 1971 (Appendix C, Tables 31, 32, and 33).

Entry and Exit

As evidenced by the changes that have taken place in categories A(2), A(3), and among the custom slaughterers, the movement in and out of the slaughter sector has been great since 1968. But movements into the A(1) and the federally inspected categories by newly established plants has been nonexistent. A few plants have left the industry from these categories. A total of 15 plants entered the industry while 20 plants left between 1968 and 1971. While these changes have been large in terms of numbers, the change in terms of capacity has been small. This information indicates that plants can still enter the industry but those plants that have chosen to enter the industry in Tennessee since 1968 have been small and have had no significant influence upon the capacity of the industry.

Those plants that have left the industry since 1968 have not taken a significant percentage of slaughter capacity out of production. What these changes sum to is a realization that the entry into and exit from the slaughter sector that has occurred since 1968 has had no major influence in terms of changes in capacity upon the industry. But some of the federally inspected and A(1) plants have expanded. Therefore, the impact that the changes in the slaughter sector has had upon the livestock producing and livestock marketing sector has been small. There has been no significant decline in the number of buyers or demand for livestock as the result of the changes that have taken place in the slaughter sector.

III. INTANGIBLES

Impact of Regulations

The biggest impact upon individual plants was the changes that took place in the day-to-day activity upon the kill floor, processing area, or in the coolers, freezers, and holding pens. A number of the members of the industry contacted throughout the state indicated that efficiency fell and the operations were disrupted when the inspectors arrived at the plants. Initially it was stated that output on the kill floor dropped from 10 to 30 percent depending upon the plant. But this problem has begun to slowly stabilize. Time spent in cleanup has jumped from 3 to 10 times the amount of time spent prior to the new laws.

One of the changes that practically all plants had to make concerned the plants' handling of sewage disposal. Most all plants, especially those in rural areas or small towns, had to undergo expensive improvements in their waste control systems. Some of these improvements were only temporary measures. As the demand increases for more control of pollutants, the members of the Livestock-Meat Industry will have to incur greater expense in solving this problem.

The relationship between the plant owners, management, the labor force, and inspectors overall. Early in the program there was some resentment on the part of management and labor toward the inspectors, but as the inspectors became better trained and more experienced and management came to appreciate the inspectors' position, this problem has tended to stabilize. Also, a number of the respondents indicated

that they felt a large portion of the inspection regulations were a form of harrassment. They had no quarrel with the plants to improve sanitation and cleanliness in the plant. Actually most of them felt that after they cleaned up their plant and began to think clearliness, it was much easier to maintain a clean plant that they had thought possible. Over time these types of problems have lessened.

There was a definite difference among the attitudes and feelings expressed by the individual livestock slaughterers, the larger processors, and the smaller processors, especially the locker plants. Probably the strongest objections raised against the present inspection program was raised by the smaller processors and the locker plant operators. These plants which operated on a small scale were greatly threatened by the new laws. These plants had no desire to increase their size, and if they did, they performed such a special function for local customers that they could not increase their business. These plants felt that they should be given special treatment in terms of not having to meet all of the stated requirements, essentially because they were locally family owned and operated businesses. The plants of this size in Tennessee were not alone in their outcry for assistance and some consideration has been given to allowing these types of businesses special treatment.

The majority of the smaller slaughter plants experienced a number of problems associated with the new inspection programs. A number of these plants reverted back to strictly custom slaughter operations. Some of the commercial plants visited in the state had started out as small custom slaughter establishments and grew to their present size.

Some of the smaller A(3) plants were primarily custom slaughterers with only a small commercial operation. Those plants which started out as custom slaughter operations will find it almost impossible to grow and develop into a full line commercial operation even on a small scale under the present inspection regulations. This is primarily due to the fact that the plants in which custom slaughterers operate will in no way meet commercial plant requirements, and a plant operating on a small scale will find it most difficult to finance a modern well equipped establishment.

Another of the complaints registered by the meat and meat product plant's management was that they did not believe that it was fair and equitable for their plants to conform to the stringent rules and regulations set forth by the new laws while restaurants and supermarkets could fabricate and manufacture meat products without meeting either the sanitation requirements or recipe and ingredients requirements of the laws. In effect what the slaughterer and processor were saying was that now we can guarantee that there is a wholesome product leaving the slaughterer and processor, but no guarantee can be made that the consumer in the supermarket or restaurant is getting a wholesome product.

One of the major complaints of the plant managers, both slaughterers and processors, was the inability of state inspected plants to move their product across state lines even though the state inspection program had been judged equal to the federal requirements.

The full impact of the Wholesome Meat Act and the Tennessee Meat and Poultry Inspection Act has not yet been fully felt throughout the industry. There is a broad range of improvements among meat and meat

products plants in evidence across Tennessee. Some plants have made great improvements in their plants while others have barely met the minimum requirements.¹¹ It would seem that stabilization of the new inspection regulations is still some two to six years away in Tennessee. As time goes by, the regulations and requirements will be more strictly enforced. This will be due to plants which have already made a number of improvements becoming more able to make more changes, further outcries from consumers concerning bad meat and unsanitary conditions (whether true or false), a more evident lack of improvement made by the slower plants in comparison to the faster improving plants, more inspectors being hired, and a realization on the part of the inspection agencies as to just how much power they have. Therefore, these plants which have so far been slow to make improvements will find it continually more difficult to make these improvements thereby risking their loss of license. But this outcome may not be as dramatic as outlined since some of these "slower" plants are under older management and the management may decide to retire and give up rather than continue to fight to stay in business.

Cooperation

Cooperation was a key word used when the members of the slaughter and processing industry discussed the implementation of the new inspection laws in the state. Overall there was good cooperation between the

¹¹It is assumed that all of the major changes have been made and that those remaining to be made are only minor and will not have a major impact upon the structure of the industry.

members of the meat-packing industry and the state and federal inspection agencies. Definitely there were problems, but in general the affected members of the industry were able to discuss these problems with the inspection officials and come to a reasonable settlement.

In the early 1960's, the members of the meat-packing industry in Tennessee formed the Tennessee Independent Meat-Packers Association. One of the first concerns of this organization was the need for some type of universal inspection program in Tennessee. They began to work for and with the Tennessee Department of Agriculture for such a program. Admittedly the program that resulted had more far-reaching effects than the packers had anticipated. But because of an early realization that an inspection program was needed, the industry in Tennessee was better able to cope with the changes than might have been expected. Since the early 1960's, the packers association had been urging its members to consider and take account of federal regulations when they expanded or remodeled their plants. When the new laws became effective, the Association urged its members to cooperate with the state and federal agencies in carrying out these laws. The State Department of Agriculture aided the plants in deciding just what changes were needed and helped determine how the changes should best be made. Because of this cooperation between the state and the industry, the new laws were put into effect with a minimum loss in plant numbers and a minimum loss of actual operating time. There was no real decline in the capacity of the slaughter industry during this period. All but a few plants contacted in the state were operating quite below capacity.

It became quite evident after the full inspection program began

that as a whole the meat-packing plants in Tennessee were not as unsanitary or unclean as was expected. This fact can be contributed to the awareness of the members of the industry of the need for cleanliness and sanitation in their operation and early efforts of the Tennessee Independent Meat-Packers Association. As one member of the industry said, "The livelihood of any plant is dependent upon the reputation of that plant's product, and it is to the plant's advantage to provide the consumer with a good wholesome product at all times."

The Future

The Wholesome Meat Act of 1967 included a provision whereby the federal government would share inspection expenses with the state on a 50-50 basis. The program adopted in Tennessee accepted the offer by the federal government to pay for 50 percent of the cost of the program. As Tennessee's budget becomes more restrictive and money for various programs becomes tighter, the state may decide it would be expedient to allow the federal government to take over the meat inspection program entirely. If this happens, the inspection requirements will become more stringent and the adjustments in plant numbers and capacity will undergo further changes.

CHAPTER VI

SUMMARY

The objectives of this study were: (1) to determine the increases in investment incurred by selected plants in complying with the new inspection regulations, and (2) to determine the change in number and size of the livestock slaughter and processing plants in Tennessee since the passage of the Wholesome Meat Act of 1967 and the Tennessee Meat and Poultry Inspection Act.

Certain study slaughter plants in the state were selected for close analysis of the improvements that they had to make in order to meet the requirements of the new inspection program. These plants were divided into various departments and budgets were developed for each department. A combination of in-plant data and economic engineering data were used to determine the increase in cost.

All plants contacted through the survey made some type of improvement in their plant and/or equipment. The plants selected for closer analysis made changes in their operation and improvements in their plants which were similar to all plants, but naturally some of the improvements made by these plants were unique to the individual plants. Four plants were chosen for closer analysis with the representative A(1) plant spending a total of \$98,944.00, the two A(2) plants spending \$87,624.32 and \$64,476.32, and the representative A(3) plant spending \$59,874.60. These expenditures covered a wide range of improvements including building a completely new plant; building or remodeling kill floors, processing

rooms, coolers, freezers, or holding pens; purchasing stainless steel tables, rubber cutting boards, paunch trucks; and other similar items. The range of expenditures found in the commercial plants contacted was from \$15,000 to well over \$1,000,000.

The improvements that these four plants made can be considered to approximate the changes made by all slaughtering plants in the state. Also, the changes can be considered representative of changes made by the processing plants if the kill floor is excluded. Thus, costs for both slaughter and processing plants were similar.

The implementation of the Wholesome Meat Act of 1967 and the Tennessee Meat and Poultry Inspection Act in Tennessee has caused no drastic changes in the structure of the Tennessee Livestock-Meat Industry. Only slight changes have occurred in the structural variable. The number of processing plants increased slightly and the number of slaughter plants decreased slightly. Location of plants in the state became somewhat more concentrated in the metropolitan areas. This was especially true for those plants which accounted for the major portion of the production. The number of people employed in the industry in the state has probably increased due to the expansion of some of the larger slaughter plants and the establishment of more processing facilities. Procurement and distribution patterns have undergone little change.

The competition of buyers in the purchase of livestock has not decreased. Although there may have been a slight decline in the number of slaughter plants, the competition for slaughter animals apparently has not decreased. Therefore, the livestock producers and the marketing sector have not been adversely affected by the new inspection laws. The

number of suppliers of carcasses and processed meat has not changed which means that no retailers have been left without a supplier.

The movement in and out of the industry during the period which this study covered was not impaired by the Wholesome Meat Act and the Tennessee Meat and Poultry Inspection Act. There was no major exodus of plants. The distribution of slaughter among the slaughter plants has stayed relatively constant since the enactment of the new laws. Slaughter capacity for the industry has not been significantly altered. There has been no move toward specialization in the slaughter of any particular species.

Other than a major one-shot increase in the investment expenditures to improve the plant and equipment, little change has taken place in the industry. Therefore, it can be said of the meat-packing industry in Tennessee that the operation of the new inspection laws has not altered the structure of the industry to any measurable extent.

The effects of the Wholesome Meat Act and the Tennessee Meat and Poultry Inspection Act are still being felt. There may yet be some significant changes take place in the Tennessee Livestock-Meat Industry. If the inspection laws become more strictly enforced or if all inspection becomes federally supervised, further changes would take place in plant numbers and capacity in the Tennessee livestock-slaughter industry.

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APPENDICES

APPENDIX A

GENERAL INSPECTION REQUIREMENTS

After the passage of the Wholesome Meat Act and the Tennessee Meat and Poultry Inspection Act those plants which were engaged in intrastate commerce underwent a drastic change in operation procedures. For the first time since they had been slaughtering livestock or processing meat, all of their operations went under the constant supervision of a state inspector. The inspectors had complete command over sanitary conditions and equipment for slaughtering and processing. The plants could not begin operations until the inspector arrived in the morning and had to cease operations and clean up the facilities before he left in the evening.

The inspector performed both an antemortem and a postmortem inspection upon the animals. In the antemortem (before death) inspection the animals were observed in the pens or as they moved from the scales after weighting to detect evidence of disease or any abnormal condition that would indicate a disease. If an animal is suspected, it is tagged and given a closer inspection during the postmortem inspection. Animals found dead or dying or showing symptoms of rabies, tetanus, milk fever, or septicaemia are condemned in the antemortem examination.

The postmortem (after death) inspection is made at the time of slaughter and includes a careful examination of the carcass and the viscera (internal organs). Certain diseases and certain stages of disease make meat unsafe for human consumption, but this does not mean

that certain diseased parts, distinctly localized, would make the entire carcass unfit for food. Therefore, in the case of lesions confined to a particular organ in which nature has erected an encapsulating tissue, making the diseased portion a distinct and separate part of the body, the surrounding meat is perfectly healthy for food (Ziegler, 1958, p. 27).

In the case of cattle which have reacted to the tuberculin test, the law requires that reactors be slaughtered at designated abattoirs where the animals are inspected by state or federal veterinarians. Carcasses that show no tubercular lesions or infected lymph glands are passed while those parts which are affected are condemned. The meat inspection service, both federal and state, is the guarantee to the supporting taxpayer that his meat is wholesome.

Condemned animals, carcasses, or other materials are destroyed by rending them in separate steam pressure tanks, sealed and under the custody of an inspector. The pressure cooking and denaturing process destroys all disease germs and the contents are made available for tankage or fertilizer. Establishments that do not have tanking facilities generally burn or denature the condemned material (Ziegler, 1958, p. 28).

The Tennessee Meat and Poultry Inspection Act sets forth the inspection and sanitary standards for official establishments for slaughtering and processing of livestock or poultry which are essentially those of the federal inspection service. The law passed by the Tennessee legislature states that:

Each official establishment at which livestock or poultry are slaughtered or livestock or poultry carcasses or parts thereof, meat food products or poultry products are processed for intrastate

commerce shall have such premises, facilities, and equipment and be operated in accordance with such sanitary practices as are required by rules and regulations prescribed by the Commissioner for the purpose of preventing the entry into and movements in such commerce of carcasses, parts thereof, meat food products, and poultry products which are unwholesome or adulterated. No live-stock or poultry carcasses or parts thereof, meat food products or poultry products shall be admitted into any official establishment unless they have been prepared only under inspection pursuant to the Tennessee Meat and Poultry Inspection Act or the Federal Meat Inspection Act or the Federal Poultry Inspection Act. The Commissioner of Agriculture will refuse to render inspection to any establishment whose premises, facilities, or equipment, or the operation thereof, fail to meet the requirements of the Tennessee Meat and Poultry Inspection Act (Tennessee Department of Agriculture, 1970, p. 5).

Therefore, it can be seen that the operation of an intrastate business in the meat industry has changed drastically. The enactment of the Wholesome Meat Act and the Tennessee Meat and Poultry Inspection Act has forced the individual plants to undergo many changes if they were to stay in business.

APPENDIX B

Table 14. Itemized List of Improvements Required for Selected Plants

Improvement Required	Plant			
	A	B	C	D
<u>Holding Pen</u>				
Clean	x	x		
Curb	x	x		
Lights	x			
Fence		x		
Scale repair		x		
New facility			x	x
Chute		x		
<u>Kill Floor</u>				
New facility		x		x
Clean	x			
Paint	x			
Cover exposed pipes	x			
Lights	x			
Cover doors	x			
Lavatory	x	x	x	x
Sterilizer	x	x	x	x
Saws	x	x	x	
Hoist		x	x	
Blood tank		x		
Fly blower		x	x	x
Offal brander		x		
Water heater		x		x
Head cabinet		x	x	
Balancer		x		
Paunch truck	x	x	x	x
Cash knocker	x	x		
Dolly		x		
Dehider		x		
Beef skin back		x		
Cradle		x		
Hooks and misc.		x		
Railing			x	x
Roof (new)			x	
Compressors			x	
Ceiling			x	
Vat			x	
Liver rack				x

Table 14 (continued)

Improvement Required	Plant			
	A	B	C	D
<u>Chill Cooler</u>				
Sandblast	x			
Replaster	x	x		
Lights	x	x	x	x
Cover pipes	x	x		
Racks	x	x		
Cover doors	x	x		
New floor	x	x		
Compressor		x		
Stag tree		x		
Light covers	x	x	x	x
New facility			x	x
New doors				x
<u>Processing Room</u>				
Clean	x	x		
Paint	x	x		
Lights	x	x		
Lavatory	x	x	x	x
Sterilizer	x	x	x	x
Stainless steel tables	x	x	x	x
Cutting boards	x	x	x	x
Refrigeration	x	x	x	x
Hooks, pans, misc.		x		
Fly blowers		x		x
Remodel		x		
Cover table tops		x		
Meat stamp	x	x	x	x
Boner		x		
Nontilt truck		x		
Heater		x		
Cover doors	x	x		
New facility			x	x
Compressor			x	x
Stainless steel sink				x
<u>Processed Product Cooler and/or Freezer</u>				
Sandblast	x			
Replaster	x			
Lights	x	x		
Cover exposed metal	x			
Cover doors	x			

Table 14 (continued)

Improvement Required	Plant			
	A	B	C	D
New facility	x	x	x	x
Air compressor		x		
Wall fan		x		
Racks		x		x
Refrigeration		x		x
<u>Loading Dock</u>				
Repair	x			
New facility			x	x
<u>Office and Parking</u>				
Remodel office	x	x		
Pave driveway and parking	x	x	x	x
New facility				x
<u>Employee Dressing and Welfare</u>				
Lockers		x		
New facility				x
<u>Dry Storage</u>				
New facility				x
<u>Miscellaneous</u>				
Retail outlet				x
Refrigerate truck bed		x		
Chlorinator		x		
Rewire building		x	x	
Septic tank		x	x	x
Waste treatment plant	x			
In-plant waste	x			

APPENDIX C

Table 15. Slaughter of Livestock in Tennessee, 1968

Species	1968				
	State		Federal		Total
	Head	% of Total	Head	% of Total	
Cattle	96,335	15.89	509,665	84.11	606,000
Calves	2,535	1.79	138,765	98.21	141,000
Sheep	5,088	14.41	30,212	85.59	35,300
Hogs	449,602	14.57	2,634,398	85.43	3,084,000
	Weight ^a Lbs.	% of Total	Weight ^a Lbs.	% of Total	Total
Cattle	79,330,080	13.92	489,407,920	86.08	569,738,000
Calves	766,347	1.86	40,216,653	98.14	40,983,000
Sheep	312,356	9.94	2,829,644	90.06	3,142,000
Hogs	110,577,263	15.05	623,839,737	84.95	734,417,000

^aLiveweight.

Source: "Slaughter Reports," Tennessee Crop Reporting Service, unpublished data, Nashville, Tennessee, 1968; USDA, Livestock Slaughter 1968, Statistical Reporting Service (Washington: Government Printing Office, April, 1969).

Table 16. Slaughter of Livestock in Tennessee, 1970

Species	1970				
	State		Federal		Total
	Head	% of Total	Head	% of Total	
Cattle	61,449	10.71	512,051	89.29	573,500
Calves	1,640	1.75	91,960	98.25	93,600
Sheep	246	1.11	28,854	98.89	22,100
Hogs	341,537	11.80	2,550,463	88.20	2,892,000
	Weight ^a Lbs.	% of Total	Weight ^a Lbs.	% of Total	Total
Cattle	52,475,204	9.33	509,935,796	90.67	562,411,000
Calves	608,102	2.09	28,417,898	97.91	29,026,000
Sheep	18,287	.85	2,109,713	99.15	2,128,000
Hogs	83,891,842	11.88	622,129,158	88.12	706,021,000

^aLiveweight.

Source: "Slaughter Reports," Tennessee Crop Reporting Service, unpublished data, Nashville, Tennessee, 1970; USDA, Livestock Slaughter 1970, Statistical Reporting Service (Washington: Government Printing Office, April, 1971).

Table 18. Slaughter Records for State Regulated Plants for 1970 by Weight^a

Species	Yearly Total-1970					
	A(1)		A(2)		A(3)	
	Weight	% of Total	Weight	% of Total	Weight	% of Total
Cattle	32,413,544	61.77	15,198,841	28.97	3,639,910	6.93
Calves	220,764	36.30	191,720	31.54	111,224	18.29
Sheep	5,343	29.21	10,854	59.35	797	4.35
Hogs	67,807,055	80.82	12,644,104	15.09	2,535,746	3.02
					1,222,909	2.33
					84,394	13.87
					1,293	7.07
					904,943	1.07
	Average Per Plant-1970					
	A(1)		A(2)		A(3)	
	Weight	% of Total	Weight	% of Total	Weight	% of Total
Cattle	2,946,685.82		524,097.96		110,300.30	
Calves	20,069.45		6,611.03		3,370.30	
Sheep	485.72		374.28		24.15	
Hogs	6,164,277.73		436,003.59		76,840.60	
Number of plants	11		29		33	
						30

^a Liveweight.

Source: "Slaughter Reports," Tennessee Crop Reporting Service, unpublished data, Nashville, Tennessee, 1970.

Table 19. Slaughter by the Largest, Smallest, and Median A(1) Plants
for 1968 and 1970

Species	Largest	Smallest	Median
<u>1968-Head</u>			
Cattle	12,807	1,760	2,815
Calves	15	0	0
Sheep	379	0	14
Hogs	149,441	30	6,662
<u>1970-Head</u>			
Cattle	13,531	2,393	1,505
Calves	2	278	105
Sheep	0	4	18
Hogs	169,552	32	5,636

Source: "Slaughter Reports," Tennessee Crop Reporting Service,
unpublished data, Nashville, Tennessee, 1968 and 1970.

Table 20. Distribution of A(1) State Regulated Plants by Number of Head Slaughtered in 1968 and 1970

Size Group by Head Slaughtered Per Year	Number of Plants							
	Cattle		Calves		Sheep		Hogs	
	1968	1970	1968	1970	1968	1970	1968	1970
None	3	0	7	3	6	4	0	0
1-999	0	1	9	8	9	7	2	1
1,000-2,999	7	7	0	0	0	0	0	1
3,000-5,999	2	1	0	0	1	0	5	5
6,000-11,999	2	1	0	0	0	0	3	1
12,000-19,999	0	1	0	0	0	0	2	1
20,000-49,999	0	0	0	0	0	0	1	0
50,000-99,999	0	0	0	0	0	0	2	1
Over 100,000	0	0	0	0	0	0	1	1

Source: "Slaughter Reports," Tennessee Crop Reporting Service, unpublished data, Nashville, Tennessee, 1968 and 1970.

Table 21. Slaughter by the Largest, Smallest, and Median A(2) Plants
for 1968 and 1970

Species	Largest	Smallest	Median
<u>1968-Head</u>			
Cattle	224	183	1,181
Calves	5	0	15
Sheep	2	2	3
Hogs	5,950	5	596
<u>1970-Head</u>			
Cattle	311	8	996
Calves	10	0	16
Sheep	6	0	0
Hogs	5,372	17	606

Source: "Slaughter Reports," Tennessee Crop Reporting Service,
unpublished data, Nashville, Tennessee, 1968 and 1970.

Table 22. Distribution of A(2) State Regulated Plants by Number of Head Slaughtered in 1968 and 1970

Size Group by Head Slaughtered Per Year	Number of Plants							
	Cattle		Calves		Sheep		Hogs	
	1968	1970	1968	1970	1968	1970	1968	1970
None	2	2	17	9	20	20	1	1
1-99	5	7	11	18	9	9	2	3
100-199	2	4	0	2	0	0	1	2
200-399	8	3	1	0	0	0	4	5
400-699	2	2	0	0	0	0	5	3
700-999	3	4	0	0	0	0	5	3
1,000-1,499	3	4	0	0	0	0	1	4
1,500-1,999	2	1	0	0	0	0	3	1
2,000-2,499	2	1	0	0	0	0	3	1
Over 2,500	0	1	0	0	0	0	4	6

Source: "Slaughter Reports," Tennessee Crop Reporting Service, unpublished data, Nashville, Tennessee, 1968 and 1970.

Table 23. Slaughter by the Largest, Smallest, and Median A(3) Plants for 1968 and 1970

Species	Largest	Smallest	Median
<u>1968-Head</u>			
Cattle	261	0	178
Calves	8	0	0
Sheep	0	0	0
Hogs	1,634	11	18
<u>1970-Head</u>			
Cattle	191	0	1
Calves	34	0	0
Sheep	0	0	0
Hogs	1,400	31	238

Source: "Slaughter Reports," Tennessee Crop Reporting Service, unpublished data, Nashville, Tennessee, 1968 and 1970.

Table 25. Slaughter Records for Federally Inspected Plants in Tennessee--1968

Species	Number of Plants	Total Head Slaughtered	Average Number of Head Per Plant
<u>Head</u>			
Cattle	12	509,665	42,471.25
Calves	12	138,765	11,563.75
Sheep	12	30,212	2,517.66
Hogs	12	2,634,398	219,533.17
<u>Liveweight</u>			
Cattle	12	490,543,949	40,878,662.42
Calves	12	40,216,653	3,351,387.75
Sheep	12	2,829,644	235,803.67
Hogs	12	623,839,737	51,986,644.75

Source: U.S. Department of Agriculture, Livestock Slaughter 1968, Statistical Reporting Service (Washington: Government Printing Office, April, 1969).

Table 26. Slaughter Records for Federally Inspected Plants in Tennessee--1970

Species	Number of Plants	Total Head Slaughtered	Average Number of Head Per Plant
<u>Head</u>			
Cattle	14	512,051	36,575.07
Calves	14	91,960	6,568.57
Sheep	14	21,854	1,561.00
Hogs	14	2,550,463	182,175.93
<u>Liveweight</u>			
Cattle	14	509,935,796	36,423,985.43
Calves	14	28,417,796	2,029,849.85
Sheep	14	2,109,713	150,693.79
Hogs	14	622,129,158	44,437,797.00

Source: U.S. Department of Agriculture, Livestock Slaughter 1970, Statistical Reporting Service (Washington: Government Printing Office, 1971).

Table 27. Total Amount of Cattle Slaughtered in Selected Southern States, 1968-1970

State	Head		
	1968	1969	1970
→ 1,000 head ←			
Kentucky	259.5	239.9	248.6
Tennessee	606.0	606.0	573.5
Alabama	273.5	251.0	152.6
Mississippi	389.5	353.5	310.6
Arkansas	192.3	179.9	179.9
Louisiana	160.9	150.9	144.0
Oklahoma	698.5	713.5	647.5
Texas	2,779.0	3,011.0	3,184.0
→ Liveweight ←			
→ 1,000 Pounds ←			
Kentucky	242,562	224,514	236,999
Tennessee	569,738	576,713	562,411
Alabama	236,313	218,460	131,993
Mississippi	320,223	294,935	261,503
Arkansas	167,427	160,460	162,445
Louisiana	126,245	119,352	120,769
Oklahoma	649,903	673,459	620,160
Texas	2,408,986	2,674,538	2,875,373

Source: U.S. Department of Agriculture, Livestock Slaughter 1968, Statistical Reporting Service (Washington: Government Printing Office, April, 1969); USDA, Livestock Slaughter 1969, Statistical Reporting Service (Washington: Government Printing Office, April, 1970); USDA, Livestock Slaughter 1970, Statistical Reporting Service (Washington: Government Printing Office, April, 1971).

Table 28. Total Amount of Calves Slaughtered in Selected Southern States, 1968-1970

State	Head		
	1968	1969	1970
	1,000 head		
Kentucky	7.5	2.4	2.0
Tennessee	141.3	138.9	93.6
Alabama	41.3	31.8	13.0
Mississippi	113.2	84.5	82.0
Arkansas	18.6	15.3	10.9
Louisiana	232.6	225.1	218.4
Oklahoma	22.7	18.5	9.4
Texas	345.7	312.9	281.3
	Liveweight		
	1,000 pounds		
Kentucky	1,690	531	474
Tennessee	40,983	40,851	29,026
Alabama	18,152	14,194	6,116
Mississippi	54,468	44,940	45,077
Arkansas	9,644	8,071	5,915
Louisiana	108,511	107,449	112,639
Oklahoma	11,375	9,145	4,588
Texas	178,149	164,894	148,717

Source: U.S. Department of Agriculture, Livestock Slaughter 1968, Statistical Reporting Service (Washington: Government Printing Office, April, 1969); USDA, Livestock Slaughter 1969, Statistical Reporting Service (Washington: Government Printing Office, April, 1970; USDA, Livestock Slaughter 1970, Statistical Reporting Service (Washington: Government Printing Office, April, 1971).

Table 29. Total Amount of Sheep Slaughtered in Selected Southern States, 1968-1970

State	Head		
	1968	1969	1970
	1,000 head		
Kentucky	182.2	173.3	177.8
Tennessee	35.3	27.9	22.1
Alabama	.7	.5	.5
Mississippi	.2	.1	.1
Arkansas	.2	.2	.2
Louisiana	3.3	3.8	3.5
Oklahoma	3.8	1.5	1.7
Texas	1,403.5	1,183.5	1,354.0
	Liveweight		
	1,000 pounds		
Kentucky	18,435	17,640	18,703
Tennessee	3,142	2,605	2,128
Alabama	74	48	53
Mississippi	19	10	15
Arkansas	20	20	20
Louisiana	245	298	274
Oklahoma	397	149	169
Texas	127,740	109,727	128,904

Source: U.S. Department of Agriculture, Livestock Slaughter 1968, Statistical Reporting Service (Washington: Government Printing Office, April, 1969); USDA, Livestock Slaughter 1969, Statistical Reporting Service (Washington: Government Printing Office, April, 1970); USDA, Livestock Slaughter 1970, Statistical Reporting Service (Washington: Government Printing Office, April, 1971).

Table 30. Total Amount of Hogs Slaughtered in Selected Southern States, 1968-1970

State	Head		
	1968	1969	1970
	1,000 head		
Kentucky	1,433.0	1,542.0	1,798.0
Tennessee	3,084.0	2,893.0	2,892.0
Alabama	953.0	931.0	861.0
Mississippi	1,049.5	1,092.0	1,232.0
Arkansas	393.5	407.0	414.5
Louisiana	227.0	214.9	208.8
Oklahoma	753.0	717.5	878.5
Texas	1,974.0	2,039.0	1,999.0
	Liveweight		
	1,000 pounds		
Kentucky	364,190	369,781	436,244
Tennessee	734,417	691,592	706,021
Alabama	215,999	211,076	198,288
Mississippi	233,109	245,254	279,698
Arkansas	94,950	99,225	99,900
Louisiana	48,447	46,458	45,759
Oklahoma	186,347	179,151	223,767
Texas	471,737	487,908	482,715

Source: U.S. Department of Agriculture, Livestock Slaughter 1968, Statistical Reporting Service (Washington: Government Printing Office, April, 1969); USDA, Livestock Slaughter 1969, Statistical Reporting Service (Washington: Government Printing Office, April, 1970); USDA, Livestock Slaughter 1970, Statistical Reporting Service (Washington: Government Printing Office, April, 1971).

Table 31. Weekly Slaughter Report of Sampled A(1) Plants

Plant Number	Weekly Kill				Number Days Per Week That Plant Operated
	Actual ^a		Rated ^b		
	Cattle	Hogs	Cattle	Hogs	
1	30	75	50	75	2
2	400	4,500	400	4,500	5
3	0	40	0	55	3
4	30	120	30	120	5
5	125	250	125	250	5
6	170	400	170	400	5
7	50	115	150	500	5
8	50	2,000	50	2,000	5

^a Actual indicates the number of animals that the firms were slaughtering.

^b Rated indicates the number of animals that the plant could slaughter at full capacity.

Table 32. Weekly Slaughter Report of Sampled A(2) Plants

Plant Number	Weekly Kill				Number Days Per Week That Plant Operated
	Actual		Rated		
	Cattle	Hogs	Cattle	Hogs	
1	13	45	35	72	2
2	0	125	0	60	2
3	20	20	35	55	2
4	15	100	50	250	2
5	30	60	30	85	2
6	50	0	50	0	2
7	30	25	100	50	2
8	0	40	0	60	2

Table 33. Weekly Slaughter Report of Sample A(3) Plants

Plant Number	Weekly Kill				Number Days Per Week That Plant Operated
	Actual		Rated		
	Cattle	Hogs	Cattle	Hogs	
1	0	0	0	0	Kills 300 each winter
2	5	28	5	30	3
3	0	8	0	15	1
4	0	0	0	0	Custom kills without inspection
5	0	0	0	0	Custom kills without inspection
6	5	10	5	65	2
7	0	0	0	0	Custom kills without inspection
8 ^a	0	0	0	0	Custom kills without inspection

^aThis particular plant killed for a local locker plant and a restaurant so therefore had to have these animals inspected. But his business was primarily a custom operation without inspection.

VITA

Robert J. Hopkins was born in Sparta, Tennessee, on September 8, 1946. He attended Black Oak Elementary School and was graduated from White County High School in 1964. In September of that year he entered Tennessee Technological University and received a Bachelor of Science degree in Agricultural Economics in June of 1968. He entered Graduate School at the University of Tennessee in June of 1968 and completed the requirements for a Master of Science degree in Agricultural Economics in March of 1970. He is presently completing the requirements for the Doctor of Philosophy degree in Agricultural Economics at the University of Tennessee.

He is married to the former Janice Elaine Hale of Sparta, Tennessee. They have two daughters, Jennipher Elaine and Robin Leah.