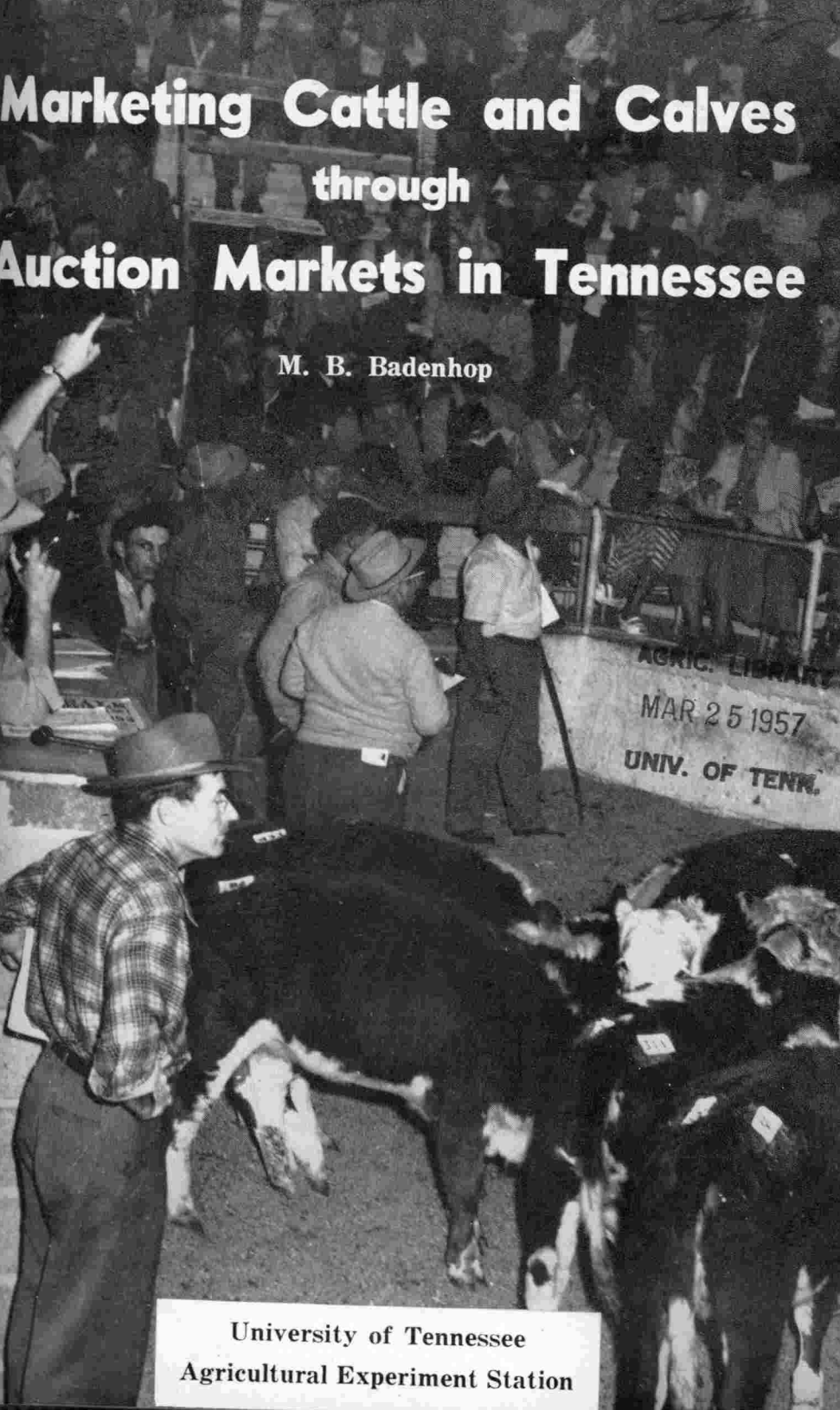
Marketing Cattle and Calves through Auction Markets in Tennessee

M. B. Badenhop



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BULLETIN 247 JUNE, 1956

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SUMMARY

In this study are described: the characteristics of slaughter cattle and calves sold through auction markets in Tennessee; the number, importance and type of buyers operating on these markets; the number and grade of animals purchased by each buyer and the prices paid; and an analysis of the factors affecting the prices paid for cattle and calves. The period of study was from the fall of 1953 through the spring of 1955.

Of the cattle and calves sold through the auction markets, 28 percent were veal calves, 18 percent butcher calves, 23 percent steers, 15 percent heifers and 16 percent cows. More veal calves, but fewer butcher calves were sold in the spring of the year than in the fall. There was a tendency for more cows to be sold in the fall than in the spring.

With respect to type, beef animals comprised 41 percent of total sales, dairy 16 percent, and animals of mixed breeding 43 percent. There was very little difference noted in the types of animals sold in the fall and spring seasons.

Average weight for veal calves sold was 175 pounds; for butcher calves, 305 pounds; steers, 575 pounds; heifers, 540 pounds; and cows, 775 pounds.

Packer buyers were the most important type of buyer, purchasing 35 percent of all animals sold in the spring sales observed and 48 percent in the fall sales. Packers purchased 53 percent of all the calves sold during the sales studied and were the most important buyers in the smaller markets. The packer buyers tended to purchase the better quality animals.

Speculators were the next most important type of buyer. They bought 18 percent of the animals sold during the spring sales studied and 25 percent during the sall sales. They were most active in the larger auction markets and were more interested in steers, heifers, and cows than in vealers or butcher calves.

Farmers purchased nearly 20 percent of all animals sold. Auction management accounted for seven percent of the purchases during the spring sales and 10 percent during the fall.

Only one percent of all the steers and heifers sold for slaughter during the spring sales graded as high as choice. Nine percent graded good; 23 percent, commercial; 32 percent, utility; 23 percent, cutter; and 12 percent, canner. During the fall sales, 17 percent graded good or higher; 36 percent, commercial; 30 percent, utility; and 17 percent, cutter and canner. Veal calves which were sold in the spring graded considerably higher than those sold in the fall. Approximately four-fifths of all slaughter cows sold were cutters and canners.

For most classes of cattle and calves, from 75 to 80 percent of the variation in price is associated with variation in (1) grade,

(2) estimated dressing percent, (3) weight of the animal, (4) size of market, and (5) the lapse of time, or the two-week interval between the first and second sale observed in a given market. The results from studying these factors associated with price are: (1) The effect of grade on price is significant for all classes of cattle and calves. More variation in price, however, is associated with grade with respect to beef-type animals than with the dairy or mixed type. (2) The effect of estimated dressing percent is interrelated with grade and is generally more pronounced for calves and steers. (3) The effect of weight on price is variable. Its effect is least pronounced with cows. In general, for a given grade of the heavier animals, namely, steers and heifers, an increase of 100 pounds in weight was associated with an increase in price of approximately 35 cents. (4) The effect of size of market on price is not clearly evident except that there seems to be a higher price at the larger markets for most of the classes of cattle and calves. (5) The effect of the lapse of time, or the two-week interval between the first and second sale observed in a given market is pronounced and may be in either direction.

Price differentials between grades were statistically significant and tended to be more pronounced for veal calves than for the other market classes. For steers and heifers, the price differential between grades averaged $1.65 per hundredweight and ranged from a low of 10 cents to $3.25.

Animals weighed after leaving the sale ring where they were sold tended to bring a higher average price than those that were weighed immediately after being unloaded and identified at the auction.

Prices for veal calves that were sorted into uniform lots, principally on the basis of weight, age and condition, and sold as pooled-ownership lots compared with the prices for vealers sold individually indicated that there was a price advantage in favor of group selling. When steers of uniform characteristics were sorted into groups on an individual ownership basis generally by auction management with respect to grade and then sold, the price was higher than when sold individually. Steers, like vealers, were sold in various sized lots; however, the average sizes of the lots were smaller, the most usual sizes ranging from two to six animals.

The relationship of the type of buyer to the prices paid for the different classes of animals did not follow any clearly defined pattern.

Marketing Cattle And Calves Through Auction Markets In Tennessee

M. B. Badenhop
Associate Agricultural Economist

INTRODUCTION

Farm income from the sale of livestock and livestock products is important to the agricultural economy of Tennessee. During the 1950-1954 period, cash receipts from the sale of livestock and livestock products accounted for an average of 48 percent of the total cash farm income of Tennessee farmers, or 240 million dollars annually.[1] In 1954, these cash receipts amounted to 225 million dollars, or about $1,100 per farm.[2] Of this amount, sales per farm from cattle and calves came to $340, or 31 percent of the receipts from livestock and livestock product sales.

About half of the cattle and calves sold off the farm move to slaughter through the 62 livestock auction markets in the state

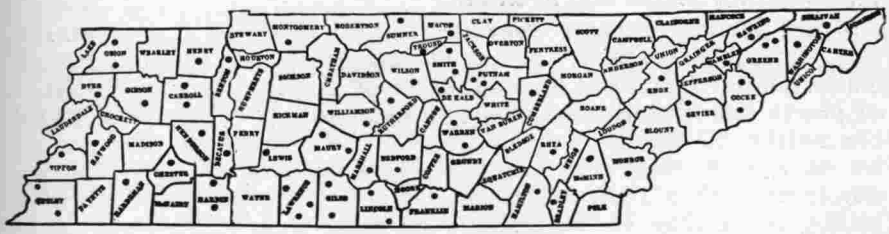


Figure 1.—Location of livestock auction markets in Tennessee, 1955.

(figure 1). In East Tennessee, almost three-fourths of these animals move through this outlet. Three-fourths of the animals marketed move 15 miles or less from the farm to the auction market.

Purpose of This Study

The determination of cattle prices in the auction markets is highly subjective because of factors difficult to measure and describe, such as quality, condition, yield, weight, season of the year the animals are marketed, kind and type of buyers, and management practices at the auction. This study is intended to provide information on these factors as they affect the marketing of cattle and calves sold through this market outlet. Such informa-

[1] United States Department of Agriculture, Agricultural Marketing Service, Washington 25, D. C., Agricultural Statistics, 1951-54 and Farm Income Situation, September 1955.
[2] Based on the 1955 Census of Agriculture of 203,149 farms.

tion should be valuable in providing farmers a better basis on which to make intelligent marketing decisions. Also, such information is necessary as a basis for improving the market facilities and thus help make pricing more efficient at these type markets.

Specific objectives were to:

1. Describe the characteristics of cattle and calves sold through the auction market.
2. Provide information on the number, importance, and type of buyers operating on these markets.
3. Determine the number and grade of cattle and calves purchased by each buyer and the price paid.
4. Analyze selected factors associated with the prices paid for the animals sold.

Procedures

This study is part of a regional plan of livestock marketing research in which a number of Southern States and the Agricultural Marketing Service, United States Department of Agriculture, are cooperating. Each state conducted its research program; however, there was joint planning and coordination of the research through a regional technical committee representing each of the participating states and agencies.[3]

Six auction markets were selected for study in Tennessee. For the participating states the sample markets were selected from a classified list furnished by each state by the Institute of Statistics of North Carolina State College in cooperation with the technical committee of the project. Three of the Tennessee markets selected were classified as large markets, that is, those selling annually more than 15,600 cattle and calves. The other three markets, selling fewer than 15,600 animals but more than 5,200, were classified as medium-sized markets. All markets selling less than an average of 100 cattle and calves a week, or small markets, were not included in the sample list.

Data from sales at the auction market were obtained during four observation periods: September 16 to October 30, 1953; April 28 to May 14, 1954; September 8 to October 29, 1954; and April 22 to May 10, 1955. Each of the six markets was observed twice during each observation period.[4] After the first visit to the market during each observation period, two weeks lapsed before the market was revisited. Data were collected to determine (1) the class, type and weight of cattle and calves sold through auction markets, (2) the number, importance and type of buyers at these markets, (3) the number, grade and estimated dressing percent

[3] A detailed statement of procedure is described in the revised master project outline of regional research project, SM-7, Regional Livestock Marketing Research. In the Southern States, April 14, 1953, and in the Addendum to the revised master project outline, SM-7, also dated April 14, 1953 (Unpublished).

[4] During the September 8 to October 29, 1954 observation period, one market was destroyed by fire; consequently data were available from only five markets during the period. The market was rebuilt and data were obtained from it during the spring 1955 observation period.

of animals purchased by each buyer and (4) prices paid. Information on internal and external management factors of the auction, such as time of sale, order of selling, practice of bidding by management, reasons for purchases by management and the type of buyers operating on the market, was also obtained about these markets by personal interview with the auction management.

All slaughter cattle and calves sold at the sample auctions on the specified sale days were graded and classified by a competent grader. Animals were graded according to United States Department of Agriculture standards for slaughter cattle, except that in order to further refine the grading, each official grade was subdivided into three parts—high, medium, and low.

The grader's work was checked by a supervising grader that was employed by the Administrative Adviser of this regional project to coordinate the procedures of the graders for the respective states participating. Prior to the initiation of the work during each of the four observation periods, graders from the participating states met for orientation and a refresher course on grading and details of procedure relevant to their work on the market. The supervising grader was responsible for each refresher course and fo checking the grader's work at the markets studied. Grades of individual state graders were adjusted to a standard determined by the supervising grader when necessary.

The identification of animals as to market class and breed type are described in footnotes 6 and 8. Definitions for buyers are defined in footnote 9.

After these data were collected on prepared schedules, they were edited, coded and punched on IBM cards for processing and analysis. A set of verified IBM cards was also sent to the department of statistics of Virginia Polytechnic Institute, where they are being combined with cards from the other participating states in the project for regional analysis.

Multiple regression analysis was used to study selected factors associated with price, the dependent variable.[5] Regression equations to predict the price of any given breed and class of animal during each observation period were computed using the independent variables of grade, estimated dressing percent, weight, size of market, and the lapse of time of two weeks between sales in a given market during the observation period. The 't' values of the individual coefficients of the independent variables in the multiple regression were computed and checked for significance. In this report, a significant relation means one at the 5 percent level and highly significant at the 1 percent level. The multiple correlation coefficients, R^2, which represent the fraction of the variation in

[5] The Department of Statistics of Virginia Polytechnic Institute computed the regression equations for this analysis. In keeping with the regional plan of analysis of these data, the results presented are from data of five Tennessee markets and three North Alabama markets. Markets in this area handle about the same volumes, types and classes of slaughter cattle and calves with only minor variations in marketing practices. East Tennessee markets were not included in this regional area.

price per hundred pounds explained in terms of the independent variables, were also determined.

CHARACTERISTICS OF ANIMALS MARKETED

Of the cattle and calves sold through auction markets during the four investigation periods, 28 percent were veal calves, 18 percent butcher calves, 23 percent steers, 15 percent heifers and 16 percent cows (table 1).[6] More veal calves, but fewer butcher calves, were sold in the spring of the year than in the fall. There was a tendency for more cows to be sold in the fall than in the spring. Steer and heifer sales were proportionally about the same during the two seasons. Difference in the class of cattle and calves handled by various auctions can be associated with the production patterns of the area surrounding each auction market.

TABLE 1.—*Percent of Cattle and Calves by Market Class Sold at Six Auction Markets in Tennessee*

Market class	Percent in each market class			Number of animals
	Fall 1953 and 1954	Spring 1954 and 1955	Total fall and spring	
Veal calves	22	38	28	4,999
Slaughter calves	22	11	18	3,192
Steers	23	22	23	3,966
Heifers	15	16	15	2,656
Cows	18	13	16	2,865
Total[1]	100	100	100	17,678

[1] Sixty-two percent of the animals were marketed in the fall seasons of 1953-54 and 38 percent during the spring seasons of 1954-55.

Sales during the fall seasons of 1953 and 1954 were considerably larger, accounting for 62 percent of the animals sold, than were the spring sales of 1954 and 1955. This follows the seasonality pattern of cattle marketings in Tennessee where from two-fifths to one-half of the slaughter cattle and calves generally move to market during August, September and October.[7]

[6] All animals graded were identified as to market class according to the following designations which are in general agreement with U.S.D.A. standards.

(a) Veal calves—calves between two weeks and three months of age and weighing less than 250 pounds.

(b) Slaughter calves—calves three to 10 months of age and weighing less than 450 pounds.

(c) Steers—includes all male animals. Exceptions: veal and slaughter calves defined above, stags and bulls.

(d) Heifers—includes all female animals which have never had calves or are not in an advanced stage of pregnancy. Exceptions: veal and slaughter calves as defined above and barren cows.

(e) Cows—includes all female animals which have had one or more calves, are in advanced stages of pregnancy, or are of calf-bearing age and barren.

Animals not normally suited or intended for slaughter were excluded from the study. Specific exclusions included: (1) cows and heifers of dairy breeding which were bought for milk-production purposes, (2) cows with young calves which were returned to farms, (3) bulls and stags, and (4) other animals not normally considered suitable for slaughter which were being returned to the farm as stockers. Certain "two-way" animals suitable for slaughter, such as partly finished calves, heifers or steers, but purchased for feeder or stocker use, were included.

[7] M. B. Badenhop, **Selling and Buying Livestock by Tennessee Farmers**, University of Tennessee Agricultural Experiment Station, Knoxville, Tennessee, Bulletin 233, 1953, pp. 8-9.

With respect to type, beef animals comprised 41 percent of total sales, dairy 16 percent, and animals of mixed breeding 43 percent (table 2).[8] There was very little difference noted in the types of animals sold in the fall and spring seasons.

Average weight for veal calves sold was 175 pounds; for butcher calves, 305 pounds; steers, 575 pounds; heifers, 540 pounds; and cows, 775 pounds.

TABLE 2.—*Percent of Cattle and Calves by Type of Breeding Sold at Six Auction Markets in Tennessee*

Type of animal	Percent in each breed type			Number of animals
	Fall 1953 and 1954	Spring 1954 and 1955	Total fall and spring	
Beef	43	37	41	7,190
Dairy	16	16	16	2,858
Mixed	41	47	43	7,630
Total	100	100	100	17,678

BUYERS[9]

The number of buyers purchasing slaughter cattle and calves in the markets observed ranged from 14 to 79. The most frequent number of head purchased by a buyer at each sale was two; however, most of the purchases ranged from one to 10 head. In all the markets, particularly the smaller ones, some four or five major buyers purchased a relatively large proportion of the cattle and calves—in a few sales as much as 75 percent.

Packer buyers purchased the largest number of both cattle and calves. During the two fall periods, they bought 35 percent and in the two spring periods, 48 percent of the total sold (table 3). Packers purchased over half of all calves sold during all periods, and were the most important buyers in the smaller markets (table 4). Most of the calves they purchased were for out-

[8] All animals graded were identified as to breed type according to the following designations:
(a) Beef—three-fourths or more beef breeding (both dam and sire of predominantly beef breeding). Dual purpose cattle were classified as beef breeding.
(b) Dairy—three-fourths or more dairy breeding.
(c) Mixed beef and dairy breeding includes all animals not in the above groups.

[9] Buyers were classified according to the following designations:
(1) Packer buyer—a person who is employed by a packing plant to buy cattle and/or calves at the auction. Normally, these buyers are full-time employees of the packer, are compensated by salary and/or commission, and visit the auction regularly. Independent buyers who occasionally substitute for regular packer buyers are considered packer buyers. (Packing plants are defined as establishments that slaughter livestock for processing and/or sale of fresh meat and serve the wholesale trade in a trade area greater than their local community. This group would include slaughterers which are normally called either "national, regional, or local packers".)
(2) Local slaughterer—a person who buys cattle and/or calves for slaughter and sale in the local community. Local slaughterers consist primarily of wholesale and retail butchers who handle mainly fresh meats and do little or no processing.
(3) Order buyer—an independent buyer who purchases cattle and/or calves on order from a second party who normally is not otherwise represented at the auction.
(4) Speculator—an independent buyer who buys cattle and/or calves at the auction for the purpose of reselling them at a future date with a hope of making a profit from the transaction.
(5) Management—the auction operator or his representative. Purchase may be made on order; to support the market, for speculative purposes, or for other reasons.
(6) Other buyers—all other buyers, including dealers, farmers, etc.

of-state packing plants. The quality of veal and butcher calves and steers and heifers purchased by packer buyers was considerably higher than those purchased by the other types of buyers. Forty-seven percent of the veal and butcher calves and 28 percent of the steers and heifers purchased by packer buyers would grade good or higher (table 5). The packer buyer, like the other types of buyers, changed their grade preferences from market class to market class.

Speculators were the next most important type of buyer. They bought 18 percent of the animals sold during the two spring periods and 25 percent during the two fall periods. Speculators were most active in the larger auction markets and were more interested in steers, heifers, and cows than in vealers or butcher calves.

Farmers purchased nearly 20 percent of all animals sold. Auction management accounted for seven percent of the purchases during the spring periods and 10 percent during the fall.

GRADE OF ANIMALS MARKETED[10]

The median grade for all slaughter cattle and calves sold during the spring periods was as follows: veal calves, low good; butcher calves, top utility; steers, utility; heifers, low utility; cows, low cutter. Fall grades were about two-thirds of a grade higher for butcher calves, steers and heifers; about one-third of a grade lower for vealers and slaughter cows. This means that the

TABLE 3.—*Percent of Slaughter Cattle and Calves Purchased in Each Market Class by Type of Buyer, Six Auction Markets in Tennessee*

Type of buyer	Number of animals	Percent of total animals	Percent in each market class				
			Veal calves	Butcher calves	Steers	Heifers	Cows
			Fall seasons, 1953 and 1954				
Packer buyer	3,868	35	48	32	25	32	40
Local slaughterer	222	2	2	1	1	5	2
Order buyer	778	7	7	4	10	8	6
Speculator	2,721	25	20	28	28	26	22
Management	1,129	10	17	7	5	8	14
Other[1]	2,256	21	6	28	31	21	16
Total	10,974	100	100	100	100	100	100
			Spring seasons, 1954 and 1955				
Packer buyer	3,222	48	82	36	13	26	45
Local slaughterer	130	2	1	3	1	2	5
Order buyer	383	6	7	7	6	5	3
Speculator	1,228	18	2	21	31	32	25
Management	446	7	5	8	8	6	8
Other[1]	1,295	19	3	25	41	29	14
Total	6,705	100	100	100	100	100	100

[1] Includes primarily farmers who purchased these animals for feeder or breeding purposes.

[10] For a statement on the specifications for official United States standards for grades of slaughter steers, heifers and cows, see United States Department of Agriculture, Production and Marketing Administration, Service and Regulatory Amendments No. 112, Washington, D. C., December, 1950.

TABLE 4.—*Percent of Slaughter Cattle and Calves Purchased in Different-Sized Markets by Different Types of Buyers, Six Auction Markets in Tennessee*

Type of buyer	Slaughter cattle including steers, heifers and cows		Slaughter calves including vealers	
	Large markets	Medium-sized markets	Large markets	Medium-sized markets
	Percent	Percent	Percent	Percent
		Fall seasons, 1953 and 1954		
Packer buyer	31	35	33	63
Local slaughterer	2	4	1	3
Order buyer	9	2	6	6
Speculator	27	15	28	8
Management	8	15	14	6
Other[1]	23	29	18	14
Total	100	100	100	100
		Spring seasons, 1954 and 1955		
Packer buyer	24	27	73	69
Local slaughterer	3	2	1	1
Order buyer	7	0	6	7
Speculator	27	34	6	9
Management	6	10	7	5
Other[1]	33	27	7	9
Total	100	100	100	100

[1] Includes primarily farmers who purchased these animals for feeder or breeding purposes.

bulk of the vealers, butcher calves and steers grade commercial during the fall marketing season.[11]

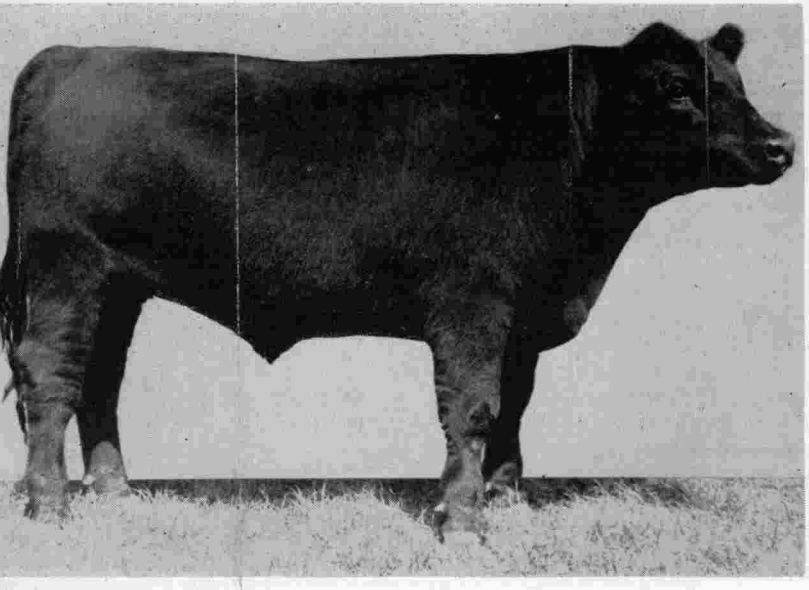
Only one percent of all the steers and heifers sold for slaughter during the spring periods graded as high as choice. Nine percent graded good; 23 percent, commercial; 32 percent, utility; 23 percent, cutter; and 12 percent, canner. During the fall periods, 17 percent graded good or better; 36 percent, commercial; 30 percent, utility; and 17 percent, cutter and canner. Veal calves sold in the spring graded considerably higher than those sold in the fall. Approximately four-fifths of all slaughter cows sold were cutters and canners (table 6).

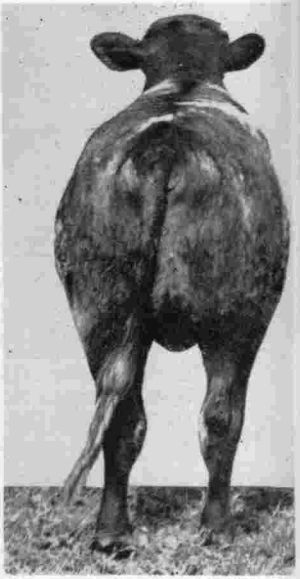
PRICING IN THE AUCTION MARKET

Major Pricing Factors

Price determination in the auction market is highly subjective, and the factors associated with price are difficult to measure and describe. Data collected indicate, however, that, for most classes of animals, from 75 to 80 percent of the variation in price is associated with variation in (1) grade, (2) estimated dressing percent, (3) weight of the animal, (4) size of market, and (5) the lapse

[11] There is no official grading service in Tennessee at auction sales. In some states a regulatory agency such as the State Department of Agriculture performs this service.

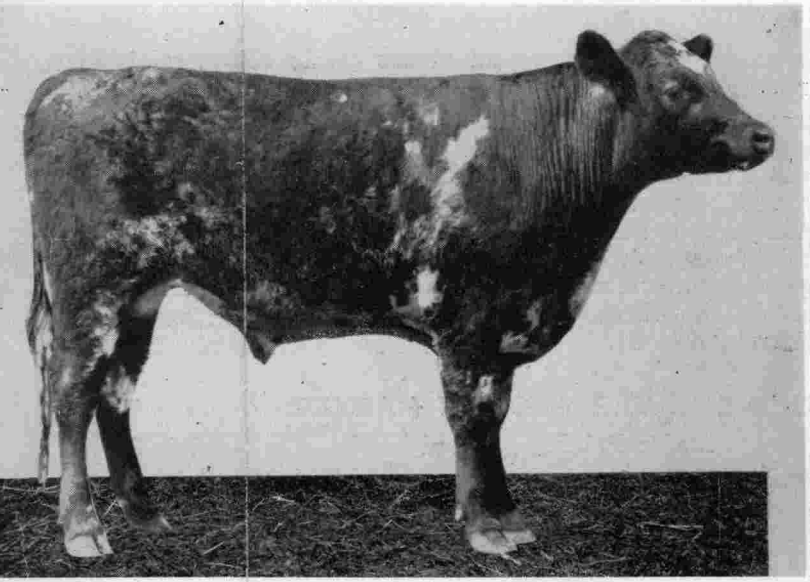


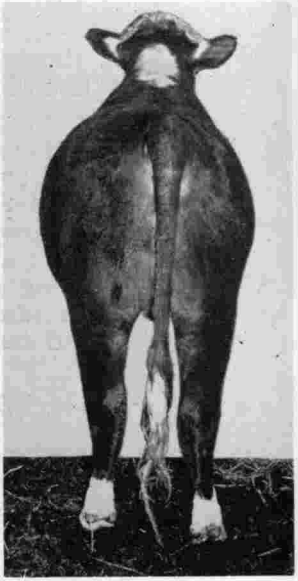


U. S. CHOICE STEER

PRICE PER 100 POUNDS

Fall 1953	$16.25	Spring 1954	$19.20
Fall 1954	$17.60	Spring 1955	$19.25



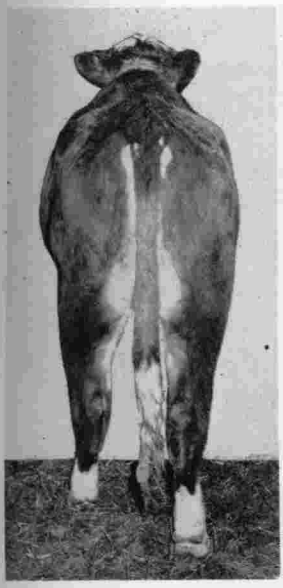


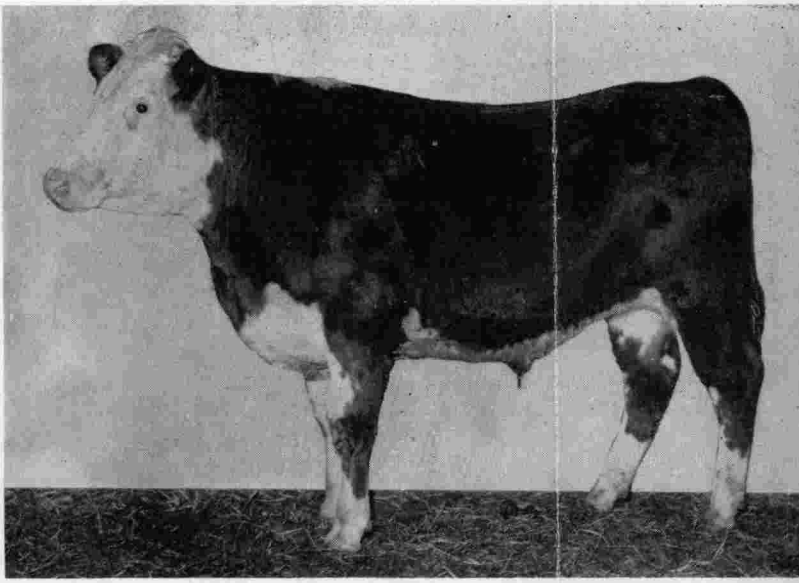
U. S. COMMERCIAL STEER

PRICE PER 100 POUNDS

Fall 1953	$12.20	Spring 1954	$16.60
Fall 1954	$14.20	Spring 1955	$16.10

Figure 2.—Prices paid by buyers for the different grades of cattle a



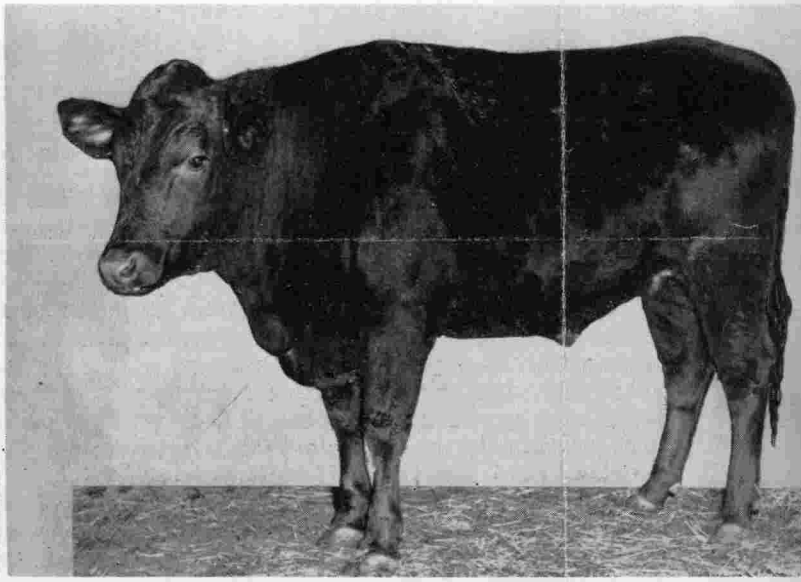


U. S. GOOD STEER

PRICE PER 100 POUNDS

Fall 1953 $14.70	Spring 1954 $18.75
Fall 1954 $14.30	Spring 1955 $18.40





U. S. UTILITY STEER

PRICE PER 100 POUNDS

Fall 1953 $ 9.65	Spring 1954 $13.75
Fall 1954 $12.10	Spring 1955 $14.85

nd calves at six auction markets in Tennessee. (USDA photographs).

TABLE 5.—*Quality of Animals Purchased by Various Types of Buyers, by Market Class,[1] Six Auction Markets in Tennessee*

Grade of animal purchased	Type of buyer					
	Packer	Local slaughterer	Order buyer	Speculator	Management	Other buyers
	Percent Purchased in Each Grade					
Veal and butcher calves						
Prime	[2]	0	[2]	[2]	0	0
Choice	21	7	13	3	2	1
Good	26	16	32	20	51	9
Commercial	28	20	33	34	21	25
Utility	17	33	18	33	17	47
Cull	8	24	4	10	9	18
Total	100	100	100	100	100	100
Slaughter steers and heifers						
Prime	[2]	1	0	0	0	0
Choice	6	2	3	1	1	[2]
Good	22	19	18	11	11	5
Commercial	34	32	30	29	27	30
Utility	22	28	33	31	29	38
Cutter	11	12	12	20	21	19
Canner	5	6	4	8	11	8
Total	100	100	100	100	100	100
Slaughter cows						
Good	1	1	2	1	0	[2]
Commercial	4	9	3	3	6	3
Utility	15	28	16	14	17	13
Cutter	40	37	38	43	39	33
Canner	40	25	41	39	38	51
Total	100	100	100	100	100	100

[1] With respect to market class, the differences noted in the distribution of animals in each of the grades within classes are significant. The distribution of animals in the respective grades purchased by different types of buyers also differed significantly. Buyers tended to change their grade preferences from market class to market class.
[2] Less than one-half of one percent.

of time, or the two-week interval between the first and second sale observed in a given market from which data were collected.

Grade. The effect of grade on price is significant for all classes of cattle and calves. For different classes of animals within different breed types about 70 percent of the variation in price is associated with grade. More variation in price, however, is associated with grade with respect to beef-type animals than with the dairy or mixed-type. Table 7 and figure 2 show the differences in prices paid for the different grades of cattle and calves. In general, price tended to be considerably higher in the spring than in the fall. This follows the traditional pattern of the index of prices farmers receive for beef cattle and calves.[12]

Price differentials between grades were statistically significant, and tended to be more pronounced for veal calves than for

[12] United States Department of Agriculture, Agricultural Marketing Service, Washington, D. C., Agricultural Handbook No. 83, p. 4.

TABLE 6.—*Grades of Slaughter Cattle and Calves Sold at Six Auction Markets in Tennessee*

Grade of animals marketed	Season of the year			
	Fall seasons 1953-1954		Spring seasons 1954-1955	
	Number of animals	Percent	Number of animals	Percent
Veal and butcher calves				
Prime	4	[1]	3	[1]
Choice	409	8	627	19
Good	1,327	27	728	22
Commercial	1,424	29	886	27
Utility	1,236	26	766	23
Cull	461	10	320	9
Total	4,861	100	3,330	100
Slaughter steers and heifers				
Prime	2	[1]	0	0
Choice	117	3	26	1
Good	590	14	242	9
Commercial	1,456	36	573	23
Utility	1,235	30	799	32
Cutter	531	13	580	23
Canner	169	4	301	12
Total	4,100	100	2,521	100
Slaughter cows				
Good	14	1	2	[1]
Commercial	84	4	28	3
Utility	313	15	125	15
Cutter	800	40	322	38
Canner	802	40	376	44
Total	2,013	100	853	100

[1] Less than one-half of one percent.

the other market classes. For steers and heifers, the price differential between grades during the four seasons studied averaged $1.65 per hundredweight and ranged from a low of 10 cents to a high of $3.25.

Difference in prices within grades was also statistically significant, but was not uniform from one grade to the next. In general, price increased with grade but not in the same proportion, suggesting that animals in the higher grades did not sell for as much as might be expected. To look further at individual price variation within a given grade of a market class, individual prices were plotted against the time of sale for the sales where the data were available. The results showed a wide dispersion of observations within a short time period. For example, commercial grade steers for a given sale in the spring of 1955 sold within a price range of $13.00 to $18.50 per hundredweight during a two-hour period of the sale. Several reasons may be given to account for this wide range of price variation for animals of the same grade. First, the grade assigned to some animals may have been incorrect.

TABLE 7.—*Prices Paid by Buyers for the Different Grades of Cattle and Calves at Six Auction Markets in Tennessee*

Grade of animal	Time of Observation			
	Spring 1955	Fall 1954	Spring 1954	Fall 1953
	Dollars per cwt.	Dollars per cwt.	Dollars per cwt.	Dollars per cwt.
Veal calves				
Prime	23.40	22.00	[1]	[1]
Choice	22.50	20.95	22.95	20.75
Good	20.90	17.20	22.40	20.20
Commercial	18.55	14.60	20.15	15.30
Utility	16.55	11.85	16.35	10.25
Cull	12.20	9.55	13.30	6.80
Butcher calves				
Prime	22.00	[1]	[1]	17.75
Choice	20.90	15.70	21.40	15.40
Good	19.40	14.05	19.15	14.20
Commercial	17.65	11.80	17.35	12.20
Utility	14.75	11.10	15.40	9.80
Cull	12.20	9.00	12.15	7.90
Slaughter steers				
Prime	[1]	[1]	[1]	[1]
Choice	19.25	17.55	19.20	16.25
Good	18.40	14.30	18.75	14.70
Commercial	16.10	14.20	16.60	12.20
Utility	14.85	12.10	13.75	9.65
Cutter	12.65	9.95	11.65	8.20
Canner	10.75	8.05	11.00	7.10
Slaughter heifers				
Prime	[1]	[1]	[1]	[1]
Choice	[1]	16.15	19.00	16.50
Good	17.75	14.35	18.10	14.80
Commercial	15.65	11.90	16.00	11.60
Utility	13.20	10.00	13.45	9.80
Cutter	11.90	8.80	11.85	8.40
Canner	10.80	7.50	10.35	7.70
Slaughter cows				
Good	[1]	9.75	14.00	14.00
Commercial	12.30	9.50	13.35	10.30
Utility	11.50	8.40	12.35	9.40
Cutter	10.45	7.30	10.85	8.00
Canner	9.10	5.85	9.50	6.65

[1] No animals were in this grade, or else too few animals, to obtain an adequate average price. Price values are weighted according to the number of transactions.

Grading is an art and is based on the application of rather indefinite interpretations of the standards to an animal. Second, the classification or grading system is not definitive; instead, each grade is a range in quality. Therefore, animals may differ considerably in conformation, type and finish, and yet be of the same grade. In this study all animals were graded to the nearest third of a grade. Even when animals of the same third of a grade were compared as to price, there was considerable price variation. Third, there is some evidence that buyers do not classify animals in the same manner as would be done under federal grades. That is, the economic value of animals to buyers may not be in accordance with

the rating by official grade standards. For example, if buyers do not want highly finished animals, they may pay more for animals of lower grade with less finish. Fourth, price variations for animals of similar quality sold at approximately the same time also can result from misjudgment on the part of buyers. In many cases, buyers try to average-out on a load or day's purchases. In doing so, they may pay relatively too much for some animals and relatively too little for others. In a highly competitive market this probably would not occur regularly, but may occur in some livestock auctions when the number of buyers is small or they are not bidding aggressively. When selling proceeds at the rate of several sales a minute, and bidders do not know the exact characteristics of each animal or the conditions under which it was raised, misjudgments can be expected to happen freqently. In some of the auctions, animals are sold in the approximate order that they are received without much grouping or sorting. Consequently, there is no consistent pattern or order in the class and grade of animals following one another into the sales ring. The selling of animals from one class and then from another and from one grade to another in fairly rapid succession as the sale proceeds may interfere with accurate pricing.

The wide variation in prices within a given grade suggests one kind of inefficiency in price discovery at auction markets. Under such conditions producers may not be rewarded according to the quality of animals they produce, or some may be rewarded more adequately than others. Accurate price reporting becomes difficult and the problem of correctly interpreting reports for use in making production and marketing decisions is increased.

Estimated dressing percent. Dressing percent is interrelated with grade and its effect on price is generally more pronounced for steers and vealers than for the other market classes.

Weight.[13] The effect of weight as a factor associated with price is variable. Its effect is least pronounced with cows. Weight tended to be more closely interrelated with grade and estimated dressing percent for vealers than for the heavier and older animals. With respect to the older and heavier animals, namely, steers and heifers, an increase of 100 pounds in weight was associated with an increase in price of approximately 35 cents. Through time, however, considerable variation existed in this relationship with an increase in price as small as five cents to as much as 60 cents per hundredweight being noted. Actual price differences by weight groups for good and commercial steers are shown in table 8. In general, for a given grade, the heavier animals brought the higher price. This was more evident in case of beef-type animals than among animals of dairy or mixed breeding.

[13] The actual weight to the nearest pound or five pounds, as recorded by the auction weighmaster, was used with respect to individual animals. When the animal was sold in a lot with one or more other animals and individual weights not recorded, the average weight per animal in the lot was used. When the lots consisted of mixed grades and varying weights, the data were discarded because they would not be meaningful.

Size of market. The effect of size of market on price is not clearly evident except that it suggests a higher price at the larger markets for most classes of cattle and calves. Data in this study do not include price and grade information from about 20 percent

TABLE 8.—*The Relationship of the Weight of Good and Commercial Grade Steers to Price at Six Auction Markets in Tennessee*

Weight (pounds)	Grade							
	Good				Commercial			
	Fall 1953	Spring 1954	Fall 1954	Spring 1955	Fall 1953	Spring 1954	Fall 1954	Spring 1955
	Dollars per hundredweight				Dollars per hundredweight			
Less than 700	14.15	18.20	15.55	17.95	11.80	16.30	13.75	16.10
700-899	14.85	18.35	17.40	18.85	12.35	17.00	14.85	16.00
900-1099	15.80	19.60	18.00	19.70	13.80	17.35	16.00	[1]
1100 or more	16.25	20.95	[1]	[1]	14.00	19.90	[1]	[1]

[1] Too few animals for accurate quotation.

of the auction markets, or those that sell an average of less than 100 animals per week. Limited observations in these small markets, however, substantiate this relationship. The relationship is not well defined when comparing price in the medium-sized markets with the large ones.

Rather wide variation in price for a given grade of animal was noted between markets. This is true for both the large and medium-sized markets and is indicated in table 9, by the prices paid for commercial and utility grade animals. Imperfections of varying degrees in the respective markets resulting from such things as differences in marketing practices, number of buyers and participation in the bidding by auction management are responsible for these price variations.

TABLE 9.—*Average Price Received by Farmers by Grade for Slaughter Cattle and Calves at Six Auction Markets in Tennessee, April 22 - May 10, 1955*

Market class	Market identification[1]					
	A	B	C	D	E	F
	Dollars per hundredweight					
	Commercial Grade					
Veal calves	20.90	22.65	17.60	19.80	18.20	17.00
Butcher calves	16.75	17.35	16.50	18.75	18.45	17.00
Steers	18.00	16.45	14.00	15.30	17.30	13.25
Heifers	15.40	15.45	13.20	15.50	16.05	12.00
Cows	13.40	12.70	12.70	[2]	[2]	[2]
	Utility Grade					
Veal calves	16.10	15.00	15.90	17.80	16.20	15.15
Butcher calves	14.55	14.70	12.90	16.05	16.30	13.25
Steers	15.05	15.00	12.70	15.15	15.35	15.75
Heifers	14.25	13.55	11.90	12.25	12.75	12.20
Cows	12.10	11.80	9.85	13.75	12.75	11.50

[1] Markets A, B, and C are classified as large markets and markets D, E, and F are medium-sized markets.
[2] None sold.

Seasonal factor. The effect of the lapse of time, or the two-week time interval between the first and second sale observed on a given market is pronounced and may be in either direction.

A summary of the major pricing factors associated with price changes is shown in table 10.[14]

TABLE 10.—*Effect on Prices Paid for Market Classes of Cattle and Calves as a Result of Change in the Major Pricing Factors Associated with Price Changes*

Market class (beef breeding)	Effect on price of following changes			
	Increase of full grade in quality	One percent increase in estimated carcass yield	Increase of 100 lbs. in weight	Change from sale in medium-size to large-size markets
	Dollars per cwt.	Dollars per cwt.	Dollars	Dollars per cwt.
Fall 1953				
Veal calves	1.33*	.55**	2.17*	—1.22
Slaughter calves	1.82**	—.04	.61	— .28
Steers	2.03**	—.02	.52**	—1.63**
Heifers	2.08**	—.05	.37*	.06
Cows	1.21**	1.21*	.09	.06
Spring 1954				
Veal calves	1.14**	.26	.54	1.27**
Slaughter calves	1.07**	.34	—1.56**	— .01
Steers	.49**	.37*	.28	.64
Heifers	1.64**	.07	— .35**	.06
Cows	— .03**	.30*	.15	.65

* t values of the coefficients significant at the 5 percent level.
** t values of the coefficients significant at the 1 percent level.

Other Pricing Factors

The variation in price not explained by the factors discussed above, and accounting for one-fifth to one-fourth of the total price variation, is a result of the interaction of numerous factors working simultaneously throughout the sale. Among these are certain management practices, such as method of weighing, the time of the sale, method of selling, and bidding by auction management. Also, the degree of participation by the different types of buyers has an influence.

Time of weighing. With respect to time of weighing, animals weighed after leaving the sale ring where they were sold tended to bring a higher average price than those that were weighed immediately after being unloaded and identified at the auction

[14] To illustrate the effect of the factors studied, observe the data for beef-type steers sold in the spring of 1954. A one-third grade improvement in the quality of a beef steer was associated with 16 cents per hundredweight increase in price. An increase of one percent in the estimated dressing percent was associated with an increase in price of 37 cents. An increase of 100 pounds in total weight was associated with an increase in price of 28 cents. A change from selling in a medium-sized market to a large market was associated with an increase of 64 cents per hundredweight. The time interval between the first and second sale from which the data were collected during the spring of 1954 was associated with a price decline of 90 cents. Seventy-eight percent of the variation in price was explained by the variation in these five independent factors in the sale of beef-type steers.

(table 11). This price relationship was more consistent among the older animals, particularly cows, than among butcher and veal calves. Essentially, the price differential among the older animals as a result of the time of weighing is the buyer's appraisal of shrink and fill as it affects yield.

TABLE 11.—*Relationship of Method of Weighing to Price by Grade at Six Selected Auction Markets in Tennessee*

Market class by grade	Method of weighing			
	Spring 1955		Fall 1954	
	Weighed upon arrival	Weighed after sold	Weighed upon arrival	Weighed after sold
	Dollars/cwt.	Dollars/cwt.	Dollars/cwt.	Dollars/cwt.
Veal calves				
Choice	22.55	22.45	21.35	20.00
Good	20.50	21.60	17.75	16.25
Commercial	18.00	19.15	15.15	14.10
Utility	16.05	17.00	11.55	12.10
Cull	12.30	13.45	9.50	9.60
Slaughter calves				
Choice	21.35	19.00	15.70	15.75
Good	19.50	19.20	13.75	14.55
Commercial	17.45	17.80	12.15	13.10
Utility	11.50	14.80	10.30	11.40
Cull	12.45	12.15	8.85	9.15
Slaughter steers				
Good	19.05	18.10	15.45	16.80
Commercial	14.80	16.30	13.40	14.70
Utility	13.70	15.05	10.30	12.70
Cutter	11.00	12.90	8.20	10.15
Slaughter heifers				
Good	16.40	18.50	13.50	16.10
Commercial	14.85	15.40	10.90	13.25
Utility	12.75	13.35	8.85	10.90
Cutter	11.70	11.95	7.55	9.10
Slaughter cows				
Commercial	12.10	12.70	9.10	10.65
Utility	11.30	11.90	7.90	9.05
Cutter	10.15	10.65	6.70	8.20
Canner	9.10	9.15	5.10	6.60

Time of sale. The effect of time when animals are sold during a given sale is not clear; particularly is this true in the smaller sales. In the larger sales the most usual pattern of price movement was for prices to increase from the beginning to the middle of the sale and then decline. The reasons for this change in price level were not clearly determined, but appear to be related to buyer competition and in some instances the management practice of selling the animals in the upper side of the grade during the middle of the sale.[15]

[15] These results substantiate similar findings of work done in Louisiana. Harlon D. Traylor, "An Analysis of Two Type Variation in Cattle Prices at Auction Markets in Louisiana," Louisiana Agricultural Experiment Station, D.A.E. Circular No. 182, October 1955.

Method of selling. Cattle and calves are sold individually at most of the auction markets in Tennessee. Some auctions, however, follow the practice, with the consignor's consent, of selling veal calves and occasionally butcher calves by pooled-ownership lots ranging in size from a few to more than 100 animals. Also, in some markets, steers and heifers having uniform characteristics and belonging to an individual consignor are sorted into groups and sold. However, in most cases, steers and heifers belonging to different consignors are not pooled for sale purposes. When consignors prefer to sell their animals in lots of more than one at a time, the sorting is generally done by the auction management. There are some advantages of selling by groups or on a pen-lot basis; namely, (1) buyers who desire a number of animals of uniform characteristics in a single lot are given an opportunity to bid on a group, thus eliminating some of the uncertainties involved in buying one animal at a time, (2) buyers may examine and appraise animals with greater care, (3) producers have a good apportunity to learn something about the value of quality standards, (4) the total time and cost of selling may be reduced materially, and (5) buyers may be able to secure a load of animals in one purchase ready to ship without further sorting. As such, certain types of buyers, such as packer or order buyers, might be attracted to a market where this practice is followed. whereas, otherwise, they might not be interested. Possible disadvantages of group selling include: (1) some small buyers, such as local slaughterers and small packers, may be eliminated and competition reduced because they may not be able to handle a large number of cattle, (2) animals of different ownership may have to be mixed, and (3) there may not be enough animals of a particular class and grade to make uniform lots.

TABLE 12.—*Relationship of Method of Selling to Price by Grade at Six Auction Markets in Tennessee*

Market class and grade	Method of selling			
	Spring 1955		Fall 1954	
	One animal per sale	More than one animal per sale[1]	One animal per sale	More than one animal per sale[1]
	Dollars/cwt.	Dollars/cwt.	Dollars/cwt.	Dollars/cwt.
Veal calves				
Choice	22.05	24.55	20.60	22.80
Good	20.75	22.25	17.05	19.90
Commercial	18.40	20.25	14.60	15.85
Utility	16.60	16.20	11.80	12.55
Cull	13.10	13.20	8.90	10.90
Slaughter steers				
Good	18.30	18.60	16.20	18.00
Commercial	15.65	17.20	14.05	15.05
Utility	14.70	15.20	11.90	13.40
Cutter	12.55	13.00	9.80	11.10

[1] Veal calves were sold by pooled-ownership lots, ranging in size from a few to more than 100 animals. The steers sold in groups were on an ownership basis and the sorting, if any, was done by the auction management.

TABLE 13.—*Prices Paid by Grade According to Type of Buyer at Six Auction Markets in Tennessee*

Market class and grade	Type of buyer					
	Packer	Local slaughterer	Order buyer	Management	Speculator	Other
	Dollars per hundredweight[1]					
Spring 1955						
Veal calves						
Choice	22.00	[1]	23.50	[1]	[1]	[1]
Good	21.05	[1]	21.00	[1]	[1]	[1]
Commercial	18.70	[1]	17.25	[1]	19.00	18.10
Utility	16.80	16.90	16.80	[1]	14.20	16.10
Cull	13.20	13.25	12.25	[1]	[1]	12.90
Slaughter steers						
Good	18.05	[1]	19.15	[1]	18.05	18.50
Commercial	15.70	[1]	14.40	16.65	16.00	16.60
Utility	14.55	[1]	13.90	15.10	14.90	15.05
Cutter	12.05	[1]	10.10	14.30	12.45	12.65
Slaughter cows						
Commercial	11.80	[1]	[1]	12.70	12.60	[1]
Utility	11.50	12.90	[1]	10.55	12.40	10.90
Cutter	10.45	10.75	9.85	9.65	10.65	11.15
Canner	9.15	10.00	[1]	8.40	9.10	9.35
Fall 1954						
Veal calves						
Choice	21.20	[1]	20.85	[1]	19.00	[1]
Good	16.75	[1]	19.70	14.95	15.25	[1]
Commercial	14.85	[1]	16.10	12.60	13.70	12.95
Utility	11.55	[1]	12.65	[1]	12.25	12.00
Cull	9.35	[1]	10.00	11.75	9.40	9.20
Slaughter steers						
Good	16.65	[1]	[1]	[1]	16.75	15.60
Commercial	13.85	14.00	12.55	14.00	14.70	14.00
Utility	10.50	10.05	12.20	12.25	12.55	12.15
Cutter	8.10	[1]	8.50	9.70	10.10	10.20
Slaughter cows						
Commercial	8.60	10.80	[1]	[1]	[1]	10.25
Utility	8.05	8.65	9.50	8.45	8.90	8.10
Cutter	7.10	7.90	6.70	7.40	7.65	7.55
Canner	5.35	6.00	6.10	5.80	6.40	6.10

[1] No animals or too few for price quotation.

The analysis of prices for veal calves sold in Tennessee auctions where the calves are sorted into uniform lots principally on the basis of weight, age and condition and sold as pooled-ownership lots compared with the prices for vealers sold individually shows that there was a price advantage in favor of group selling (table 12). There is also some indication that when vealers are grouped or pooled in rather large groups the average price they bring is slightly higher than when sold in small groups. Since most of the vealers were purchased by packer buyers and shipped to out-of-state packing plants for processing, the possibility of being able to secure a load of animals in one purchase without further sorting, or of being able to purchase a load at one sale, is an incentive for a packer buyer to pay a higher price. The buyer can do this be-

cause the cost of assembling the animals and the transportation cost for the packer is reduced. Similar results were experienced in Virginia where large groups, averaging 43 head, sold for more per animal than did small groups.[16]

When steers of uniform characteristics were sorted into groups on a single ownership basis generally by auction management with respect to grade and then sold, the price was also higher than when sold individually. Steers, like vealers, were sold in various sized lots; however, the average sizes of the lots were smaller, the most usual sizes ranging from two to six animals.

Type of buyer. The relationship of the type of buyer to the prices paid for the different classes of cattle and calves did not follow any clearly defined pattern (table 13). Speculators operating on the market did not apparently purchase animals at a lower price than other types of buyers. It was observed at several sales that bidding by management was quite evident. Management purchased 10 percent of all animals sold in the fall and seven percent of those sold during the spring seasons. The main reason given by management for participating in the bidding and purchasing of animals was to support the market, particularly for the poorer grade of animals. No consistent pattern of differences in prices paid, however, was noted when comparing average prices paid by management and other types of buyers.

[16] Unpublished data from K. C. Williamson of Virginia Agricultural Extension Service, February 28, 1955.