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The Relation Between Gradings of
*Live and Dressed
Chickens in Utah*

By

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and

GLEN E. DOWNS

under direction of

Western Poultry Marketing Research Technical Committee

in cooperation with the Marketing Research Service

United States Department of Agriculture

FEBRUARY 1954

BULLETIN 366

AGRICULTURAL EXPERIMENT STATION

UTAH STATE AGRICULTURAL COLLEGE

LOGAN, UTAH

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SUMMARY AND CONCLUSIONS

1. The sale of chickens by Utah farmers has accounted for about one-fifth of the gross receipts from both chickens and eggs in the past 24 years.

2. In 1949-50, fryers accounted for about 30 percent of the poundage of chickens sold from Utah farms, and this enterprise has been increasing in importance in recent years.

3. The percentage of chickens purchased by Utah buyers as first grade on a live basis was relatively high when compared with USDA specifications on a dressed basis.

4. When compared with USDA specifications, the quality factors most often overlooked by live chicken buyers in Utah were excessive curved or dented breastbone, fleshing, and finish. Almost one-fifth of the grade-down was a result of processing factors most important of which were skin tears, cuts, and abrasions.

5. In Utah, light hens graded approximately 68 percent A, 24 percent B, and 8 percent grade C by U. S. standards. The other classes of chickens graded somewhat higher, and ranged from 82 to 84 percent grade A, 14 to 16 percent grade B, and 1 to 2 percent grade C.

6. The competition among buyers for an individual lot of chickens depended more upon non-price than upon price factors. This is evident from the fact that:

- a. The average value received per pound depended on the grade-out of the lot, the grading being conducted by the buyer.
- b. Differentials in prices paid for various grades of chickens varied according to class of chickens and fluctuated considerably from month to month.
- c. The variation in quality among lots of chickens of same live grade as graded by Utah buyers on a live basis was sufficient to account for a difference in the average price of $1\frac{1}{2}$ cents per pound in one out of three lots, and 3 cents per pound in one out of twenty lots.

7. The variation between live and dressed grade-out indicated that selling chickens on a basis of buyers' live grades did not assure equality among producers. The practice of selling chickens on a flock-run basis may be as equitable for growers as selling on buyers' grades and would permit competition among buyers to be registered through paying price rather than grade-out.

8. The results of this study indicate that there may be justification to consider paying for chickens on a dressed grade and yield basis in order to compensate producers equitably for the quality of chickens they sell.

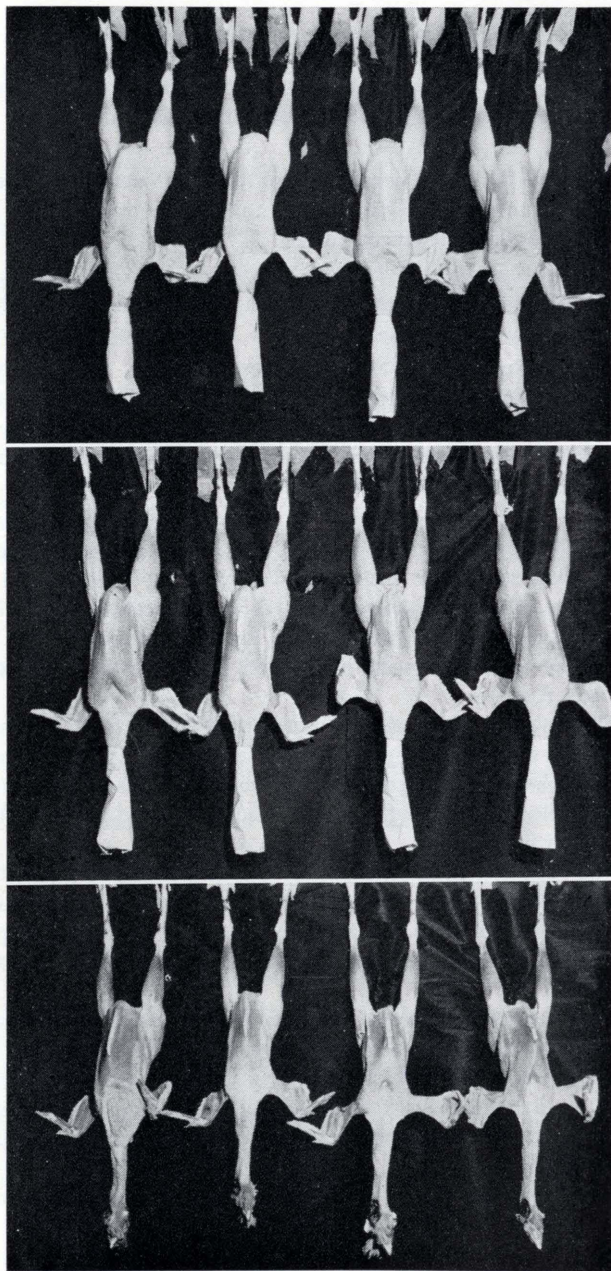


Fig. 1. Light hens of A (upper), B (center), and C (lower) grade

The Relation Between Gradings of Live and Dressed Chickens in Utah

1949 - 50

Roice H. Anderson and Glen E. Downs¹

INTRODUCTION

THE EGG AND POULTRY INDUSTRY is one of the important agricultural industries in Utah. From 1929 to 1952 the proportion of farm income from sale of chickens and eggs has varied from 9 to 15 percent without any particular trend and averaged 12.2 percent for the 24 year period.²

The sale of chickens from Utah farms has in past years been largely a by-product of the egg enterprise. Egg producers in the state sell about one hen for meat purposes for every two hens housed in the fall.³ The practice of purchasing straight-run chicks for flock replacements results in production of cockerels for sale as meat. In recent years there has been a trend away from this practice, however, since most of the flock replacements are produced from day old sexed chicks.

Since 1950, there has been an increase in the number of chickens grown exclusively for meat in Utah. Prior to that time commercial broiler production was not sufficiently large to be reported separately from farm chickens. In 1950, 700,000 commercial broilers were produced and by 1952 production had increased to 1,634,000 birds.⁴

Although the sale of chicken meat from Utah farms has largely been considered a by-product, almost a fifth of the total receipts from both egg and chicken sales has come from chickens. In the 25 year period 1929-1952 receipts from chickens sold varied from 12 to 25 percent of the receipts from both eggs and chickens and averaged 19 percent for the entire period.⁵ Even with expansion in the production of commercial broilers the importance of chickens relative to eggs has not increased because the production of Leghorn cockerels has been decreasing at the same time.

¹ Associate professor of agricultural economics, Utah Agricultural Experiment Station and cooperative agent, Research Division, Poultry Branch, Production Marketing Administration, respectively.

² Farm income situation. U. S. Department of Agriculture.

³ Roice H. Anderson. Marketing of chickens from producer to first handler, Washington, Oregon and Utah, 1948-1949. Utah Agr. Exp. Sta. Bul. 354. 1952.

⁴ Farm production, disposition, cash receipts, and gross income, chickens and eggs. U. S. Department of Agriculture, April 1953.

⁵ Farm income situation reports. U. S. Bureau of Agricultural Economics.

In buying chickens from producers in Utah the usual practice of buyers has been to purchase the chickens on a basis of grade. The purchase agreement is determined on the basis of a price for first grade chickens. The buyer then grades the chickens on a live basis. He pays the agreed price for first grade chickens and lower prices for second and third grade chickens. Prior to the sale the producer has no way of knowing the average price which he will receive for a lot of chickens because this cannot be determined until after the grading has been done. Prices offered by buyers are not an accurate reflection of returns a producer can expect because of the differences in the grading of various buyers.

OBJECTIVES OF THE STUDY

THIS STUDY was undertaken in order to (1) ascertain the importance of chicken sales of various classes and grades from Utah farms, (2) determine the relation between live and dressed grading of chickens, and (3) ascertain the influence of live grading on the price of chickens at the farm level.

SOURCE OF DATA AND PROCEDURES

FOR THE YEAR July 1, 1949 to June 30, 1950 information was obtained from 12 chicken processors, which included all the major plants in Utah, concerning their purchases of chickens of various classes and grades. From these data the buying practices were obtained and the live grade-out of birds of various classes was determined.

In two of the major processing plants, both of which were cooperatives, random samples of chickens, which had previously been graded on a live basis, were selected every two weeks from July 1950 to March 1951. These samples were graded after processing according to federal specifications⁶ and used as a basis of comparing live and dressed grading. The person who did the dressed grading was not a licensed grader at the time but he had previously been a licensed state-federal turkey grader and had had experience in poultry grading and inspection work in the U.S. Army.

SALE OF CHICKENS FROM UTAH FARMS

THE SALE OF CHICKENS from Utah farms in this study will be discussed under three general headings: volume of sales, quality of chickens, and pricing of chickens.

⁶ Regulations governing the grading and inspection of poultry and domestic rabbits and edible products thereof and United States specifications for classes, standards, and grades with respect thereto. Poultry Branch, U. S. Production Marketing Administration effective January 1, 1950.

VOLUME OF SALES

During the year 1949-50, 9.4 million pounds of live chicken were sold from Utah farms, 59 percent of which were light hens (table 1). About 30 percent were fryers, 8.6 percent broilers, and 2.7 percent heavy hens.

Table 1. *Purchases of various classes of live chickens from Utah farms by buyers 1949-50*

Class of chickens*	Pounds purchased live weight	Percent of total	Average weight per head
	<i>pounds</i>	<i>percent</i>	<i>pounds</i>
Heavy hens	254,367	2.7	5.2
Light hens	5,552,170	59.0	4.0
Fryers	2,787,721	29.7	3.3
Broilers	806,974	8.6	2.3
All classes	9,401,232	100.0	3.6

* Classes of chickens as used throughout this report include: heavy hens—colored hens of meat or dual purpose type, light hens—egg type hens primarily of Leghorn breed, fryers—young chickens of heavy or cross breeds grown exclusively for meat, broilers—young Leghorn cockerels grown as joint product with laying flock replacements.

The average live weight per bird varied from 5.2 pounds for heavy hens to 2.3 pounds for broilers. Light hens averaged 4.0 pounds and fryers 3.3 pounds per bird.

Sixty-two percent of the chickens sold were processed by cooperative processing plants and 31 percent by independent processors. About 7 percent of the chickens were sold direct from farm to ultimate consumers (table 2).⁷

Table 2. *Volume of chickens of all classes purchased by various buyers*

Type of buyer	Pounds purchased (live weight)	Percent of total
Cooperative processors	5,845,497	62.2
Independent processors	2,935,193	31.2
Ultimate consumers	620,542	6.6
Total	9,401,232	100.0

THE QUALITY OF UTAH CHICKENS

The quality of Utah chickens is determined by grading the chickens on a live basis at the farm by the buyer. Grading is done in order to compensate the individual producer equitably for the quality of his birds.

⁷ Data for sale direct to consumer were obtained from a sample of 135 producers as part of a different study.

No attempt is made to retain the identity of the various grades through processing as a basis of selling the dressed chickens.

It is difficult to grade chickens before they are processed because of the quality factors which are hidden from the eye by feathers. The live grade must be determined largely by the touch and the general outward appearance of the individual bird. Such quality factors as deformities and fleshing can be determined fairly accurately by touch but such factors as finish and bruises are difficult to evaluate. The method of grading used by Utah buyers is to handle each chicken by feeling the breast for condition and deformities. Most buyers use a three-fold quality classification, the first two grades being used for human consumption. The third grade are birds of extremely low quality, many of which die before processing or are discarded during processing. Many buyers think that birds of this quality should be left on the farm and not marketed but competition results in these birds being purchased even though they may be a total loss to the buyer. Paying prices of various grades will be discussed in a subsequent section.

GRADE-OUT OF CHICKENS^s

The grade-out of various classes of chickens was determined from the data obtained from the 12 processing plants covering the year 1949-1950 (table 3). While quality was designated in various ways by different buyers, the classification of first, second, and third grades will be used for live grades throughout this report in order to distinguish them clearly from the federal dressed grade designations.

Table 3. *Proportion of various classes of chickens graded first, second, and third on a live basis by Utah chicken buyers*

Class of chickens	First grade	Second grade	Third grade
	<i>percent</i>	<i>percent</i>	<i>percent</i>
Heavy hens	93.9	5.9	0.2
Light hens	82.9	11.8	5.3
Fryers	95.4	3.7	0.9
Broilers	94.1	5.3	0.6

On an average, a fairly large percentage of all classes was graded in the top grade particularly among heavy hens, fryers, and broilers which graded more than 94 percent in the top grade. About 83 percent of the light hens were first grade, 12 percent were second, and about 5 percent third grade.

^s The term *grade-out* refers to the proportion of chickens placed in the various grades.

Comparison of live and dressed grading. In order to check the accuracy and consistency of live grading in Utah, batteries of various classes of chickens which had been previously graded on a live basis were identified and followed through the processing plant. After cooling, these birds were graded on a dressed basis according to federal specifications. Random samples of batteries of chickens were selected at two processing plants every two weeks from July 1950 to March 1951 to make the tests. During the entire period 106 batteries comprising 10,486 chickens which were graded on a live basis by Utah buyers were processed and then graded on a dressed basis and the two gradings compared.

The grade-out of chickens previously graded firsts by Utah buyers varied from 81.6 percent U. S. grade A for light hens to 88.1 percent grade A for broilers when graded on a dressed basis according to USDA specifications (table 4). Most of the chickens grading below U. S. grade

Table 4. *Dressed grade-out of chickens according to federal specifications* (Sample of chickens from Utah processing plants, 1949-50)*

Class of chickens	Chickens graded <i>number</i>	Proportion graded		
		U.S. grade A <i>percent</i>	U.S. grade B <i>percent</i>	U.S. grade C <i>percent</i>
(Chickens previously graded firsts on a live basis by Utah buyers)				
Heavy hens	178	87.6	10.7	1.7
Light hens	4701	81.6	17.0	1.4
Fryers	3002	87.9	11.8	0.3
Broilers	965	88.1	11.7	0.2
(Chickens previously graded seconds on a live basis by Utah buyers)				
Light hens	1219	3.2	85.9	10.9
Fryers	421	6.9	82.7	10.4

* Processing defects included.

A were U. S. grade B, although 1.4 and 1.7 percent of light and heavy hens, respectively, were graded U. S. grade C.

Light hens which were previously graded seconds by Utah buyers were graded 85.9 percent U. S. grade B on a dressed basis, and fryers were graded 82.7 percent in this grade. More than 10 percent of both classes was graded U. S. grade C, and the remainder, 3.2 percent of the light hens and 6.9 percent of the fryers, was graded U. S. grade A. It was not possible to get a sufficient sample of second grade heavy hens and broilers to make comparisons of live and dressed grading of these classes.

The large percentage of first grade chickens graded below U. S. grade A on a dressed basis is indicative that on the average Utah buyers are grading and paying for a relatively high percentage of top grade chickens when compared with federal standards. This does not necessarily

mean, as might be supposed, that producers are getting a "good deal" because of the large percentage of chickens in the buyers' top grade. It may suggest that competition among buyers is being expressed in high grade-out rather than in paying price. If quality standards were more strictly followed and if competition were keen the percentage in top grades might well be lower but the price for each grade would undoubtedly be higher.

Variation in Grade-out. The consistency of grading between buyers or between flocks of chickens by the same buyer is even more important than the level of grading. Actually there was considerable variation among the batteries of chickens graded in the comparison of dressed and live grading. One battery of first grade light hens graded as low as 55 percent U. S. grade A on a dressed basis, and one as high as 96 percent U. S. grade A, with an average for all lots of 81.6 percent. It should be pointed out that this variation included processing mishaps such as abrasions, skin tears, and blood clots.

When measured by the coefficient of variability based on standard deviation 49 batteries of first grade light hens varied an average of 11.8 percent from the mean of 81.6 percent U. S. grade A for all batteries (table 5). This means that in one lot out of three the percent grade A would be higher than 91.3 or lower than 71.9 percent when graded by federal specifications. The coefficient of variability was 9.7 percent for 13 batteries of light hens previously graded seconds. The variability in grade-out among batteries of fryers was only about half as great as among batteries of light hens and was even less among batteries of broilers.

Table 5. *Variations in grade-out of chickens according to federal specifications 1949-50*

<i>Birds previously graded firsts on a live basis, by Utah buyers:</i>				
Class of chickens	Number of batteries graded	Percent U.S. grade A	Variation in percent grade A among batteries	
			Standard deviation	Coefficient of variability
Light hens	49	81.6	9.7	11.8
Fryers	30	87.9	5.0	5.6
Broilers	8	88.1	2.3	2.6

<i>Birds previously graded seconds, live basis, by Utah buyers:</i>				
Class of chickens	Number of batteries graded	Percent U.S. grade B	Variation in percent grade B among batteries	
			Standard deviation	Coefficient of variability
Light hens	13	85.9	8.3	9.7
Fryers	4	82.7	4.5	5.5

Reasons for grading below U. S. Grade A. In order to ascertain the specific grading factors most often overlooked in live grading of chickens, the reason for down grading was recorded and tabulated for all chickens grading below U. S. grade A. These reasons were classified as to the main factor for down grading and were grouped into two groups, those associated with growing of the chickens, and those caused by processing.

From 13 to 21.6 percent of the chickens of various classes was graded below U. S. grade A because of factors associated with processing, and most of these were a result of skin tears, cuts, and abrasions (table 6). It is obvious that factors causing birds to be down graded assignable to processing, would not be evident when grading live birds.

Table 6. *Percent of chickens graded below U. S. grade A on a dressed basis for various reasons, birds previously graded firsts on a live basis by Utah buyers*

Growing factors	Heavy hens	Light hens	Fryers	Broilers
	<i>percent</i>	<i>percent</i>	<i>percent</i>	<i>percent</i>
Curved and dented breastbone	22.6	23.5	18.9	17.4
Conformation	5.0	2.0	3.6	3.5
Fleshing	18.2	23.5	46.3	58.3
Finish	22.6	30.7	3.0	.....
Excessive abdominal fat	13.6	3.1	.....	.....
Calloused breast	.....	4.2	6.6	3.5
Total growing factors	82.0	87.0	78.4	32.7
Processing factors				
Wholesomeness	9.0	0.6	.....	.....
Discoloration	.....	1.0	.....	.....
Pin feathers	.....	0.3	2.7	.....
Skin tears, cuts, and abrasions	9.0	9.2	15.7	10.4
Disjoined bones	.....	0.3	1.6	2.6
Blood clots	.....	1.6	1.6	4.3
Total processing factors	18.0	13.0	21.6	17.3

About 80 percent of the down grading was assignable to reasons associated with the chicken itself rather than with the processing. Of these factors, the ones most frequently overlooked by buyers grading chickens on a live basis were curved or dented breastbone, fleshing, and finish.

Loose grading methods are reflected in the fact that from 17 to 24 percent of the down grading was caused by excessive curve or dent in the breastbone. Deformities of the breast are much more easily detected in live birds than quality factors such as finish or fleshing.

Degree of finish was a factor of less importance in causing down-grade of fryers and broilers than was true of hens. Federal specifications require more finish on the older birds than they do on young birds.

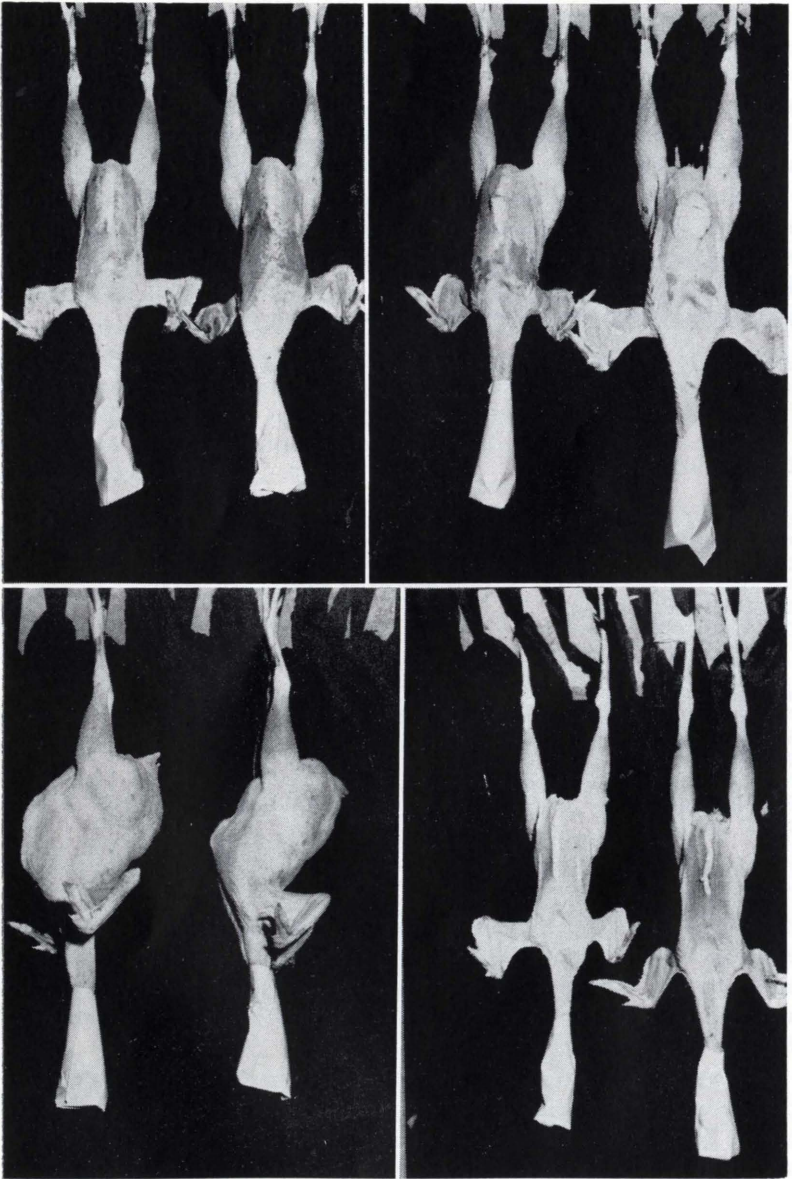


Fig. 2. Common defects which cause chickens to be down graded: (upper left) skin abrasions, (upper right) cyst and calloused breastbone, (lower left) hunch back and dented breastbone, and (lower right) poor fleshing and dented breastbone. Skin abrasions result from processing damage, all others are growing factors

Reasons for down grading birds previously graded seconds on a live basis are shown in table 7. From 80 to 90 percent of the birds were graded below U. S. grade B because of factors associated with growing of the bird rather than processing defects. From one-half to two-thirds of these birds were graded below U. S. grade B because of lack of fleshing and most of the remainder because of conformation and excessive curve or dent in the breastbone.

Table 7. *Percent of chickens graded below U. S. grade B on a dressed basis, for various reasons, birds previously graded seconds on a live basis by Utah buyers*

Growing factors	Light hens	Fryers
	<i>percent</i>	<i>percent</i>
Curved and dented breastbone	8.3	11.4
Conformation	11.3	11.4
Fleshing	67.7	52.4
Finish	.....	.....
Excessive abdominal fat	.....	.....
Calloused breast	1.5	4.5
Total growing factors	88.8	79.7
Processing factors		
Wholesomeness	0.7	.....
Discoloration	4.5	4.5
Pin feathers	.....	4.5
Skin tears, cuts and abrasions	.....	4.5
Disjoined bones	.....	.....
Blood clots	6.0	6.8
Total processing factors	11.2	20.3

Approximate Grade-out of Utah Chickens According to Federal Specifications. It was possible to approximate the grade-out of various classes of Utah chickens according to federal specifications, by combining the data from table 3, which represent the grade-out of chickens as purchased by Utah buyers, with the grade-out of samples of these chickens according to federal specification as shown in table 4.

Based on this procedure, approximately 68 percent of the light hens in Utah in 1949-50 would have graded U. S. grade A, 25 percent grade B, and 8 percent grade C if graded on a dressed basis (table 8). The grade-out of the other classes, heavy hens, fryers, and broilers, would have been similar with a variation from 82 to 84 percent grade A, 14 to 16 percent grade B, and 1 to 2 percent grade C.

Table 8. *Approximate grade-out of various classes of Utah chickens according to federal specifications, 1949-50*

Class of chickens	Approximate percent grading:		
	U.S. grade A	U.S. grade B	U.S. grade C
	<i>percent</i>	<i>percent</i>	<i>percent</i>
Heavy hens	82	16	2
Light hens	68	24	8
Fryers	84	14	2
Broilers	83	16	1

PRICING OF UTAH CHICKENS AT FARM LEVEL

There are two phases of price determination of chickens: (1) establishing the general level of chicken prices; and (2) determining the price of a particular lot of chickens above or below the general level.

The level of prices for chickens is dependent upon the supply and demand within a given market area. Whether or not the price reflects the true supply and demand conditions depends upon the degree of competition among buyers and sellers. While a discussion of the degree of competition as establishing the general level of price is beyond the scope of this study, it is apparent that there is a relatively high degree of competition among chicken buyers in Utah. As previously mentioned there are about 12 chicken processors in the state, some operating state-wide and others in rather restricted localities. Some are cooperatives and some are independently operated. In addition to the processors, there are a number of hucksters who make a business of buying chickens from producers and selling to independent processors.

Competition among these buyers results in a rather uniform paying price being quoted by the different buyers in the state.

PRICE OF INDIVIDUAL LOTS

The price of a particular lot of chickens in Utah is dependent more on the grade-out than on the price as quoted by the buyer. Since the grading is done by the buyer, the actual net price for the lot is dependent upon the grade-out and, as previously demonstrated, this is subject to considerable variation.

Prices Paid by Class and Grade. In 1949-50, the average price paid for light hens was 17.3 cents per pound. Prices paid for heavy hens and broilers were, respectively, 5.4 and 6.4 cents higher than for light hens; and prices paid for fryers averaged 29.3 cents, or 12 cents higher than for light hens (table 9).

Table 9. *Price paid by Utah buyers for various classes and grades of chickens 1949-50*

Class of chickens	Price paid by grade			Difference between first and second grades
	First	Second	Third	
	<i>cents per pound</i>			
Heavy hens	22.7	17.7	3.3	5.0
Light hens	17.3	12.0	3.3	5.3
Fryers	29.3	23.1	3.1	6.2
Broilers	23.7	17.6	3.1	6.1

Prices paid for second grade chickens were 5 to 6.2 cents below top grade prices for the various classes of chickens. Third grade chickens of all classes were fairly uniformly sold at a little more than three cents per pound. Many of these third grade chickens died and were discarded prior to processing while others were diverted to by-product uses. Third grade chickens as used by Utah buyers were of considerably lower quality than the specifications for U. S. grade C.

Price Differentials by Months. The differential between prices paid for first and second grade chickens varied considerably by months (table 10).

Table 10. *Price differential between first and second grades of chickens by class and months Utah 1949-50*

Month	Average price differential between first and second grade				
	Heavy hens	Light hens	Fryers	Broilers	
	<i>cents</i>				
1949	July	8.0	7.0	4.8	5.7
	August	5.1	4.9	5.2	4.7
	September	5.3	5.6	5.0	4.2
	October	6.4	5.3	5.8	5.1
	November	7.9	5.0	4.8	5.6
	December	4.1	4.6	6.0	4.8
1950	January	5.7	4.8	5.1	....
	February	5.5	4.7	6.9	....
	March	5.6	8.4	5.1	....
	April	6.7	5.9	9.5	9.0
	May	3.3	4.6	7.0	5.0
	June	3.0	5.9	4.4	6.0
	Average	5.0	5.3	6.2	6.1

The differential for second grade heavy hens was 8.0 cents in July 1949, but by the following June, was only 3.0 cents per pound. The variation in these differentials by months was somewhat less for the

other classes of chickens, but for most of them, the differential for second grade was twice as high in some months as it was in others. The price differential between grades for different months was not consistent among the various classes. It would seem that the price differential would move up or down in relation to the relative supply of the various grades, but according to available evidence, the supply of the different grades of chickens has no particular seasonal pattern. Variation from month to month in the price differences among grades does, however, illustrate the added difficulty encountered by the producer in determining the average price for a lot of chickens prior to sale.

EFFECT OF GRADE-OUT ON PRICE VARIATION

The variation in grade-out of chickens and the differential in prices for the various grades contribute to variation in net price of individual lots of chickens, presumably of the same quality. The variation in grade-out of Leghorn hens as reported previously in this study and based on average price differentials for various grades was sufficient to account for a variation in price of about $1\frac{1}{2}$ cents per pound in one out of three lots of chickens. In one out of twenty lots the variation would be as much as 3 cents per pound, or from 6 to 12 cents per hen weighing an average of four pounds. This amount may not be of great economic significance to a producer selling a few hens culled from the laying flock, but may be rather important when selling the entire flock.

It is doubtful whether the normal variation among lots of chickens as sold by producers is greater than that which results from grading of different lots on a live basis. If so, this would suggest that the practice of selling chickens flock-run would be as equitable among producers as the present system of live grading and would eliminate the necessity of handling individual birds to determine grade. Flock-run selling would have the advantage from the producer's standpoint, in that he would know the average price of the lot of chickens prior to sale. This practice would require the buyer to appraise each lot of chickens and make a bid. Flock-run selling may be impractical for small lots of chickens because of the difficulty of getting bids from prospective buyers.