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Introduction and Purpose

COMMERCIAL BROILER PRODUCTION is a relatively new agricultural industry in the United States and more particularly in West Virginia. Development of this industry has taken place largely in the present century; growth has been especially rapid since 1934, when separate statistics on commercial broiler production became available which first measured its importance. Broilers are the chief source of income on a number of farms at present. Size of the industry, its rapid growth, and the many uncertainties associated with its development make highly desirable a study of the problems faced by producers. This is especially true since producers do not have years of experience to guide them as they do for many other farm enterprises.

This study in Grant, Hardy, and Pendleton Counties of West Virginia was undertaken in an effort to determine the growth and importance of the industry in the state. An understanding of some of the economic factors relating to profits has been sought. Information on brooding, feeding, housing, financing, and marketing was needed in order to appraise the industry. Problems of the industry have been examined. The findings should form the basis for research and action programs which will aid the industry.

Historical Development of the Industry

Commercial broilers have been produced in the United States for a number of years. According to Johnson[1] "commercial broilers were being produced in the vicinity of Hammonton, New Jersey, ... around 1880." He states that "production of a type comparable to that on the Peninsula, however, was relatively unimportant prior to World War I."

The industry is at present most concentrated on the Delmarva Peninsula, which lies between the Chesapeake Bay and the Atlantic Ocean and comprises parts of Delaware, Maryland, and Virginia. In West Virginia, broilers in more recent years have come to be an important source of income for farmers in a section composed of Grant, Hampshire, Hardy, and Pendleton Counties. In 1945 the gross income from broilers in the state was $7,229,000 or nearly one-fourth of the income from all types of poultry and poultry products. This sum represented more than 4 percent of the total gross income from all agricultural commodities that year. While this is not a large part of the total, its

[1]Johnson, Hugh A., *The Broiler Industry in Delaware*. Delaware Agr. Exp. Sta. Bul. 250. 1944, p. 7.

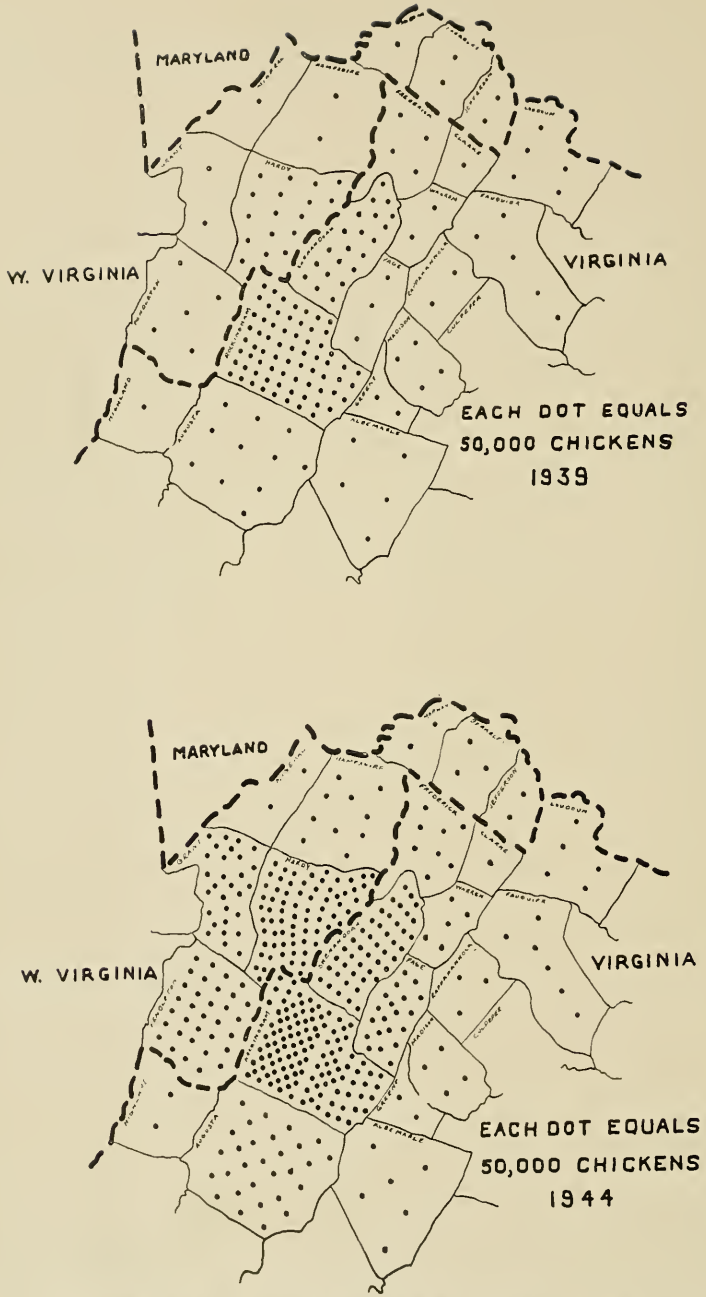

Fig. 1—Chickens Raised, Including Broilers and Fryers, in the Commercial Broiler Area of the Shenandoah Valley, 1939 and 1944

TABLE 1—Chickens Raised in West Virginia and Virginia and in Selected Counties of These States, 1929, 1934, 1939, and 1944

State and county	Chickens raised (including broilers and fryers)			
	1929	1934	1939	1944
	thousands	*thousands*	*thousands*	*thousands*
W. Va.	5,504	5,355	6,087	12,855
Berkeley	149	152	123	165
Grant	81	62	101	1,451
Hampshire	100	100	115	480
Hardy	135	142	888	3,552
Jefferson	101	116	97	107
Mineral	63	60	65	96
Morgan	53	38	60	84
Pendleton	111	123	252	1,671
Virginia	16,729	16,517	22,117	34,335
Albemarle	242	254	239	301
Augusta	416	513	549	1,426
Clarke	68	59	49	64
Fauquier	220	258	232	309
Frederick	177	164	182	397
Greene	72	72	88	71
Highland	35	37	37	103
Loudoun	246	256	231	262
Madison	194	154	203	205
Page	208	163	170	982
Rappanhannock	78	83	76	131
Rockingham	783	1,006	3,465	5,861
Shenandoah	420	427	1,036	2,233
Warren	91	63	121	258

Source: U. S. Censuses of Agriculture, 1940 and 1945.

concentration in a few counties makes it of vital importance to the farmers in the area.

Production of commercial broilers in the four West Virginia counties has increased tremendously in the past few years. That area is part of a larger area which includes all or part of Augusta, Frederick, Page, Rockingham, Shenandoah, and Warren Counties in Virginia (see Fig. 1). Contrary to common belief, production of commercial broilers in this area did not have its beginning as a result of forces growing out of World War II, although it has grown considerably during the war period. Examination of Table 1 indicates that chickens have been raised in commercial quantities in several of these counties for a number of years. Production of commercial broilers is most intensive in Rockingham County, Virginia, the center of production in this Shenandoah Valley Area.

Commercial production in West Virginia, as illustrated by data for Hardy County (Table 1), which got off to a somewhat later start, nevertheless began several years before World War II started. Hardy County

TABLE 2—Commercial Broiler Production and Income, West Virginia, 1935-1947

Year	Number produced	Weight produced	Price per pound	Gross income (a)
	thousands	1,000 *pounds*	*cents*	1,000 *dollars*
1935	100	(b)	(b)	61
1936	200	(b)	(b)	132
1937	300	(b)	(b)	207
1938	600	(b)	(b)	360
1939	1,200	3,840	16.8	645
1940	2,000	6,400	17.4	1,114
1941	4,200	13,440	19.0	2,554
1942	5,900	18,880	23.5	4,437
1943	7,500	24,000	28.3	6,792
1944	7,200	23,040	28.4	6,543
1945	8,136	27,662	27.8	7,690
1946	6,753	22,285	31.5	7,020
1947	8,441	27,011	32.0	8,644

(a) Includes consumption in households of producers, which is less than 1 percent of total production.

(b) Not available. Source: West Virginia Crop and Livestock Reporting Service and Bureau of Agricultural Economics, U. S. Department of Agriculture.

farmers raised 113,261 chickens in 1919; 97,220 in 1924; 135,453 in 1929; 141,926 in 1934; 887,989 in 1939 and 3,551,966 in 1944. Hence it appears that commercial production on a large scale had its beginning in West Virginia some time between 1934 and 1939.

Table 2, which gives estimates of the number of commercial broilers for the state as a whole, tends to bear out this conclusion. Although the data cannot be broken down by counties, it is generally believed that the majority of commercial broilers produced in the state are produced in Grant, Hampshire, Hardy, and Pendleton Counties.

As early as 1938 Dodd[2] reported:

"The poultry business has changed very rapidly from small farm flocks in Hardy County to large commercial ones in a large part of the county. This rapid change has taken place within the last ten years and largely within the last five years.

"The method by which the small farmer can get started in the business is one big reason for the enormous increase. The baby chicks are furnished by the large hatcheries around Harrisonburg (Va.). — Feeds and everything needed are furnished as needed until the broilers are ready for market at which time the broilers are bought back by the hatchery, mill, or huckster, and after paying all costs the net profit is split between the hatchery and the farmer on somewhat varying percentage, usually about 50-50."

[2]Dodd, S. L., *Annual Narrative Report*, 1938. County Agricultural Agent, Hardy County, W. Va.

In 1942 Dodd[3] stated: "The poultry (broiler) business in Hardy County has brought in more money than that received from all forms of livestock combined." Continuing, he said, "Some of the heaviest producers are men living on poor lands." Later he indicated that "there are about 1,500,000 broilers on feed now."

Similarly Stickler[4] reported for Grant County: "The most accurate figures obtainable indicated a total production of broilers of 1.25 million head in 1945. Estimated production for the previous year was over a million head."

There is an indication that production of broilers in Pendleton County was somewhat above that in Grant County.

Sources of Data

Several different sources were used in this study. Data on management practices and on labor, fuel, building, equipment, and miscellaneous costs for the year 1945 were obtained during the summer of 1946 by interviews with 108 broiler producers. Information on feed, mortality, sales, and financing for 269 broods of broilers raised in 1945 by 117 producers was obtained from broiler contractors who were financing the raising of broilers under contract. Historical information and statistics on the growth and importance of the broiler industry were gathered from previous studies made on this subject, from reports of county agricultural agents, from the West Virginia Crop and Livestock Reporting Service, from marketing agencies, and from the various Censuses of Agriculture.

The data assembled from broiler contractors were obtained first. It was found out that this information would be extremely difficult to get accurately from producers. It is thought that the data on feed, chicks, and other items furnished by the contractors were quite accurate, as they formed the basis for financial settlement between producer and contractor. Also, no home-grown feeds were used in the broods for which amounts and costs of feed were obtained. This indicates that records from dealers covered all feed used. The sample was taken by obtaining data for individuals listed consecutively on the basis of time of sale in the records of the contracting firms. The only selection made was to get records of sales during each month of the year. Records were not taken for some of the producers who raised only one brood during the year. An effort was made to adjust the number of records taken from a firm somewhat in accordance with the amount of business done. In interviewing farmers an attempt was made to visit those whose records had been obtained from the contracting firms. This was done for 48 producers. Where this was impossible because of discontinuance of operations or when the producer could not be found at home, in-

[3]Dodd, S. L., *Annual Narrative Report*, 1942. County Agricultural Agent, Hardy County, W. Va.

[4]Stickler, C. L., *Annual Narrative Report*, 1945. County Agricultural Agent, Grant County, W. Va.

formation was solicited from a producer on an adjoining or nearby farm.

During the period covered by this study numerous forces were at work which made it either impossible or undesirable to get complete information on some important phases of the broiler industry. The marketing and pricing structure was considerably disrupted by black markets and by the activities of the Office of Price Administration. This made tracing of broilers through market channels virtually useless. Feed was scarce and feed quality low. Discussion of some phases of the industry are therefore limited.

Explanation of Terms

Brood. Refers to a particular lot or "bunch" of broilers started at one time. The usual practice is for a producer to fill his house or houses with a brood of broilers and after they have been sold to fill again with another brood.

Broilers. The term refers to young chickens of the heavy breeds raised solely for meat and usually sold at average weights ranging from 2 3/4 to 3 1/4 lb. Such chickens more closely approach the U. S. Department of Agriculture's description of fryers but are commonly called broilers in the production area.

Broiler Contractor. A feed dealer, feed mill, poultry dealer, huckster, or other individual or concern who furnishes feed, chicks, medicine, litter, insurance, and fuel to farmers who raise broilers for him under some form of contract arrangement.

Mortality. Mortality was computed by deducting the number of broilers sold from the number started. It was not possible to determine the age at which death occurred. Since it is the custom of some hatcheries to add a few chicks to each hundred sold, the mortality figures shown herein may be underestimated to the extent that this practice was followed during the period covered by this study.

Northeastern West Virginia. Refers to the area of Grant, Hampshire, Hardy, and Pendleton Counties, where commercial broiler production is concentrated. It is the area from which information in this study was gathered.

Size of Broods

In West Virginia most broiler broods are small compared to those in the commercial broiler-producing area of the Delmarva Peninsula. Broods are seldom larger than can be cared for by the farm family and frequently require only a few hours of labor per day. The average number of chicks started per brood in the 269 broods for which records were obtained from the contractors was 1688. Nearly three-fourths of the broods started consisted of less than 2000 chicks per brood. Table 3 shows the relationship between the size of brood, feed and chick costs, mortality, and pounds of feed required per pound of broiler sold. The variations in costs by size of brood are not significantly different for the

TABLE 3—Relation Between Size of Brood and — Average Mortality, Pounds of Feed per Pound of Broiler Sold, Feed Cost, and Chick Cost, Northeastern West Virginia, 1945

Chicks started per brood	Broods	Chicks started	Average mortality	Feed per pound of broiler sold		Chick cost per pound of broiler sold
				Amount	Cost	
number	*number*	*number*	*percent*	*pounds*	*cents*	*cents*
Less than 1000	78	52,870	12.4	4.3	16.7	4.6
1000 to 1999	118	158,200	12.8	4.4	16.6	4.9
2000 to 2999	31	71,470	14.8	4.5	17.1	5.0
3000 to 3999	21	67,700	11.5	4.1	15.5	4.6
4000 to 4999	14	60,500	16.6	4.3	15.8	4.9
5000 to 5999	5	25,600	17.3	4.8	19.2	5.1
6000 and over	2	17,600	9.4	4.7	19.1	5.1
Total	269	453,940	13.5	4.4	16.7	4.8

broods numbering under 5,000 birds, when mortality is considered. The size of the sample for broods larger than 5,000 is not sufficient to indicate that costs are higher for the larger broods.

Sources of Chicks

Producers were getting their chicks largely from hatcheries in the immediate area. Fifty-nine reported getting chicks at Virginia hatcheries, 40 at West Virginia hatcheries, 1 at a Pennsylvania hatchery, and 8 either did not know or were uncertain from which hatchery their chicks had come. This local purchase of chicks appeared to be a good practice, since it was easy for producers to report to hatcherymen the progress that chicks had made and to arrange for adjustments when these were required. Producers could also become acquainted with the flocks from which hatcherymen were buying eggs, since some of these were in the same area.

The producers on 103 of the 108 farms visited believed that their chicks had come from flocks which were tested for pullorum disease. The remaining 5 producers did not know or did not report on this point. Broilers were usually delivered to the farm in a truck by the hatchery concerned, and the chicks were thus less likely to be subjected to undesirable treatment *en route*.

Management Practices

Farmers usually prepared for the chicks several days in advance by starting the stoves to dry out thoroughly the litter that was being used and to have the house warm on arrival. The chicks were kept close to the hover of the brooder for several days by use of boards, cardboard, or wire. Frequently the producers placed paper over the litter for a few days (Fig. 2). Feed was scattered on the paper until the chicks

learned to eat. This prevented them from eating litter. After the chicks learned to eat from small feeders the paper was removed.

The usual practice was for broilers to be started in a clean house with adequate litter and to keep the broilers in the same house, without cleaning, until they were sold. On 76 farms the broilers on hand at any one time on individual farms were all of the same age, but 31 farmers had broilers of more than one age, while one farmer gave no report on this point. Producers on 107 farms kept all the broilers of different ages in separate houses, while one producer had broilers of several ages in the same house, though not in the same pen. Of 104 producers reporting, 56 stated that litter was added while the broilers were in the house, while 48 reported that no additional litter was added. A few producers were moving birds to clean and larger houses after about 6 weeks, but this practice was not common and involved considerable additional labor.

Several different types of litter were being used. Sawdust, which apparently gave desirable results, was available in most localities without cost except for hauling. The type used and the number of producers using each type follow:

Type of litter	Producers using *number*
Sawdust	23
Crushed cane stalks	19
Shavings	9
Peat moss	3
Peanut hulls	3
Other	9
Some combinations of above	42
Not reporting	18
Total	108

Fifty-nine percent of the producers raised broilers in confinement. The remaining 41 percent allowed broilers to range outside the buildings when the weather would permit. Either method appeared to be satisfactory.

Investment and Its Relation to Income

Broiler producers estimated their investment in the broiler enterprise to be from 2 to 99 percent of the total investment in their farming operations. The average for 105 producers was 27.7 percent.[5] Producers in this study estimated their net receipts from farming in 1945 at $1489 per farm and their net receipts from broilers at $894

[5]The number of producers furnishing information on various subjects varies depending on how many were able to answer the questions asked. The number of producers interviewed also differs slightly from the number for which the data were obtained on feed, feed cost, weight sold, etc., in the 269 broods.

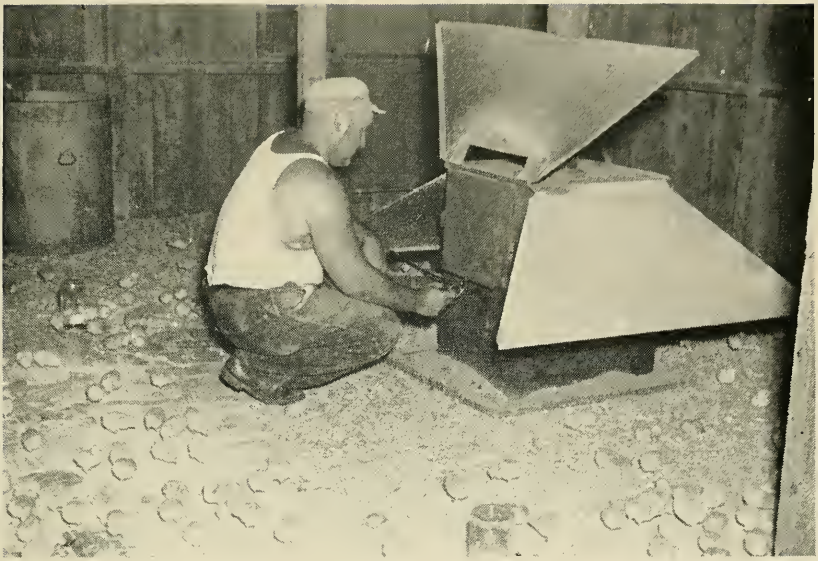

Fig. 2—Producer Tending a Wood Brooder Stove. Heat Must Be Carefully Regulated While the Broilers Are Young. Notice That the Chicks Which Have Recently Arrived on the Farm Are Eating Their First Few Meals from Paper Spread over the Litter. This Helps to Prevent Them from Eating the Litter

per farm. This leaves net receipts of only $595 from all other enterprises on an average investment which was 72.3 percent of the total investment in farming operations. Thus it is apparent that the return from broilers per dollar of investment was considerably higher than the total of all other enterprises on these farms.

Table 4 shows how broiler producers estimated their net income deriving from various enterprises on their farms. While the accuracy of these estimates made by farmers might be improved, it is obvious that a

TABLE 4—Rank of Various Enterprises as Source of Estimated Net Farm Income on 108 Farms, Northeastern West Virginia, 1945

Enterprise	Rank as a source of income		
	First	Second	Third
	number farms reporting		
Broilers	87	13	6
Cattle and calves	5	24	19
Sheep, wool, and lambs	7	17	11
Hogs	1	7	11
Turkeys	1	8	2
Crops	1	4	7
Other	5	11	5
No estimate made	1	24	47
Total	108	108	108

large proportion of the farmers raising broilers believe their greatest source of net income to be from broilers.

COSTS AND RETURNS IN BROILER PRODUCTION

Production costs[6] amounted to 25c per pound of broiler sold[7] and 82.9c per bird sold. The feed cost amounted to 66.7 percent of this cost, the chicks 19.3 percent, labor 4.3 percent, fuel 3.7 percent, and the remaining 6 percent for other miscellaneous expenses, shown in Table 5.

TABLE 5—Costs and Returns in Producing Broilers on 108 Farms in Northeastern West Virginia, Calendar Year, 1945

Item	Cost and returns per			Percent of total
	1000 chicks started	Broiler sold	Pound of broiler sold	
	dollars	*cents*	*cents*	
Costs				
Feed	477.98(a)	55.2	16.7	66.7
Chicks	138.66	16.0	4.8	19.3
Man labor	30.96(b)	3.6	1.1	4.3
Fuel	26.74	3.1	.9	3.7
Repairs and depreciation on bldg.	11.46	1.3	.4	1.6
Repairs and depreciation on equip.	11.25	1.3	.4	1.6
Transportation	6.61(c)	.8	.2	.9
Interest on investment	5.98(d)	.7	.2	.8
Litter	5.82	.7	.2	.8
Electricity	1.24	.1	(e)	.2
Real estate and property taxes	.69	.1	(e)	.1
Total costs	717.39	82.9	25.0	100.0
Returns				
Broilers sold	805.95	93.1	28.1	95.5
Manure	35.52	4.1	1.2	4.2
Broilers used on farm	2.51	.3	.1	.3
Total returns	843.98	97.5	29.4	100.0
Net return or profit	126.59	14.6	4.4	----
Labor return	157.55	18.2	5.5	----

(a) Includes costs of medicine and disinfectants which amounted to 1% or less of this figure when it was possible to separate them. Also includes a hauling charge of 10c per 100 lb. This, however, is offset in most instances by a credit of 10c per empty bag returned.
(b) Computed at 40c per hour which was the prevailing rate for day labor in the area.
(c) Includes use of both auto and truck for broiler enterprise. Part of transportation expense is combined with feed cost. Some producers had no direct transportation expense.
(d) Computed at 6% on half the original investment in buildings and equipment.
(e) Less than 0.05c.

[6]Prevailing prices of feed and live broilers are shown in Table 10.

[7]Costs and returns are expressed in terms of broilers sold instead of broilers produced. Broilers sold were 99.68 percent of broilers produced.

TABLE 6—Feed, Chick, and Labor Costs of Producing Broilers in Selected States During Various Periods

Item	Production costs in percentage of total costs					
	Maryland 1934-36 (b)	Indiana 1936-37 (a)	Maryland 1941 (b)	Maine 1944 (c)	This study 1945	Delaware 1946 (d)
	percent	*percent*	*percent*	*percent*	*percent*	*percent*
Feed cost	54.3	54.3	60.4	62.9	66.7	72.9
Chick cost	25.1	19.8	18.6	14.4	19.3	11.7
Labor cost	8.6	7.8	10.3	14.0	4.3	7.4
Total, three items	88.0	81.9	89.3	91.3	90.3	92.0
	number	*number*	*number*	*number*	*number*	*number*
Number broods	----	141	----	308	269	120
Number broilers	1,962,202	165,374	----	602,488	453,940	1,495,680

(a) Young, E. C., **An Economic Study of the Broiler Industry in Western Indiana.** Purdue Agr. Exp. Sta. Bul. 441, 1939, p. 9.
(b) Davies, T. J., **et al., The Broiler Industry in Maryland.** Maryland Agr. Exp. Sta. Bul. A16, 1942, p. 107.
(c) Perry, Alvah L., and G. F. Dow, **Costs and Returns in Broiler Production.** Maine Agr. Exp. Sta. Bul. 441, 1945, p. 72.
(d) Bausman, R. O., and R. J. McMillan, **Costs and Returns in Producing Broilers in Delaware.** Delaware Agr. Exp. Sta. Pamphlet No. 27, 1947, p. 2.

Total returns from broilers amounted to 29.4c per pound and 97.5c per broiler sold. Of these returns 95.5 percent were from broilers sold, 4.2 percent from manure produced, and 0.3 percent from broilers used on the farm.

Net return or profit was 4.4c per pound of broiler sold and 14.6c per broiler sold. The labor return was 5.5c per pound of broiler sold and 18.2c per broiler sold.

Most producers are primarily interested in the cash or out-of-pocket costs involved in producing broilers. For farm flocks these consist largely of the costs of feed and chicks; for larger flocks they include hired labor also. Feed and chick costs in this study amounted to 86 percent of total costs. Farmers' decisions as to whether to start a brood of broilers at a particular time are based largely on their estimate of whether the returns from broilers will pay these costs plus a margin of profit. These out-of-pocket costs vary in proportion to total costs as the costs of feed, chicks, labor, and other items fluctuate. Table 6 shows how these costs have been related to total costs in other producing areas and at different periods. This table shows that the expense for feed, chicks, and labor ranges from about 80 percent to about 90 percent of total costs.

Estimating Production Costs

In this study mortality averaged 13.5 percent of the chicks started. Birds were sold at average weight of 3.3 lb. Thus it would require about 0.35 chick per pound of broiler sold. Average feed used amounted to

4.4 lb. per pound of broiler. Labor amounted to 77.4 hr. per 1000 broilers started or 0.027 hr. per pound of broiler sold. These three items amounted to 90.3 percent of total production costs in this study.

With these facts it will be possible to estimate production costs per pound by applying current prices to feed, chicks, and labor as follows:[8]

0.35 × current price of chicks = ------
4.4 × current price broiler ration = ------
0.027 × current hourly wage rate = ------

Total these three items and divide by 90 percent (.90) to find total production costs.

Example

Assume:

Chick cost @ 14c
Broiler ration @ $5.00 per 100 lb.
Labor @ 50c per hr.

	cents
Chicks: 0.35 × 14c	= 4.9
Feed: 4.4 × 5c	= 22.0
Labor: 0.027 × 50c	= 1.3
	28.2

28.2 ÷ .90 (90 percent) = 31.3c (the estimated total cost of producing one pound of broiler)

A somewhat shorter formula can be used in which only feed and chick costs, the principal items of cash outlay, are considered. The formula is based on feed and chick costs, which amounted to 86 percent of total production costs. An example follows:

Assume:

Chick cost @ 14c
Broiler ration @ $5.00 per 100 lb.

	cents
Chicks: 0.35 × 14c	= 4.9
Feed: 4.4 × 5c	= 22.0
	26.9

26.9 ÷ .86 (86 percent) = 31.3c (the estimated total cost of producing one pound of broiler)

Total production costs may also be estimated by multiplying the cost

[8]The formula proposed by Perry, Alvah L., and George F. Dow, *Costs and Returns in Broiler Production*, Maine Agr. Exp. Sta. Bul. 441, 1945, has been adjusted for conditions found in this study.

TABLE 7—Estimates of Feed and Chick Cost of Producing One Pound of Broiler at Various Levels of Feed and Chick Prices and under Average Conditions of Mortality and Feed Consumption

Feed cost per 100 pounds	Cost per chick, cents							
	10	11	12	13	14	15	16	17
	Estimated cost of feed and chicks							
dollars	*cents*	*cents*	*cents*	*cents*	*cents*	*cents*	*cents*	*cents*
2.00	12.3	12.6	13.0	13.4	13.7	14.0	14.4	14.8
2.25	13.4	13.7	14.1	14.5	14.8	15.1	15.5	15.9
2.50	14.5	14.8	15.2	15.6	15.9	16.2	16.6	17.0
2.75	15.6	15.9	16.3	16.7	17.0	17.3	17.7	18.1
3.00	16.7	17.0	17.4	17.8	18.1	18.4	18.8	19.2
3.25	17.8	18.1	18.5	18.9	19.2	19.5	19.9	20.3
3.50	18.9	19.2	19.6	20.0	20.3	20.6	21.0	21.4
3.75	20.0	20.3	20.7	21.1	21.4	21.7	22.1	22.5
4.00	21.1	21.4	21.8	22.2	22.5	22.8	23.2	23.6
4.25	22.2	22.5	22.9	23.3	23.6	23.9	24.3	24.7
4.50	23.3	23.6	24.0	24.4	24.7	25.0	25.4	25.8
4.75	24.4	24.7	25.1	25.5	25.8	26.1	26.5	26.9
5.00	25.5	25.8	26.2	26.6	26.9	27.2	27.6	28.0
5.25	26.6	26.9	27.3	27.7	28.0	28.3	28.7	29.1
5.50	27.7	28.0	28.4	28.8	29.1	29.4	29.8	30.2
5.75	28.8	29.1	29.5	29.9	30.2	30.5	30.9	31.3
6.00	24.9	30.2	30.6	31.0	31.3	31.6	32.0	32.4

for feed and chicks obtained in the formula above by 1.163 rather than by dividing by .86.

Example: $26.9 \times 1.163 = 31.3$c (the estimated total cost of producing one pound of broiler)

Table 7 shows combined feed and chick costs computed by the short formula above for various levels of feed and chick costs. These costs represent the largest cash or out-of-pocket costs; alone they will give some indication as to whether broiler production would be profitable at a particular time. The multiplication of the cost for these items by 1.163, or division by .86, will give the estimated total cost of producing a pound of broiler at a given time.

The formulas above are based on average mortality and average feed consumption under the farm conditions prevailing in this study. Figure 3 indicates that there was considerable variation in the quantity of feed and in the number of chicks required to produce a pound of broiler at any particular level of mortality. These variations may be explained in part by differences in the age at which mortality occurred in the various broods, by variations in the quality of feed, by variations in the quality of chicks, and by other factors which it was impossible to measure.

If the relationship between feed, chick, labor, and other costs differs greatly from that which prevailed in 1945, the formulas will need to be revised; but as long as such conditions prevail their use in West Virginia

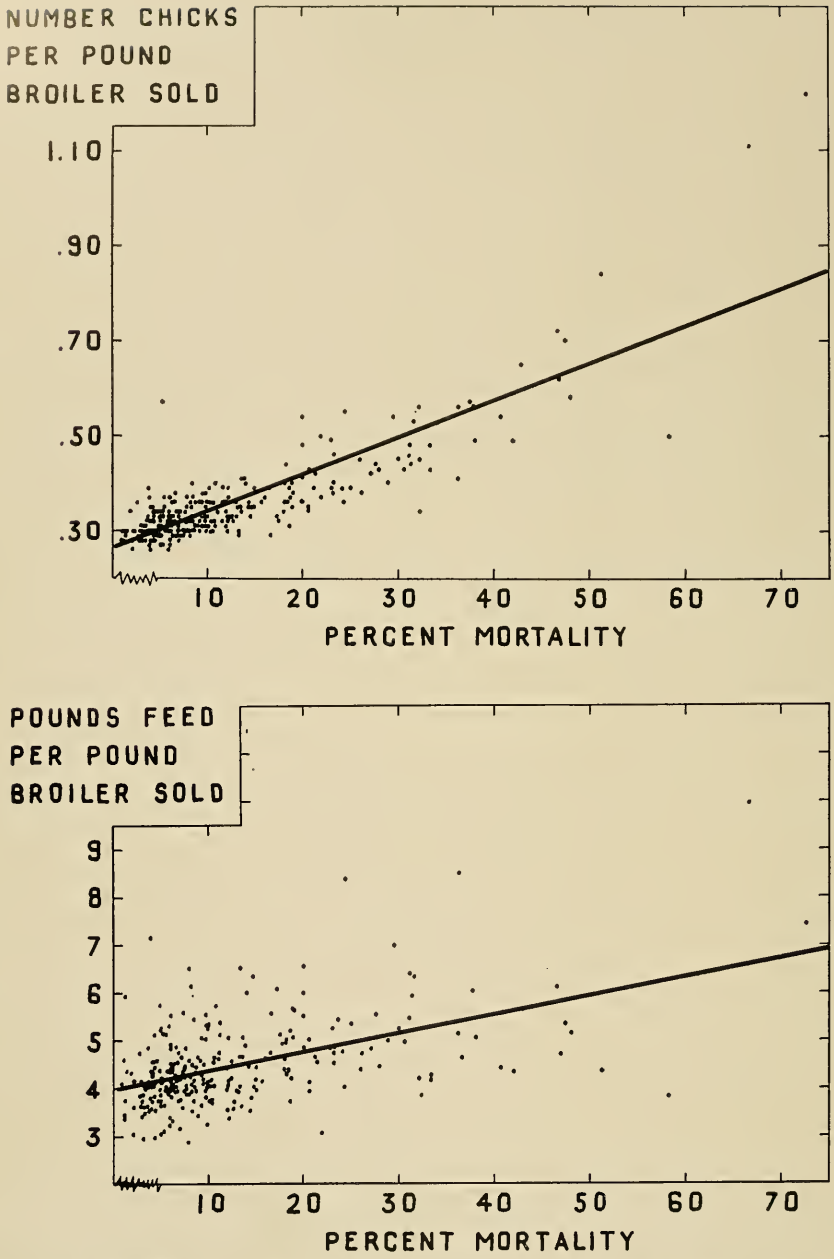

Fig. 3—Relation of the Number of Chicks and Pounds of Feed Required per Pound of Broiler Sold to Mortality of Broilers

Fig. 4—Feed-storage Bins near Point of Consumption and Water Fountains in Each Pen Were Used by Some Producers to Reduce the Labor Required for Broilers. In This House One Feed Bin Serviced Four Pens or 2000 Broilers

should be of considerable value to producers in estimating in advance their production costs. This will aid them in deciding whether or not profits are to be expected from starting a brood at a particular time.

Labor Used and Labor Costs

An average of 77.4 hr. of labor were used per 1000 chicks started. Of this 24.1 hr. was for cleaning and preparing the house and 53.3 hr. for feeding and caring for the birds. Table 8 indicates that producers raising the larger number of broods per year were slightly more efficient in the use of labor, but the differences indicated were not highly significant because of the great variation between individual producers. The amount of labor required depends to a large extent on the arrangement of houses and the availability of labor-saving devices such as conveniently situated feed bins and fuel supplies and automatic water systems.

Careful planning of the location and building of the brooder house can save considerable labor. Several producers had feed storage bins arranged within the house so that more than one pen of broilers could be served from each bin (Fig. 4). Others had storage bins into which feed could be dumped directly from trucks delivering it. Still others were carrying feed from a central feed room to various pens on a track carrier. Water systems arranged so that automatic fountains could be used saved much labor. Location of the house on a site that would facilitate the easy removal of manure was also found to be desirable.

TABLE 8—Hours of Man Labor Used in Cleaning and Preparing Broiler Houses and Equipment and in Feeding and Tending Broilers in Northeastern West Virginia, 1945

Broods per year	Producers	Broilers started 1945	Average size of brood	Labor per 1000 broilers started		
				Cleaning and preparation	Feeding and tending (a)	Total
number	*number*	*number*	*number*	*hours*	*hours*	*hours*
1	4	6100	1525	28.69	191.09	219.78
2	27	155,000	2870	22.20	74.69	96.87
3	45	430,800	3191	26.16	42.68	68.84
Average or total						
2.54	76	591,900	3067	24.07	53.35	77.42

(a) The standard deviation for producers with 2 broods per year was 55.4 hours and for those with 3 broods per year was 34.4 hours. Hence the differences existing are not considered highly significant.

The average labor cost amounted to $30.96 per 1000 chicks started, 3.6c per broiler sold, and 1.1c per pound of broiler sold (Table 5). This cost was computed on the basis of the time shown above and using a rate of 40c per hour, which was the prevailing rate for day labor in the area at the time the study was made. Labor costs amounted to only 4.3 percent of total costs, which is somewhat lower than the proportion shown for other studies in Table 6. This is due in part to the somewhat fewer hours reported by West Virginia producers and also to the use of a relatively lower wage rate.

Fig. 5—Broiler House Constructed from Locally Available Rough Lumber and Roofing Material. It Had a Wood Floor and Was Heated by Wood Brooder Stoves. The House Had a Capacity of 900 to 1000 Broilers and Was Constructed at Relatively Low Cost. Building Cost Could Have Been Reduced Still Further by Omitting the Wood Floor

Fig. 6—Three-story Broiler House Constructed from Locally Sawed Timber. Second and Third Floors Are Wood and the First Concrete. This House of 5000 Capacity Was Heated by a Furnace and Was Constructed at Moderate Cost

Most of the labor used in producing broilers in West Virginia was supplied by the farm family. Only 2 producers had sufficient broilers to require the complete time of the producer for their care. Hired labor was reported by only 24 of 108 producers interviewed. The cash outlay for labor was above $50 per brood for only 11 of these producers.

Housing

Producers were using many different types of houses of several different types of construction. The most common was a shed type house of wood construction with the length varying according to desired capacity. However, gable-roof houses and buildings converted from other uses were frequently used. Houses were usually separated by wire partitions into pens around each stove with a capacity of approximately 400 chicks per stove. Houses with furnaces were similarly separated into sections holding 400 or 500 broilers. Some producers did not separate the birds into pens except when they were small, and this was done largely to keep them near the hover.

The investment in buildings varied greatly with the type of construction. The original investment averaged 40c per square foot but ranged from 5c to $1.17. The original investment in buildings averaged $1102.59 per farm and $340.03 per 1000 birds. The investment per bird averaged 34c.

Producers estimated the useful life of broiler houses from 8 to 67 years with an average life for all houses of 21.2 years. This wide range

in estimated life is justified by the wide range in type of construction. The less expensive houses were built of a poor grade of rough lumber from local sawmills. These were usually built by the producer or by unskilled labor. Some of the more expensive buildings were built of concrete blocks and required skilled labor for their construction. Figures 5 to 8 show some typical buildings at various levels of cost.

Type of Floor and Floor Space per Bird. Of the 108 producers interviewed, 12 percent were using dirt floors, 34 percent wood floors, 7 percent concrete floors, and 47 percent some combination of these three types. A number of producers who were using both dirt and wood floors indicated a preference for dirt floors. They stated that the dirt floors would stay dry longer and were easier to clean. Not enough producers had a combination of dirt and concrete floors to make comparison possible. There appears to be a preference for concrete floors over wood, largely because they are easier to clean.

West Virginia producers were providing 0.85 sq. ft. per bird started at the time this study was made, compared with an average of 0.60 sq. ft. provided by broiler producers on the Delmarva Peninsula.[9] Two-thirds of the producers in West Virginia were providing 0.80 sq. ft. or more per bird. The space provided is indicated below.

space per chick started	producers
square feet	*number*
Under .65	15
.65 to .74	12
.75 to .84	28
.85 to .94	18
.95 to 1.04	24
1.05 and over	10
.85 (average)	107 (total)

Bausman[9] indicates that from 0.6 to 0.7 sq. ft. per broiler appears to be optimum floor space under Delaware conditions. However, he points out that the flocks having the larger amount of floor space made more rapid gains in weight, reached a marketable weight at an earlier age, and consumed less feed per pound of weight. This study shows that, with an average of 0.85 sq. ft. per bird, heavier broilers were marketed in less time and with less feed per pound of broiler sold than when floor space averaged 0.60 sq. ft. per bird in the Delaware study. The data follow:

	West Virginia	Delaware
Floor space per bird (square feet)	.85	.60
Period fed (weeks)	13.9	14.8
Weight at which sold (pounds)	3.3	3.0
Feed per pound of broiler (pounds)	4.4	4.68
Average mortality (percent)	13.5	13.1

[9]Bausman, R. O., *Influence of Management Practices on Cost of Producing Broilers in Delaware.* Pamphlet No. 28, Delaware Agr. Exp. Sta., 1947, p. 4.

Fig. 7—Two-story Broiler House Constructed from Concrete Blocks. This House of 5000 Capacity Had a Dirt Floor on the Ground Level and a Concrete Second Floor. It Was Heated by a Furnace and Was in the High-construction-cost Group

Heating and Fuel

Wood was the fuel used by 73 percent of the producers reporting on this point, coal by 20 percent, and 7 percent used both wood and coal. Stoves were being used by 94 percent of the producers reporting, furnaces by 2 percent, and both stoves and furnaces by 4 percent. Average fuel cost amounted to $26.74 per 1000 chicks started. Wood fuel costs amounted to $26.34 per thousand birds started compared with $33.30 for producers using coal. Heating costs were 3 to 4 times as high in winter as during the summer months. Most producers were able to obtain wood for fuel on their own farms, whereas producers using coal had to purchase it. A number of producers expressed a preference for wood over coal, not considering cost, especially during the spring, summer, and fall, when only a small amount of heat was required. They indicated that wood fires could be regulated to produce the heat required during these periods better than coal fires. The type of wood brooder used is shown in Figure 2.

Not enough producers were using furnaces to make possible a comparison between costs of heating with furnaces and stoves. However, the few operators with furnaces reported considerable saving in time required to tend fires.

One stove was provided for each 374 sq. ft. of floor space. The floor space per stove ranged from 188 to 750. The number of chicks per stove averaged 445 and ranged from 267 to 600. Producers could not always obtain the feed for the chicks they desired to produce. As a result there were sometimes fewer chicks per stove than might have been.

Equipment

The principal items of equipment used for producing broilers were brooder stoves, feeders, and water fountains. Water systems, furnaces,

and other items were used on some farms. Usually at least two different sizes of both feeders and fountains were used. As indicated in Table 5 the repairs and depreciation on equipment amounted to $11.25 per 1000 birds started, or 1.6 percent of the cost of producing broilers. The cost for equipment varied considerably from farm to farm. Farmers taking good care of their equipment were able to prolong its life and reduce equipment costs. Stoves were estimated by producers to last from 2 to 20 yr., with an average of 6.4 yr. Similarly producers estimated the life of feeders at 2 to 20 yr., with an average of 6.4 yr. Water fountains were estimated to have an average life of only 4.1 yr., with a range of from 1 to 10 yr.

The original investment in equipment amounted to $340.79 per farm and $101.37 per 1000 birds.

Returns

Broilers Sold. The principal item of return from the production of broilers was the sale of live broilers. This amounted to $805.95 per 1000 chicks started, 93.1c per broiler sold, and 28.1c per pound of broiler sold and was 95.5 percent of total returns. For each 1000 chicks started producers marketed 865 broilers weighing approximately 2870 lb. This was at an average of 3.3 lb.

Broilers Used on the Farm. Consumption of broilers on the farm was 2.7 birds or approximately 9 lb. per 1000 chicks started. The value of these amounted to $2.51 per 1000 broilers started. This rather limited use of broilers on the farm may be attributed in part to the fact that the broilers were of an edible weight during only a short portion of the period they were on the farm. Another factor undoubtedly was the fact that the contracts between producer and financing agency were silent on the point of consumption of broilers by the producer.

Manure. The Pennsylvania Agricultural Experiment Station has estimated that hens will produce 1.72 lb. of fresh manure per pound of feed consumed.[10] Broilers in this study consumed 12.6 lb. of feed per bird started. On the above basis it is estimated that they would produce 21.7 lb. of fresh manure each or 10.8 tons of fresh manure per 1,000 birds started. However, some deterioration takes place, moisture is lost, and some manure is dropped in areas where it has little or no value to the farmer. This reduces the amount of manure which can be used to good advantage on the farm.

Producers in this study estimated that an average of 3.7 tons of manure were recovered per 1,000 broilers started. This figure includes the weight of the litter with which the manure was mixed. The Pennsylvania study values old manure of this type (floor litter) at $9.60 per ton.[11] At this rate the value of manure recovered on West Virginia

[10] White, J. W., F. J. Holben, and A. C. Richer, *Production, Composition and Value of Poultry Manure*, Pennsylvania Agr. Exp. Sta. Bul. 469, 1944, p. 9.

[11] *Ibid.*, Table 29, p. 34 (Nitrogen at 10c, P_2O_5 at 5c, and K_2O at 4c per pound).

Fig. 8—Broiler House Constructed from Cinder Blocks. This House of 5000 Capacity Had a Dirt Floor and Was Heated by Wood Brooder Stoves. It Was Built at Moderate Cost

farms would be $35.52 per 1,000 broilers started, 4.1c per broiler sold and 1.2c per pound of broiler sold.

Some producers made the statement that, if cash returns from broilers equalled only the cash or out-of-pocket outlay, they still could afford to produce broilers for the value derived from the manure. As there are few alternative uses at which farm labor can be employed on some of these farms, this statement may well be true. Once the original capital investment is made it is usually advantageous for a farmer to continue its use, even though returns from the enterprise are not sufficient to replace the facilities involved.

It is estimated that there is a large net increase in fertility in the area where broilers are raised, since a large portion of the feed consumed by broilers is shipped into the area. Assuming that only 5 million of the 7.2 million chickens raised in these counties in 1944 were broilers and that 90 percent of their feed is brought into the area, the amount of manure recovered from these imported feeds would approximate 16,650 tons. The value of this manure at the rates previously used would be about $160,000. Importing this much fertility annually should have considerable effect in increasing future crop yields in the area if the manure is used properly. Better care, more complete recovery, and more effective use of manure produced could increase crop yields even more than is being done at present.

Net Return. The net return from producing broilers amounted to an average of $126.59 per 1000 chicks started, 14.6c per broiler sold, and 4.4c per pound of broiler sold. Prevailing prices for broilers and for feed are shown in Table 11. Net returns from the various broods varied widely. The broilers from 42 of the 269 broods failed to sell for enough to pay for the items furnished by the contractor; these consisted mainly of the chicks and the feed but occasionally included a few other items such as medicines, disinfectants, litter, and fuel.

Labor Return. The labor return for producing broilers is computed by deducting from total returns all costs except that for labor.

This amounted to $157.55 per 1000 chicks started, 18.2c per broiler sold, and 5.5c per pound of broiler sold. This measure is more useful because it reflects the importance to the producer of the value of his labor. This is of particular interest in West Virginia because labor used in the production of broilers was furnished largely by the producer and his family. Only 24 of the 108 producers interviewed reported any expense for hired labor and for 13 of these this expense was $50 or less per brood.

In addition to furnishing an outlet for the family labor the broiler enterprise also furnished a profitable use for farm-supplied wood that would otherwise be wasted. The estimated value of this fuel amounted to $26.34 per 1000 chicks started, 3.1c per broiler sold and 0.9c per pound of broiler sold. Therefore, in cases where the producer furnished his own labor and fuel the total return to him from the broilers and for labor and wood was $183.89 per 1000 chicks started, 21.3c per broiler sold, and 6.4c per pound of broiler sold.

Mortality and Its Effect on Cost

Broiler production costs were closely related to mortality, as indicated in Table 9. Average mortality for the 269 broods for which records were obtained amounted to 13.5 percent. Feed and chick costs were directly and positively related to mortality, the lowest costs being associated with the broods having the lowest mortality.

Mortality appeared to be one of the most important factors affecting costs and profits in this study. The feed and chick costs per pound of broiler sold increased from 18.7c when the average mortality was 3.3 percent to 29.8c when the mortality averaged 46.9 percent. In a similar

TABLE 9—Relation Between Mortality and Pounds of Feed per Pound of Broiler Sold, Feed Cost, and Chick Cost, Northeastern West Virginia, 1945

Range in mortality	Broods	Broilers started	Average mortality	Feed per pound of broiler sold		Chick cost per pound broiler sold (a)
				Amount	Cost(a)	
percent	*number*	*number*	*percent*	*pounds*	*cents*	*cents*
0- 4.9	53	73,400	3.3	4.0	14.7	4.0
5- 9.9	99	168,975	7.3	4.2	16.0	4.5
10-14.9	40	70,015	12.0	4.4	16.6	4.8
15-19.9	22	49,535	17.5	4.9	18.8(b)	5.3
20-24.9	20	36,065	22.0	4.8	18.8(b)	5.6
25-29.9	8	9,700	27.2	5.2	18.8(b)	5.9
30-34.9	11	17,850	31.8	5.0	18.9(b)	6.7
35 and over	16	28,400	46.9	5.6	21.7	8.1
Total	269	453,940	13.5	4.4	16.7	4.8

(a) Feed and chick costs averaged 86% of total costs.
(b) Feed prices were actual prices paid; they fluctuated enough in these ranges to hold feed costs relatively constant.

TABLE 10—Relation of Feed and Chick Costs to Mortality and to Pounds of Feed Consumed per Pound of Broiler Sold, Northeastern West Virginia, 1945

Mortality		Pounds of feeds per pound of broiler sold		
Range	Average	Less than 4.0	4.0 to 4.9	5.0 and over
		Feed cost per pound of broiler sold		
percent	*percent*	*cents*	*cents*	*cents*
0.0-9.9	6.1	13.9	16.1	20.2
10.0-14.9	12.0	14.0	16.5	21.2
15.0 and over	27.0	14.5	17.2	22.4
		Chick cost per pound of broiler sold		
		cents	*cents*	*cents*
0.0-9.9	6.1	4.2	4.4	4.6
10.0-14.9	12.0	4.6	4.7	5.4
15.0 and over	27.0	4.1	6.0	6.2

manner, the feed used per pound of broiler increased from 4.0 lb. to 5.6 lb. when the average mortality increased from 3.3 percent to 46.9 percent.

Another factor associated with broiler costs was the quantity of feed consumed per pound of broiler sold. Table 10 shows how feed and chick costs were related to this factor and to mortality. The cost of both feed and chicks increased as the quantity of feed consumed per pound of broiler sold increased and as mortality increased. When the feed consumed per pound of broiler sold was less than 4.0 pounds the increase in feed costs was 0.6c per pound, or 4.3 percent when the average mortality increased from 6.1 to 27.0 percent. Feed costs increased 1.1c or 6.8 percent when feed ranged from 4.0 to 4.9 lb. per pound of broiler sold, the change in mortality being the same. The increase in feed costs was still greater when the feed consumed per pound of broiler sold exceeded 5.0 lb. With this high mortality change, the feed-cost increase was 2.2c per pound of broiler sold or 10.9 percent. Thus it is evident that a combination of high mortality and a large consumption of feed per pound of broiler sold will greatly increase feed costs. The same thing can be said for chick costs.

Mortality among broods of broilers sold in December, January, February, March, and July and produced during the 97-day period immediately preceding the date of sale was higher than for those sold in other months (Table 11). Producers frequently indicated that broods started in the early spring and early fall "did better" than broods started in either the winter or the summer. These would be sold before either extremely hot or extremely cold weather affected them greatly. The mortality figure for July is high because one of the producers had mor-

tality amounting to 38.0 percent. This producer started one-fourth of the chicks on which the July mortality was based. The unweighted mortality for July was 9.0 percent.

It was impossible to determine when the mortality in the various broods of broilers occurred, since a count only at the beginning and end of production was available. Therefore it was assumed that there would be little relationship between mortality and pounds of feed consumed per pound of broiler sold if the chicks died when they were very young. Conversely it was assumed that, if mortality took place in the last few weeks the broilers were fed, that the relationship would be high. Analysis[12] indicates that mortality in the broods studied was not concentrated while the chicks were very young or when they approached maturity. This supports the view expressed by farmers that mortality was due largely to coccidiosis. This disease kills mainly at the intermediate broiler ages under usual farm conditions.

TABLE 11—Relation of Month Sold to Mortality, Selling Price, Feed Prices, Feed and Chick Cost, and Pounds of Feed per Pound of Broiler Sold, Northeastern West Virginia, 1945

Month sold	Broods (a)	Chicks started	Average mortality	Average selling price per pound	Average price of feed (b) per 100 lb.	Feed per pound of broiler sold		Chick cost per pound of broiler sold
						Amount	Cost	
	number	*number*	*percent*	*cents*	*dollars*	*pounds*	*cents*	*cents*
January	56	79,525	17.6	27.0	3.79	4.4	16.9	5.1
February	7	14,000	19.1	27.4	3.77	4.3	16.1	5.3
March	13	33,550	14.6	27.7	3.85	4.5	17.5	5.0
April	8	11,800	8.7	30.1	3.89	3.8	14.8	3.8
May	37	53,650	6.9	30.5	3.77	3.9	14.7	4.1
June	9	18,525	5.4	29.7	3.51	3.8	13.3	4.0
July	12	17,375	14.7	29.4	3.71	4.0	14.8	4.4
August	21	39,115	10.7	28.8	3.60	4.0	14.5	4.3
September	17	31,900	8.5	29.4	3.69	4.1	15.3	4.7
October	11	19,955	10.0	27.0	3.77	4.6	17.2	5.0
November	4	11,000	9.8	27.0	3.82	5.1	19.6	5.7
December	13	26,385	14.2	25.0	3.85	4.5	17.2	5.1
Total	208	356,780	12.3	28.3	3.75	4.2	15.9	4.7

(a) These figures do not reflect accurately the proportion of birds sold each month in the entire production area because of the method by which the sample was selected.
(b) Average feed price is for the period broilers were fed (averaged 97 days) and not for the month opposite which it is shown.

[12]Correlation of the percent mortality with the pounds of feed consumed per pound of broiler sold gave $r = + .49 \pm .03$.

TABLE 12—Rank of Diseases as a Cause of Broiler Mortality on 108 Farms, Northeastern West Virginia, 1945

Disease	Rank as a cause of mortality		
	First	Second	Third
	number of farms reporting		
Coccidiosis	97	8	1
Pullorum	10	32	11
Colds	--	20	17
Typhoid	--	2	--
Mycosis	--	4	2
Other	1	11	3
Not reporting	--	31	74
Total	108	108	108

Diseases Responsible for Mortality

The farmers reported that disease was the main cause of mortality in broods of broilers. Coccidiosis was by far the most important. It was listed by 97 producers as the principal cause of mortality. Rank of various diseases as a source of mortality is shown in Table 12.

Because of its high importance, inasmuch as coccidiosis was the principal disease causing broiler mortality, producers were questioned concerning methods used to prevent and treat coccidiosis. Of the 108 producers, 48 reported no preventive measures other than the normal amount of care given the broilers. However, 29 reported the use of a flush, either mash or salts, about the end of the fourth week, and 22 reported using various other preventives. A combination of preventive remedies was used by 9 producers. Many producers expressed the view that nothing could be done which would prevent coccidiosis; nevertheless, some of these were using preventives of some type.

As a treatment for the disease, once established, 28 reported using a flush of some sort. Sulfaguanidine was used by 11, acid and iodine by 5, bluestone and vinegar by 4, and various specific commercial treatments by 9. Some combination of the treatments listed above was used by 34 producers; 17 reported using no treatment at all.

The wide diversity of preventive measures and treatments used indicates need for a more satisfactory solution to this particular disease problem in this area than had been evidenced up to the summer of 1946. None of the treatments, in the form tried, appeared either to prevent or control coccidiosis satisfactorily.

Another problem frequently voiced by producers was the lack of adequate facilities for the early diagnosis of disease. The only laboratories in the state for diagnosis of disease are located at Charleston and Morgantown, and frequently it is impossible for producers to ship diseased birds to arrive at these points in proper condition for diagnosis. There is also some delay in reports because of the distances involved, and frequently these delays are extremely costly to producers.

The State of Virginia maintains a laboratory at Harrisonburg, Virginia, which gives service to a good many West Virginia producers. However, a large number of producers find this laboratory equally inaccessible; these have expressed the view that a laboratory should be set up in the center of the producing area in West Virginia.

Financing

Broiler production in West Virginia was financed to a large extent by contractors. Of the 108 producers interviewed, 74 percent were so financed. Twenty percent financed their own operations, while the remainding 6 percent did not indicate the method of financing. Contractors were usually feed mills, feed dealers, poultry dealers, hucksters, or others closely associated with the poultry industry. The usual arrangement was for the contractor to furnish the farmer or producer with the chicks, the feed, the medicine, the litter, the insurance (if any), and the fuel needed to produce a brood of broilers. The farmer or producer furnished the labor, the buildings, the stoves, and other equipment necessary.

It should be noted that there was some variation in the arrangements between contractors and producers. In some cases the producer furnished the fuel and the litter in addition. In practically all cases the birds remained the property of the contractor, and the producer was bound, by contract terms, to feed, manage, and sell the birds at direction of the contractor. It appears that these provisions of the contract were designed not only for the protection of the contractor but also to enable him to use the signed contracts as security in obtaining credit from regular lending agencies. While the terms of the contract were binding, it was noted that frequently the producer was given the privilege of selecting the person or the agency to which the birds were sold. During most of the period covered by this study, ceiling prices for broilers were in effect, and there was little to be gained by bargaining with different legitimate outlets. This may have accounted for the leniency of the contractors concerning the selling of the birds during this period.

After selling, the settlement between the contractor and the producer usually followed one of the following plans (also see Table 13):

(a) The contractor deducted from the total sales receipts the cost of feed, chicks, and other items furnished by him; he turned over to the producer 75 percent of the remainder and retained 25 percent.

If the producer raised three consecutive broods for the contractor, the contract usually called for payment of a bonus to the producer amounting to one-half of the 25 percent retained by the contractor in a bonus pool on all three broods. If one or more of the three broods did not sell for enough to pay for items furnished by the contractor, then the contractor's bonus pool accrued from the 25 percent was reduced by the amount of the loss. The producer's and the contractor's shares of the bonus at the end of the year were each correspondingly reduced. The contractor furthermore took the loss if the 25 percent retained by him from the three broods was not enough to pay for all the items fur-

TABLE 13—Plans by Which Broiler Contractors Finance Broiler Production

Assume:	*1st brood*	*2d brood*	*3d brood*
Gross sales value of broilers sold	$2000	$ 1100	$1600
Cost of items furnished by contractor	1600	1200	1100
Gain or loss	$ 400	$—100	$ 500
Plan (a)			
Producer's share (75% of gain)	$ 300	$ None	$ 375
Contractor's share for bonus pool (25% of gain, 100% of loss)	100	—100	125
Total contractor's bonus pool (3 broods)		$ 125 (a)	
Producer's share of bonus pool (3 broods)		62.50	
Contractor's share bonus pool (3 broods)		62.50	
Plan (b)			
Producer's share (80% of gain)	$ 320	$ None	$ 400
Contractor's share for bonus pool (20% of gain, 100% of loss)	80	—100	100
Total of contractor's bonus pool (3 broods)		$ 80 (a)	
Producer's share of pool (3 broods)		40	
Contractor's share of pool (3 broods)		40	
Plan (c)			
Same as Plan (b) except that producer gets all of money in contractor's bonus pool after three broods were produced.			
Producer's share of pool (3 broods)		$ 80 (a)	
Contractor's share of pool (3 broods)		None	
Plan (d)			
(Each brood was figured separately)			
Producer's share (87½% of gain)	$ 350	$ None	$ 437.50
Contractor's share (12½% of gain, 100% of loss)	50	—100	62.50
Plan (e)			
Producer's share (100%)	$ 400	$—100	$ 500
Contractor's share	None	None	None

(a) If bonus pool for three broods was a negative figure the contractor took the loss and it was not charged against subsequent broods.

nished by the contractor, when the cost of these items exceeded total sales receipts from a particular brood or broods.

(b) Same as (a) except that contractor retained 20 instead of 25 percent of the amount remaining from the total sales receipts after paying for all items furnished by the contractor.

(c) The contractor deducted from the total sales receipts the amount due him for all items furnished by him and turned over 80 percent of the remainder to the producer. The other 20 percent of the remainder was held by the contractor until the producer had raised three broods of broilers. If the total sales receipts from one or more broods were not sufficient to pay for the items furnished by the contractor, the 20 percent retained by the contractor was reduced by the amount of the difference. Any balance left from this fund held by the contractor was turned over to the producer after the third brood had been raised. If no balance remained, the contractor assumed the loss. In effect, this was merely the furnishing of feed to the producer on credit, with the addition of a deposit held by the contractor to insure that he would be reimbursed for the items furnished by him in the event of loss by the producer.

(d) The contractor deducted from the total sales receipts the amount due for all items furnished by him and turned over to the producer 87½ percent of the remainder. In the event that the cost of the items furnished by the contractor exceeded the total sales receipts, the contractor assumed the loss and it was not charged against any subsequent broods that might be raised.

(e) The contractor furnished feed and other items to the producer, and the latter retained all the proceeds from sales in excess of the cost of items furnished by the contractor. If the total sales receipts were not sufficient to pay such cost, the producer agreed to make up the difference. This arrangement included also the furnishing of feed on credit, with the exception that the contractor was protected from unscrupulous producers who might sell the birds without settling their accounts with the contractor. This arrangement was usually not available to producers who lacked capital or real property of their own in considerable amount.

The financial arrangements described above, which were the principal ones in use in West Virginia, differ considerably from the arrangements outlined in reports on broiler production in other areas.[13] [14] As was pointed out earlier, the majority of the broiler producers were lacking in adequate capital to finance their own feeding operations. Neither was the capital needed available to producers through the usual credit organizations. Hence the contractors, by furnishing the producers with the items which account for approximately nine-tenths of the cost of producing broilers, made it possible for a large number of producers to engage in broiler production who would not otherwise have been able to do so.

Normally producers having adequate capital of their own could make some savings on feed bills by purchasing feed for cash. However,

[13]Poffenberger, P. R., and S. H. DeVault, *An Economic Study of the Broiler Industry in Maryland*. Maryland Agr. Exp. Sta. Bul. 410. Sept. 1937, pp. 45-46.

[14]Frazier, Russell F., *Broiler Production in the Gainsville, Georgia Area*, Southern Field Office, Dairy and Poultry Branch, Office of Distribution, Atlanta 3, Georgia. December 1944, pp. 3-5.

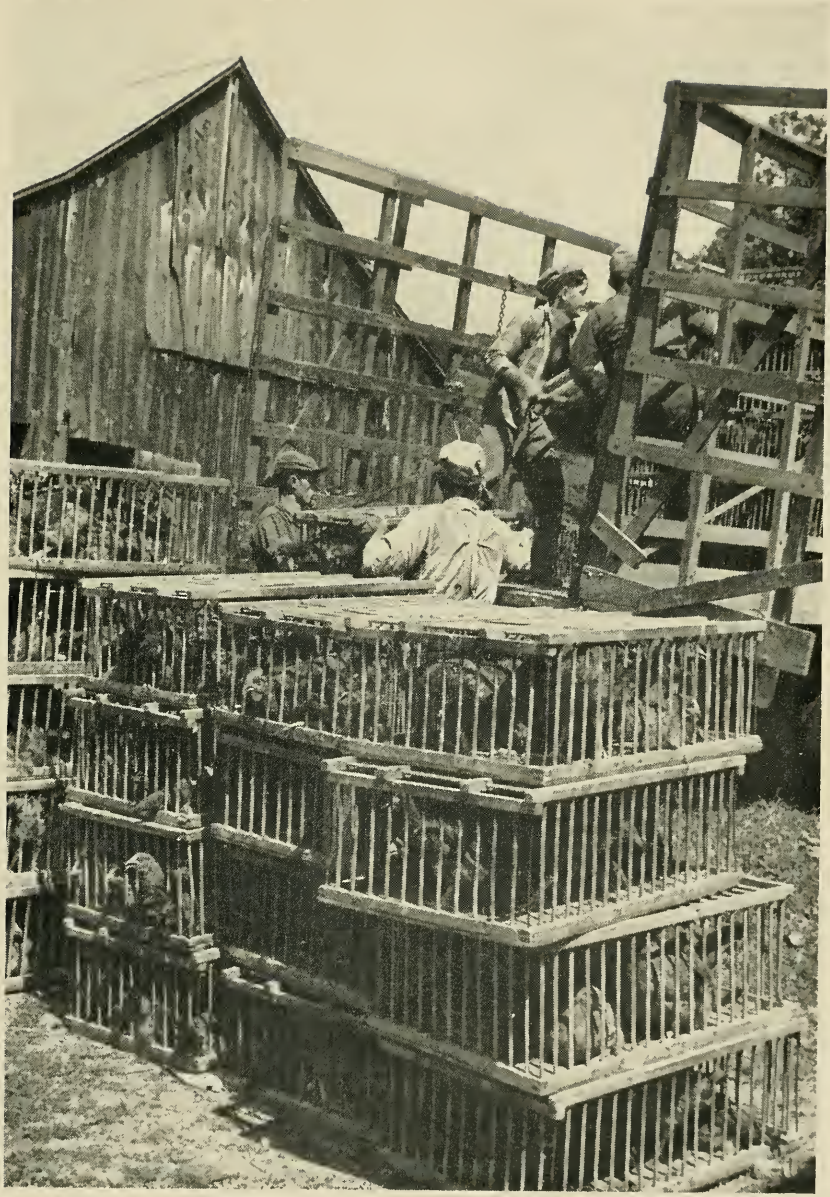

Fig. 9—Crated Broilers Being Weighed and Loaded Just Before Leaving the Farm for Market. Sales Were Frequently Made at the Farm and Dealers' Trucks Called to Haul the Broilers to Dressing Plants and to Live Poultry Markets

most of the dealers contacted made no difference in price between cash purchases and feed sold under contract. This probably was due to the small proportion of business done on a cash basis.

During a large part of the period covered by this study, feed supplies were scarce. Frequently contractors found it neccessary to limit the number of birds on feed at a particular time. Hence few farmers made any effort to purchase feed for cash, inasmuch as their feed supply was more certain if they operated under contract. Also, a number of farmers stated that they did not wish to assume the total risk involved in producing a brood of broilers and were therefore willing to pass part of the responsibility to the contractor. However, this would seem to be a rather short-sighted view, inasmuch as all of the producers except one who raised as many as three broods during the period covered by the study had total sales receipts sufficient to more than pay for all the feed, chicks, and other items furnished by the contractor. It should be noted that, when total sales receipts from the birds in a particular brood were not great enough to meet the cost of items furnished by the contractor, the producer was not reimbursed for labor, for use of his buildings and equipment, and for any other items furnished by him before the contractor had any loss. In other words, when a net loss occurs in production of a brood of broilers, the contractor and the producer do not share equally in that loss or in any fixed relation to each other, as is true when a so-called profit results from the operation.

It would appear that the primary reason why producers entered into such an agreement was the fact that they lacked the capital required to do otherwise. On the other hand, it should be pointed out that most of the farmers contacted believed that the system was fair enough, and they did not suggest that it be changed substantially.

Technical Aid

In addition to the financial aid which contractors gave producers, they also extended technical aid in production of broilers. The contractors with a large volume of business frequently hired fieldmen who visited producers from time to time to inspect the broilers and to make suggestions for improvements in management practices. Contractors with less volume performed the service personally. This not only helped to protect the contractor's investment but was also a valuable service to producers. The fieldmen were frequently able to diagnose disease in the early stages and to recommend preventives and cures. Thus it was possible for the contractors to know the production conditions under which the producers working with them were operating. When producers were unwilling or incapable of doing a satisfactory job of producing broilers, the contractors usually refused to extend credit to them. In this way it was possible for the contractors to discontinue business with their most unprofitable producers. Producers with high mortality and other poor practices were forced out of business, but probably no sooner than if they had been using their own capital.

Fig. 10—The Rockingham Poultry Marketing Cooperative's Moorefield Dressing Plant. This Plant Can Process Approximately 10,000 Broilers per Day

Marketing

There was little orderliness in the marketing of broilers from the northeastern part of West Virginia during the period covered by this study. No attempt was made to gather information on black-market activities. But they did exist. The former channels through which the birds moved to market were upset. During a large part of the period, ceiling prices established by the Office of Price Administration prevailed. New poultry buyers began to operate as the industry grew.

Buyers were usually glad to bring their trucks to the farm and to take all of a producer's broilers at one price (Fig. 9). There was no price distinction between the various heavy breeds. Location of the birds was seldom a market factor. Buyers would go anywhere in the area to get broilers. Frequently there were not as many broilers as the market could absorb. Inasmuch as price was usually fixed, trading was done on the basis of other values. Some of these were legal and some were not. When the price was not a factor, producers and contractors frequently sold birds to dealers who had helped them move birds when supplies of finished broilers were heavy. Ninety-eight percent of the sales made in 1945 as reported by the farmers interviewed were made on a straight basis as contrasted with only 2 percent sold on a graded basis. In 53 percent of the cases, sales were made by the producer, in 40 percent by the contractor, and sales were made by the two combined for the remaining 7 percent.

In the late summer of 1944, just before the period for which data were obtained, a cooperative dressing plant was established in Moorefield (Fig. 10). Marketings through this plant have been affected by many of the factors discussed above. Its position as a competitive buyer has frequently been limited by controlled prices. However, nearly 2 million chickens and over 40,000 turkeys were marketed through the plant in 1945.

The dressed birds from the plant either were marketed as fresh killed broilers (Fig. 11) or were sent to the freezer and moved into market channels as frozen poultry. The plant at Moorefield has no freezing unit and the birds must be sent to the cooperative's freezer and cold-storage warehouse at Broadway, Virginia. However, a large portion move to market as fresh killed broilers (Fig. 12). Numerous independent buyers of live poultry operated in the producing territory, but their activities had also been modified to a considerable degree as changes took place in the market and in the growth of the industry. There was no well-defined market for the live broilers which move out of the area. Some move to Baltimore, Washington, Philadelphia, and New York. If conditions in these markets are not satisfactory, live broilers are frequently marketed in Pittsburgh and Cleveland. Few live broilers moved southward. Broilers were sold when about 13.9 weeks of age and at an average weight of 3.3 lb. Table 14 shows how age and weight varied at time of sale.

SUMMARY AND CONCLUSIONS

The broiler industry in Grant, Hampshire, Hardy, and Pendleton Counties of West Virginia has become an important source of farm income in the past 10 years. On many farms in this area it is the principal source of income.

Little capital is required to enter the broiler business on the farm. Feed dealers, feed mills, hucksters, and others frequently furnish a large portion of the out-of-pocket expenses involved in production. Thus farmers with only enough money to build an inexpensive building and to buy a small amount of equipment can get started in the business.

The principal items of expense in producing broilers are feed, chicks, and labor. These three items account for 67, 19, and 4 percent,

TABLE 14—Age and Weight of Broilers Sold, Northeastern West Virginia, 1945

Range in age sold	Broods	Range in weight sold	Broods
weeks	*number*	*pounds*	*number*
Less than 10	3	Less than 2.50	4
10 - 10.9	2	2.50 - 2.74	11
11 - 11.9	9	2.75 - 2.99	28
12 - 12.9	20	3.00 - 3.24	63
13 - 13.9	73	3.25 - 3.49	81
14 - 14.9	62	3.50 - 3.74	61
15 - 15.9	28	3.75 - 3.99	16
16 - 16.9	7	4.00 and over	5
17 and over	1		
average	total	average	total
13.9	205	3.3	269

Fig. 11—Grading, Weighing, and Packaging Chilled New York Dressed Broilers at the Cooperative Dressing Plant in Moorefield

respectively, of the cost of producing broilers; collectively they amount to 90 percent of the total costs of production.

Returns from the broiler enterprise were 95.5 percent from broilers sold, 4.2 percent from manure, and 0.3 percent from broilers used on the farm.

Mortality appeared to be the dominant factor responsible for varying production costs. Low mortality was associated with low costs and high mortality with high costs. No other factor was discovered which had such an important bearing on costs. This may be explained by the fact that the principal costs are variable and that they are directly linked with mortality.

The principal disease reported as responsible for death losses was coccidiosis. Other diseases had caused serious loss at times but were less important. Producers were trying many preventive and curative treatments with varying degrees of success. No specific remedy had been found that would satisfactorily prevent or control this disease.

Local sources of rough lumber for construction of buildings, of sawdust and shavings for litter, and of wood for fuel help to keep costs for these items at a minimum.

Nearly all of the broilers are produced in small broods and can be adequately cared for by the family labor on the farm without upsetting the normal farming operations.

RECOMMENDATIONS

It is evident from this study that high mortality is one of the important factors associated with high production costs. If producers would concentrate their efforts on reducing mortality, production costs could be reduced. Mortality could be reduced by such measures as improving sanitation; prompt application of the currently recommended controls and treatments for coccidiosis and other diseases, when these have been developed; maintenance of an adequate amount of dry litter; and careful attention to other recognized management practices. Under the conditions which existed at the time this study was made, reduction of mortality appeared to be the most likely means of increasing the profits from broilers. That it can be done is evidenced by the low mortality in a large number of broods for which records were obtained.

Practices which tend to reduce feed waste, either by feeding it to chicks of poor breeding or by careless management, will result in lower costs and higher profits for broiler producers.

Lack of adequate laboratories in the immediate area of concentrated production in the state for prompt diagnosis of disease is a serious handicap which undoubtedly results in a higher rate of mortality than might otherwise prevail. Quick diagnosis and proper treatment would save producers many dollars. Inasmuch as approximately one fourth of the state income from poultry and poultry products originates in the area of concentrated broiler production here reported, it would appear to be the most appropriate site for location of a diagnostic laboratory.

Under the present system of production, where contractors furnish a large part of the out-of-pocket capital required to produce broilers, the producers are protected from extreme losses. If, in the future, producers begin to operate on a cash basis, some form of insurance to protect the individual producer against the extreme losses which would accompany high mortality would be deemed desirable. Also, producers would need additional technical help such as was previously furnished by the fieldmen employed by the contractors.

The wood fuel now used by a majority of the producers appeared to be satisfactory. As long as supplies of fuel wood continue abundant in the area, this method of heating will probably be found advantageous. This is especially true in view of the limited alternatives for farm labor in much of the area. Sawdust litter was cheap and likewise appeared to be highly satisfactory to those using it. Ready availability of this litter material is a strong argument for its use.

Many producers could reduce the amount of labor used in producing broilers by installation of inexpensive water systems, by locating feed bins in places accessible to both the trucks delivering the feed and to the broilers in the houses, and by using a satisfactory amount of litter on the type of floors present to insure ease of cleaning. If enough litter is used to keep it dry during the entire time the broilers are housed, one cleaning of the house after the broilers have left the farm will in most cases be all that is needed.

Fig. 12—Boxes of Iced Broilers Leaving Dressing Plant on the Same Day They Were Killed. Broilers Are Transported in Refrigerated Trucks to Markets in Many Cities

A wide range in the quality of housing seemed to give satisfactory results. The producer should be guided in his selection of housing largely by his financial condition and by his knowledge of broiler production. As in any enterprise, it would not seem to be desirable to invest too heavily until the producer is sure that he can produce broilers economically.

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