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Investment costs and returns to egg producers

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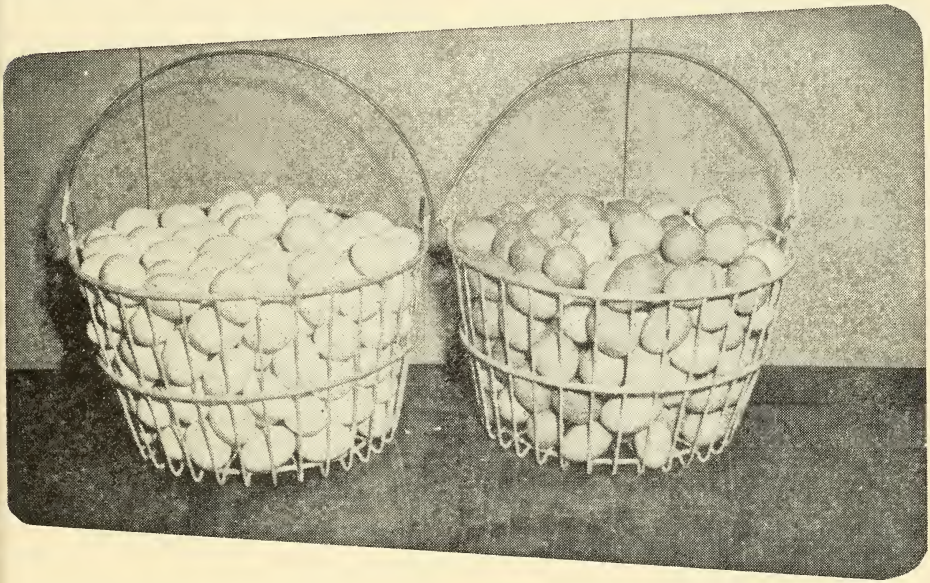

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TABLE OF CONTENTS

LIST OF TABLES

APPENDIX TABLES

ACKNOWLEDGEMENTS

This is one of a series of studies dealing with the economics of livestock production on Mississippi farms. Other studies include beef, sheep, hog, milk and broiler production.

Special appreciation is extended to the 54 egg producers who contributed so generously their time and information to make this report possible.

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INVESTMENT, COSTS AND RETURNS TO EGG PRODUCERS

By D. W. PARVIN

The Problem: Commercial egg production has been increasing in importance in Mississippi for a number of years. Mississippi producers sold 516 million eggs in 1954 compared to 233 million in 1940.[1] Relatively high retail prices for eggs during recent years was the major factor accounting for the expansion of commercial egg production in Mississippi; also the surplus labor on small farms was a contributing factor in that a laying flock could be added to the farm operation without taking labor from other enterprises.

It is expected that consumers will have relatively large amounts of spendable income for some time; therefore the demand for eggs should continue at a high level. The total demand for eggs will increase as the population increases and as consumers become better informed about nutrition. Conditions in Mississippi are favorable for egg production because of the unused labor available on many small farms. The operators of most of these small farms do not have the land resources to produce livestock other than poultry. While capital is limited on most small farms, operating capital for egg production is easily obtained by producers able to provide buildings and equipment. Based upon the above observations, it is expected that the commercial production of eggs will continue to increase in Mississippi.

Producers not satisfied with present returns from their laying flocks and individuals contemplating producing eggs commercially for the first time need basic information on investment, cost, returns and management practices on which to base their decisions. This study was designed to provide this information.

[1]Agricultural Statistics, United States Department of Agriculture, 1941 and The Poultry and Egg Situation, United States Department of Agriculture, May, 1955.

Method of Study: Data for the study were obtained by personal interview with producers in Forrest, Stone, Perry, Lamar, Covington, Jones, and Jasper counties. This area was chosen because it is the oldest and largest concentration of laying flocks in the state.

The period covered in this study was from August 1, 1953, through July 31, 1954. This period was used because it starts and ends at about the time of the year when the majority of producers place pullets in laying houses.

Insofar as possible, a 100 percent sample of commercial egg producers in the sample area was taken. A producer with 200 or more laying hens was considered a commercial producer. Only those producers who started commercial egg production prior to August 1, 1953, were included in the study. A list of commercial egg producers in the sample counties was obtained from county agents, county cooperatives and feed dealers. Usable records were obtained from 54 producers and detailed information with regard to all phases of commercial egg production was obtained.

System of Farming

Type of Production: Forty of the 54 farms studied sold market eggs and 14 sold hatching eggs. None of the producers used cages for layers. Eight of the producers of hatching eggs sold market eggs part of the year. Eggs were produced and sold throughout the year by 33 operators. The 21 operators that did not produce throughout the year sold eggs an average of 9 months. In most cases the period out of production represented a more or less normal lag between the time the last of the old hens were sold and pullets were ready for the laying house. In some cases, the period out of production was due to the selling of

flocks earlier than usual because of diseases.

Type of Birds Used: All of the producers of market eggs used light breeds and all of the producers of hatching eggs used heavy breeds.

Size of Flocks: Producers of hatching eggs had larger flocks than those producing market eggs. For the production period, the number of hens per flock averaged 922 for flocks producing hatching eggs, 567 for those producing market eggs and 659 for all flocks. Twenty-five producers had less than 500 hens, 19 had from 500 to 999 hens, and 10 had more than 1,000 hens.

The number of layers housed was considerably larger than the average number on hand during the production period. The number of hens housed per flock averaged 1,205 for flocks producing hatching eggs, 797 for flocks producing market eggs and 903 for all flocks. For hatching flocks, 86 roosters were housed per flock and an average of 72 were kept during the production period.

Sources of Income: Approximately one-fourth of the producers received all of their farm income from the laying flock and two-thirds received 50 percent or more. For all farms, the sale of eggs accounted for an average of 59 percent of farm income; the remainder came from the following sources; beef cattle, 11 percent; milk, 9 percent; cotton, 7 percent; and miscellaneous enterprises, 14 percent.

Tenure and Color: For all practical purposes, all operators can be classified as white owner-operators. All of the operators were white and all owned their farms except two. These two lived on farms owned by a son or daughter.

Acres Operated: The average size farm producing commercial eggs was 102 acres, this was approximately one-half as large as the average for all farms operated by white owners in Mississippi.[2] Of the 54 farms, 13 had less than 50 acres, 36 had less than 100 acres and only 1 had over 300 acres.

Farm labor supply: Including the operator there was an average of 3.4 persons in the family labor force per farm (Appendix Table 1). There were approximately the same number of males and females and about 50 percent was between the ages of 18 and 60. Over half of the operators (52 percent) were over 50 years of age; 22 percent was over 60 years of age; and 24 percent was under 40 years of age (Appendix Table 2).

All of the daily chores connected with the production and marketing of eggs was done by the operator and members of his family. Only one producer hired labor to help with a seasonal job.

Experience of operators: Commercial production of eggs is a relatively new enterprise for most egg producers in Mississippi. Over one-half of the operators (52 percent) had produced eggs commercially for less than 5 years; less than one-fourth (22 percent) had produced them commercially 10 years or more (Appendix Table 3).

Resources Used and Management Practices

Laying houses: There were 106 laying houses on the 54 farms studied. Of this total, 45 had less than 1,000 square feet of floor space, 32 had from 1,000 to 2,000 square feet and 29 had more than 2,000 square feet of floor space. The amount of floor space per house averaged 1,577 square feet for flocks producing market eggs, 2,550 square feet for flocks producing hatching eggs and 1,852 square feet for all flocks. Floor space per 100 birds housed amounted to 386 square feet for flocks producing market eggs, 423 square feet for flocks producing hatching eggs

[2] In 1950 the white-owner operated farms averaged 210 acres. United States Census of Agriculture, 1950.

and averaged 400 square feet for all flocks (Appendix Table 4). The recommended floor space per 100 birds housed is 300-350 square feet for light breeds and 350-400 square feet for heavy birds.

Approximately three-fourths of the laying houses were between 20 and 32 feet in width. Twenty-seven percent were 30 feet wide; 17 percent, 24 feet; 16 percent, 20 feet; 8 percent, 32 feet; and 5 percent, from 26 to 29 feet wide. Thirteen percent were less than 20 feet wide and 14 percent were over 32 feet wide. Metal roofing was used on approximately three-fourths of the houses. Thirty-four percent of the houses had concrete foundations; 12 percent, concrete blocks; 10 percent, poles on concrete blocks; 29 percent, poles in the ground; and 15 percent miscellaneous types of foundations, mostly wood.

Equipment: All producers except one used trough hand-feeders; the other producer used mechanical feeders. Of the 53 producers using trough hand-feeders, 29 used wooden feeders, 16 used metal feeders and 8 used both wooden and metal feeders. The wooden troughs were built on the farm in all cases, except one, and the metal troughs were purchased in all cases, except two. Most of the trough hand-feeders (90 percent) were 4, 5, 6, 8, 10, or 12 feet long. On the 53 farms having trough hand-feeders, the amount of feeder space per 100 birds housed was equivalent to approximately 4 five-foot feeders or 2 ten-foot feeders.

Approximately two-thirds of the producers used automatic waterers. Thirty-one producers used automatic trough waterers only, 4 used automatic pan waterers only, 16 used hand waterers only, and 3 used a combination of hand waterers and automatic waterers. Practically all waterers were purchased.

Most of the automatic watering troughs were 3, 4, 5, 6, or 8 feet long with 4-foot waterers being the most common. On the 31 farms having automatic watering troughs, the amount of watering space per 100 birds housed was equivalent to one 5-foot waterer. Producers using other type waterers provided a comparable amount of watering space.

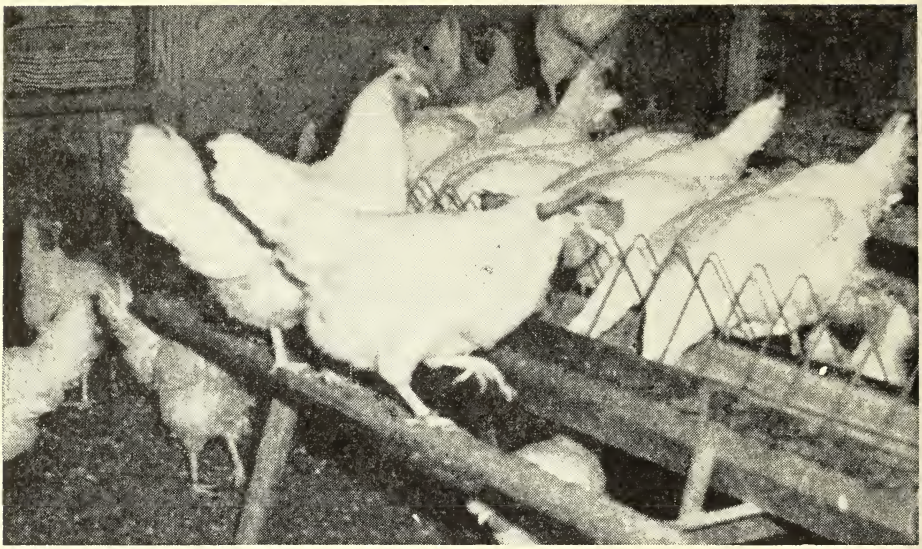
Eight of the 54 producers did not provide their hens with roosts. An average of eight linear inches of roosting space was provided per bird housed on the 46 farms having roosts.

Of the 54 producers, 29 used individual nests, 17 used community nests and 8 used both individual and community nests. When the community nests were converted to individual nest equivalent and added to the number of individual nest, it was found that 1 nest was provided for every 5 hens housed. Forty-one producers used wooden nests, nine used metal nests and three used both wooden and metal nests. The wooden nests were built on the farm in all cases, except three; all of the metal nests were purchased.

The amount of facilities provided by the average producer was equal to or greater than the recommended amount. The amount of feeding and watering space per 100 birds housed was considerably in excess of the amount commonly recommended. Roosting space, when provided, and nesting space was equal to or slightly in excess of the amount commonly recommended. The amount of all types of facilities, except roosts, provided per 100 birds housed was greater for hatching flocks than for market flocks.

Feeding Practices: Laying mash, grain, shell, and grit were the feeds used in egg production. Laying mash accounted for 69 percent of all feed used; grain, 26 percent; and osyter shell and grit, 5 percent (Appendix Table 5).

Four producers did not feed grain. Of the 50 producers feeding grain, 10 grew all of the grain fed, 14 grew part of the grain fed and 26 purchased all of the grain fed. All producers purchased and fed laying mash and oyster shell or grit.



Forty of the 54 flocks included in this study produced market eggs.

Feed used per 100 hens per day amounted to 282 pounds for flocks producing market eggs, 352 pounds for flocks producing hatching eggs and averaged 306 pounds for all flocks (Appendix Table 6). Feed used per dozen eggs produced averaged 6.45 pounds[3] for flocks producing market eggs, 7.51 pounds for flocks producing hatching eggs and 6.83 pounds for all flocks.

Labor Utilized: An average of 247 hours of labor was used per 100 hens during the year studied (Appendix Table 7). Of the total, 84 percent was devoted to daily chores, 9 percent to seasonal jobs and 7 percent to marketing. Producers of market eggs used 293 hours of labor per 100 hens compared to 172 hours for producers of hatching eggs. Larger flocks and more efficient equipment[4] were the major factors accounting for lower labor requirements per 100 hens for hatching flocks; also fewer days in production and less time spent in marketing contributed to the lower labor requirements for hatching flocks. Chore labor per day per 100 hens amounted to .71 hours for flocks producing market eggs, .46 hours for flocks producing hatching eggs and averaged .63 hours for all flocks.

The type of equipment used and the number of hens in the flock exerted considerable influence on labor required for daily chores. Chore labor per day per 100 layers averaged .60 hours for producers using automatic waterers and hand feeders compared to .94 hours for producers using hand waterers and hand feeders (Appendix Table 8). It should be recognized that all this difference is not attributable to difference in equipment because producers using automatic waterers and hand feeders had larger flocks than producers using hand waterers and hand feeders.

[3]This is higher than ordinarily expected for the production of market eggs; however, the producers of market eggs reported that they had more trouble with diseases than normal.

[4]Only one of the 14 producers of hatching eggs used hand waterers, whereas, 15 of the 40 producers of market eggs used hand waterers. Also the producer using automatic feeders produced hatching eggs.

Since the majority of producers used hand feeders and automatic waterers, it was possible to calculate the relationship of the size of the laying flocks to the number of hours of chore labor required daily when this type of equipment was used. When hand-feeders and automatic waterers were used, the daily chore labor per 100 layers varied from .83 hours for flocks of 300 layers to .66 hours for flocks of 900 layers and .49 hours for flocks of 1,500 layers (Appendix Table 9).

Replacements: There were no significant differences in replacement practices for flocks producing hatching eggs and flocks producing market eggs. Practically all pullets (about 96 percent) were produced from sexed chicks. Age of pullets placed in laying houses varied from 4 to 7 months and averaged 5 months. Over half of the pullets, approximately 6 out of 10, were placed in laying houses in July and August. Pullets placed in laying houses cost an average of $1.78 each for flocks producing market eggs compared to $1.99 for flocks producing hatching eggs.[5]

Roosters Per 100 Hens: For flocks producing hatching eggs, an average of 8 roosters were kept per 100 hens during the period of time hatching eggs were being sold.

Health and Sanitation Practices: All producers of hatching eggs vaccinated their pullets for New Castles and foul-pox. Of the producers of market eggs, approximately 60 percent vaccinated for New Castles, 90 percent for foul-pox, and 12 percent for bronchitis. At regular intervals, 86 percent of the producers of hatching eggs and 68 percent of the producers of market eggs fed a worming mash.

At some time during the year, all producers cleaned and disinfected laying houses and equipment. The depth of litter varied from 3 to 15 inches and averaged 7 inches. The average depth of litter was approximately the same for both type producers. Forty-eight producers used shavings for litter and four producers used other materials such as oat straw, sawdust and pine needles; two producers of market eggs reported that no litter was used.

Mortality Rate: Mortality rate as used here refers to the number of hens that died during the production period expressed as a percentage of the average number of hens on hand during the production period. The mortality rate averaged 24 percent for flocks producing market eggs, 16 percent for flocks producing hatching eggs and 21 percent for all flocks (Appendix Table 10).

Production: Egg production includes eggs sold and eggs used by the farm family. Based upon the average number of hens, 177 eggs were produced per hen for the average production period of 330 days; this represents an egg production of 54 percent (Appendix Table 11). Egg production averaged 52 percent on farms producing market eggs and 56 percent on farms producing hatching eggs.[6]

Buying and Selling. In marketing eggs and hens, and buying poultry supplies, 30 producers bought and sold through farmer cooperatives, 10 bought through farmer cooperatives but sold to local

[5]Estimated by producers. If produced under the same conditions, we would expect the difference in the cost of producing light breed pullets and heavy breed pullets to be greater than this. Evidently the producers of hatching eggs did a more efficient job of producing pullets than did the producers of market eggs; it will be shown later that they did a more efficient job of producing eggs than market egg producers.

[6]Ordinarily producers of market eggs have a higher percent egg production than producers of hatching eggs; however, during the year studied, the producers of market eggs had more trouble with diseases than producers of hatching eggs as evidenced by the higher mortality rate.

merchants and 14 bought and sold exclusively through local merchants.

In practically all cases where producers bought and sold through farmer cooperatives, the cooperative delivered the supplies and picked up the eggs and hens. In those cases where producers did not buy and sell through farmer cooperatives, they had the expense of marketing their own eggs and hens, except in those cases where purchasers picked up eggs and hens at the farm.

Investment, Costs and Returns

Investment: Based upon 1954 prices, the replacement cost of laying houses, equipment and birds housed amounted to $461 per 100 hens housed (Table 1). Laying houses accounted for 47 percent of this total, equipment for 16 percent and birds housed for 37 percent. The replacement cost of the above items per 100 hens housed averaged $434 for flocks producing market eggs and $513 for flocks producing hatching eggs.

The average investment in laying houses and equipment over the lifetime of these items would be one-half of their replacement cost. Also the average investment in the laying flock for the year would be less than its replacement cost because the birds would depreciate in value during the year and the number would decline because of mortality and culling. For the year studied, the average investment per 100 hens[7] amounted to $329 for flocks producing market eggs, $370 for flocks producing hatching eggs and averaged $344 for all flocks (Appendix Table 12).

The replacement cost of laying houses averaged $217 per 100 hens housed. Replacement cost of houses as reported in this study included the cash cost of all material purchased and of all labor hired, plus the value of materials and labor furnished from the farm. Therefore, the cash cost of laying houses would be less than the replacement cost (total value) on farms where all or part of the labor and materials were furnished from the farm. The producers included in this study reported that cash costs represented 70 percent of the total value (replacement cost) of laying houses (Appendix Table 13).

The size of laying houses and the type of construction were the major factors influencing cost of construction per

[7]Based upon the average number of hens during the production period.

Table 1. Replacement cost of houses, equipment, water systems and of birds used in egg production per 100 hens housed, 54 producers, South Mississippi, August 1, 1953-July 31, 1954.

Item	Flocks producing		All flocks
	Market eggs	Hatching eggs	
		Dollars	
Laying houses	213.17	225.23	217.27
Water system[1]	26.60	31.45	28.24
Feeders	10.16	24.07	14.95
Waterers	4.02	12.78	6.98
Roosts	7.40	4.31	6.31
Nests	13.93	19.34	15.73
Total houses and equipment	275.28	317.18	289.48
Laying flocks[2]	158.47	195.52	171.09
Total	433.75	512.70	460.57

[1]The flocks' share of the investment in the water system.

[2]Includes the value of roosters for hatching flocks. Hens carried over were valued at their depreciated value at the time pullets were housed.

Table 2. Cost of producing eggs, 54 producers, South Mississippi, August 1, 1953-July 1, 1954.

Item	Flocks producing market eggs		Flocks producing hatching eggs	
	Per 100 hens	Per dozen eggs	Per 100 hens	Per dozen eggs
	Dollars	Cents	Dollars	Cents
Feed	443.31	29.83	525.11	35.78
Flock	111.17	7.48	104.69	7.14
Miscellaneous	41.38	2.78	31.04	2.12
Total cash cost	595.86	40.09	660.84	45.04
Depreciation, buildings, and equipment	32.20	2.17	39.39	2.69
Interest on investment	16.44	1.11	18.52	1.26
Total non-cash cost	48.64	3.28	57.91	3.95
Total cost	644.50	43.37	718.75	48.99

square foot of floor space. Replacement cost of laying houses per square foot of floor amounted to 81 cents for houses having less than 1,000 square feet of floor space, 58 cents for houses having from 1,000 to 2,000 square feet of floor space, 45 cents for houses having over 2,000 square feet of floor space, and averaged 54 cents for all houses. The replacement cost of laying houses having an aluminum roof and a foundation of concrete or concrete blocks amounted to 60 cents per square foot of floor space compared to 49 cents for laying houses having a composition roof and a foundation of poles or posts (Appendix Table 14).

The replacement cost of equipment used in laying houses amounted to $44 per 100 hens housed. Of this total, $16 was invested in nests, $15 in feeders, $7 in waterers and $6 in roosts.

The replacement cost of the laying flock per 100 hens housed amounted to $158 for flocks producing market eggs and $196 for flocks producing hatching eggs. The replacement cost of the laying flock includes the cost of pullets when housed plus the depreciated value of hens carried over from the preceding production period. In addition, the cost of roosters is included in the replacement cost of the laying flock for producers of hatching eggs.

Costs. In this study, all work done in taking care of laying flocks was preformed by members of the farm family. For this reason a charge for labor is not included as a cost of producing eggs. Costs per 100 hens amounted to $644 for flocks producing market eggs and $719 for flocks producing hatching eggs; costs per dozen eggs averaged 43.4 cents for flocks producing market eggs and 49.0 cents for flocks producing hatching eggs (Table 2). Cash expenditures accounted for 92 percent of all costs for both type flocks. Cash expenses averaged $596 per 100 hens or 40.1 cents per dozen eggs for flocks producing market eggs compared to $661 per 100 hens or 45 cents per dozen eggs for flocks producing hatching eggs.

Feed was the most important item of cost accounting for 74 percent of cash cost for flocks producing market eggs, and 79 percent for flocks producing hatching eggs. Feed cost averaged $443 per 100 hens and 29.8 cents per dozen eggs for flocks producing market eggs; comparable figures for flocks producing hatching eggs were $525 per 100 hens and 35.9 cents per dozen eggs.

Flock cost was the second most important item of expense. Flock cost is the net cost to producers of using the laying flock during the period studied

and was calculated as follows: the value of bird on hand August 1, 1953, plus the value of birds added to the flock during the year minus the value of birds sold, eaten and on hand July 31, 1954 (Appendix Table 15). Flock cost averaged $111 per 100 hens for flocks producing market eggs and $105 for flocks producing hatching eggs; flock cost per dozen eggs averaged 7.5 cents for market eggs and 7.1 cents for hatching eggs.

Miscellaneous cash expenditures which included cost of marketing, repairs on houses and equipment, medications and disinfectants, litter, electricity, insurance, and taxes amounted to $41 per 100 hens for flocks producing market eggs and $31 for flocks producing hatching eggs; these costs averaged 2.8 cents per dozen eggs for market eggs and 2.1 cents for hatching eggs. For flocks producing market eggs, miscellaneous cash costs per 100 hens averaged $16.86 for marketing, $9.02 for repairs on buildings and equipment, $6.98 for medications and disinfectants, $2.22 for litter, $3.15 for electricity, and $0.87 for taxes and insurance (Appendix Table 16). The cost of the above items per 100 hens were about the same for hatching flocks except that marketing costs were considerably lower and litter cost somewhat higher.

Non-cash cost items (depreciation on buildings and equipment and interest on investment) averaged $49 per 100 hens for flocks producing market eggs and $58 for flocks producing hatching eggs; these items of cost averaged 3.3 cents per dozen eggs for market eggs and 4.1 cents for hatching eggs. For flocks producing market eggs non-cash cost per 100 hens averaged $32 for depreciation and $16 for interest on investment; for flocks producing hatching eggs, these cost per 100 hens averaged $39 for depreciation and $19 for interest on investment.

Returns. The average total returns was $742 per 100 hens and 50 cents per dozen eggs for flocks producing market eggs compared to $1,049 per 100 hens and 71.5 cents per dozen eggs for flocks producing hatching eggs (Table 3). Egg sales accounted for 93 percent of total returns for producers of market eggs and 95 percent for producers of hatching eggs. Non-cash returns (value of eggs used on farm, value of sacks used on farms and the value of the manure) averaged $39 per 100 hens and 2.6 cents per dozen eggs for flocks producing market eggs; non-cash returns were about the same for producers of hatching eggs.

The difference between total returns and total costs as calculated in this study represents the return to the producer and his family for labor used in taking care of the enterprise and managing the enterprise. Returns to labor amounted to $98 per 100 hens, 6.6 cents per dozen eggs, and 34 cents per hour of labor for flocks producing market eggs; for flocks producing hatching eggs returns to labor averaged $330 per 100 hens, 22.5 cents per dozen eggs and $1.92 per hour of labor.

High-Profit Flocks

The most profitable flocks producing market eggs and the most profitable flocks producing hatching eggs were studied in order to determine the characteristics of each. Fifty percent of the flocks (20 market flocks and 7 hatching flocks) were included in the most profitable groups.

For flocks producing market eggs, the most profitable flocks had returns to labor of $277 per 100 hens compared to $98 for all flocks. For flocks producing hatching eggs, returns to labor per 100 hens averaged $475 for the most profitable flocks compared to $330 for all flocks (Table 4).

For flocks producing market eggs, it was found that the most profitable flocks had the following characteristics as compared to the average for all flocks: higher returns, lower costs, less capita in-

Table 3. Returns to egg producers, 54 producers, South Mississippi, August 1, 1953-July 31, 1954.

Item	Flocks producing market eggs		Flocks producing hatching eggs	
	Per 100 hens	Per dozen eggs	Per 100 hens	Per dozen eggs
	Dollars	Cents	Dollars	Cents
Eggs sold	691.81	46.56	999.51	68.13
Sacks sold	11.46	.77	9.51	.65
Total cash receipts	703.27	47.33	1,009.02	68.78
Value of eggs used	14.92	1.00	8.73	.59
Value of sacks used	4.02	.27	3.68	.26
Value of manure[1]	20.21	1.36	27.08	1.84
Total non-cash returns	39.15	2.63	39.49	2.69
Total returns	742.42	49.96	1,048.51	71.47
Less total costs	644.50	43.37	713.75	48.99
Returns to labor	97.92	6.59	329.76	22.48
Returns to labor per hour of labor	.34		1.92	

[1]Producer's estimates of the value of manure saved. In Mississippi Experiment Station Bulletin Number 524 published in December 1954, it was reported that the value of manure produced, when taken from poultry houses, amounted to $7.34 per ton of feed fed. Based on the above report and the amount of feed fed. the value of manure produced amounted to $35 for flocks producing market eggs and $40 for flocks producing hatching eggs... Therefore, it appears that egg producers handled the manure in such a way that part of the plant food was lost or else part of the manure was not saved.

vested per 100 hens, higher prices for eggs sold, more days in production, a higher rate of lay, less feed used per hen per day and per dozen eggs, more labor used per 100 hens per day and a lower mortality rate (Appendix Table 17).

For flocks producing hatching eggs, the differences between the most profitable flocks and the average for all flocks were found to be quite similiar to those found for flocks producing market eggs; however there were two exceptions. As compared to the average for all hatching flocks, the most profitable flocks had more capital invested per 100 hens and used slightly more feed per hen per day.

Returns Under Varying Price Conditions

In this study, feed accounted for 74 percent of the cash cost of producing market eggs and for 79 percent of the cash cost of producing hatching eggs. Therefore, from the standpoint of changing prices, the relationship between prices paid for feed and prices received for eggs would be the most important factor determining profits.

The relationship between egg prices and feed prices was about normal during the year studied. At that time the egg-feed ratio for Mississippi was 10.7, as compared to 10.6 for the 15-year period, 1940-1954 (Appendix Table 18). (The egg-feed ratio is the number of pounds of feed equivalent in value to one dozen eggs.)

During the 15-year period, 1940-1954, the most favorable egg-feed ratio for Mississippi was 11.8 in 1945 and the least favorable was 9.4 in 1952. If the egg-feed ratio had been at the 1945 level during the year studied, returns to labor per 100 hens would have been increased from $98 to $140 for the flock producing marketing eggs and from $330 to $379 for flocks producing hatching eggs (Appendix Table 19). On the other hand, if the egg-feed ratio had been at the 1952

level during the year studied, returns to labor per 100 hens would have been reduced to $37 for flocks producing market eggs and to $257 for flocks producing hatching eggs.

Returns to labor for the most profitable flocks were relatively high even when calculated on the basis of the least favorable egg-feed ratio reported during the past 15 years. When calculated on the basis of the least favorable egg-feed ratio reported from 1940 through 1954, returns to labor per 100 hens averaged $216 for the 20 most profitable market egg flocks and $392 for the 7 most profitable hatching egg flocks.

Table 4. Costs and returns per 100 hens on the most profitable farms, with comparisons, 54 producers, South Mississippi, August 1, 1953-July 31, 1954.

Item	Flocks producing market eggs		Flocks producing hatching eggs	
	All flocks	20 most profitable flocks	All flocks	7 most profitable flocks
	Dollars	Dollars	Dollars	Dollars
Cost per 100 hens:				
Feed	443.31	445.72	525.11	592.73
Flock	111.17	84.21	104.69	117.34
Miscellaneous	41.38	36.20	31.04	33.04
Total cash cost	595.86	566.13	660.84	743.11
Depreciation	32.20	27.49	39.39	45.37
Interest on investment	16.44	16.04	18.52	20.61
Total non-cash cost	48.64	43.53	57.81	65.98
Total cost	644.50	609.66	718.75	809.09
Returns per 100 hens:				
Eggs sold	691.81	833.28	999.51	1,232.62
Sacks sold	11.46	10.52	9.51	9.96
Total cash receipts	703.27	843.80	1,009.02	1,242.58
Value of eggs used	14.92	19.12	8.73	7.86
Value of sacks used	4.02	5.32	3.68	3.29
Value of manure	20.21	18.83	27.08	30.35
Total non-cash receipts	39.15	43.27	39.49	41.50
Total returns	742.42	887.07	1,048.51	1,284.08
Total returns	742.42	887.07	1,048.51	1,284.08
Less total cost	644.50	609.66	718.75	809.09
Returns to labor	97.92	277.41	329.76	474.99

SUMMARY AND CONCLUSIONS

Investment Required: The replacement cost of laying houses, equipment and birds housed amounted to $461 per 100 birds housed. Of this total laying houses accounted for 47 percent; equipment, 16 percent; and birds housed, for 37 percent. The replacement cost of the above items per 100 hens housed averaged $434 for flocks producing market eggs and $513 for flocks producing hatching eggs.

Annual Costs: Costs per 100 hens amounted to $644 for flocks producing market eggs and $719 for flocks producing hatching eggs. This includes depreciation and interest on investments listed above. Cash expenditures accounted for 92 percent of total cost. Cash expenses averaged $596 per 100 hens for flocks producing market eggs compared to $661 per 100 hens for flocks producing hatching eggs. Feed was the most important item of cost accounting for approximately three-fourths of cash costs.

Annual Returns: Returns, of which egg sales accounted for about 94 percent, averaged $742 per 100 hens for flocks producing market eggs compared to $1,049 per 100 hens for flocks producing hatching eggs. Returns to labor amounted to $98 per 100 hens and 6.6 cents per dozen eggs for flocks producing market eggs; for flocks producing hatching eggs, returns to labor averaged $330 per 100 hens and 22.5 cents per dozen eggs.

Hatching vs. Market Eggs: Higher prices received for eggs, a higher rate of lay and a lower mortality rate were the major factors accounting for profits being higher for hatching egg flocks than for market egg flocks. The producers of hatching eggs used better health and sanitation practices and provided their hens with more adequate facilities than did the producer of market eggs; this probably accounts for hatching flocks having the higher rate of lay and the lower mortality rate.

Most Profitable Flocks: A comparison of the most profitable flocks with the average for all flocks of the same type showed that the managers of the most profitable flock did a better job in practically all phases of management. Returns to labor per 100 hens averaged $277 per year for the 20 most profitable flocks producing market eggs and $475 for the 7 most profitable flocks producing hatching eggs.

Price Relationship: In this study, feed accounted for approximately three-fourths of the cash cost of producing eggs. Therefore, from the standpoint of changing prices, the relationship between prices paid for feed and prices received for eggs would be the most important factors determing profits. The relationship between egg prices and feed prices was about normal during the year studied. If, during the year studied, the egg-feed ratio had been at the least favorable level that existed during the preceding 15 years, the average producer would have had a return to labor of $37 per year per 100 hens for market eggs and $257 for hatching eggs.

It appears that from the standpoint of price relationships, the egg laying enterprise in Mississippi is relatively safe in that the average producer could expect some return to labor most years.

Appendix Tables

Appendix Table 1. Age and sex of the family labor force, 54 egg producers, South Mississippi, August 1, 1953-July 31, 1954.

Age groups	Number per farm			Percent of Total
	Males	Females	Total	
Under 9	.28	.17	.47	13
9-12	.17	.17	.34	10
13-17	.20	.26	.46	13
18-59	.85	.87	1.72	51
60-69	.13	.13	.26	8
70 & over	.13	.04	.17	5
Total	1.76	1.64	3.40	100

Appendix Table 2. Age of operators, 54 egg producers, South Mississippi, August 1, 1953-July 31, 1954.

Age groups	Number of producers	Percent of producers
30-39	13	24
40-49	13	24
50-59	16	30
60-69	6	11
70-79	6	11
Total	54	100

Appendix Table 3. Years in commercial egg production, 54 producers, South Mississippi, August 1, 1953-July 31, 1954.

Years in production	Number of producers	Percent of producers
25 and over	4	7
20-24	2	4
15-19	1	2
10-14	5	9
5-9	14	26
Under 5	28	52
Total	54	100

Appendix Table 4. Facilities used in egg production per 100 birds housed, 54 producers, South Mississippi, August 1, 1953-July 31, 1954.

Item	Unit	Flocks producing		All flocks	Recommended per 100 birds housed[1]
		Market eggs	Hatching eggs		
Laying houses	Square feet	386	423	400	300- 400
Feeders	Linear inches	415	547	466	300
Waterers	Linear inches	110[2]	127[2]	118[2]	48- 77
Roosts	Linear inches	864[3]	744[3]	816[3]	800-1,000
Nests	Number[4]	18[5]	25[5]	20[5]	17- 20

[1]J. E. Hill, Head of Poultry Department, Mississippi State College.

[2]For those having automatic trough waterers.

[4]Community nests were converted to the equivalent of individual nests by dividing the number of square feet in community nests by the average number of square feet in individual nests.

[5]Per 100 hens housed.

Appendix Table 5. Composition and cost of rations used in producing eggs, 54 producers, South Mississippi, August 1, 1953-July 31, 1954.

Item	Composition of ration			Cost per 100 pounds		
	Flocks producing			Flocks producing		
	Market eggs	Hatching eggs	All flocks	Market eggs	Hatching eggs	All flocks
Laying mash	70.8	66.0	68.9	5.09	5.30	5.18
Grain	23.3	29.2	25.7	4.09	4.15	4.12
Shell and grit	5.9	4.8	5.4	1.15	1.16	1.15
Total	100.0	100.0	100.0	4.63	4.77	4.68

Appendix Table 6. Total feed fed per 100 hens, feed per 100 hens per day and feed fed per dozen eggs produced, 54 producers, South Mississippi, August 1, 1953-July 31, 1954.

Item	Flocks producing		All flocks
	Market eggs	Hatching eggs	
Total pounds fed per 100 hens	9,575	11,016	10,098
Total pounds fed per 100 hens per day	282	352	306
Total pounds fed per dozen eggs	6.45	7.51	6.83

Appendix Table 7. Hours of labor used per 100 hens, 54 producers, South Mississippi, August 1, 1953-July 31, 1954.

Item	Flocks producing		All flocks
	Market eggs	Hatching eggs	
Daily chores[1]	243	145	208
Seasonal	23	24	23
Marketing	24	3	16
Total	290	172	247

[1]Chore labor per 100 hens per day amounted to .71 hours for flocks producing market eggs, .46 hours for flocks producing hatching eggs and averaged .63 hours for all flocks.

Appendix Table 8. Daily chore labor used per 100 hens related to type of equipment used, 54 producers, South Mississippi, August 1, 1953-July 31, 1954.

Item	Average No. of hens per flock	Daily chore labor	
		Per farm	Per 100 hens
Automatic waterers and hand feeders	782	4.73	.60
Hand waterers and hand feeders	293	2.76	.94
All producers	659	4.18	.63

Appendix Table 9. Relationship of size of flock to the daily chore labor required on farms using hand feeders and automatic waterers, South Mississippi, August 1, 1953-July 31, 1954.

Average number of hens	Daily chore labor (hours)	
	Per farm	Per 100 hens
300	2.49	.83
600	4.46	.74
900	5.92	.66
1,200	6.87	.57
1,500	7.30	.49

Source: Based upon the formula $Y = .0091426\ X - .0000028512\ X^2$, where X equals the average number of hens in the flock and Y equals the daily chore labor per flock. This formula was estimated by regression techniques from labor requirements reported by producers using automatic waterers and hand feeders. The b values are significant at the 1 percent level.

Appendix Table 10. Mortality rate, by type of production, 54 producers, South Mississippi, August 1, 1953-July 31, 1954.

Item	Flocks producing		All flocks
	Market eggs	Hatching eggs	
Average number of hens per farm[1]	567	922	659
Number of hens dying per farm	137	144	139
Mortality rate, percent	24	16	21

[1]During the production period.

Appendix Table 11. Eggs produced by type of production, 54 producers, South Mississippi, August 1, 1953-July 31, 1954.

Item	Unit	Flock producing		All flocks
		Market eggs	Hatching eggs	
Eggs sold per farm	number	98,846	160,315	114,782
Eggs used per farm	number	2,175	2,066	2,147
Eggs produced per farm	number	101,021	162,381	116,929
Average number of hens[1]	number	567	922	659
Eggs produced per hen	number	178	176	177
Days in production[2]	number	340	313	330
Egg production	percent	52	56	54

[1]During the production period.
[2]Days in production weighted by the average number of hens.

Appendix Table 12. Investment per 100 hens[1], 54 producers, South Mississippi, August 1, 1953-July 31, 1954.

Item	Flocks producing		All flocks
	Market eggs	Hatching eggs	
		Dollars	
Laying houses	149.91	147.18	148.87
Water system	18.70	20.61	19.42
Feeders	7.05	15.73	10.32
Waterers	2.82	8.35	4.86
Roosts	5.29	2.82	4.25
Nests	9.70	12.58	10.77
Total houses and equipment	193.47	207.27	198.49
Laying flock	135.28	163.23	145.38
Total	328.75	370.50	343.87

[1]Based upon the average number of hens during the production period.

Appendix Table 13. Relationshiip of size of laying houses to replacement cost, 106 houses, South Mississippi, August 1, 1953-July 31, 1954.

Item	Size of houses in square feet			All flocks
	Under 1,000	1,000-2,000	Over 2,000	
Number of houses	45	34	27	106
Floor space per house, square feet	687	1,496	4,243	1,852
Replacement cost per house, dollars	554	867	1,908	999[1]
Replacement cost per square foot of floor space, cents	81	58	45	54

[1]Cash cost averaged $704 per laying house.

Appendix Table 14. Relationship of type of construction to replacement cost, 48 houses, South Mississippi, August 1 ,1953-July 31, 1954.

Type of construction	Number of houses	Replacement cost per house[1]	Replacement cost per square foot
		Dollars	Cents
Aluminum roof, concrete foundation	26	1,087	60
Aluminum roof, concrete block foundation	10	1,089	60
Composition roof, poles or post foundation	12	875	49

[1]For houses 30 feet by 60 feet (1,800 square feet). Estimated by regression techniques.

Appendix Table 15. Flock cost per farm and per 100 hens, 54 producers, South Mississippi, August 1, 1953-July 31, 1954.

Item	Flocks producing	
	Market eggs	Hatching eggs
	Dollars	
Value of birds on hand, August 1	792	1,396
Plus value of birds added	846	2,383
Minus value of birds sold	411	1,122
Minus value of birds eaten	17	17
Minus value of birds on hand, July 31	580	1,674
Flock cost per farm	630	966
Flock cost per 100 hens	111	105

Appendix Table 16. Miscellaneous cash expenditures for egg production per 100 hens, 54 producers, South Mississippi, August 1, 1953-July 31, 1954.

Item	Flocks producing	
	Market eggs	Hatching eggs
	Dollars	
Marketing costs	16.86	2.65
Repairs	9.02	9.68
Medications and disinfectants	6.98	6.80
Litter	2.22	6.09
Electricity	3.15	3.59
Insurance and taxes	.87	1.53
Other	2.28	.70
Total	41.38	31.04

Appendix Table 17. Comparison of various factors and practices for the most profitable flocks with the average for all flocks, 54 producers, South Mississippi, August 1, 1953-July 31, 1954.

Item	Flocks producing market eggs		Flocks producing hatching eggs	
	All flocks	Most profitable flock	All flocks	Most profitable flock
Number of farms	40	20	14	7
Average number of hens per farm	567	526	922	1,191
Average number of days in production	340	361	313	344
Average investment per 100 hens (dollars)	329	321	370	411
Price received per dozen eggs sold (cents)	48	49	69	72
Pounds of feed used:				
Per 100 hens per day	282	266	352	360
Per dozen eggs	6.45	5.47	7.51	7.18
Hours of labor used:				
Per 100 hens	290	290	172	182
Per 100 hens per day	.71	.80	.46	.53
Mortality rate:				
Number of hens dying per farm	137	76	144	197
Percent mortality	24.2	14.5	15.6	16.5
Rate of lay:				
Eggs produced per hen	178	211	176	207
Egg production, percent	52	58	56	60

Appendix Table 18. The egg-feed ratio for Mississippi for the year studied compared with the annual egg-feed ratio for Mississippi from 1940 through 1954.

Year	Poultry feed price per pound[1]	Eggs price per dozen[1]	Egg-feed price ratio[2]
1940	1.88[3]	19.4	10.3
1941	2.33[3]	23.6	10.1
1942	2.58[3]	28.8	11.2
1943	3.31[3]	36.5	11.0
1944	3.24[3]	35.2	10.9
1945	3.44	40.5	11.8
1946	4.09	43.8	10.7
1947	4.70	49.6	10.6
1948	4.87	50.1	10.3
1949	3.88	46.1	11.9
1950	4.07	40.3	9.9
1951	4.39	49.3	11.2
1952	4.81	45.1	9.4
1953	4.50	47.9	10.6
1954	4.32	41.4	9.6
Average:			
1940-1949	2.67	28.7	10.7
1945-1949	4.20	46.0	11.0
1950-1954	4.42	44.8	10.1
1940-1954	3.76	39.8	10.6
August, 1953-July, 1954	4.34	46.4	10.7

Source: Crops and Markets, Volume 31, 1955, Agricultural Marketing Service, United States Department of Agriculture; and monthly issues of Agricultural Prices, Agricultural Marketing Service, United States Department of Agriculture.

[1]Simple average of monthly prices.

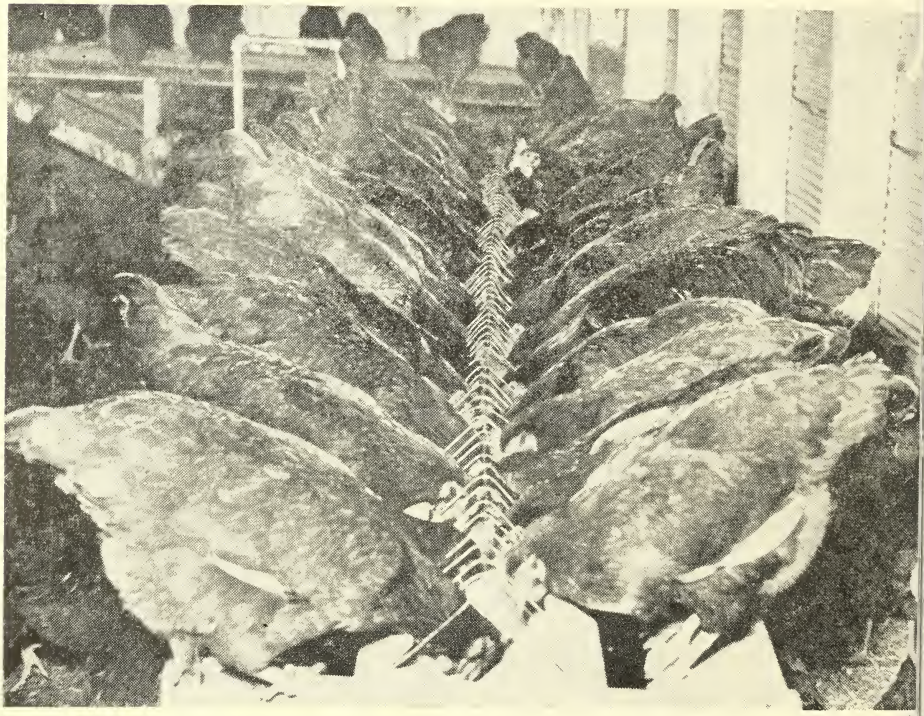
[2]Number of pounds of poultry feed equivalent in value to a dozen eggs.

[3]Estimated. Based upon the average prices reported for the United States and the average relationship between Mississippi prices and United States prices from 1945 through 1954.

Appendix Table 19. Cost and returns per 100 hens with varying egg-feed price ratios, 54 producers, South Mississippi, August 1, 1953-July 31, 1954.

Item	Egg-feed ratio	Total returns	Total cost	Return to labor
All flocks producing marketing eggs:				
Average for the year studied	10.7	742.42	644.50	97.92
Most favorable egg-feed ratio[1]	11.8	742.42	602.83	139.59
Least favorable egg-feed ratio[1]	9.4	742.42	705.68	36.74
All flocks producing hatching eggs:				
Average for the year studied	10.7	1,048.51	718.75	329.76
Most favorable egg-feed ratio[1]	11.8	1,048.51	669.39	379.12
Least favorable egg-feed ratio[1]	9.4	1,048.51	791.22	257.29
Twenty most profitable flocks producing market eggs:				
Average for the year studied	10.7	887.07	609.66	277.41
Most favorable egg-feed ratio[1]	11.8	887.07	567.76	319.31
Least favorable egg-feed ratio[1]	9.4	887.07	671.17	215.90
Seven most profitable flocks producing hatching eggs:				
Average for year studied	10.7	1,284.08	809.99	474.99
Most profitable egg-feed ratio[1]	11.8	1,284.08	754.27	529.81
Least profitable egg-feed ratio[1]	9.4	1,284.08	891.79	392.29

[1]These calculations show what returns to labor would have been during the year studied if the egg-feed ratio had been equal to the highest or lowest level reported during the 15-year period, 1940-1954. In these calculations returns and all costs except feed are those reported for the year studied; the cost of feed was adjusted to give the egg-feed ratio specified. Feed costs were decreased 9.4 percent to give the egg-feed ratio 11.8 and increased 13.8 percent to give the egg-feed ratio 9.4.



Fourteen of the 54 flocks included in this study produced hatching eggs.