Commercial chick hatcheries as a potential market for Mississippi eggs

W. E. Christian

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COMMERCIAL CHICK

Hatcheries As A Potential Market For Mississippi Eggs

MISSISSIPPI STATE COLLEGE
AGRICULTURAL EXPERIMENT STATION
CLAY LYLE, Director

MISSISSIPPI
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The authors are grateful to the hatchery operators of the state for their cooperation in supplying necessary data for carrying out this study. Appreciations are also extended to Mr. Paul T. Blair for his computational work on this study, to Mr. J. E. Hill, Head, Poultry Department, Experiment Station, Mr. Paul Yount, Extension Poultryman, and Dr. Roscoe J. Saville, for their suggestions and criticisms during the time the study was being made and the manuscript prepared. Acknowledgment is also due the Editorial sub-committee of the Southern Regional Poultry Marketing Technical Committee for their helpful suggestions and criticism.
COMMERCIAL CHICK HATCHERIES AS A POTENTIAL MARKET FOR MISSISSIPPI EGGS

By W. E. CHRISTIAN, JR. and M. S. DICKERSON, JR.

Egg production in Mississippi is highly seasonal. Most of the total yearly production is in the late winter, spring, and early summer months. Prices received by farmers for eggs are inversely related to this seasonality of production. During the peak months, when most producers have a large supply to sell, the price of eggs is usually low and when the farmer has few to sell the price is high. Consequently, the total yearly returns to producers are often low. The remedy is a market that will take eggs at reasonable prices in months when production is high as well as in months of relatively low production—or increased production when the price of eggs is relatively high.

There is a possibility that commercial chick hatcheries will provide Mississippi egg producers an additional market for at least part of their eggs. With commercial broiler production increasing, there will likely be an increasing demand for chicks from commercial hatcheries. If the hatchery industry is of sufficient size or grows to sufficient size to demand a large number of eggs and if it is a stable, dependable industry, hatcheries may become an important market outlet for eggs in Mississippi.

Eggs used for hatching purposes must be produced under controlled conditions specified by the hatcherymen who use them. The effect of the requirements for hatching-egg production upon the economic desirability of hatcheries as an egg market depends upon two major factors: (1) the extra costs entailed in the production of hatching eggs, and (2) the extent to which the hatching-egg producer is compensated for carrying out these requirements through the prices received for hatching eggs.

However, due to peculiarities of the hatchery industry, the total amount of compensation received by hatching-egg producers would be reflected by factors other than the actual price of hatching eggs. These factors are: (1) the methods available for the disposition of eggs produced during "off-hatching seasons," and (2) the methods available for disposition of eggs not suitable for hatchery uses due to variations in size, shape, and weight. Once a hatcheryman establishes a hatching-egg-supply flock, he usually has sole right to the use of these eggs. Therefore, the producer would be permitted to sell eggs to other hatcheries only at the discretion of the hatcheryman who originally engaged him to supply eggs. During certain seasons of the year the hatcheryman who established the flocks may not want all of the producer's eggs. The producer normally would not have an outlet for his eggs established with other hatcheries, because the hatcheryman who established the flock probably would not know very far in advance exactly how many eggs he wanted. The producer may also find himself faced with a problem of disposing of eggs due to the physical variations in eggs produced. Eggs that vary as to size, shape, and weight more than is allowable by the hatcheries must be disposed of in some way other than as hatching eggs. Therefore, the actual price received for all eggs produced under hatching-egg conditions will be determined by the weighted average price of the "off-season" eggs, the eggs unsuitable for hatchery uses, and the eggs sold as hatching eggs.

The number of chicks commercial hatcheries can produce and the number of eggs they can set, will depend upon available facilities. Assuming any given demand, the volume at which these commercial chick hatcheries actually operate, or the number of eggs they set will be influenced to a large extent by the total costs incurred in hatching chicks and the allocation of these costs between "fixed"
and "variable" costs. Therefore, the investment in hatchery facilities and the nature of the total costs will have influence on the demand for hatching eggs.

The present sources of supply of hatching eggs and the seasonality of the total operations of the hatcheries will influence the number of eggs that can be sold to hatcheries by Mississippi egg producers. If hatcheries are obtaining a large number of eggs from out-of-state, this would indicate a potential market for Mississippi eggs, assuming the Mississippi producers had them available at the time they were needed and assuming the Mississippi eggs were of the quality desired.

The Problem

The object of this study is to appraise commercial chick hatcheries as a potential market for Mississippi eggs. The study includes an analysis of: (1) the growth and stability of the commercial hatchery industry in Mississippi, (2) the effects that the conditions under which hatching eggs must be produced have upon the economics of hatching-egg production in Mississippi, (3) the cost relationships of operating chick hatcheries and the effects of these relationships upon the stability of the hatchery industry, and (4) the extent to which Mississippi producers are filling the egg needs of hatcheries.

Scope and Method

Both primary and secondary data are used in this study. The primary data were obtained by personal interview with hatchery operators during the summer of 1950. Owners of all commercial chick hatcheries in the state were interviewed to obtain detailed information on their individual operations. Prior to entering the field, it was anticipated that a 100 percent sample would be taken. Due to various reasons, however, complete data were obtained from only 61 of the 70 hatcheries located in the state. Partial data were obtained from an additional 4 operators while no data were obtained from five operators.

Development of the Hatchery Industry In Mississippi

Development of the Hatcheries Now In Operation

A study of the growth and development of the commercial hatchery industry in Mississippi will give an indication of its stability and at the same time point out its present size. In May 1950, there were 70 commercial chick hatcheries in Mississippi. Most of these hatcheries were relatively new enterprises, two-thirds of them having begun operation since January 1942. (See Table 1.) The oldest of these hatcheries began operation during the period 1917-21; 16 of the present hatcheries were operating before 1936 and 26 were in operation in 1941.

It seems that most of the hatcheries now in operation began as small units and "grew into the business." The average of the original capacities of all hatcheries studied was 23,400. However, there has been a recent tendency toward larger capacities.

Prior to 1932 the average capacity of new hatcheries did not exceed 6,000 and in only one period prior to 1942 did the average original capacity of the hatcheries exceed 20,000. On the other hand, from 1942 through May 1950, there were only 2 years in which the average original capacity of the hatcheries studied was be-

1 "Variable" cost: that part of total cost which, within a period of a year or a hatching season, varies with the output of the hatchery. "Fixed" cost: that part of total cost which, within a period of a year or a hatching season, tends to remain approximately constant at all outputs above zero.

2 Capacity: the number of eggs that incubators will hold including both incubating and hatching trays.
low 20,000. The average original capacity of hatcheries established during 1949 and January-May 1950 was greater than that of any other period with the exception of 1944. Original capacities do not necessarily reflect the total capacities of hatcheries now in operation. Capacity changes of previously established hatcheries may cause the total capacity during any particular period to be either larger or smaller than the original capacity. During all periods from 1917 through May 1950, however, capacity changes of previously established hatcheries have been positive. From 1917-May 1950, capacity increases of previously established hatcheries have been larger than the capacity added by new hatcheries. The trend for established hatcheries to expand their capacities has been upward for all periods from 1917 through May 1950, with the exception of the period 1932-36.

Hatcheries Now In Operation Compared To The Recent Hatchery Industry

A comparison of the number and capacity of the hatcheries that were in operation during the period, 1942 to 1949, with the number and capacity of the hatcheries that were still operating at the time of this study, will give some indication of the stability of the hatchery industry.

From 1942 to 1949 the hatcheries that were in operation in Mississippi increased from 38 to 71, or almost doubled. This increase, however, was apparently accompanied by an appreciable amount of turn-over in the composition of the firms making up the total during a particular period.

From Table 2 a comparison of the hatcheries in operation during a particular year with the number of these hatcheries still in operation (May 1950) indicates the rather high rate of turnover.

For instance, in 1944, 61 hatcheries were in operation. Of this number only 36 are still in operation (May 1950) indicating that 23 of the original 61 have gone out of business since 1944.
Table 2. Changes in capacity and number of total hatcheries in operation compared to portion of commercial chick hatcheries now in operation that were operating during selected periods, Mississippi, 1942-49.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total hatcheries¹</th>
<th>Hatcheries now in operation which were operating during selected periods²</th>
<th>Capacity of hatcheries operating in indicated periods which later ceased operation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Total</td>
<td>Capacity</td>
</tr>
<tr>
<td></td>
<td>(thou.)</td>
<td>(thou.)</td>
<td>(thou.)</td>
</tr>
<tr>
<td>1942</td>
<td>38</td>
<td>1,393</td>
<td>36.6</td>
</tr>
<tr>
<td>1943</td>
<td>42</td>
<td>1,726</td>
<td>41.1</td>
</tr>
<tr>
<td>1944</td>
<td>61</td>
<td>2,004</td>
<td>32.8</td>
</tr>
<tr>
<td>1945</td>
<td>65</td>
<td>2,260</td>
<td>34.8</td>
</tr>
<tr>
<td>1946</td>
<td>61</td>
<td>1,975</td>
<td>32.3</td>
</tr>
<tr>
<td>1947</td>
<td>54</td>
<td>2,206</td>
<td>40.8</td>
</tr>
<tr>
<td>1948</td>
<td>56</td>
<td>2,170</td>
<td>38.8</td>
</tr>
<tr>
<td>1949</td>
<td>71</td>
<td>3,023</td>
<td>42.4</td>
</tr>
</tbody>
</table>

¹Source: Data supplied by the Extension Poultry Department, Mississippi State College.
²Source: Data for 5 of these hatcheries were obtained from the Extension Poultry Department, Mississippi State College. The information relative to 65 of the hatcheries was obtained from the survey of 65 commercial chick hatcheries, Mississippi, 1950.

Effect of Size on Development

Although there has been an appreciable amount of fluctuation as to the particular hatcheries that made up the total number operating at any particular time, most of the fluctuation in number seems to have been due to the smaller hatcheries. The average capacities of the hatcheries that were operating at some time during this period and later went out of business, exceeded 20,000 in only 3 of the 8 periods studied—1943, 1945, and 1947—the average capacities for those years being 58,200, 25,500, and 41,200, respectively. (See Table 2.) Only during 1943 and 1947 was the average capacity of the hatcheries that later went out of business larger than the average capacity of all hatcheries. In 1948 and 1949 the average capacities of the hatcheries that have since failed to operate were 5,700 and 4,500, respectively, while the average capacities of the hatcheries that have continued to operate were 40,600 and 47,400, respectively.

Relation of the Production of Chickens to the Growth of Hatcheries

From an examination of Table 3 it is apparent that there has been no pronounced upward trend in the total production of chickens in Mississippi (1942-1949) but there has been an upward trend in the production of commercial broilers corresponding rather closely to the upward trend in hatchery capacity. Probably one reason for the close relationship between the development of the hatcheries and commercial broiler production is that broilers are usually raised in sufficiently large lots to necessitate obtaining the chicks from commercial hatcheries. On the other hand, chickens other than commercial broilers may be raised in small enough lots to allow hatching on the farm.

The expansion of commercial broiler production probably explains the high percentage of heavy-breed chicks produced by hatcheries. Production of 64 hatcheries that reported breeds of chickens produced from June 1949-May 1950 was proportioned: 83 percent New Hampshires, 7 percent crosses, 3 percent White Rocks, 2 percent Barred Rocks, 2 percent Rhode Island Reds, 2 percent White Leghorns, and 1 percent miscellaneous breeds.
Table 3. Total hatcheries in operation and chickens raised, Mississippi, 1942-1949.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total hatcheries in operation</th>
<th>Commercial broilers</th>
<th>Other chickens</th>
<th>All chickens</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Capacity (thou.)</td>
<td>(thou.)</td>
<td>(thou.)</td>
</tr>
<tr>
<td>1942</td>
<td>38</td>
<td>1,393</td>
<td>1,385</td>
<td>20,918</td>
</tr>
<tr>
<td>1943</td>
<td>42</td>
<td>1,726</td>
<td>19,553</td>
<td>21,631</td>
</tr>
<tr>
<td>1944</td>
<td>61</td>
<td>2,004</td>
<td>15,251</td>
<td>17,225</td>
</tr>
<tr>
<td>1945</td>
<td>65</td>
<td>2,260</td>
<td>16,737</td>
<td>19,106</td>
</tr>
<tr>
<td>1946</td>
<td>61</td>
<td>1,975</td>
<td>15,733</td>
<td>17,486</td>
</tr>
<tr>
<td>1947</td>
<td>54</td>
<td>2,206</td>
<td>14,474</td>
<td>17,874</td>
</tr>
<tr>
<td>1948</td>
<td>56</td>
<td>2,170</td>
<td>14,763</td>
<td>20,747</td>
</tr>
<tr>
<td>1949</td>
<td>71</td>
<td>3,023</td>
<td>15,944</td>
<td>24,332</td>
</tr>
</tbody>
</table>

1Data supplied by the Extension Poultry Department, Mississippi State College.
3Market eggs: all eggs that were sold through market outlets other than commercial chick hatcheries.

Practices Of Hatcheries That Affect The Economics Of Hatching-Egg Production

Owners of laying flocks in Mississippi were required to see that their flocks met certain requirements before eggs could be sold as hatching-eggs. To meet these requirements the owners had to incur costs which may not have been necessary if the eggs had been sold as market eggs. Presumably, if the production of hatching-eggs did involve more costs than the production of market eggs, the hatching-egg producer was compensated by a higher price. However, due to the nature of the hatchery industry, factors other than the price received for eggs actually used by the hatchery influenced the amount of compensation for producing hatching-eggs. If the producer had a flock of sufficient size to supply the hatchery with all the eggs needed during certain seasons of the year, he may have found himself with more eggs than the hatchery wanted during other seasons. This is due primarily to seasonal variations in hatchery settings. On the other hand, the producer also probably found that part of the eggs produced under conditions specified were not accepted as hatching-eggs due to variations in size, shape and weight—that are beyond the control of the producer. Therefore, some of the factors which affected the actual compensation of hatching-egg producers are: (1) methods available to dispose of “off-season” hatching eggs, (2) methods available to dispose of eggs that failed to meet requirements due to size, weight, and shape variations, and (3) extra costs incurred in producing hatching eggs.

The following factors are analyzed in this section: (1) the production requirements that egg producers faced in order to sell eggs to hatcheries, (2) the aid that was given to producers by hatcheries in disposing of the producers' eggs during “off-hatching seasons,” (3) the aid that was given the producer by the hatchery in disposing of those eggs that failed to meet hatchery requirements, and (4) the relative prices of hatching and market eggs. For this information only those data obtained from 47 of the hatcheries were suitable for analysis due to the following reasons: of the 65 hatcheries that participated in this study, 2 did custom hatching and hatched eggs from their own flocks while 16 used out-of-state eggs or eggs from their own flocks, or a
combination of out-of-state eggs and eggs from their own flocks.

Producer Requirements

Most of the requirements of hatching-egg flocks originated with the individual hatchery to which eggs were sold. However, the state law indirectly imposed a requirement concerning pullorum control upon all hatching-egg flocks in Mississippi. It requires that any incubator hatched chicks offered for sale had to be produced from flocks that met the following requirements:

1. The flock shall be tested for pullorum disease when the breeding birds are more than 5 months of age, and shall contain no reactors, the last test being made within 12 months immediately preceding the sale of hatching eggs or chicks or poults from any such flock.
2. A flock having any reactors may not be retested for a period of 30 days (for chickens) or 21 days (for turkeys).
3. All reactors must be identified by tail cropping, have leg bands removed, and shall be immediately removed from the flock and from the premise, and sold for immediate slaughter only.

The testing mentioned above must be done by a person licensed by the Livestock Sanitary Board. Although these state pullorum control requirements are imposed by the state at the hatchery level, they are in turn "shifted" to the hatching-egg flock owners.

All other requirements producers met in order to sell eggs to hatcheries were imposed by the hatcheries themselves. Twenty-seven of the forty-seven hatcheries using eggs from Mississippi flocks reported that they had vaccination requirements in addition to the testing requirements imposed by state law. (See Table 4.) Seventeen hatcheries required vaccination for both fowl pox and Newcastle. Ten hatcheries reported that they required vaccination only for fowl pox in addition to the state pullorum testing requirements. The maximum vaccination and testing requirements that hatching-egg flock owners had to meet were pullorum testing, and fowl pox and Newcastle vaccinations. These maximum requirements were required by 17 of the 47 hatcheries. Ten hatcheries required vaccination for fowl pox and testing for pullorum.

Hatching-egg flocks must, of course, have a sufficient number of roosters to ensure fertile hatching eggs. For the hatcheries studied, there was no uniform figure apparent as to the number of roosters required. The number was usually determined by the individual hatcheries to which eggs were sold.

The lowest rooster requirements were 6 per 100 hens. Only 3 of the 47 hatcheries using eggs from Mississippi had requirements this low. (See Table 4.) The largest number of roosters required by any of the hatcheries was 15 per 100 hens. This requirement was made by only 2 of the hatcheries studied. The average number of roosters required per 100 hens was approximately 8. Seventeen hatcheries required seven roosters per 100 hens. This was the largest number of hatcheries with a uniform rooster-hen ratio requirement.

Vaccination, testing, and roosters seem to have been the main additional requirements necessary to qualify for the hatching rather than the regular egg market. The other requirements made of egg producers by hatcheries did not vary much from the practices recommended for quality market egg producers. Thirty-nine of the forty-seven hatcheries that used eggs from Mississippi hatching-egg flocks required the producers to deliver the eggs once per week, while the other eight hatcheries required producers to deliver eggs every three to four days. (See Table 4.)

Most of the hatcheries did not have strict requirements as to the method producers used in holding the eggs prior to
Table 4. Requirements for producers of hatching eggs, commercial chick hatcheries, Mississippi, June 1949-May 1950.

<table>
<thead>
<tr>
<th>Requirements and testing</th>
<th>Number of Hatcheries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pullorum test</td>
<td>20</td>
</tr>
<tr>
<td>Pullorum test &amp; fowl pox vaccination</td>
<td>10</td>
</tr>
<tr>
<td>Pullorum test &amp; fowl pox &amp; Newcastle vaccination</td>
<td>17</td>
</tr>
</tbody>
</table>

Males per 100 hens
6 3
7 17
8 13
9 2
10 8
12 2
15 2

Feed
Breeder mash 9
Any balanced ration 5

Regularity of Delivery
Once per week 39
Twice per week 8

Method of Holding
Egg cellar 10
Any cool place 33
Any place where temperature was 50-60 degrees 4

Grade eggs 39

Humidity 0

Cost of Producer Requirements

Requirements previously discussed obviously make it more expensive to produce eggs for hatcheries than for market. The vaccination, testing, and rooster requirements gave rise to the greatest part of the additional costs necessary to sell eggs to hatcheries. To test for pullorum costs the producer about 3 cents per bird, to vaccinate for fowl pox about 1 cent per bird, and to vaccinate for Newcastle about 1 cent per bird. Therefore, the total vaccination and testing costs to producers who supplied hatcheries with the highest vaccination and testing requirements (pullorum testing, fowl pox and Newcastle vaccinations) would be about 5 cents per bird. The total vaccination and testing costs to producers who supplied eggs to hatcheries with the intermediate (pullorum testing and fowl pox vaccination) and lowest (pullorum testing only) vaccination and testing requirements would be about 4 cents per bird and 3 cents per bird, respectively. Assuming that a hen will lay an average of 165 eggs per year, or about 13.8 dozen, it will cost the hatching-egg producer .39 cents per dozen to meet the vaccination and testing requirements of the 17 hatcheries with the highest requirements, .31 cents for the 10 hatcheries with the intermediate requirements, and .23 cents for the 10 hatcheries with the lowest requirements, if 100 percent of the eggs were sold as hatching eggs. (See Table 5.) However, it is highly improbable that 100 percent of the eggs were sold as hatching eggs the year round, due to the variations in the physical qualities of the

delivery to the hatchery. Thirty-three of the forty-seven hatcheries required only that the producer hold the eggs in a cool place. (See Table 4.) Ten of the hatcheries required that their egg producers hold the eggs in an egg cellar or egg pit while four hatcheries specified a temperature of fifty to sixty degrees for holding eggs. In most cases all of the storage requirements of the hatcheries could be met by the use of an egg cellar or egg pit. Thirty-nine of the forty-seven hatcheries required that the producers to grade their eggs before delivering them to the hatchery.

Only 14 of the 47 hatcheries had any feed requirements for producers — 9 hatcheries required that laying flocks be fed breeder mash while 5 hatcheries required only a balanced ration. Market-egg producers did not feed breeder mash, of course, but the more progressive producers probably fed a balanced ration.
eggs and seasonal operations of the hatchery. This would raise the cost per dozen of those eggs used for hatching purposes. If it is assumed that 75 percent of the producers’ eggs were used for hatching, it would cost the egg producer .52 cents per dozen hatching eggs to meet the vaccination and testing requirements of the 17 hatcheries with the highest vaccination and testing requirements, .41 cents for the 10 hatcheries requiring only pullorum testing and fowl pox vaccination or .31 cents for the 20 hatcheries requiring only pullorum testing. (See Table 5.) Still further, if it is assumed that only 50 percent of the producers’ eggs were used for hatching purposes, it cost the producers .78 cents, .62 cents, or .46 cents per dozen hatching eggs to meet the vaccination and testing requirements of the hatcheries with the highest, intermediate, or lowest vaccination and testing requirements, respectively.

All of the vaccination and testing costs incurred by producers who sold to hatcheries were an addition to the costs of producing market eggs where no vaccinating or testing is required. However, since mature birds are subject to pullorum, fowl pox and Newcastle, vaccinating and testing may be, in the long run, a saving also to the flock owners producing market eggs.

Roosters added more to the costs of producing hatching eggs than did vaccination and testing. These costs were primarily for feed for raising and maintaining the roosters along with the original cost of the cockerel. Also, there may have been other added cost involved in the form of a discount on the portion of the hatching eggs that were sold as market eggs due to their fertility—fertile eggs are of as good quality as infertile eggs when consumed soon after they are produced; however, when eggs spend considerable time in the marketing channels fertile eggs lose quality much faster than the infertile eggs.

Of the three main elements constituting the total costs of keeping roosters in the hatching-egg flock, the cost of feed for maintaining the mature roosters was most important. While the amount of feed that a rooster or hen will consume in a year varies by breeds, the average rate of consumption per year is about 95 pounds for roosters and about 85 pounds for hens.\(^7\) To maintain the number of roosters required by the 3 hatcheries with the highest rooster-hen ratio, it cost the hatching-egg producer .067 pounds of feed for roosters for every pound of feed fed to hens, .168 pounds for the 2 hatcheries with the highest rooster-hen ratio, or .089 pounds to meet the average rooster requirements of all hatcheries studied.

By assuming the cost of feed to be 5 dollars per 100 pounds and the rate of production for hens to be 165 eggs per year, an estimate of the added cost of producing hatching eggs over the cost of producing market eggs due to the cost of maintaining the roosters can be made. (See Table 6.)

The original cost of the cockerels and the cost of raising them to maturity must be added to the cost of maintaining the mature roosters. While the original cost of cockerels varied by breeds, the average cost of a day-old cockerel was about 9 cents.\(^8\) This means that it would cost the hatching-egg producer 54 cents to purchase the number of cockerels required by the hatcheries with the lowest rooster-hen ratio, and $1.35 for the cockerels required by the 3 hatcheries with the highest rooster-hen ratio. It takes an average of about 32 pounds of feed to raise the different breeds of cockerels from 1 day old to maturity.\(^9\) Therefore, it will take 192 pounds of feed to raise the number of cockerels required by the

\(^7\) A statement made by James E. Hill, Department of Poultry Husbandry, Mississippi State College.

\(^8\) op. cit.

\(^9\) This assumes a mortality rate of zero in the cockerels.
Table 5. Costs per dozen hatching eggs due to testing and vaccinating laying flocks, according to the requirements of commercial chick hatcheries when different proportions of the eggs were used as hatching eggs, Mississippi, June 1949-May 1950.1

<table>
<thead>
<tr>
<th>Testing and/or vaccinations required by hatcheries</th>
<th>Percent of eggs used as hatching eggs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100 (cents)</td>
</tr>
<tr>
<td>Pullorum test, fowl pox and Newcastle vaccinations</td>
<td>.39</td>
</tr>
<tr>
<td>Pullorum test and fowl pox vaccination</td>
<td>.31</td>
</tr>
<tr>
<td>Pullorum test</td>
<td>.23</td>
</tr>
</tbody>
</table>

1Calculated by dividing the cost of the testing and vaccination requirements per 100 hens and 8 roosters by the dozens of eggs produced by 100 hens per year. The resulting quotient was divided by the percent of the eggs that was used as hatching eggs.

Table 6. Cockerels—cost per dozen hatching eggs due to purchasing, raising to maturity and maintaining after maturity, the number of roosters required by commercial chick hatcheries when different proportions of the eggs were used as hatching eggs, Mississippi, June 1949-May 1950.

<table>
<thead>
<tr>
<th>No. of roosters required by hatcheries per 100 hens</th>
<th>100</th>
<th>75</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Purchasing1</td>
<td>Raising to maturity2</td>
<td>Maintenance after maturity3</td>
</tr>
<tr>
<td>6</td>
<td>.05</td>
<td>.82</td>
<td>2.43</td>
</tr>
<tr>
<td>7</td>
<td>.05</td>
<td>.96</td>
<td>2.84</td>
</tr>
<tr>
<td>8 (Av.)</td>
<td>.06</td>
<td>1.09</td>
<td>3.25</td>
</tr>
<tr>
<td>9</td>
<td>.07</td>
<td>1.23</td>
<td>3.66</td>
</tr>
<tr>
<td>10</td>
<td>.08</td>
<td>1.37</td>
<td>4.06</td>
</tr>
<tr>
<td>12</td>
<td>.09</td>
<td>1.80</td>
<td>4.88</td>
</tr>
<tr>
<td>15</td>
<td>.10</td>
<td>2.05</td>
<td>6.09</td>
</tr>
</tbody>
</table>

1Calculated by dividing the purchase price of the number of cockerels required per 100 hens by the dozens of eggs laid by 100 hens per year. This quotient was divided by the percent of eggs that was used as hatching eggs.

2Calculated by multiplying the pounds of feed required to raise the required number of roosters to maturity by the price per pound of feed. The resulting product was divided by the dozens of eggs produced by 100 hens per year. This quotient was divided by the percent of the eggs used as hatching eggs.

3Calculated by multiplying the pounds of feed needed to maintain the required number of roosters by the price per pound of feed. The resulting product was divided by the dozens of eggs produced by 100 hens per year. The resulting quotient was divided by the percent of the eggs that was used as hatching eggs.
3 hatcheries with the lowest rooster-hen ratio, 480 pounds for the 2 hatcheries with the highest rooster-hen ratio, and 256 pounds for the average rooster-hen ratio of all hatcheries studied.\textsuperscript{10}

The amount added to the cost of producing hatching eggs over market eggs due to the cost of cockerels and the feed to raise them can be estimated when different proportions of the producers' eggs are used as hatching eggs. (See Table 6.)

It will be observed that the additional cost of producing hatching eggs, due to the rooster requirements, increased as the percentage of eggs used for hatching purposes decreased. However, this would not necessarily be true if the hatchery operated only part of the year allowing the producer the possibility of disposing of the roosters. This would avoid the maintenance feed costs and at the same time permit the producer to sell infertile market eggs.

All of the hatchery requirements other than those pertaining to vaccination, testing, and roosters, seem to have been relatively insignificant from a cost standpoint. Methods specified for the producers to hold eggs prior to delivery to the hatchery apparently could be met with a very small cost and in most cases without an additional cash outlay. This is especially applicable to the 33 hatcheries who reported that they only required that producers hold the eggs in some cool place. The most rigid holding requirements could be met with the use of an egg cellular or pit.

The necessity of grading eggs, as required by 39 hatcheries, probably would have a slight effect on raising the cost of hatching-egg production. This added cost, however, would consist mostly of the producer's time consumed in the grading process. This would involve sorting by hand on the basis of size, shape, and weight.

The delivery requirements reported by the hatcheries were probably met with very little cost in the form of either the producers' time or cash. This is especially applicable for the 39 hatcheries which required the producers to deliver their eggs only once per week. Most farmers could probably make deliveries at least once per week without incurring any additional cost, combining the delivery with other activities.

Since the vaccination, testing, and rooster requirements gave rise to at least the major part of the increased costs, a summation of the costs incurred due to these requirements will give the primary costs of producing hatching eggs over the costs of producing market eggs. (See Tables 5 and 6.) Assuming that 100 percent of the producers' eggs were sold as hatching eggs, the primary cost of producing hatching eggs over the costs of producing market eggs was 8.63 cents per dozen eggs for hatcheries with the maximum vaccination, testing and rooster requirements, 4.77 cents for the hatcheries with average vaccination, testing and rooster requirements, and 3.53 cents for the hatcheries with pullorum testing and the minimum rooster requirements. If it is assumed that only 75 percent of the eggs were sold as hatching eggs and that the producer did not dispose of any of his roosters the primary costs of producing hatchings eggs over the cost of producing market eggs was 11.50 cents per dozen for hatcheries with maximum requirements, 6.27 for the hatcheries with average requirements, and 4.71 cents for the hatcheries with pullorum testing and the minimum rooster requirements. If it is assumed that only 50 percent of the producer's eggs were sold as hatching eggs and he did not sell his roosters, primary costs of producing hatching eggs over the cost of producing market eggs was 17.26 cents per dozen for hatcheries with the maximum requirements, 9.42

\textsuperscript{10} A statement made by James E. Hill, Department of Poultry Husbandry, Mississippi State College.
cents for hatcheries with average requirements, and 7.38 cents for the hatcheries with pullorum testing and minimum rooster requirements.\textsuperscript{11}

Relative Prices of Hatching Eggs
And Market Eggs

The average prices received by hatching-egg producers for their eggs relative to the average prices received by market-egg producers will give an indication of the extent to which hatching-egg producers were compensated for the extra costs that were incurred.

However, in studying the relative prices of hatching eggs and market eggs consideration must be given to the relative qualities of the hatching eggs and the market eggs for which these prices were paid. Most of the hatching-egg producers were probably much more specialized and produced better quality eggs than the average of the market-egg producers. Even if these hatching eggs were sold as market eggs they would probably bring a higher average price than most of the eggs that were produced for and sold as market eggs. To this extent the comparison between market eggs and hatching eggs is inadequate.

During all months studied from June 1949 to May 1950 prices received by producers for hatching eggs were considerably more than the prices received for market eggs. Hatching-egg producers enjoyed an average margin of 27.3 cents per dozen more for their eggs than the average price received by market-egg producers. (See Table 7.) Under the assumed conditions this gave the hatching-egg producer an average of 10.1 cents per dozen more for his eggs than the market-egg producer above the maximum primary hatching-egg production cost, even if it is assumed that only 50 percent of the producers' eggs were used at hatching eggs and he did not dispose of his roosters in the off season. In May, the difference in the price between hatching eggs and market eggs was largest. Even if it is assumed that the producers were able to sell only 50 percent of their eggs as hatching eggs, the hatching-egg producers were receiving about 18.8 cents per dozen more for their eggs above the maximum primary production costs than the market-egg producers. However, if it is assumed that the producer sold only 50 percent of his eggs as hatching eggs, the amount that the hatching-egg price exceeded the market-egg price during October, November, and December was less than the primary production costs by an average of about .7 of a cent. On the other hand, if it is assumed that 75 percent of the producers' eggs were sold as hatching eggs the hatching-egg price would have exceeded the market-egg price by more than the maximum primary cost of production during all months studied, or by an average of 17.88 cents per dozen for the 12 months from June 1949 to May 1950.

Aid Given Hatching-Egg Producers By
The Hatcheries In Disposing Of Eggs
Not Meeting Hatching-Egg
Requirements

Thirty of the forty-seven hatcheries which obtained part or all of their supply of hatching eggs from Mississippi hatching-egg producers reported that they paid the producer hatching-egg prices for all of the eggs received and any eggs that did not meet hatching-egg specifications were sold as market eggs by the hatchery. (See Table 8.) However, all of the hatcheries in this group required the producer to grade the eggs before bringing them

\textsuperscript{11}These cost figures do not include the cost to the hatching-egg producer of breeder mash, which cost an average of about 15 cents per 100 pounds more than regular laying mash. Only 9 of the hatcheries studied required producers to follow this practice of feeding breeding mash. Where this practice is followed hatching flocks with minimum rooster requirements would have their cost increased .99 cents per dozen eggs if they sold 100 percent of the assumed production as hatching eggs. Flocks with average or maximum rooster requirements would have their cost increased by 1.01 and 1.08 cents per dozen, respectively.
Table 7. Average prices received by producers for hatching eggs and market eggs, Mississippi, June 1949-May 1950

<table>
<thead>
<tr>
<th>Month</th>
<th>Average price received for hatching eggs</th>
<th>Average price received for market eggs</th>
<th>Difference in hatching and market egg price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(cents per dozen)</td>
<td>(cents per dozen)</td>
<td>(cents per dozen)</td>
</tr>
<tr>
<td>June</td>
<td>69.3</td>
<td>38.1</td>
<td>31.2</td>
</tr>
<tr>
<td>July</td>
<td>74.6</td>
<td>40.4</td>
<td>34.2</td>
</tr>
<tr>
<td>August</td>
<td>74.7</td>
<td>46.0</td>
<td>28.7</td>
</tr>
<tr>
<td>September</td>
<td>73.0</td>
<td>53.4</td>
<td>19.6</td>
</tr>
<tr>
<td>October</td>
<td>73.6</td>
<td>56.6</td>
<td>17.0</td>
</tr>
<tr>
<td>November</td>
<td>74.4</td>
<td>57.8</td>
<td>16.6</td>
</tr>
<tr>
<td>December</td>
<td>71.9</td>
<td>56.0</td>
<td>15.9</td>
</tr>
<tr>
<td>January</td>
<td>68.4</td>
<td>39.5</td>
<td>28.9</td>
</tr>
<tr>
<td>February</td>
<td>66.8</td>
<td>31.8</td>
<td>35.0</td>
</tr>
<tr>
<td>March</td>
<td>61.7</td>
<td>29.8</td>
<td>31.9</td>
</tr>
<tr>
<td>April</td>
<td>63.0</td>
<td>29.5</td>
<td>33.5</td>
</tr>
<tr>
<td>May</td>
<td>64.3</td>
<td>28.5</td>
<td>36.0</td>
</tr>
<tr>
<td>Average</td>
<td>69.6</td>
<td>42.2</td>
<td>27.3</td>
</tr>
</tbody>
</table>

1 Source: Survey of 47 commercial chick hatcheries, Mississippi, 1950.

to the hatchery. The hatchery assumed no responsibility in helping the producer dispose of those eggs culled when graded by the producers. Therefore, in effect, none of the hatcheries paid hatching-egg prices for all eggs produced under conditions specified for hatching-egg production. Probably the hatcherymen would allow the producer a small error in grading and the producer benefited by the amount of the allowable error.

Nine hatcheries reported that they returned all eggs to the producer which did not meet specifications, while 5 hatcheries reported that the producers graded so carefully that practically all of the eggs received from the producers were used for hatching. Three hatcheries acted as a free marketing agency for the producer; that is, all eggs that did not meet hatching-egg specifications were sold by the hatchery for the producer and the producers were paid the price the hatchery received for them.

Aid Given Producers by Hatcheries in Disposing of Eggs During “Off-Hatching Season”

The percentage of capacity at which most of the hatcheries in Mississippi operate is quite seasonal, due largely to the seasonality of demand for baby chicks. The policy of the hatcheries in helping the producer dispose of hatching eggs produced during “off-hatching seasons” will influence the economics of hatching-egg production.

Fourteen of the hatcheries that used eggs from Mississippi flocks provided a relatively dependable market throughout the year. Twelve of these reported that they bought all the eggs from their hatching-egg flocks that met requirements the year round and paid hatching-egg prices. All 12 of these hatcheries “staggered” their hatching-egg flocks so that eggs

Table 8.1 Aid given to hatching-egg producers by hatcheries in disposing of eggs not meeting hatching-egg requirements, Mississippi, June 1949-May 1950.

<table>
<thead>
<tr>
<th>Method of disposition used by hatchery</th>
<th>Number of hatcheries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sold as market eggs</td>
<td>30</td>
</tr>
<tr>
<td>Returned to producer</td>
<td>9</td>
</tr>
<tr>
<td>Sold as market eggs for producer</td>
<td>3</td>
</tr>
<tr>
<td>All eggs received used as hatching eggs</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>47</td>
</tr>
</tbody>
</table>

1 Source: Survey of 47 commercial chick hatcheries, Mississippi, 1950.
would be available when needed. An additional 2 hatcheries reported that they maintained an outlet with other hatcheries so that if they did not need the eggs they could sell them to other hatcheries. Two of these hatcheries, however, did not take title to the eggs, but rendered their services free of charge to the producer in the marketing process. (See Table 9.)

Eighteen of the hatcheries helped their producers sell as market eggs the eggs not needed for hatching. Ten of these 18 bought the eggs from the producer (took title to them) at market-egg prices and resold them as market eggs. Eight hatcheries acted as market agencies for the hatching-egg producers in the sense that they helped their producers find market outlets. These 8 hatcheries, however, did not actually take title to the eggs. These hatcheries that helped hatching-egg producers dispose of eggs as market eggs usually had regular customers such as cafes, hotels, restaurants, or some other type customer who wanted high quality eggs for immediate consumption. Therefore, the eggs were not discounted in price due to their fertility. This service is especially important to the hatching-egg producer when the hatchery uses some of the producers’ eggs as hatching eggs during most of the months, but the number it uses fluctuates up and down from month to month. Under these conditions the flock owner could not dispose of his roosters and produce infertile market eggs at any time during the year.

Fifteen hatcheries reported that they gave the producer no assistance at all in disposing of eggs during “off-hatching seasons.” It is significant that most of these hatcheries operated for only 4 to 6 months during the year and then stopped completely. Therefore, the producer could dispose of his roosters during “off-hatching seasons” and sell quality market eggs for the remainder of the year.

### The Costs of Hatchery Production And The Investment In Hatchery Facilities

An analysis of the composition and nature of the total costs incurred by hatcheries gives a further indication of stability of the hatchery industry as well as an indication of the potentialities for expansion. For the purpose of arriving at the total costs and the nature of these costs, the hatchery costs are analyzed under three groups:

1. Investment cost which consists of land, building and equipment;
2. Labor costs, excluding labor of owner-operators and his family;
3. Supplies and miscellaneous expenses.

In this cost analysis the data as supplied by 59 hatcheries are used. Of the 65 hatcheries that participated in the study, two were custom hatcheries which were excluded in the cost analysis because their costs were not comparable with other hatcheries and the data from five additional hatcheries were unsuitable for cost analysis for various reasons.

For the purpose of analysis the hatcheries are grouped into seven groups according to their incubator capacity. These groups are: under 15,000; 15,000-29,999; 30,000-44,999; 45,000-59,999; 60,000-74,999; 75,000-89,999, and 90,000 and above.
Investment

The following method was used in determining investment in land, buildings, and equipment. The original investment, year investment was made, and the percent of the investment that was used by the hatchery business were obtained separately for land, buildings and different items of equipment. These data were obtained by use of a formal schedule taken through a personal interview with the hatchery operator. The original investments were then adjusted so that they were expressed in terms of 1949 equivalents. The index of the costs of materials used in farm building, the index of farm real estate values and the index of farm machinery costs respectively, were used to bring investments in buildings, land and equipment up to a 1949 equivalent. This was done by dividing the particular index for the year in which the investment items were purchased by the index in 1949 and then dividing the resulting index by the purchase price of the investment item and multiplying by 100.

The investment in buildings and equipment during the period June 1949-May 1950 was calculated by depreciating adjusted original investment on the basis of the age of the items involved. All equipment was depreciated at the rate of 10 percent per year using the straight-line method with 10 percent of the adjusted original value reserved for "junk value." Buildings were depreciated by the same method except the rate was four percent with 10 percent of adjusted original value reserved for "junk value." The adjusted original investment in land was considered equal to the 1949 investment. In cases where the items involved were not used 100 percent in the hatchery business, the 1949 investment was multiplied by the percentage which the operator estimated it was used in the hatchery business to obtain the 1949 investment in the hatchery business.

In some cases the hatcherymen had investment in land, buildings and equipment on which they were unable or did not give adequate information to determine their investment. In such cases the average investment of the group was used to represent their investment.

Only the 45,000-59,999 and the 60,000-74,999 size groups failed to have a larger total average investment than the hatcheries in any preceding size group. This resulted from the relative number of hatcheries in the 60,000-74,999 group that had rental land and buildings and the relatively low investment in all items of equipment as well as in land and buildings in the 45,000-59,999 size group.

The investment in incubators was of primary importance. If adequate incubators were available, it may have been possible to operate with a relatively small investment in other items of equipment. The importance of incubators relative to other equipment used by hatcheries probably explains the fact that the total average investment in incubators was several times as large as the total average investment in all other items of hatchery equipment. (See Table 10.)

The primary effect most of the other items of hatchery equipment had on the quantity of chicks produced was related to the "business" practices of the hatchery. For example, a hatchery that produced chicks primarily for broiler growers did not need as much space as a hatchery of equal capacity that produced chicks for customers who bought chicks at irregular intervals. This is due to the fact that "broiler" hatcheries usually had their chicks sold before the chicks were hatched and they were taken out of the incubators.

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11 1949 equivalents are defined as the estimated cost of these items if they had been purchased under the 1949 general price level.

12 These indexes were used because indexes relating directly to the cost of hatchery, buildings, land and equipment were not available. However, it is believed that these indexes fairly adequately reflect the changes in the cost of the particular items in the hatchery industry which they are used to represent.
Table 10*. Average investment of commercial chick hatcheries in land, buildings, and equipment, according to size groups, Mississippi, 1950, and average depreciation, June 1949-May 1950.

<table>
<thead>
<tr>
<th>Incubator capacity</th>
<th>No. of hatcheries</th>
<th>Av. incubator capacity</th>
<th>Land</th>
<th>Building</th>
<th>Incubators</th>
<th>Brooders</th>
<th>Car &amp; truck</th>
<th>Other equip.</th>
<th>Av. total equip.</th>
<th>Av. depreciation</th>
<th>Cost of investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-14,999</td>
<td>No.</td>
<td>Eggs</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>0-14,999</td>
<td>15**</td>
<td>8,383</td>
<td>236</td>
<td>891</td>
<td>595</td>
<td>190</td>
<td>332</td>
<td>56</td>
<td>1,173</td>
<td>2,075</td>
<td>214</td>
</tr>
<tr>
<td>15,000-29,999</td>
<td>21,139</td>
<td>1,174</td>
<td>1,281</td>
<td>1,373</td>
<td>238</td>
<td>276</td>
<td>60</td>
<td>1,947</td>
<td>3,876</td>
<td>8715</td>
<td>326</td>
</tr>
<tr>
<td>30,000-49,999</td>
<td>37,862</td>
<td>765</td>
<td>3,969</td>
<td>3,149</td>
<td>651</td>
<td>862</td>
<td>411</td>
<td>5,073</td>
<td>8,715</td>
<td>664</td>
<td>395</td>
</tr>
<tr>
<td>45,000-59,999</td>
<td>5</td>
<td>54,019</td>
<td>723</td>
<td>2,418</td>
<td>3,676</td>
<td>509</td>
<td>471</td>
<td>198</td>
<td>4,855</td>
<td>7,996</td>
<td>823</td>
</tr>
<tr>
<td>60,000-74,999</td>
<td>2</td>
<td>62,500</td>
<td>150</td>
<td>4,500</td>
<td>4,473</td>
<td></td>
<td></td>
<td>935</td>
<td>85</td>
<td>5,494</td>
<td>7,818</td>
</tr>
<tr>
<td>75,000-90,000</td>
<td>3</td>
<td>80,333</td>
<td>1,484</td>
<td>3,262</td>
<td>11,150</td>
<td>443</td>
<td>792</td>
<td>450</td>
<td>12,836</td>
<td>17,582</td>
<td>852</td>
</tr>
<tr>
<td>90,000 &amp; above</td>
<td>7</td>
<td>142,571</td>
<td>813</td>
<td>6,868</td>
<td>13,311</td>
<td>196</td>
<td>2,587</td>
<td>667</td>
<td>16,716</td>
<td>21,030</td>
<td>1,993</td>
</tr>
<tr>
<td>Average, all</td>
<td></td>
<td>43,221</td>
<td>758</td>
<td>2,572</td>
<td>3,822</td>
<td>337</td>
<td>759</td>
<td>240</td>
<td>5,112</td>
<td>7,699</td>
<td>712</td>
</tr>
</tbody>
</table>

*Source: Survey of 59 commercial chick hatcheries, Mississippi, 1950.

**Three hatcheries in each of these groups rented their land and buildings. The average investment in land and buildings was obtained by dividing the number of hatcheries that owned their land and buildings into the total investment in land and buildings, respectively.

***One hatchery rented its land and buildings (average investment was obtained same as in footnote 2).

****One hatchery rented its incubators (average investment was obtained by dividing the number of hatcheries that owned their incubators into the total investment in incubators.)

*****Includes egg and chick box holding racks, fans, heaters, tray cleaners, sprayers, auxiliary power facilities, and office equipment.

******Calculations: Depreciation for the year, June 1949-May 1950, 4 percent for buildings and 10 percent on all equipment.
and immediately delivered to the broiler producer. More broiler chicks were produced by hatcheries in the higher capacity groups. This explains the relatively small investment in brooders by the hatcheries in the upper capacity groups. On the other hand, the average investment in cars, trucks, and office equipment tended to increase as the capacity of the hatcheries increased.

The average investment in buildings was second only to the average investment in incubators. Most of the hatcheries with a capacity of less than 30 thousand were located in buildings also housing other types of businesses. Thus, only a part of the building was used for the hatchery business. For this reason the buildings of these smaller hatcheries were probably of better quality than that indicated by the investment in buildings. Hatcheries with capacities of 30 thousand and greater usually were located in buildings devoted primarily to the hatchery business.

The average investment in land did not seem to bear a very close relationship to the size of the hatcheries. It seems likely that the location of the hatchery affected the investment in land more than anything else. The most dis-proportionate variation in the investment in land occurred in the group with capacities of 60,000-74,999. Only one of the hatcheries in this group owned its land and this hatchery was located in a rural area. The investment in land probably would reflect the potential quantity of chicks that could be produced only in so far as the investment reflected the desirability of the location of the hatchery from the standpoint of demand for chicks.

Labor Costs

Labor costs were divided between skilled and common labor. This division was made because it was felt that costs which arose from the use of skilled labor had a tendency to be relatively "fixed," especially during the hatching season, while labor costs that arose from the use of common labor were probably "variable." An attempt was made to obtain the costs that were incurred by hatcheries for common and skilled labor for the period, June 1949-May 1950, by asking the hatcherymen the number of laborers, the rate of pay, the period for which the laborers were employed, the type of work done, and the percent of the laborer's time that was used in the hatchery. Those hatcheries for which information relative to labor costs could not be obtained were assigned the average labor costs of the other hatcheries within the same size group.

The hatcheries with less than 30 thousand incubator capacity had a relatively small cash outlay for labor costs. (See Table 11.) Cash labor costs for these small hatcheries were low because in most cases the hatcheries were operated entirely by the owner and his wife, with the aid of a little seasonal labor that was hired during peak hatching seasons to help with tray washing, cleaning up the hatchery, and setting eggs in the incubators. The hatcheries with less than a 15-thousand egg capacity used no skilled labor at all. Several of the hatcheries in this size group were operated primarily as "sideline" businesses on the part of the hatchery operators, in which cases the operators usually attended to the hatchery business in their spare time.

The hatcheries with incubator capacities of 30 thousand and more seem to

14Skilled labor: productive efforts of those employees who were employed in positions that required a relatively high degree of training and who worked on at least a monthly salary.

15Common labor: the productive efforts of those employees who were employed in positions that required no preliminary training and usually worked by the hour or week.

16An estimate of the labor contribution of owner and family was obtained but due to several difficulties, only hired labor was used in figuring labor cost.
Table 11.1  Average yearly labor costs per hatchery by types of labor used according to size groups, commercial chick hatcheries, Mississippi, June 1949-May 1950.2

<table>
<thead>
<tr>
<th>Incubator capacity</th>
<th>Hatcheries</th>
<th>Skilled</th>
<th>Common</th>
<th>Average total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-14,999</td>
<td>15</td>
<td>$</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>15,000-29,999</td>
<td>14</td>
<td>184</td>
<td>108</td>
<td>292</td>
</tr>
<tr>
<td>30,000-49,999</td>
<td>13</td>
<td>634</td>
<td>590</td>
<td>1,224</td>
</tr>
<tr>
<td>45,000-59,999</td>
<td>5</td>
<td>1,476</td>
<td>312</td>
<td>1,788</td>
</tr>
<tr>
<td>60,000-74,999</td>
<td>2</td>
<td>2,460</td>
<td>520</td>
<td>2,980</td>
</tr>
<tr>
<td>75,000-89,999</td>
<td>3</td>
<td>1,325</td>
<td></td>
<td>1,325</td>
</tr>
<tr>
<td>90,000 &amp; above</td>
<td>7</td>
<td>4,835</td>
<td>1,908</td>
<td>6,743</td>
</tr>
<tr>
<td>Average all hatcheries</td>
<td>1,033</td>
<td>449</td>
<td></td>
<td>1,482</td>
</tr>
</tbody>
</table>

1Source: Survey of 59 commercial chick hatcheries, Mississippi, 1950.
2Does not include the time of the hatchery owner.

have required relatively larger cash expenditures for labor than the smaller hatcheries. After the hatcheries reached a capacity of 30 thousand, the owners usually needed some regular help in addition to temporary help during peak hatching seasons. The larger hatcheries usually required relatively more skilled labor than the smaller ones, primarily because the skilled labor requirements of the small hatcheries were met by the family of the operator. The hatcheries with capacities as much as 45 thousand were usually operated by a hired operator or hatcheryman instead of by the owner, who assumed a supervisory role and had some other business to which he devoted part of his time. Some of these larger “plants,” especially those with capacities in excess of 60 thousand, also employed a night hatcheryman who could observe the incubators at night to see that they remained at the proper temperature. These regular hatcherymen were most common in the hatcheries with a capacity of 90 thousand and more. Generally, when regular operators were employed in hatcheries of less than 90 thousand capacity some other type of business was operated in connection with the hatchery, so that when the man was not busy in the hatchery he could utilize his time in the related business. Therefore, only a fraction of his salary was charged to the hatchery. The smaller the hatchery the more common was this situation. In addition to the hatcherymen, the larger hatcheries usually employed one or two egg trayers who were well trained in the technical phase of the hatchery operation. These employees were classed as skilled. Common laborers were used to help the regular egg trayers with the egg laying and the cleaning of the incubators and hatchery building, especially during peak hatching seasons. In some cases skilled workers also performed the functions of unskilled laborers. This seems to be especially applicable to the hatcheries in the 75,000-89,999 size group. Most of the hatcheries did not employ an appreciable amount of specialized office help.

Supplies and Miscellaneous Expenses

In attempting to arrive at the costs of supplies and miscellaneous expense items from June 1949-May 1950, problems of incomplete data were dealt with in much the same way as that of labor costs. That is, if a hatcheryman stated that he used certain supplies or incurred certain miscellaneous expenses, but did not know these actual costs, the average cost of each item to other hatcheries in the same size group was used.

Miscellaneous expenses are presented under the headings of Advertising, Power, Automobile Expenses, Parcel Post, and Express Expenses, and Other Expenses. This division is made because it
Table 12. Average yearly cost per hatchery of supplies and miscellaneous expenses for commercial chick hatcheries, according to size groups, Mississippi, June 1949 - May 1950.

<table>
<thead>
<tr>
<th>Hatcheries</th>
<th>Chick eggs &amp; pads</th>
<th>Fumigants</th>
<th>Miscellaneous expenses</th>
<th>Power</th>
<th>Total expenses</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10,000</td>
<td>$1,750</td>
<td>40</td>
<td>$86</td>
<td>$1,871</td>
<td>$3,227</td>
</tr>
<tr>
<td>10,000-20,000</td>
<td>2,442</td>
<td>7</td>
<td>77</td>
<td>1,567</td>
<td>3,025</td>
</tr>
<tr>
<td>20,000-30,000</td>
<td>3,450</td>
<td>10</td>
<td>100</td>
<td>2,500</td>
<td>5,450</td>
</tr>
<tr>
<td>30,000-45,000</td>
<td>4,908</td>
<td>14</td>
<td>145</td>
<td>3,214</td>
<td>7,467</td>
</tr>
<tr>
<td>45,000-59,999</td>
<td>6,458</td>
<td>18</td>
<td>181</td>
<td>3,914</td>
<td>10,283</td>
</tr>
<tr>
<td>50,000-84,999</td>
<td>8,908</td>
<td>21</td>
<td>215</td>
<td>4,500</td>
<td>13,958</td>
</tr>
<tr>
<td>75,000-99,999</td>
<td>11,420</td>
<td>24</td>
<td>249</td>
<td>5,000</td>
<td>13,419</td>
</tr>
<tr>
<td>90,000 &amp; above</td>
<td>13,950</td>
<td>27</td>
<td>279</td>
<td>5,500</td>
<td>15,449</td>
</tr>
</tbody>
</table>

2. Includes wire, twine, staples, caging, excavation, fuel, water, steam, and building maintenance.
3. Includes telephone, insurance, taxes, fuel for heating building, water, correspondence material and rent.

is felt that Advertising, Power, Automobile Expenses, Parcel Post and Express Expenses are "variable" where Other Expenses are "variable" but since they made up such a large proportion of the total expenses some of the costs of major supply items are presented separately in order to show their individual importance. (See Table 12.)

Hatching eggs and chick boxes and pads made up the largest part of the supply costs for all hatcheries. The average total cost of all supplies for all hatcheries was $13,043, the average total cost of hatching eggs for all hatcheries was $12,395, and the average total cost of chick boxes and pads for all hatcheries was $577. Thus hatching eggs and chick boxes and pads made up about 95 percent and 4 percent respectively, of the total average supply costs for all size groups. Of the remaining 1 percent, disinfectants and fumigants made up less than one-half, and "other supplies" made up the remainder.

The total average miscellaneous expenses showed an over-all tendency to increase as the size of the hatcheries increased, but there was a considerable amount of fluctuation in this over-all tendency. (See Table 12.) This fluctuation can probably be attributed to the fact that the cost of most of the items of expense to the hatcheries varied more with the "business practices" of the hatcheries than with their capacity. For example, if the hatcheries in any size group had a policy of delivering a large part of the chicks they sold, they probably had a relatively high automobile expense. Parcel post and express expenses were probably influenced largely by the quantity of chicks that were delivered by these methods. The variations in power expenses were caused largely by technological factors. Variations in power costs for any hatchery of a given capacity may be attributed to the types of incubators, the number of incubators making up the given capacity, the capacity at which the
incubators were operated, and other technological factors beyond the scope of this study.

**Costs of Hatching a Chick**

The total costs incurred by hatcheries in producing a chick are divided into "fixed" and "variable" costs. "Fixed" costs included all skilled labor and office help that was used in the hatchery, that part of the miscellaneous expenses representing expenditures for telephone, insurance, taxes, water, correspondence materials, rent, and cost of investment. The investment cost was composed of one year's depreciation on buildings and all items of equipment, plus an allowance of 5 percent of the investment in land, buildings, and equipment as of May 1950. The "variable" costs were composed of all supplies used by the hatcheries, "unskilled" labor costs, and that part of Miscellaneous Expenses composed of power costs, gas for automobiles and/or trucks used in the hatchery, and parcel post and railway express charges.

"Fixed" costs made up a relatively small part of the total costs. The average "fixed" cost per chick ranged from a low of 10.5 percent of the total cost per chick for the hatcheries in the 60,000-74,999 size group, to a high of 23.3 percent of the total cost per chick for the hatcheries in the 30,000-44,999 size group. (See Table 13.) Hatcheries in the size groups that had the lowest "fixed" cost relative to total cost per chick also had the lowest absolute "fixed" cost per chick, 0.9 cent. The hatcheries in the group that had the highest fixed cost relative to total cost per chick also had the highest absolute fixed cost per chick. "Plants" in the 30,000-44,999 size group were the only hatcheries with a fixed cost per chick as high as 2.4 cents. The hatcheries in the 4 size groups over 44,999 all had an average fixed cost per chick of less than 1.5 cents and the hatcheries in the two size groups of less than 30,000 had average "fixed" costs per chick of less than 2.5 cents.

For all size groups, over 84 percent of the total costs incurred by hatcheries in producing a chick was variable costs. Variable costs per chick for the different size groups are shown in Table 13.

The relationship of high "variable" costs relative to "fixed" costs indicates that commercial hatchery production is flexible and sensitive to changes in chick prices. In an industry whose costs are largely variable the number of firms and their production levels are usually subject to rapid variations. It does not take a very sizable increase in price to attract new firms nor a very sizeable decrease in price to depress the marginal firms. With high variable costs relative to total costs it would probably take only a small decrease in the price of chicks for hatcheries to fail to recover more than their variable costs, assuming that hatcheries are not operating on a large margin. A hatchery is not likely to continue to produce unless the price of chicks will at least cover the variable costs incurred in producing the chicks. Conversely, a small increase in the price of chicks would probably be sufficient to attract new hatcheries into the industry since fixed costs make up such a small percentage of the total costs of production.

The average total cost of producing a chick increased as the size of the hatchery increased up through the 30,000-44,999 size group, where the average total cost was 10.3 cents, the highest for any size group. In the 45,000-59,999 group the average total cost per chick declined to 9.5 cents and in the 60,000-74,999 group it declined 8.6 cents. After this size group was passed, average total costs began to increase again.

The extent to which hatchery operators fully utilized their existing hatchery facilities influenced the average cost per chick as well as did the size of the hatchery. The influence of the size of the hatchery, however, seems to have been the most important. The intensity at which the hatchery facilities were used
Table 13. Average yearly fixed, variable, and total costs per chick; percent average variable and average fixed costs are of average totals costs; and the number of times incubators were filled with eggs, according to size groups, commercial chick hatcheries, Mississippi, June 1949-May 1950.

<table>
<thead>
<tr>
<th>Incubator capacity</th>
<th>Hatcheries</th>
<th>Average fixed cost per chick</th>
<th>Average variable cost per chick</th>
<th>Average total cost per chick</th>
<th>Percent average fixed is of average total cost</th>
<th>Percent average variable is of average total cost</th>
<th>Average No. of times incubators were filled with eggs</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-14,999</td>
<td>15</td>
<td>1.3</td>
<td>6.9</td>
<td>8.2</td>
<td>15.9</td>
<td>84.1</td>
<td>4.3</td>
</tr>
<tr>
<td>15,000-29,999</td>
<td>14</td>
<td>2.2</td>
<td>7.8</td>
<td>10.0</td>
<td>22.0</td>
<td>78.0</td>
<td>2.3</td>
</tr>
<tr>
<td>30,000-44,999</td>
<td>13</td>
<td>2.4</td>
<td>7.9</td>
<td>10.3</td>
<td>23.3</td>
<td>76.7</td>
<td>3.4</td>
</tr>
<tr>
<td>45,000-59,999</td>
<td>5</td>
<td>1.3</td>
<td>8.2</td>
<td>9.5</td>
<td>13.7</td>
<td>86.3</td>
<td>4.8</td>
</tr>
<tr>
<td>60,000-74,999</td>
<td>2</td>
<td>0.9</td>
<td>7.7</td>
<td>8.6</td>
<td>10.5</td>
<td>89.5</td>
<td>8.8</td>
</tr>
<tr>
<td>75,000-89,999</td>
<td>3</td>
<td>1.3</td>
<td>8.0</td>
<td>9.3</td>
<td>14.0</td>
<td>86.0</td>
<td>4.2</td>
</tr>
<tr>
<td>90,000 &amp; above</td>
<td>7</td>
<td>1.4</td>
<td>8.8</td>
<td>10.2</td>
<td>13.7</td>
<td>86.3</td>
<td>6.5</td>
</tr>
<tr>
<td>Average, all hatcheries</td>
<td></td>
<td>1.5</td>
<td>8.3</td>
<td>9.8</td>
<td>15.3</td>
<td>84.7</td>
<td>5.0</td>
</tr>
</tbody>
</table>

1Source: Survey of 59 commercial chick hatcheries, Mississippi, 1950.
2Does not include labor of the hatchery owner.
3Obtained by dividing the total incubator capacity into the total number of eggs set.

would affect, primarily, the fixed cost per chick; that is, as more chicks were hatch- ed at a given fixed cost, the lower would be the fixed cost per chick until the hatch- ery reached its full capacity. The hatch- eries in the 60,000-74,999 size group used their available facilities more intensely than did hatcheries in any other size group. (See Table 13.) Conversely, the hatcheries in the size group, 75,000-89, 999, used their hatchery facilities to about the same intensity as those in the 0-14,999 size group but the average total cost per chick was nine-tenths of a cent lower for the hatcheries in the 0-14,999 size group. This is probably due to the fact that the very small hatcheries operated mostly in late winter and early spring when hatching egg cost was relatively lower than other seasons and they also had little hired skilled labor.

**Relationship of Costs to Price of Chicks**

The hatcheries in all size groups seemed to have received, on an average, a price that was sufficient to insure an “adequate margin” between the price per chick and the average total cost of producing a chick. (See Table 14.) The average margin between the price of chicks and the average total cost of production for the hatcheries in all size groups was about 3.2 cents per chick. The smallest margin between the price received per chick and the average total cost of producing a chick was an average of 2.6 cents for hatcheries in the size group of 90,000 and above. The highest margin between the price received per chick and the average total cost per chick was an average of 4.8 cents for hatcheries in the 0-14,999 size group. The margin between average total cost of production and the price received per chick was less than 3 cents per chick for the hatcheries in only three size groups. It must be realized that these margins also represent returns to labor for owner-operators and their families.

These relationships between the price of chicks and the cost of producing chicks indicate that the hatcheries in general are “economically sound.” (See Table 14.) The indications are that the hatchery industry is likely to expand if the price of chicks remains at about the same level or eration. The price of chicks may decline substantially before the hatcheries fail to increases relative to cost of hatchery op-
produce in the "long run" (they would fail to produce in the "long run" when the price received for chicks will not at least cover total costs). The price may decline even further (where price of chicks at least covers variable costs) before production is likely to be cut substantially in the "short run."

**Effects Of Egg Requirements Of Hatcheries On The Potentials Of Hatcheries As An Egg Market**

**Egg Requirements of Hatcheries and Egg Production in Mississippi**

The economic desirability of hatcheries as an egg market apparently will be influenced by the total demand for hatching eggs and the seasonal variation of this demand relative to the seasonal variation in egg production.

The total number of eggs used by commercial chick hatcheries from June 1949 to May 1950 made up about 4 percent of the total eggs produced in Mississippi during the same period. Since hatcheries used such a small proportion of the total eggs produced, it may appear that they would be relatively unimportant as a market outlet for eggs. The demand for eggs, as for most other agricultural products, is relatively inelastic.\(^1\)\(^6\) If producers had been forced to sell hatching eggs as market eggs, it is quite probable that market-egg prices would have been depressed significantly. However, the influence of the demand for hatching eggs on the price of market eggs was made greater by the seasonal nature of this demand. The greater the concentration of hatching-egg requirements during the season of peak egg production, the more effective was this demand in alleviating the "seasonal price strain" on the egg market. At the same time, if hatcheries required most of their eggs during the peak seasons of egg production, they were probably able to obtain their eggs at lower costs than if they had bid the major portion of their egg supply away from market uses during the season when eggs were relatively scarce.

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\(^1\)Source: Survey of 59 commercial chick hatcheries, Mississippi, 1950.

\(^2\)Does not include labor cost of the hatchery owner or his family.

\(^3\)Weighted average price.
Both the setting of eggs by hatcheries and the production of eggs in Mississippi had a very distinct seasonal pattern during the period June 1949-May 1950. In general, the seasonal pattern of egg settings by hatcheries corresponded closely to the seasonal pattern of egg production. Of the total eggs used by hatcheries, the largest proportion was used during the season when egg production was greatest. The egg requirements of hatcheries were concentrated largely in the period January-May while egg production was concentrated largely in the period February-June. (See Table 15) Within the period February-June, the egg supply was apparently most abundant from March through May when the seasonal index of egg production ranged from 146.9 in May to 159.4 in April. During the same period (March through May) the seasonal index of the eggs set by hatcheries ranged from 140.4 in May to 180.0 in March. Both egg requirements of hatcheries and egg production were relatively low except for the peak periods.

Sources of Supply of Hatching Eggs

The total quantity of eggs used by commercial chick hatcheries from June 1949 to May 1950 and the seasonal variation in this quantity, give an indication of the importance of hatcheries as an egg market for Mississippi egg producers. An analysis of the sources of the supply of hatching eggs will give a further insight into this problem. The proportion of the total supply of hatching eggs from each source of supply, the seasonal variation in the proportion of the total supply from each source, and the price paid for eggs from the different sources of supply must be included in an analysis of the potentials of hatcheries as an egg market. Hatcheries producing all or a part of their own hatching-egg supply probably would not produce market eggs as an alternative to hatching-egg production.

As hatcheries produce a larger proportion of their total egg supply, the smaller will be the possibility for a potential hatching-egg producer to find a market for his eggs. If hatching eggs from Mississippi flocks made up a relatively large proportion of the total eggs used by hatcheries during the peak egg production months, the possibility of hatcheries further easing the "seasonal strain" on the egg market would be weakened. If a large proportion of the total supply of eggs came from out-of-state, there would be possibilities for the expansion of hatching-egg production in Mississippi, providing hatching eggs produced in Mississippi were equally acceptable to the hatcheryman. Furthermore, if hatching eggs from out-of-state constituted a large proportion of the total quantity of hatching eggs used during the peak egg production season, the possibility of hatcheries in helping to alleviate the "seasonal strain" on the egg market would be enhanced.

A high price for hatching eggs relative to the price of market eggs would indicate favorable conditions for expansion of hatching-egg production by Mississippi egg producers. The higher these prices were relative to the prices of market eggs during the peak market-egg production season, the greater would be the potentialities of hatcheries in easing the "seasonal strain" on the egg market.

During the period June 1949-May 1950, out-of-state hatching eggs constituted a relatively large proportion of the total eggs used by hatcheries. Out-of-state eggs made up a larger proportion of total eggs used during the period when both egg production and hatchery production were relatively high. Hatching eggs from out-of-state hatching-egg flocks constituted 54.9 percent of the total eggs set by Mississippi chick hatcheries from June.
Table 15. Total eggs set by hatcheries and total eggs produced with seasonal indexes, Mississippi, June 1949-May 1950.

<table>
<thead>
<tr>
<th>Month</th>
<th>Total eggs set by hatcheries¹</th>
<th>Total eggs produced²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number (thou. eggs)</td>
<td>Seasonal index³</td>
</tr>
<tr>
<td>June</td>
<td>847</td>
<td>51.6</td>
</tr>
<tr>
<td>July</td>
<td>762</td>
<td>45.6</td>
</tr>
<tr>
<td>August</td>
<td>785</td>
<td>48.0</td>
</tr>
<tr>
<td>September</td>
<td>917</td>
<td>55.2</td>
</tr>
<tr>
<td>October</td>
<td>1,098</td>
<td>66.0</td>
</tr>
<tr>
<td>November</td>
<td>1,213</td>
<td>73.2</td>
</tr>
<tr>
<td>December</td>
<td>1,173</td>
<td>70.8</td>
</tr>
<tr>
<td>January</td>
<td>2,233</td>
<td>135.6</td>
</tr>
<tr>
<td>February</td>
<td>2,711</td>
<td>164.4</td>
</tr>
<tr>
<td>March</td>
<td>2,980</td>
<td>180.0</td>
</tr>
<tr>
<td>April</td>
<td>2,790</td>
<td>169.2</td>
</tr>
<tr>
<td>May</td>
<td>2,323</td>
<td>140.4</td>
</tr>
<tr>
<td>Total</td>
<td>19,832</td>
<td>1,200.0</td>
</tr>
</tbody>
</table>

¹Source: Survey of 65 commercial chick hatcheries, Mississippi, 1950.
³Calculated by multiplying by 12 the percentage of the total eggs that was set during each month.
⁴Deviation of monthly data from 13 month moving average.

1949 to May 1950. The use of out-of-state hatching eggs was concentrated to the highest degree in the period of January-May; however, about one-half of the total eggs used during June and July came from out-of-state. During the January-May period out-of-state eggs constituted an average of 60.9 percent of the total eggs set, while during the remainder of the year, August-December, out-of-state hatching eggs made up an average of about 41 percent of the total eggs used.

The hatchery owner’s own eggs made up a relatively small proportion of the total eggs used by hatcheries. Of the total eggs set from June 1949 to May 1950, only 15 percent came from hatchery owners’ flocks. (See Table 16.) There was a distinct seasonal variation in the quantity of hatchery owners’ eggs used relative to the total eggs used.

Of the total eggs set by hatcherymen the proportion of eggs produced by their own hatching-egg flocks was greatest during August-December and least during February-June.

Hatching eggs from Mississippi flocks composed 30.1 percent of the total eggs that were used by hatcheries from June 1949 to May 1950, or slightly more than two times the quantity supplied by the hatchery owners’ laying flocks. The total quantity of eggs set from non-hatchery owned Mississippi laying flocks did not show as distinct seasonal variation as did the total quantity of hatching eggs that came from hatchery-owned laying flocks.

Even though the relative quantities of eggs from the different sources of supply indicate favorable possibilities for the expansion of hatching-egg production, these data should be studied in the light of prices for hatching eggs relative to the source of supply.¹⁸ For the year, June 1949 to May 1950, the average price of out-of-state eggs exceeded the average price of Mississippi eggs 6.8 cents per dozen. (See Table 17.) Higher prices were paid for out-of-state eggs during the

¹⁸Hatchery owners reported that they credited the eggs produced in their own flocks at the same price paid for eggs produced in non-hatchery owned Mississippi flocks. The price of eggs produced in the hatchery-owner’s flock will not be considered in this analysis since the hatchery-owner would logically use his own eggs rather than buy eggs.
Table 16. Quantity of eggs set, according to source of supply and the percent eggs from each source of supply is of total eggs set, by months, commercial chick hatcheries, Mississippi, June 1949-May 1950.

<table>
<thead>
<tr>
<th>Month</th>
<th>Source of supply</th>
<th>Percent eggs from each source of supply is of total eggs set</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Own flock (thou.)</td>
<td>Miss. flock (thou.)</td>
</tr>
<tr>
<td>June</td>
<td>77</td>
<td>350</td>
</tr>
<tr>
<td>July</td>
<td>116</td>
<td>261</td>
</tr>
<tr>
<td>Aug.</td>
<td>215</td>
<td>196</td>
</tr>
<tr>
<td>Sept.</td>
<td>262</td>
<td>279</td>
</tr>
<tr>
<td>Oct.</td>
<td>249</td>
<td>421</td>
</tr>
<tr>
<td>Nov.</td>
<td>312</td>
<td>449</td>
</tr>
<tr>
<td>Dec.</td>
<td>261</td>
<td>405</td>
</tr>
<tr>
<td>Jan.</td>
<td>379</td>
<td>566</td>
</tr>
<tr>
<td>Feb.</td>
<td>309</td>
<td>771</td>
</tr>
<tr>
<td>Mar.</td>
<td>338</td>
<td>908</td>
</tr>
<tr>
<td>April</td>
<td>246</td>
<td>765</td>
</tr>
<tr>
<td>May</td>
<td>216</td>
<td>594</td>
</tr>
<tr>
<td>Total</td>
<td>2,980</td>
<td>5,965</td>
</tr>
</tbody>
</table>

1Source: Survey of 65 commercial chick hatcheries, Mississippi, 1950.

entire period studied, with the exception of the 4 months, July-October. The price paid for eggs produced out-of-state exceeded the price paid for eggs produced in Mississippi by a relatively larger amount during March-May, the period when the supply of market eggs was greatest. During this period the price paid for out-of-state eggs exceeded the price paid for Mississippi eggs by an average of 7.6 cents per dozen. This is of special significance because Mississippi producers may be able to replace some of these out-of-state eggs with Mississippi eggs. If Mississippi producers can produce hatching eggs in sufficient quantity of the same quality as out-of-state producers, most of the hatchery owners probably would be willing to purchase eggs from Mississippi producers. Since the cost of keeping roosters constituted the major part of the cost of producing hatching eggs over the costs of producing market eggs (See Chapter III), some egg producers may find it advantageous to produce hatching eggs during the spring months and sell their roosters about July or August and produce market eggs during the remainder of the year.

In competing with out-of-state hatching-egg producers, Mississippi egg producers seem to have at least two factors in their favor: (1) relative hatchabilities of out-of-state and Mississippi eggs and (2) cost of transportation of out-of-state eggs. According to the reports obtained from the 65 hatcheries included in this study a 4.8 percent better hatch was obtained from Mississippi produced eggs than from out-of-state eggs. Mississippi eggs had an average hatchability of 78.6 percent while out-of-state eggs had an average hatchability of 73.8 percent.\(^{10}\)

Probably the reason that a better hatch was obtained from Mississippi eggs is that they were not transported as far and “shaken up” as much as the out-of-state eggs. Still further, it cost an average of 5.9 cents per dozen for transportation of the out-of-state eggs.

\(^{10}\)Includes all eggs set (both fertile and infertile).
Table 17. Weighted average prices paid for hatching eggs, according to source of supply, by months, commercial chick hatcheries, Mississippi, June 1949-May 1950.

<table>
<thead>
<tr>
<th>Month</th>
<th>Source of supply</th>
<th>(cents/doz.)</th>
<th>(+) Out-of-state price exceeds Miss. price</th>
<th>(—) Miss. price exceeds out-of-state price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Miss. flock</td>
<td>Out-of-state flock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>June</td>
<td>69.3</td>
<td>72.0</td>
<td>+2.7</td>
<td></td>
</tr>
<tr>
<td>July</td>
<td>74.6</td>
<td>72.0</td>
<td>—2.6</td>
<td>—4.1</td>
</tr>
<tr>
<td>August</td>
<td>74.7</td>
<td>70.6</td>
<td>—4.1</td>
<td>—2.7</td>
</tr>
<tr>
<td>September</td>
<td>73.0</td>
<td>70.3</td>
<td>—2.7</td>
<td>—1.9</td>
</tr>
<tr>
<td>October</td>
<td>73.6</td>
<td>71.7</td>
<td>—1.9</td>
<td>—4.2</td>
</tr>
<tr>
<td>November</td>
<td>74.4</td>
<td>78.2</td>
<td>+4.2</td>
<td></td>
</tr>
<tr>
<td>December</td>
<td>71.9</td>
<td>74.1</td>
<td>+3.8</td>
<td></td>
</tr>
<tr>
<td>January</td>
<td>68.4</td>
<td>69.2</td>
<td>+1.4</td>
<td></td>
</tr>
<tr>
<td>February</td>
<td>66.8</td>
<td>68.5</td>
<td>+6.8</td>
<td></td>
</tr>
<tr>
<td>March</td>
<td>61.7</td>
<td>68.5</td>
<td>—6.8</td>
<td></td>
</tr>
<tr>
<td>April</td>
<td>63.0</td>
<td>69.9</td>
<td>—6.9</td>
<td></td>
</tr>
<tr>
<td>May</td>
<td>64.3</td>
<td>73.3</td>
<td>+9.0</td>
<td></td>
</tr>
<tr>
<td>Weighted yearly average</td>
<td>63.8</td>
<td>70.6</td>
<td>+6.8</td>
<td></td>
</tr>
</tbody>
</table>

1Source: Survey of 65 commercial chick hatcheries, Mississippi, 1950.
2Prices do not include cost of transportation.

Summary

In May 1950, there were 70 commercial hatcheries operating in Mississippi with a total incubator capacity of 3,501,000 eggs. Most of these hatcheries were relatively new. The three oldest hatcheries began operations during the period 1917-21, while about two-thirds of them began operations since January 1942.

Most of the hatcheries started operations as relatively small units and “grew into the business.” During all periods from 1917-May 1950, the capacity changes of previously established hatcheries have been upward.

In reaching its present size, the Mississippi hatchery industry has apparently had an appreciable amount of turn-over in the firms making up the total at any particular time. During all periods studied from 1942-1949, there were apparently many hatcheries in operation that later went out of business. Most of the fluctuations in hatchery numbers, however, have been due to the in-and-out movement of small hatcheries.

While there has been no pronounced upward trend in the total production of chickens in Mississippi (1942-49), there has been an upward trend in the production of commercial broilers that corresponded rather closely to the upward trend in hatchery capacity.

Egg producers were required to see that their laying flocks met certain requirements before the eggs from these flocks were acceptable at the hatchery for hatching purposes. The primary requirements that added to the costs of producing hatching eggs over the costs of producing market eggs were for testing for pullorum, vaccination for foul pox and for Newcastle diseases, and the cost of roosters. With the exception of testing for pullorum, requirements that any particular egg producer faced depended upon the hatchery which he was supplying eggs. A Mississippi law specifies that all eggs hatched in the State must come from pullorum-free flocks, if the chicks are offered for sale. In addition to testing for
pullorum, 10 hatcheries required vaccination for fowl pox and 17 for fowl pox and Newcastle. Rooster requirements ranged from 6 to 15 roosters per 100 hens, while the average for all hatcheries was 8 roosters per 100 hens. The hatcheries also had requirements relative to the method of holding eggs prior to delivery to the hatchery, regularity of delivery, and grading of eggs. These requirements could usually be met with very little addition to the cost of producing good grade market eggs.

In arriving at the cost of producing hatching eggs over the cost of producing market eggs, the following assumptions were made: (1) the cost of testing for pullorum at three cents per bird; for fowl pox one cent per bird, and Newcastle one cent per bird; (2) an average of 32 pounds of feed is required to raise one cockerel from one day old to maturity (no attempt was made to obtain cost resumes about 85 pounds of feed per year; resulting from mortality of cockerels); (3) one rooster consumes an average of 95 pounds of feed per year; (4) one hen consumes 165 eggs per year, and (6) a feed cost of 5 dollars per 100 pounds. No attempt was made to determine the housing cost of roosters since it was felt that in most cases this would be minor.

Eggs produced under the conditions specified for hatching egg production will vary as to the proportion used as hatching eggs due to two reasons: (1) seasonal variation in egg requirements of hatcheries, and (2) variation in physical qualities of eggs. If 100 percent of the producer's eggs were sold as hatching eggs (which is very unlikely), the primary cost per dozen of hatching eggs over the cost of producing market eggs was 8.63 cents, when maximum requirements were met; 4.77 cents, when average requirements were met and 3.53 cents, when minimum requirements were met. If it is assumed that only 50 percent of the producer's eggs were sold as hatching eggs, the cost of producing hatching eggs over cost of producing market eggs was 17.26 cents, 9.54 cents and 7.06 cents per dozen, respectively.

During the year the study was made. Hatching egg producers received an average premium of 27.3 cents per dozen for their eggs over the average price received for market eggs. In addition to the price differential, some of the producers received aid from the hatcheries in disposition, through market-egg channels, of eggs surplus to hatchery needs and eggs that did not meet hatching egg specifications. Fourteen hatcheries provided a relatively dependable year-round hatching egg market.

The average total investment in hatcheries was $7,699 and ranged from $2,075 for hatcheries with an incubator capacity of less than 15,000 eggs to $21,030 for hatcheries with a capacity of 90,000 and above. For hatcheries of all sizes, the investment in equipment constituted approximately 66 percent of the average total investment per hatchery while investment in land and buildings constituted the remaining 34 percent. The investment in incubators alone accounted for about 50 percent of the average total investment.

Supplies and miscellaneous expenses were the major components of hatchery cost. Average expenditure for supplies for all hatcheries was $13,043, of which the major part was for hatching eggs and chick boxes and pads, while average miscellaneous expenses were $1,380. Average labor expenditure was $1,482 of which $1,033 was for skilled labor and $449 was for common labor.

The nature of hatchery costs would contribute to a high degree of flexibility and sensitivity to price changes when hatcheries operate near the cost of produc-

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20In areas where the producer of market eggs could get a premium above average market price in Mississippi the 27.3 cents premium would be reduced accordingly or vice versa.
tion level. "Variable" costs made up an average of 84.7 percent of the total cost of hatching a chick. The hatcheries with capacities of 60,000-74,999 had the highest percentage of "variable" cost relative to "fixed" cost, while the hatcheries in the 30,000-44,999 group had the lowest percentage.

The average margin between the price received per chick and the cost of hatching a chick for all hatcheries was 3.2 cents. This margin ranged from a high of 4.8 cents for the 0-14,999 size group to a low of 2.6 cents for the 90,000 and above group.

Hatcheries set a total of 19,832,000 eggs during the year of the study. About two-thirds of these eggs were set during the period January-May, a period when egg production as a whole was at a peak.

Hatcherymen obtained 54.9 percent of their hatching eggs from out-of-state; 30.1 percent from Mississippi flocks other than their own flocks, and 15.0 percent from their own flocks. Both the quantity of eggs that came from out-of-state and the quantity that came from the hatcherymen's flocks, relative to total eggs used, showed greater seasonal variation than did the quantity used from Mississippi flocks.

During the period, June 1949-May 1950, the price paid for eggs from out-of-state exceeded the price paid for eggs produced in Mississippi by an average of 6.8 cents per dozen. These price relationships when related to the large quantity of eggs that came from out-of-state are of special significance because Mississippi producers may be able to replace some of these out-of-state eggs with Mississippi eggs. In competing with out-of-state producers, Mississippi producers are in a relatively favorable position for several reasons: (1) the cost of producing hatching eggs and prices received are generally favorable; (2) hatchability of Mississippi eggs is better than out-of-state eggs; and (3) the cost of transportation of out-of-state eggs is relatively high.
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