CAPITAL INVESTMENT REQUIREMENTS, COSTS AND RETURNS OF THE EGG ENTERPRISE IN KANSAS UNDER ALTERNATIVE TYPES OF LAYING HOUSES (COMPLETELY-ENCLOSED AND OPEN-FRONT) AND POULTRY MANAGEMENT SYSTEMS (CAGES AND FLOOR PLANS)

by

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INTRODUCTION

Economic Trends in Egg Production

While chickens and eggs traditionally have been considered a part of the diversified farm of Kansas, only in recent years has poultry production on a large commercial scale expanded into its present importance in the state.

In the past almost every family farm produced poultry and eggs for home consumption and perhaps as a supplementary source of income to buy the week's groceries. But on many farms the laying flock expanded into a special type of farming enterprise. Mortenson and Annin stated:

> In 1910, nine out of every 10 farmers in the United States kept chickens, mostly in small farm flocks of fewer than 100 layers. Now only seven out of every 10 have poultry as one of the farm enterprises. Even though the small farm flocks are still somewhat common, more and more of the chickens are in the larger flocks.
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> In 1935, 44 percent of the chickens on farms were in flocks of fewer than 100 layers compared with only 15 percent in 1954, (latest census figure). Only 13 percent of the layers were in flocks of 400 or over in 1935 compared with 44 percent in 1954. The farmers who have continued in the poultry business are increasing the size of their flocks.[1]

In 1952, results of an unpublished mail survey made by the Kansas State Board of Agriculture disclosed that there were only 32 laying flocks of 1,000 or more birds in Kansas.[2]

However, by 1957, a list of "approximately 500 flock owners in Kansas

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[1]W. P. Mortenson and G. E. Annin, Recent Changes and Goals in the Poultry Business, mimeographed manuscript prepared for the Wisconsin Poultry Association, May 10, 1957, p. 1.

[2]Information supplied verbally by Jim Petr, Director, Marketing Division.

with 1,000 or more laying hens"[1] with a classification of flocks according to cage or floor plan was compiled from information furnished by County Agricultural Agents on the size of flocks as of September 1, 1957. These data show strikingly the rapid trend toward larger size laying flocks in Kansas.

Cage layer systems of management are thought generally to have been used first in Hawaii, and in the United States made the greatest first strides in Southern California, where the cages have been in use commercially since 1935.[2] An almost phenomenal development of cage layer plants occurred in Kansas during the years 1955 to 1957. This development was stimulated by financing arrangements of large feed companies and manufacturers of laying houses as well as a temporary guaranteed price structure for eggs by a large processing plant. In 1957, reports indicated 283 cage laying plants were operating in Kansas.[3]

The Problem and Reasons for the Study

Many farmers in Kansas and other midwestern areas are considering setting up a commercial-size laying flock using either the floor plan or cage layer system of management.

As the cage layer system spread to geographic areas having wide extremes in climatic conditions, the use of a completely-enclosed laying house with

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[1]M. A. Seaton, Annual Report, Extension Specialist in Poultry Husbandry, Kansas Agricultural Extension Service, Dec. 1, 1956, to Nov. 30, 1957, p. 3.

[2]Dale F. King, Single Deck Cages for Laying Hens, Alabama Polytechnic Institute Agricultural Experiment Station Circular No. 116, May 1954, p. 1.

[3]Seaton, op. cit., p. 33.

mechanical ventilation, heating, and cooling systems was generally advocated. However, in the Southern Plains States Region, an open-front, pole-type house of cheaper construction was considered feasible for both cage layers and floor plan operations. Plans prepared by the Kansas Extension Service are now available for variable-size laying houses of each type, adaptable to both system of management.

A laying flock of 800-1,000 birds may still fit well into the present-day organization of many midwestern farms. But many producers have hesitated to risk a rather heavy capital investment in the larger-size housing units manufactured and advocated by commercial firms.

In view of the continuing trend toward commercialization involving fewer but larger farm-laying flocks, many farmers have to decide whether to continue the egg enterprise or to shift their limited resources to some other farm enterprise competing for capital and labor. As a basis for sound decision making, farmers need information on the comparative capital requirements, probable costs and returns from the laying flock under alternative types of housing and management systems. A review of related literature disclosed no studies that would provide such information.

Extension poultry specialists and county agricultural agents have also expressed an urgent need for such information, prepared by a public research agency rather than private firms interested in promotional activities, for the guidance of farmers.

Complete and accurate records from a sufficient number of actual farm flocks for statistical analysis of the capital investment, costs and returns from the egg enterprise, under specified conditions of housing and management, were not available. Therefore, the budgetary approach was necessary in this

study.

Objectives of the Study

Objectives of this study were:

(1) To determine the capital investment in laying stock, housing and equipment at 1957-58 price levels for a 1,000 bird laying flock in Kansas under alternative types of housing and poultry management practices.

(2) To prepare a budget of costs and returns for this flock under the alternative types of housing and management practices for an average 12-months period.

The alternate types of housing and poultry management practices for which the capital investment was to be determined and the budget prepared were as follows: (a) a completely-enclosed, insulated house with mechanical ventilation and cooling system adapted for (1) a cage layer system and (2) a floor plan operation with litter and droppings pits; (b) an open-front, pole-type house with natural ventilation and insulated ceiling adapted for (1) a cage layer system, (2) a floor plan operation with litter and droppings pits, and (3) a floor plan operation with slatted floors.

PROCEDURE AND SCOPE OF ANALYSIS

The Budgeting Method

Budgeting is a means of analyzing plans for the use of agricultural resources. Any portion of the farm business ranging from an operational decision in an enterprise to the total farm business may be analyzed.[1]

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[1]North Central Farm Management Research Committee, Budgeting in Farm Management, Mimeographed report, December 1954, p. 1.

Researchers use the budget to estimate returns from alternative systems of organizing or managing the farm business.

> The important objective of budgeting is to compare alternative plans for prospective profitability. The goal is not one of setting down a single plan to be followed without deviation. The only reason for setting down the figures of a given plan would be to provide estimates of the timing of income and expenses. Otherwise, the real purpose is to figure out two or more organizations of the farm, estimate income and expense for each, and then select the one for which profit expectations are greatest.[1]

A budget has the advantages of avoiding misinterpretations of cost-price relationships and being simple and easily understood. It has the disadvantage of being highly subjective. This may cause a wide variation in results when estimated by different investigators. Problems are also presented in making correct assumptions.

The value of budgeting to solve farm management problems largely depends upon the assumptions used and the problem being considered. "Conventional budgeting consists of predicting the outcome of one or of several different systems of operation by (1) estimating physical outputs on the basis of given resource inputs and (2) applying prices to those products and factors.[2]

Under a complete budgetary approach, which was used in this study, all input requirements and associated costs as well as the output are estimated or calculated. In most instances at least part of the estimation on inputs fall on the judgment of the researcher. Even if it were possible to determine all inputs by scientifically accurate procedure, a certain measure of

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[1]John A. Hopkins and Earl O. Heady, Farm Records. Ames: The Iowa State College Press, 1949, p. 13.

[2]North Central Farm Management Research Committee, op. cit., p. 7.

judgment would still be involved in determining the prices that are most appropriate.[1]

Research Procedure

The budgeting method was used in this study. Prior to the preparation of detailed budget standards, several visits were made to farms in Kansas which were using the different types of laying houses and management practices being studied. Valuable background information and a greater appreciation of each system and its problems were gained.

A group of poultry husbandmen, agricultural economists, and extension agricultural engineers served in an advisory capacity and were consulted frequently. This group formulated certain basic assumptions underlying the study and were directly responsible for detailed budget standards relating to the technology of egg production, economic costs, and specification on housing and equipment, respectively. The basic assumptions covered such factors as managerial ability, laying houses and equipment, the laying flock, basis of selling eggs, prices received for eggs and financing. Detailed budget standards are shown in Appendices A and B.

Individual budgets were prepared for each type of laying house and management practice (cage layer system and floor plan operation).

Detailed costs and returns for the egg enterprise were computed for a representative 12-months period. Costs and returns for four successive 15-months rotation periods were summed and divided by five to convert the data

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[1]John H. McCoy, Grain Storage Policy with Particular Reference to Cost of Storing Wheat in Kansas. Unpublished Ph.D. Thesis, the Graduate School of the University of Wisconsin, Madison, 1955, p. 97.

to an annual basis. The use of 15-months rotation periods takes into account the maximum productive life that a layer may profitably be kept in the flock. Its use also allows for the influence of seasonal variations in prices of laying mash and eggs, the two major components affecting costs and returns, respectively. However, since farmers usually tend to think in terms of a year's operations for income tax purposes, costs and returns were expressed on a 12-months basis.

The initial investments, total and per layer in laying houses and equipment were determined.

Construction costs of laying houses were calculated showing separately the aggregate costs of building materials and labor. Such costs were expressed on a total and per square foot basis.

Factors such as feed conversion efficiency, actual rate of lay and feed cost as a percent of total cost were determined and provide a check on the reasonableness of the technology involved in budgeting.

Basic Assumptions

Managerial Ability. It was assumed that the managerial ability of the farm operator of the egg enterprise was above average. This implies that he consistently followed recommended practices in caring for the laying flock and particularly in the care and handling of market eggs.

Laying Houses and Equipment. Plans prepared by and currently available from the Kansas Extension Service were followed in determining costs of laying houses, with each type of laying house having a capacity of 1,000 layers. The initial number of layers governed the size of the house to be used with either cage layer system or floor plan operation of management.

The physical dimensions in feet of each type of laying house, by management practice were as follows:

Cage layer systems:

40' x 50' completely-enclosed house

40' x 50' open-front house

Floor plan operations:

40' x 50' completely-enclosed house (with litter)

40' x 50' open-front house (with slotted floor)

40' x 70' open-front house (with litter)

The same type and size of egg room was built at one end of each laying house, and each was equipped alike.

Retail prices of all equipment, except cages, purchased from poultry equipment companies were discounted by 10 percent, and freight charges were ignored. This policy was justified on the assumption that fairly large operators would be able to secure special concessions in price.

Facilities were assumed to be available on the farmstead for housing temporarily the pullets purchased as replacements for cages; therefore, no effort was made to provide construction plans or specifications for equipment for this building.

The Laying Flock. The same egg type, production-bred, light breed of bird was to be used in each house. All layers, with the exception of those removed by culling or death, were kept until the completion of their 15th-month of lay (age 21 months) since it was felt that the practice commonly followed today by most floor plan operators of selling hens at the close of their 12th month of lay may have removed profitable layers before their productive life had expired. Early culling of layers would tend to result

in a higher cost for flock depreciation and hence lower net return per bird. Egg quality and the rate of lay tend to decline after a hen reaches this age. For these reasons it was believed that net returns would be maximized by keeping healthy, productive layers for a 15-months period.

One thousand pullets six months of age were purchased initially for each of the five laying houses. No replacements were made during the 15-months accounting period for floor plan operations. However, in the cage layer systems, enough pullet replacements were purchased initially for the first three-months period. Following this, a three-months supply of replacements, 6-months-old pullets, was purchased on the first day of each succeeding three-months period. Replacements were made automatically the same day that cages were vacated in order to keep cage layer houses at 100 percent of capacity.

Costs and returns from the small reserve supply of pullet replacements houses in temporary facilities on the farm were ignored. It was assumed that returns from such pullets just defrayed the major cost items including feed and labor.[1]

Basis of Selling Eggs and Prices Received. Eggs were sold on a graded basis with returns based on actual grade and size distributions, case return basis. A moderate price premium of 2 1/2 cents per dozen was added to the quoted market price for A large and A medium eggs since it was considered that a producer of high quality eggs would be in a position to market his eggs advantageously. No cost for transporting the eggs to market was charged

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[1]For the first 15-months rotation period, egg receipts from such replacement pullets amounted to $806. Feed costs totaled $559 and the cost of labor, charged at $1 per hour, was $117. A gross return of $130 was thus available to defray all other costs.

against the egg enterprise.

Financing. The operator was assumed to have adequate capital of his own for the purchase of equipment and laying stock and for the construction of a laying house. Therefore, financing was not involved in this study and there was no interest change for borrowed capital.

Sources of Information For Specifications and Data

Much of the data needed for a budget analysis of the egg enterprise is of a technical nature that requires a broad background of experience in poultry technology and agricultural engineering as well as in economics. For this reason, the advisory committee mentioned in the research procedure was set up and consultations were held frequently on various problems as the study progressed.

The Laying Houses. Specifications for the construction of laying houses were obtained from agricultural engineers of the Kansas Extension Service. Plan number 72-734, Kansas Pole Type Laying House, was used in computing costs for open-front laying houses while plan 72-735 was used for the completely-enclosed laying houses. Plans of commercial firms, including metal and concrete type houses, were not included in this study since it was believed that houses of wood construction without concrete floors would provide adequate housing at minimum cost.

Prices for lumber, hardware, electrical and plumbing materials were quoted by firms at Manhattan, Kansas. Estimated hours of labor for carpentry were based on data from Barre and Sammet.[1]

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[1] H. J. Barre and L. L. Sammet, Farm Structures. New York, John Wiley and Sons, January 1950, p. 621.

Hourly labor requirements, both skilled and unskilled, for carpentry were based on the actual material requirements of lumber and hardware. Appendix Tables 1-4 show the bill of materials, costs of lumber, hardware and labor and total construction cost for laying house and an egg room. The hourly wage rate of $2.65 for skilled carpenters was provided by a local contractor at Manhattan, Kansas. For unskilled labor, $1.25 per hour was estimated.

Material requirements for wiring and plumbing of laying houses were computed based on rough working diagrams. (Figs. 3, 4, and 5, Appendix). Such diagrams were prepared for each type of laying house (completely-enclosed and open-front) with the assistance of an extension agricultural engineer.

Material requirements and costs of materials and labor for wiring and plumbing the laying houses and egg room are shown in Appendix Tables 5-11. The cost of labor for both wiring and plumbing was roughly estimated to equal the cost of materials.[1]

Equipment. An attempt was made to include all the necessary equipment in each type of laying house. The costs of specialized poultry equipment and of the bulk feed storage bin were based on prices, less a 10 percent discount, listed by various manufacturing companies; including some which manufactured only poultry equipment.

Plans for certain equipment such as the poultry disposal pit,[2] droppings

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[1]Based on information obtained from local electrical and plumbing firms, Manhattan, Kansas.

[2]Plan 77-802, Kansas State College Extension Service.

pit,[1] roll-down community nests[2] and evenflow waterers[3] for floor plan operations were obtained and costs of construction, both materials and labor, were computed.

Prices of certain non-specialized equipment, such as feed buckets, feed scoops, wheelbarrow, and shovels were obtained from local business establishments in Manhattan, Kansas. The kind of equipment, price, and quantity used in each laying house are shown in Table 2.

The Technology of Egg Production. Certain technological factors affecting egg production, such as the rate of lay, rate of culling, mortality rate, and feed consumption level are particularly important in affecting the costs and returns from the egg enterprise. No research studies were available to furnish technological data regarding these factors for layers held for a 15-month laying period—one of the basic assumptions underlying this study. Therefore, budget standards were estimated in consultation with poultry husbandmen.

Careful thought and much consideration were given to these factors especially with respect to their reasonableness and trueness. Decisions with respect to the budget standards by the poultry husbandmen were based upon a knowledge of related research and the experiences of several commercial poultrymen in Kansas.

During any month, rate of lay and number of layers on hand were the principal factors affecting total egg production. Laying houses with floor plan operations were filled with 1,000 pullets at the beginning of each

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[1]Circular 189, October 1945, Kansas State College Extension Service.
[2]Plan 87841 Midwest Plan Service.
[3]Rough plan sketched by Professor Ray Morrison, Poultry Husbandry Department, Kansas State College.

15-months period, so the number of layers in the flock in successive months depended upon the rate of culling and death loss.

Mortality was figured at the rate of nine percent for cage layer systems and 12 percent for floor plan operations. These percentages were based on 1,000 birds and were distributed over a 15-month period. This meant that in cage layer systems, an average of six layers died each month, while in floor plan operations, the number was eight layers. Any layer that was out of condition or had not been laying for 10-14 days was removed from the flock and sold as a cull. Budget standards were prepared and indicate the total number of layers removed from the flock seasonally through both culling and mortality. For any given month, the total number of layers removed minus the number which died gave the number of layers culled from the flock.

Appendix Table 12 shows for cage layer systems, irrespective of the type of house, the schedule of pullet replacements during successive three months in any 15-months rotation period. Replacements were for layers removed through culling and mortality. Appendix Table 13 shows for cage layer systems the composition of the laying flock, in terms of the numbers and ages of layers, by months and rotation periods, for the entire 60 months covered by this study. Likewise, Appendix Table 14, shows for all floor plan operations the total number of layers removed (culled and died) from the flock seasonally by age of layers.

Budget standards reflecting the relationships between rate of lay, age of layer, type of housing (completely-enclosed and open front) and management practice (cage layer system and floor plan operation) for each 15-month period are shown in Appendix Table 16.

Given the seasonal standards for both rate of lay and the number of

layers remaining in each flock (after culling and death loss) as well as the number of days by half-month periods, it was simple to compute the total production of eggs for floor plan operations each month. (Appendix Tables 17 and 18).

For cage layer systems, it was necessary to consider the varying composition of the laying flock according to number of layers by age groups and corresponding rates of lay in calculating the monthly production of different grades and sizes of eggs. Appendix Tables 19 and 20 show the monthly rate of lay and total monthly egg production, for various ages of layers. Total production of eggs, by grades and sizes, was then calculated by months and rotation periods (Appendix Tables 21 and 22).

Levels of feed consumption of laying mash and grit were established by the poultry husbandmen. These budget standards and an explanation of the procedure followed in computing the cost of feed are given in Appendix C.

Appendix Table 29 summarizes for cage layer systems the consumption of feed, price of feed, and total feed cost, by months and rotation periods, for a 1,000 bird laying flock. Likewise, Appendix Table 30 shows similar data for floor plan operations except that the size of flock declined each half-month period reflecting normal culling and death loss of layers. All layers received medications including fly spray, phosphate, vaccines (bronchitis, newcastle and chicken pox) and worm medicines. These medication requirements were based on recommendations of the poultry husbandmen.

All eggs were sold on a graded basis. Therefore, it was necessary to convert total monthly egg production to various grades and sizes of eggs. Appendix Tables 23 and 24 show for cage layer systems and floor plan operations,

respectively, the seasonal grade and size distribution of eggs produced by layers of various ages. These data[1] were obtained from a few select producers of high quality eggs in Kansas who used the type of houses and management systems being studied. (The sources of data are indicated in Appendix Tables 23 and 24).

Appendix Tables 25 and 26 show for cage layer systems the receipts from eggs by months and rotation periods. The monthly production (in dozens) of various grades and sizes of eggs used in calculating the value of eggs is also shown. Similar data for floor plan operations are summarized in Appendix Tables 27 and 28.

Eggs were collected in wire baskets at least three times daily and allowed to cool overnight before being packed in egg cases. Soiled eggs were cleaned immediately after gathering by means of a commercial egg washer. All eggs were held in a refrigerated egg room until marketed.

All layers were fed a laying mash with a protein level of 16 percent. In addition, a commercial grit was fed. The laying ration consisted only of mash and no scratch grain.

Labor Requirements. Interviews with a few operators[2] of cage layer systems in Kansas and data obtained from a research study[3] indicate that

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[1]The original grading data obtained from these producers was "broken down" into many grades and sizes of eggs. For example, the distributions recorded separately both AA large and A large, both AA medium and A medium, etc. For budgeting purposes, certain grades were combined whenever possible without affecting the research results (see Appendix Tables 23 and 24). This was done to conform to the grades and sizes on the Kansas City graded egg market, from which price quotations were taken for budgeting.

[2]Kansas State College poultry farm, two Lincoln county and one Wabaunsee county poultrymen.

[3]Charles K. Laurent, Production and Marketing of Cage-Laid Eggs in Alabama, Alabama Polytechnic Institute Experiment Station Bulletin No. 297, June 1955, p. 32.

approximately three hours of labor per day were required to care for 1,000 cage layers. For floor plan operations, an estimate of one hour of labor per year for each layer was based on results of several studies[1] as well as accurate records kept by one large producer[2] in Kansas.

Prices of Feed, Eggs, and Cull Layers. For the year 1957, monthly prices of 16-percent protein laying mash were obtained from four large commercial feed companies in Kansas. Quotations represented the prices per ton on a bulk-feed basis, delivered to farmers. A yearly average of these monthly prices was approximately $75 per ton. This price was then adjusted seasonally.[3] Appendix Table 31 shows the price of laying mash, by months, used in this budgeting study. A price of $1.50 per hundredweight for grit was obtained from a hatchery at Manhattan, Kansas. The procedure followed in computing feed costs is given in Appendix C.

Seasonal prices of eggs, by grades and sizes, were obtained from the Kansas City Daily Drovers Telegram. Market quotations represented prices paid to producers at country points in the Kansas City market area with

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[1]J. G. Hawthorne and L. F. Miller, An Economic Analysis of 32 Poultry Cost Accounts, Pennsylvania 1946-1947, Pennsylvania State College Agricultural Experiment Station Bulletin No. 511, April 1949, pp. 13-14.

Arthur Shultis and W. E. Newlon, The Chicken Business in California, University of California Extension Service Circular No. 147, Sept. 1951, p. 6.

M. H. Becker, Egg Production Costs and Returns in Western Oregon, Oregon State College Agricultural Experiment Station Bulletin No. 559, May 1957, p. 16.

[2]Kidwell Poultry Farm and Hatchery, Enterprise, Kansas.

[3]Average seasonal indexes were calculated by expressing actual mid-month prices paid by Kansas farmers for laying mash during the period, 1953-1957, as a percentage of a 12-month centered moving average. The resulting percentages for individual months were averaged to arrive at the seasonal index for each month. The 12 monthly average indexes were totaled and adjusted so as to average 100 percent for the year. The adjusted averages constitute the index of seasonal variation.

returns based on actual gradings, cases returned. The 1953-57 averages of monthly means of daily prices for A large, A medium, B large and grade C eggs were computed. A moderate price premium of 2 1/2 cents per dozen on A large and A medium was allowed in budgeting while prices of B large and grade C eggs were unadjusted. Appendix Table 32 shows the prices of eggs used in this budgeting study.

Layers culled from the flock were sold at market value. The value of "culls" was figured on the basis of a uniform weight of four pounds per bird. Prices represent the yearly average of monthly means of daily prices of light hens on the Kansas City Produce Market during 1953-57, weighted seasonally by the estimated number of hens and cocks commercially slaughtered in the United States during 1954-57. A price of 41 cents per cull layer was used in this budgeting study.

Miscellaneous Economic Costs. An important element in a cost study of the egg enterprise is laying flock depreciation. It is defined as the loss due to mortality, loss in value of birds culled and the loss in value of layers remaining in the flock at the end of a given 15-month period. The method of determining flock depreciation is given in Appendix C. The basis of valuing layers for inventory purposes, by age of layer, was determined jointly by the poultry husbandmen and agricultural economists.

The straight line method of computing annual depreciation was used for both laying houses and equipment. Depreciation included an allowance for building repairs and upkeep. The standards used in budgeting are given in Appendix A.

Methods of computing depreciation on laying houses, equipment and laying flocks follow the recommendations of agricultural economists in farm

management.

Allowance of five percent for interest on investment in buildings and equipment was in accordance with common usage. It was believed to be comparable to the return available on investments of similar risk. Insurance was computed at rates used by the Kansas Farm Bureau Mutual Insurance Company of Manhattan, Kansas. Rates on which real estate and personal property taxes were figured were obtained from the County Treasurer, Riley County, Kansas. Budgeting standards for these cost items are given in Appendix A.

Interest of five percent per annum on the investment in the laying flock was calculated on the average monthly value of layers during 60 months. The average monthly value of layers was based on the actual number of birds, by age groups, during the four 15-month rotation periods. (Appendix Tables 3, 15, and 33.)

Personal property taxes on the laying flock were computed based on the average number of layers on hand on March 1 during the four 15-month rotation periods. The assessed valuation of laying stock and the tax rate are shown in Appendix A.

Since the farm family was already using the minimum consumption of electricity at certain fixed rates, it was assumed that electricity costs for the egg enterprise would be at the lower rate schedule for consumption above the minimum. Daily time requirements for various equipment and the rate of usage of electricity were based on studies made by agricultural engineers at Kansas State College and experiences of the College poultry farm and of a few poultrymen in Kansas. Rural electrical rates for Riley County, Kansas, were used as a basis for computing costs. For methods used see Appendix B.

Definition of Terms

Rotation Period—A maximum period of 15 months during which six months old pullets were put in the laying flock, subject to culling and mortality. For floor plan operations, the entire flock of layers was sold at the end of each 15-months period. For cage layer systems, replacements were made automatically to keep all cages filled during the 15-months period.

Cage Layer System—The management practice of confining each layer in an individual cage during her entire period of production.

Floor Plan Operation—The management practice of confining all layers together in a laying house with each layer permitted full freedom of the entire house. The house may be provided with a wood-slatted floor or simply a dirt floor with litter.

Completely-Enclosed Laying House—One without windows but equipped with mechanical ventilation and a cooling system. The walls and ceiling were insulated.

Open-Front Laying House—One with three sides fully enclosed and the remaining, front (south) side covered largely with wire netting and/or muslin cloth, to permit natural ventilation. Air outlets were provided at the roof ridge and at the rear of the house.

Flock Depreciation—The loss in the laying flock due to mortality, loss in value of birds culled and the loss in value of layers remaining in the flock at the end of a given 15-month period.

CAPITAL REQUIREMENTS OF THE EGG ENTERPRISE

Investment in Laying Houses

In this and succeeding sections, for greater ease in comparing total costs of construction, equipment, and investment and total costs and returns from the egg enterprise, total costs will be discussed in terms of the nearest whole dollar.

Table 1 summarizes the construction costs of laying houses, by management practice (cage layer system vs. floor plan operations) and type of house (completely-enclosed vs. open-front). Total cost was separated into its major components of buildings materials (lumber, hardware, wiring and plumbing) and labor (carpentry, wiring and plumbing) in order to point out more easily any significant differences. Total cost per square foot also was determined in accordance with conventional practice.

Comparison of Cage Layer Systems. The completely-enclosed and open-front laying houses equipped with cages were both of the same size (40 by 50 feet). However, the total cost, amounting to $4,002, of constructing the enclosed house was $722 more than for the open-front house (Table 1).

Except for plumbing which was the same in both types of houses, the enclosed house required more construction materials as well as additional labor for carpentry and electrical work. The major difference in cost of materials was in the items, lumber and hardware. This cost item also was the most important in explaining the higher cost of the enclosed house.

Comparison of Floor Plan Operations. The floor plan laying houses included an enclosed house with litter (40 by 50 feet), an open-front house with slatted floors (40 by 50 feet), and an open-front house with litter

Table 1. Summary of construction costs of laying houses, by management practice and type of housing.

Item	Cage systems		Floor plan operations		
	40'x50' Completely-enclosed house	40'x50' Open-front house	40'x50' Completely-enclosed house (with litter)	40'x50' Open-front house (with slatted floor)	40'x70' Open-front house (with litter)
	Dollars				
Materials cost					
Lumber and hardware	2,323.52	1,857.77	2,323.52	1,857.77	2,348.89
Wiring	244.00	212.93	244.00	212.93	356.49
Plumbing	131.77	131.77	78.46	78.46	78.46
Labor cost					
Carpentry	926.47	733.08	926.47	733.08	880.84
Wiring	244.00	212.93	244.00	212.93	256.49
Plumbing	131.77	131.77	78.46	78.46	78.46
Total cost	4,001.53	3,280.25	3,894.91	3,173.63	3,899.63
Cost per square foot[1]	1.87	1.50	1.82	1.48	1.32

[1]Each house had a 12'x12' egg room. Cost per square foot included this floor space.

(40 by 70 feet). The difference in total construction cost between the enclosed house and the 40 by 70 feet open-front house was negligible and total cost of the 40 by 50 feet open-front house was the least (Table 1).

The difference in total cost between the two open-front houses was principally due to a difference in their sizes. The enclosed house had an additional cost for insulation. The 40 by 70 feet house had 800 more square foot of floor space than the other two houses. The cost per square foot ranged from $1.32 for the 40 by 70 feet house to $1.82 for the enclosed house.

The cost of plumbing accounted for no differences in total construction costs, but wiring costs had a slight effect. The cost of electrical installations (materials and labor) was $426 for the 40 by 50 feet open-front house; $488 for the enclosed house; and $513 for the 40 by 70 feet open-front house (Table 1).

Comparison of Cage Layer Systems and Floor Plan Operations. Total construction costs of the five laying houses ranged from a low of $3,174 for the 40 by 50 feet open-front house with slatted floor (floor plan operation) to $4,002 for the 40 by 50 feet enclosed cage house (Table 1). Cost per square foot of floor space varied from $1.32 for the 40 by 70 feet open-front house (floor plan operation) to $1.87 for the 40 by 50 feet enclosed cage house. Larger investments in the enclosed houses, for cages and floor plan, were due primarily to the additional insulation costs.

The difference in cost between the two enclosed houses (cage and floor plan) as well as between the 40 by 50 feet open-front houses (cage and floor plan) was due to higher plumbing expenses for cage systems. Economies associated with the construction of larger houses account for the relatively low investment per square foot in the 40 by 70 feet open-front house with

litter. The cost per square foot would have been considerably less without the egg room. Such factors as extra insulation for the egg cooler, concrete floors, and the diseconomy of small size caused the construction cost of this room to be quite expensive at $4.89 per square foot.

Investment in Equipment

An inventory of various equipment and their cost, by management practice (cage systems and floor plan operations) and type of housing, are summarized in Table 2. The relative importance of a few items of equipment to total equipment cost is clearly indicated.

Comparison of Cage Layer Systems. Both the enclosed and the open-front cage houses used identical equipment except for the evaporative cooler necessary for the ventilation system in the enclosed house (Table 2). This item, at a cost of $239, brought the cost of equipping the enclosed house to $2,690 as compared with $2,451 for the open-front house.

Comparison of Floor Plan Operations. The total investment in equipment for floor plan operations ranged from $1,694 for the 40 by 70 feet open-front house to $2,502 for the open-front house with slatted floor. Differences in cost between the 40 by 70 feet and the 40 by 50 feet open-front houses reflect the use of droppings pits and litter in the cheaper house and slatted floors in the more expensive house. Investment in equipment in the 40 by 70 feet open-front house and the 40 by 50 feet enclosed house differed in amount only by the cost of the evaporative coolers.

Comparison of Cage Layer Systems and Floor Plan Operations. The equipment cost for the cage systems tended to be considerably higher than for the floor plans, except for the floor-plan house with slatted floors. This

Table 2. Inventory and costs of equipment, by management practice and type of housing.

Item	Number of units	Unit cost	Cage systems: 40'x50' Completely-enclosed house	Cage systems: 40'x50' Open-front house	Floor plan operations: 40'x50' Completely-enclosed house (with litter)	Floor plan operations: 40'x50' Open-front house (with slatted floor)	Floor plan operations: 40'x70' Open-front house (with litter)
					Dollars		
Cages	1,000	1.35	1,350.00	1,350.00	———	———	———
Nests[1]	10	33.23	———	———	332.28	332.28	332.28
Feeders	10	12.51	———	———	125.10	125.10	125.10
Waterer (50 feet)	1	19.50	———	———	19.50	19.50	19.50
Dropping pits[2]	———	———	———	———	191.83	———	191.83
Feed buckets	2	3.25	———	———	6.50	6.50	6.50
Feed cart	1	7.15	7.15	7.15	———	———	———
Feed hoppers	2	3.50	7.00	7.00	———	———	———
Feed scoops	2	1.57	3.14	3.14	3.14	3.14	3.14
Water trough cleaner	1	31.45	31.45	31.45	———	———	———
Wheelbarrow	1	35.90	35.90	35.90	———	———	———
Shovels	2	5.50	11.00	11.00	11.00	11.00	11.00
Sprayer	1	8.10	8.10	8.10	8.10	8.10	8.10
Poultry crates	6	2.29	13.74	13.74	13.74	13.74	13.74
Egg baskets	8	2.65	21.20	21.20	21.20	21.20	21.20
Bulk storage bin	1	225.90	225.90	225.90	225.90	225.90	225.90
Evaporative coolers	2	119.50	239.00	———	239.00	———	———
Egg washer	1	186.75	186.75	186.75	186.75	186.75	186.75
Egg room cooling unit	1	416.70	416.70	416.70	416.70	416.70	416.70
Disposal pit	1	132.52	132.52	132.52	132.52	132.52	132.52
Slatted floor (square feet)	2,000	.50	———	———	———	1,000.00	———
Total cost			2,689.55	2,450.55	1,933.26	2,502.43	1,694.26

[1]Each community nest handled 100 layers.
[2]Total cost of all dropping pits for each laying house.

higher expense for the cage system was due primarily to the investment in cages. At $1.35 each, the cost of 1,000 cages was $1,350 for each laying house. The installation of slatted floors at a cost of 50 cents per square foot was a major expense item, amounting to $1,000. While this expense brought the total equipment cost in the 40 by 50 feet open-front house (floor plan) to $2,502, it was still slightly less than that of the enclosed 40 by 50 feet cage house.

Equipping the enclosed cage house, the most expensive of the five, cost $2,690. The least expensive was the 40 by 70 feet open-front floor plan house with litter system at $1,694. Slightly higher in cost, but still considerably less than the two cage houses and the floor plan house with slatted floors, was the 40 by 50 feet enclosed house (floor plan) at $1,933. The medium-cost house, in terms of equipment, was the 40 by 50 feet open-front cage house at $2,451 (Table 2).

For both cage systems and floor plan operations, the open-front houses, excepting the one with slatted floors, had somewhat smaller equipment costs than enclosed houses. The difference in cost is due to the expense of a ventilation system in the enclosed structures.

Major items of equipment required for cage layer systems and not needed for floor plan operations were cages, a feed cart, feed hopper, water trough cleaner and a wheel barrow. Besides the cost already mentioned for the cages, these additional items were valued at $82. On the other hand, nests, feeders, waterers, and feed buckets needed for floor plan operations but not for cage layer systems amounted to $483. For the two houses using floor plans without slatted floors, an additional $192 was added for droppings pits, bringing this figure to $675. For cage systems, the cost of cages and other equipment

totaled $757 more than the equipment for two floor-plan houses with litter systems. Although the cost of equipping a 40 by 50 feet open front house with slatted floors was $1,000, total equipment cost for this house was still $187 less than for the enclosed cage house.

The expense of equipping the 40 by 50 feet enclosed cage house was $995 more than for the 40 by 70 feet open-front floor plan house with litter; $757 more than for the 40 by 50 feet enclosed house with floor plan operation; $239 more than the 40 by 50 feet open-front cage house; and $187 more than the 40 by 50 feet open-front floor plan house with slatted floors.

Investment in Laying Stock

Laying flock investment was smaller than the other two main categories of investment (housing and equipment), as shown in Table 3. There was no difference in investment between the cage layer systems or among the floor plan operations using the different types of houses. However, flock investment in the cage layer systems was $210 per year more than for floor plan operations. A larger number of layers, in cage systems than in floor plan operations, reflects a continuous replacement program and was responsible for this difference in cost.

Total Investment

A summary of the investment in housing, equipment, and laying stock, by management practice (cages and floor plans) and type of house (completely-enclosed and open-front) is given in Table 3. The investment per layer as well as the total investment are shown.

Comparison of Cage Layer Systems. There was considerable difference

Table 3. Summary of investment in housing, equipment, and laying stock management by practice and type of housing.

Item	Cage systems		Floor plan operations		
	40'x50' Completely-enclosed house	40'x50' Open-front house	40'x50' Completely-enclosed house (with litter)	40'x50' Open-front house (with slatted floor)	40'x70' Open-front house (with litter)
	Dollars				
Investment in					
Housing[1]	4,001.53	3,280.25	3,894.91	3,173.63	3,899.63
Equipment	2,689.55	2,450.55	1,933.26	2,502.43	1,694.26
Laying flock[2]	1,457.32	1,457.32	1,247.42	1,247.42	5,593.89
Total	8,148.40	7,188.12	7,075.59	6.923.48	6,841.31
Per layer[3]	8.15	7.19	8.44	8.26	8.16
Housing and equipment[1]					
Total	6,691.08	5,730.80	5,828.17	5,676.06	5,593.89
Per layer[3]	6.69	5.73	6.95	6.68	6.77

[1]Includes investment in the egg room.
[2]Average investment for 12-months based on a 60-months accounting period.
[3]Based on an average number of layers for the year: Cage systems-1000; Floor plan operations-838.

in total investment in buildings, equipment, and laying stock between the two cage houses (Table 3). An investment of $7,188 for the open-front house compares with $8,148 for the enclosed house. This difference is particularly apparent in terms of total cost per layer. The investment per layer for the open-front house was $7.19 as compared to $8.15 for the enclosed house. The largest portion of this difference was due to housing costs.

Comparison of Floor Plan Operations. Total investment in buildings, equipment, and layers under floor-plan operations ranged from $6,841 for the 40 by 70 feet open-front house to $7,076 for the enclosed house. The 40 by 50 feet open-front house was medium in cost, at $6,923 (Table 3). Total investment per bird ranged from $8.16 for the 40 by 70 feet house to $8.44 for the enclosed house.

Comparison of Cage Layer Systems and Floor Plan Operations. Total investment in housing, equipment, and layers was larger for the cage systems than for floor-plan operations (Table 3). Total investment in the enclosed cage house was considerably larger than in the other four houses.

At $8,148, the enclosed cage house had a total investment amounting to $1,307 more than the 40 by 70 feet open-front house (floor plan), which had the lowest total investment of any house. The 40 by 50 feet open-front house (with slatted floor) had a medium investment of $6,923; the 40 by 50 feet enclosed house (floor plan) had $7,076; and the 40 by 50 feet open-front cage house had $7,188 of total investment.

However, in considering total investment per bird, the situation was changed. Investment per bird of $7.19 was lowest for the 40 by 50 feet open-front house with cage layer system. The greatest investment per bird, amount to $8.44, was incurred for the 40 by 50 feet enclosed house (floor

plan). Investment per layer for the 40 by 50 feet open-front house with slatted floors under floor plan management was $8.26. There was little difference in per layer investment between the 40 by 70 feet open-front house (floor plan) and the 40 by 50 feet enclosed cage house, the former being $8.16 and the latter $8.15.

In general, the differences noted in total investment and investment per layer between cage systems and floor plan operations were due to a difference in the average number of layers in flocks for the year.

COMPARATIVE COSTS AND RETURNS

There are several costs in the egg enterprise that are generally ignored by producers. Such costs include depreciation on buildings and equipment and interest on investment in buildings, equipment, and layers. An attempt was made to include all economic costs in this study.

Table 4 shows the costs and returns from the laying flock for a 12-months period, by management practice (cage layer systems and floor plan operations) and type of house (completely-enclosed and open-front).

The effects of large investment on cost are more apparent when their indirect influence is considered. The investment in the laying house influenced such economic costs as depreciation on buildings, interest on investment, insurance on buildings and equipment and real estate taxes.

Comparison of Cage Layer Systems

Total costs of the egg enterprise for cage houses were $5,975 for the open-front house and $6,221 for the enclosed house (Table 4). Factors accounting for the disparity were differences in the amount of electricity

Table 4. Costs and returns from the laying flock for a 12-months period, by management practice and type of housing.

Item	Cage systems		Floor plan operations		
	40'x50' Completely enclosed house	40'x50' Open-front house	40'x50' Completely enclosed house (with litter)	40'x50' Open-front house (with slatted floor)	40'x70' Open-front house (with litter)
	Dollars				
Receipts from eggs[1]	7,365.58	7,237.84	6,027.70	5,864.31	5,864.31
Costs:					
Feed[1]	3,438.47	3,438.47	3,266.97	3,266.97	3,266.97
Use of building and equipment:					
Depreciation on building	200.12	164.01	194.74	158.68	194.98
Depreciation on equipment	268.96	245.05	193.33	250.24	169.43
Interest on investment (buildings and equipment)	167.30	143.27	145.70	141.90	136.53
Insurance (buildings and equipment)	20.60	17.31	18.73	16.99	18.29
Real estate taxes	41.05	35.16	35.75	34.82	34.32
Flock depreciation[1]	1,674.48	1,674.48	1,509.95	1,509.95	1,509.95
Interest on investment (laying stock)	72.86	72.86	62.37	62.37	62.37
Electricity	241.63	88.32	241.63	88.32	94.17
Medications	70.00	70.00	70.00	70.00	70.00
Insurance on laying stock	5.60	5.60	4.79	4.79	4.79
Personal property tax on laying stock	20.37	20.37	18.11	18.11	18.11
Litter			24.00		33.60
Total	6,221.44	5,974.90	5,786.07	5,623.14	5,613.51
Net returns to labor and management	1,144.14	1,262.94	241.63	241.17	250.80

[1]An average for 12-months based on a 60-months accounting period.

consumed and in fixed costs. The ventilation system, involving use of mechanical cooling, in the enclosed house was largely responsible for the difference in electricity consumed. A different investment in buildings and equipment influenced fixed costs.

Receipts from eggs were smaller for the open-front house than for the enclosed house because of a lower rate of lay for birds at the ages 15 to 20 months (Appendix Table 16). However, larger costs for the enclosed house offset the advantage of greater receipts and as a result, the open-front house showed a net return of $119 more than the enclosed house.

Comparison of Floor Plan Operations

Receipts from marketings of eggs were $5,864 for both the open-front houses and $6,028 for the enclosed house (Table 4). This difference in receipts was due to higher production probably resulting from better control of ventilation and temperature in the enclosed house. Costs of the egg enterprise for the two open-front houses differed by only $9 with a slight advantage to the 40 by 70 feet house. Total enterprise costs of $5,614 for the lower cost open-front house compare with $5,786 for the enclosed house. Electricity accounted for much of the higher enterprise costs of the completely-enclosed house.

Net returns to labor and management differed very little among the three floor plan operations. The 40 by 70 feet open-front house showed a net return of roughly $9 more than either of the 40 by 50 feet houses, enclosed and open-front.

Comparison of the Most Profitable Cage Layer System and Floor Plan Operation

There was a large difference in net returns to labor and management between the most profitable cage system and floor plan operation. The 40 by 70 feet open-front house (with litter) was the most profitable floor plan operation and the open-front house was the most profitable cage system. Total enterprise costs of these two systems differed by $361. The floor plan operation had a total cost of $5,614 as compared to $5,975 for the cage system (Table 4).

Depreciation on laying stock was the largest cost item encountered, other than feed, and was $164 higher for the cage system than for the floor plan operation. Depreciation cost might be lowered by purchasing cheaper pullets; however, the housing of less productive layers would affect egg receipts adversely and probably offset the slight cost advantage which might be gained. There was little difference between the cage system and the floor plan operation as far as electricity costs were concerned. Depreciation on the laying house was $164 for the most profitable cage system and $195 for the most profitable floor plan operation. The latter house was larger thus accounting for the greater depreciation expense. However, equipment depreciated $245 in the cage system as compared with $169 in the floor plan operation and reflects the sizeable investment in cages.

Feed was the largest single cost item at $3,267 for the most profitable floor plan and $3,438 for the most profitable cage layer system. Two factors were involved here, one of which gave an advantage to the cage system and the other to the floor plan operation. First, cage layers consumed 250 pounds of feed per 100 layers per day while birds on the floor consumed 280

pounds. This factor lowered the cost of feed per layer for the cage system relative to the floor plan operation. But total feed costs for a 12-months period were higher for the cage system because 1,000 cages were filled at all times, as compared to an annual average of 838 floor-plan layers.

Table 4 shows that net returns to labor and management from the open-front house (cage system) were considerably higher than for the 40 by 70 feet open-front house (floor plan). Net returns for a 12-months period amounted to only $251 for the floor plan house, as compared with $1,263 for the cage house.

Although total costs were somewhat higher for the most profitable cage system than for the most profitable floor plan operation, receipts were correspondingly higher by enough to compensate for this and give the cage system a decided advantage over the floor plan operation.

Based on a net return of $1,263 for the open-front house with cage layers and assuming 1,095 hours of labor per year for 1,000 layers, the return per hour was $1.15. Ranking next was the completely-enclosed house with cage layer system which showed a return of $1.05 per hour. Likewise, assuming an average size flock of 838 layers during the year and a requirement of one hour of labor per bird per year under floor plan operations, the return per hour of labor for the 40 by 70 feet open-front house (with litter system) was $ .30. For both of the other floor plan operations, the completely-enclosed house (with litter system) and the open-front house (with slatted floors), the return was 29 cents per hour.

FACTORS AFFECTING COSTS AND RETURNS

Important factors which influence costs and returns are: total egg

production, feed conversion efficiency, feed cost as a percent of total cost; total investment in housing and equipment per layer, flock depreciation, the price of laying mash and prices of eggs.

Factors such as the general price level and economic conditions are beyond the control of producers. However, two factors greatly affecting costs and returns from the egg enterprise and over which producers may exercise some control are the cost of feed and the market outlets for eggs.

It may be possible for an individual, large-scale egg producer to compare prices of comparable quality feed from several nearby sources and bargain for a favorable price, by virtue of his large size.[1] Likewise, substantial prices premiums for eggs may be obtained by a large producer from certain market outlets, including direct marketing to consumers, because of a dependable supply of high quality eggs the year around.

In this budgeting study, however, since prices of feed and market eggs were the same for each flock, irrespective of type of housing or management practice, these factors did not affect relative costs and returns from each egg enterprise although they did influence the level of costs and returns.

Table 5 shows total egg production, feed conversion efficiency, capital investment in housing and equipment, and costs and returns from the laying flock for a 12-months period, by management practice (cage system and floor plan), and by type of house (completely-enclosed and open-front).

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[1]The average annual consumption of laying mash was 45.62 tons by cage layers and 43.37 tons by floor layers, based on a 60-month accounting period. Therefore, each dollar per ton change in the price of laying mash would alter feed costs by roughly $46 for cage layer systems and $43 for floor plan operations.

Table 5. Egg production, feed conversion efficiency, capital investment in housing and equipment and costs and returns from the laying flock for a 12-months period, by management practice and type of housing.

Item	Cage systems		Floor plan operations		
	40'x50' Completely enclosed house	40'x50' Open-front house	40'x50' Completely enclosed house (with litter)	40'x50' Open-front house (with slatted floor)	40'x70' Open-front house (with litter)
Egg production (dozens)	20,976	20,693	17,334	16,835	16,835
Feed conversion ratio (pounds of feed per dozen eggs)	4.4	4.41	5.0	5.1	5.1
Total egg production cost[1] (cents per dozen)	29.7	28.9	33.4	33.5	33.7
Feed cost (cents per dozen)	16.4	16.6	18.8	19.4	19.4
Feed cost as percent of total cost	55.0	57.6	56.5	58.1	58.1
Investment in housing and equipment					
Total (dollars)	6,691.08	5,730.80	5,828.17	5,676.06	5,593.89
Per layer[2] (dollars)	6.69	5.73	6.95	6.68	6.77
Gross returns					
Per layer[2] (dollars)	7.36	7.24	7.19	7.00	7.00
Total Costs					
Per layer[2] (dollars)	6.22	5.98	6.90	6.71	6.70
Annual net returns to labor and management					
Per layer[2] (dollars)	1.14	1.26	.29	.29	.30

[1]Includes all cost items such as feed, use of building and equipment, real estate taxes, flock depreciation, interest on investment (laying stock), electricity, medications, insurance on laying stock, personal property tax on laying stock and litter.

[2]Based on an average number of layers for the year: Cage systems-1000; Floor plan operations-838.

Cage Layer Systems

For the two houses with cage layer systems, total annual egg production of 20,693 dozen for the open-front house compares with 20,976 dozen for the enclosed house (Table 5). This was a difference of 283 dozen in favor of the enclosed house. Pounds of feed consumed for each dozen eggs was 4.4 for both houses but feed cost per dozen eggs produced was two-tenths of a cent more for the open-front house.

Despite lower annual gross returns per layer for the open-front house than for the enclosed house, net returns to labor and management were greater (Table 5). This reflects a substantially smaller investment in housing and equipment per layer for the open-front house and, consequently, lower charges against the enterprise for fixed cost items.

Table 6 shows the effect of the schedule of layer replacements upon the size and grade distributions of eggs and the value of eggs for cage layer systems, by type of housing and rotation period.

The grade and size distributions of eggs produced in cage layer houses were relatively constant during the last three 15-month rotation periods, once the cycle of pullet replacements became established.[1] (Table 6). However, in the first period there were fewer A large and C grade eggs but more A medium and B large eggs than in the following rotation periods. Nevertheless, the value of eggs varied no more than $139, by rotation periods, for the enclosed house and no more than $84 for the open-front house. Data of Appendix Table 13 indicated that there was a larger

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[1]Appendix Table 13 shows the replacement schedule of pullets in cage layer systems.

Table 6. Cage layer systems (completely-enclosed and open-front houses). Production of eggs by grades and sizes and total receipts from eggs, by rotation periods, 1000-bird laying flock.

Type of house	15-months rotation period	Grades and sizes of eggs: A large	A medium	B large	C[1]	Total[2]	Value of eggs (dollars)
		(dozens of eggs)					
Completely-enclosed	First	16,613	7,250	26	2,644	26,533	9,220.76
	Second	16,993	6,190	23	2,852	26,058	9,127.93
	Third	17,218	6,297	22	2,778	26,315	9,212.99
	Fourth	17,218	6,300	22	2,772	26,312	9,266.21
Open-front	First	16,291	7,193	24	1,612	26,120	9,073.39
	Second	16,701	6,130	22	2,611	25,664	8,989.28
	Third	16,833	6,320	22	2,723	25,903	9,065.04
	Fourth	16,812	6,225	22	2,723	25,782	9,061.47

[1]Includes A small and undergrades.
[2]Inedible eggs are not included.

proportion of younger age layers and fewer old layers in the first period than in any succeeding period. It is known that pullets produce eggs at a higher rate than hens and also lay a higher percentage of A grade eggs; therefore, these factors would account for the slightly higher total production in the first period and differences in grades of eggs as compared with succeeding periods.

Floor Plan Operations

Egg production ranged from 16,835 dozen for the two open-front houses to 17,334 dozen for the enclosed house (Table 5). The feed conversion ratio, or pounds of feed per dozen eggs, varied from 5.0 for the enclosed house to 5.1 for the two open-front houses. The total cost of producing a dozen eggs and feed cost per dozen eggs were lower for the enclosed house than for the open-front houses.

Gross returns of $7.19 per layer for the enclosed house compare with

$7.00 per layer for the two open-front houses. The higher gross returns for the enclosed house reflect higher egg production. Moreover, the egg conversion rates were better for the enclosed house than for the open-front houses. Hoever, the annual net return to labor and management per layer was approximately the same for all floor plan operations. Enterprise costs for the enclosed house were relatively high and reflect a large investment in housing and equipment per layer (Table 5).

Total enterprise costs per bird were $6.70 for the 40 by 70 feet open-front house with litter, $6.71 for the 40 by 50 feet open-front house with slatted floors, and $6.90 for the 40 by 50 feet completely-enclosed house.[1]

Cage Layer Systems vs. Floor Plan Operations

Egg production ranged from 16,835 dozen for the 40 by 70 feet floor plan house to 20,976 dozen for the enclosed cage house. Major factors affecting egg production were rate of lay and number of layers. Higher total egg production and a more efficient rate of converting feed into eggs explain the lower feed cost of eggs per dozen for cage layer systems than in floor plan operations (Table 5).

In addition, the higher total egg production from cage layer houses than from floor plan operations contributed to greater annual gross returns per layer.

The importance of keeping houses full is easily visualized by noting the annual egg production per layer, or rate of lay, in the alternative types

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[1]Total enterprise cost per bird was computed by dividing total costs as shown in Table 4 by the average number of layers for a 12-months period.

of houses and mana ement practices. For floor plan operations, layers in the two open-front houses averaged 241 eggs per bird per year and those in the enclosed house averaged 248 eggs. This productivity compares with 248 eggs for the open-front cage house and 252 eggs for the enclosed cage house.[1]

In this budgeting study, the pounds of feed to produce a dozen eggs was within the range discussed in other studies. The feed conversion ratio may be influenced by the protein content and energy level of feeds, the amount of feed wasted, and genetic factors. Even though the feed conversion ratios obtained in this study were slightly higher than those reported by a few outstanding producers in Kansas, they are consistent in the relationship between cage systems and floor plan operations. A poultry nutritionist[2] reported a feed conversion ratio of 4.1 for cages and 4.6 for floor plan operations in station experiments at the Kansas State College poultry farm. On the basis of data obtained from 21 farms, the Alabama Agricultural Experiment Station reported a feed conversion ratio of 5.7 for cages.[3] Table 5 shows a ratio of 4.4 for both cage layer systems in this budgeting study. For floor plan operations, the ratio was 5.0 for the enclosed house and 5.1 for both open-front houses.

As a rule of thumb, feed cost usually makes up 60 percent of total cost

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[1]The annual egg production per layer was computed by dividing the total number of eggs produced during an average 12-months period by the average number of layers for this period. (838 layers for floor plan operations and 1,000 for cage systems).

[2]Dr. Paul Sanford, Poultry Husbandry Department, Kansas State College, Manhattan, Kansas.

[3]Laurent, op. cit., p. 15.

for the egg enterprise. Data of Table 5 show that the calculations of feed cost as a percent of total cost, for both cage layer systems and floor plan operations, were close to that percentage in this budgeting study.

The investment in housing and equipment per layer had an important effect on net returns since a charge was made for the use of such capital in computing total costs for the egg enterprise.

Depreciation on layers was the second largest cost item (Table 4). Flock depreciation for cage layer systems was $1,674 as compared to $1,510 for floor plan operations. The slightly higher depreciation cost for cage systems reflected the need to replace layers periodically to keep all cages filled. However, egg production was thus maintained at a high level. Relative to other costs and the returns from the egg enterprise, cage systems were better able to stand this cost than floor plan operations. Flock depreciation was a high cost item because 6-months old pullets cost $2.25 each whereas the value of a cull layer, at any age, was only $ .41.

REVIEW OF LITERATURE

No literature was available on detailed comparisons of costs and returns from cage layer systems and floor plan operations such as were made in this study. While certain studies of cage laying systems and floor plan operations were available from other states, difficulty was encountered in comparing their results with those of this study. Differences in technology of egg production, time periods, methodology, prices of input and output factors, climatic conditions, and different sizes and types of buildings make a comparison difficult.

Cage Layer Systems

Laurent of the Alabama Agricultural Experiment Station made a survey of 73 cage layer farms. The period covered by this survey was from September 1, 1953, to August 31, 1954. While operations of 73 poultry enterprises were studied, data on costs and returns of producing and marketing eggs were obtained only from 21 farms. The cost of producing a dozen eggs was 52 cents per dozen and returns per dozen amounted to 52.6 cents. The return to labor was $1.02 per hour.[1]

The Vineland Poultry Laboratories kept accounting records on 360 cage layers in 1954. They reported a net profit of $3.90 per cage unit, but in examining the study it was found that the profit figure merely represented returns above feed and replacement costs.[2]

Floor Plan Operations

Becker of Oregon State College made a study of 91 farms in 1956. Detailed costs for the egg enterprise included feed, labor, depreciation on layers, buildings and equipment, supplies, interest, and taxes on layers. Producers' estimates were used where adequate records were not available. Total cost per layer was $8.62 and gross return per layer was $9.04. Net returns were 42 cents per layer. Cost per dozen eggs was 52.8 cents and returns were 55.3 cents. Producers received an average of $1.24 per hour for labor. The value of cull layers ranged from 99 cents for light breeds

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[1] Laurent, op. cit., pp. 28-30.

[2] Tevis M. Goldhaft, A Comprehensive Analysis of a Cage Laying Operation Over a One Year Period, Vineland, N. J.: Vineland Poultry Laboratories, n.d., pp. 5-6.

to $1.46 for heavy breeds.[1]

Kearl made a study of 172 poultry farms in New York state during 1947. Costs included in this study were for feed, labor, buildings and equipment, depreciation, and other items. The average cost of producing eggs was 53 cents per dozen and returns per dozen were 54.5 cents. The total cost of production per layer on all farms was $7.62 and total returns were $7.78. Profit was 22 cents per layer and returns to labor were 76 cents per hour.[2]

Cage Layer Systems vs. Floor Plan Operations

An actual experiment comparing production of cage and floor plan layers was conducted at the Mississippi Agricultural Experiment Station by J. E. Hill, R. C. Albritton, and L. J. Dreesen. The study showed that, under the climatic conditions in Mississippi, labor income was in favor of cage layers even though replacements were added to the floor plan operation in order to keep the house at full capacity.[3]

In summary, a review of these studies indicated that total returns from cage layer systems were greater than for floor plan operations. Although the initial investment and labor requirements were greater for the cage system, production per bird also was higher and feed consumption less than for floor plan layers.

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[1]Becker, op. cit., pp. 6-11.

[2]C. D. Kearl, Commercial Poultry-Farm Management in New York State, Cornell University Agricultural Experiment Station Bulletin No. 864, October 1950, pp. 12-18.

[3]Mississippi Farm Research, May 1957.

SUMMARY AND CONCLUSIONS

In order to summarize findings of this study in a concise manner, the total and per layer investment in housing, equipment and laying stock, total costs, gross returns and net returns per layer in the various egg enterprise are presented in tabular form. The investment in housing, equipment and laying stock, by management practice and type of laying house was as follows:

Item	Housing and equipment: Total	Housing and equipment: Per layer	Total in laying stock
Cage layer systems:			
40' x 50' enclosed house	$6,961	$6.69	$1,457
40' x 50' open-front house	5,731	5.73	1,457
Floor plan operations:			
40' x 50' enclosed house	5,828	6.95	1,247
40' x 50' open-front house (slatted floors)	5,676	6.68	1,247
40' x 70' open-front house	5,594	6.77	1,247

Investment in housing and equipment for the enclosed cage house was much greater than that of the open front cage house. This was due to the additional construction materials, labor for carpentry and electrical work, and the mechanical ventilation system required by the enclosed house. Plumbing costs were the same in both houses.

The larger investment in the enclosed cage house, as compared to the enclosed floor plan house, was due primarily to the cage equipment and additional plumbing needed in the cage house. There was no difference in

wiring costs between these houses.

Investment in housing and equipment per bird was greater for most floor plan operations than for cage systems.

A larger average number of layers per year in cage systems (1,000 birds) than in floor plan operations (838 birds) reflected a continuous replacement program and was responsible for the difference in total investment in laying stock between these two management practices.

Returns from eggs were the only source of receipts. Total costs of the egg enterprise consisted of the cost of feed, use of buildings and equipment, real estate and personal property taxes, flock depreciation, interest on investment in laying stock, electricity, medications, insurance on laying stock, and litter. Feed and depreciation on laying stock were the largest cost items encountered.

The following is a summary of costs and returns from the egg enterprise for a 12-months' period, by management practice and type of laying house. Data are on a per layer basis.

Item	Gross returns	Total costs	Net returns to labor and management
Cage layer systems:			
40' x 50' enclosed house	$7.36	$6.22	$1.14
40' x 50' open-front house	7.24	5.98	1.26
Floor plan operations:			
40' x 50' enclosed house	7.19	6.90	.29
40' x 50' open-front house (slatted floors)	7.00	6.71	.29
40' x 70' open-front house	7.00	6.70	.30

Total feed cost per dozen eggs and total egg production cost per dozen eggs were both lower for cage systems than for floor plan operations. These lower costs for cage layers were due to the higher total egg production and more efficient rate of converting feed into eggs. The feed conversion ratio for the two cage systems was 4.4 as compared to 5.0 for the enclosed house and 5.1 for the open-front floor plan houses.

Higher total egg production for cage layer systems was the result of a larger average number of layers in cage systems and a higher annual rate of lay than under floor plan operations.

Total returns to labor and management per year for each house were as follows: Cage layer systems -- enclosed house, $1,144; open-front house, $1,263; floor plan operations -- enclosed house, $242; open-front house with slatted floors, $241; open-front house with litter, $251.

Based on a net return of $1,263 for the open-front house with cage layers and assuming 1,095 hours of labor per year for 1,000 layers, the return per hour was $1.15. Ranking next was the completely-enclosed house with cage layer system which showed a return of $1.05 per hour. Likewise, assuming an average size flock of 838 layers during the year and a requirement of one hour of labor per bird per year under floor plan operations, the return per hour of labor for the 40 by 70 feet open-front house (with litter system) was $ .30. For both of the other floor plan operations, the completely-enclosed house (with litter system) and the open-front house (with slatted floors), the return was 29 cents per hour.

This study indicates that if an investment is contemplated in a poultry enterprise under prevailing conditions in Kansas, the advantages of the cage layer system over the floor plan operation should be considered. However,

if some system could be devised whereby the number of layers in floor plan houses was kept nearer the 1,000 layer capacity each month, then floor plans would show a considerably higher net return than was indicated in this study.

ACKNOWLEDGMENTS

The author wishes to acknowledge his indebtedness to Dr. Joe W. Koudele, of the Department of Economics and Sociology staff and major instructor for the author, for his suggestion of the problem and his assistance and direction. He also wishes to express appreciation for the many hours that Professors T. B. Avery, head of the Department of Poultry Husbandry, and M. E. Jackson and M. A. Seaton, extension poultry specialists, spent as an advisory committee.

Special gratitude is expressed to Dr. George Montgomery, head of the Department of Economics and Sociology, for the assistantship which enabled the author to study at Kansas State College and for use of the facilities of the department.

Information provided by Manhattan businessmen on the price of building materials and equipment was of great value to this study. The author also wishes to thank Kansas poultrymen for making records available on size and grade distributions of eggs and commercial feed companies in northeastern Kansas for supplying prices of laying mash.

Others who deserve credit for assistance and interest in the study are Dr. Leo Hoover, Dr. Fred C. Bortfeld, Mrs. Ruth Clifton, and Mr. Edwin C. Heinsohn of the economics and sociology department staff; Professors Leo Wendling and Harold Stover of the extension staff; and Mrs. Carol Hatfield, Mrs. Dixie Dickens, and Mrs. Janice Kientz, typists.

Although the assistance of many persons is hereby acknowledged, the author assumed full responsibility for any errors or inconsistencies that may be found in the manuscript.

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APPENDICES

Appendix A

Budget Standards for Laying Houses, Equipment, and Other Fixed Cost Items

I. Laying Houses

Wiring. A sufficient number of electrical outlets were installed to handle present equipment and any necessary equipment that might be added later. Three-way switches were used in all houses in order that lights might be switches on and off at either end of the house. One 15-watt flourescent-type light tube was installed for every 200 square foot of floor space. Two 48-inch flourescent light strips were used in the egg room. A time clock was used to turn lights on and off automatically. For diagrams of the wiring systems, see Figures I, II, and III, Appendix D.

Plumbing. Pipe was laid two and a half feed below ground level. Three-quarter inch inlet pipe and four-inch drain pipe were used. The main waterline was 100 feet from the house. The fiber drain pipe extended 20 feet from the house. The bottom waterer was located 44 inches above floor level and the top waterer 60 inches above the floor in the cage layer houses. Waterers were located 36 inches above floor level in the floor plan houses. Drains from the waterers to the soil pipe consisted of rubber hose inserted into a hole drilled in the soil pipe. The egg room was built at the end of the building where the water line was located. A floor drain was placed in the center of the front division of the egg room. Four-inch sewer pipe was used for this 27 feet of drainage. The water hydrant was two and a half feet high and was provided with a garden hose connection.

II. Equipment

Cage houses were equipped with 1,000 individual cages (8" by 16") complete with feeders and waterers.

Community rollaway nests were used with floor plan operations.

Continuous flow waterers fifty feet in length were included in floor plan houses.

A slatted floor was figured for the 40' by 50' open-front floor plan house, and dropping pits for the other two floor plan houses.

Disposal pits were included in all five houses.

Evaporative coolers, used only with enclosed houses, had a capacity of 4,000 cubic feet of air per minute.

Round egg baskets were selected in order that they could be used with the egg washer.

The egg washer was equipped with a heating element and cleaned one basket of eggs at a time.

Bulk storage bins were 12 feet, 10 inches high, six feet in diameter, and had a capacity of 215 cubic feet.

III. Depreciation

The original construction cost of houses or purchase price of equipment was divided by its expected life. Life of the houses was figured at 20 years and of equipment at 10 years.

IV. Interest on Investment

Investment in houses and equipment was computed at 50 percent of the original value. Rate of interest was five percent per annum.

V. Taxes

Houses and equipment were assessed at 25 percent of their actual value. Taxes were paid at the rate of $49.08 per $1,000 assessed valuation. The actual value of real estate was determined to be half the original value.

VI. Insurance (fire and extended coverage)

Houses and equipment were insured for eighty percent of their value. Premium rates were computed at 98 cents for $100 of insured value on houses and 48 cents on equipment. For insurance purposes, it was assumed that both houses and equipment had depreciated by 50 percent of their original value.

Appendix B

Budget Standards for Laying Flocks and Other Variable Cost Items

I. Interest on Investment in Laying Stock

The annual charge was five percent.

II. Taxes on Laying Stock

Layers were valued at $5 per dozen and the tax rate was $49.08 per $1,000 of assessed valuation.

III. Electricity Costs

All electricity costs were computed at two cents per kilowatt hour.

The following daily time requirements were allowed: lights, 14 hours; egg washer, somewhat less than 2 hours; egg cooler, 8 hours; evaporative cooler, 14 hours.

Consumption of electricity was computed at the following rate: egg washer, 500 watts an hour; egg cooler, 1 kilowatt per hour; evaporative cooler, three-fourths of a kilowatt per hour; miscellaneous equipment, 1 kilowatt per day.

Annual electricity cost was figured for 365 days.

IV. Medications

Total medications costs were based on seven cents a bird per year for a 1,000 bird laying flock.

Appendix C

Procedure

I. Depreciation on Laying Stock

To determine depreciation for any 15-months period, the sum of the values of birds sold as culls and on hand at the end of the period was subtracted from the total of the value of layers on hand at the beginning of the period and of pullet replacements during the period. Beginning and ending inventory values were based on various ages of layers (Appendix Table 33). Depreciation was calculated for each of four successive 15-months rotation periods, summed, and divided by five to convert to a 12-months basis of accounting.

II. Feed Costs

The cost of laying mash was based on the amount of mash consumed monthly during each of four successive 15-months rotation periods. Seasonal prices of mash were used. Feed cost on a 12-months basis was computed by dividing the sum of the cost of mash for four 15-months rotation periods by five.

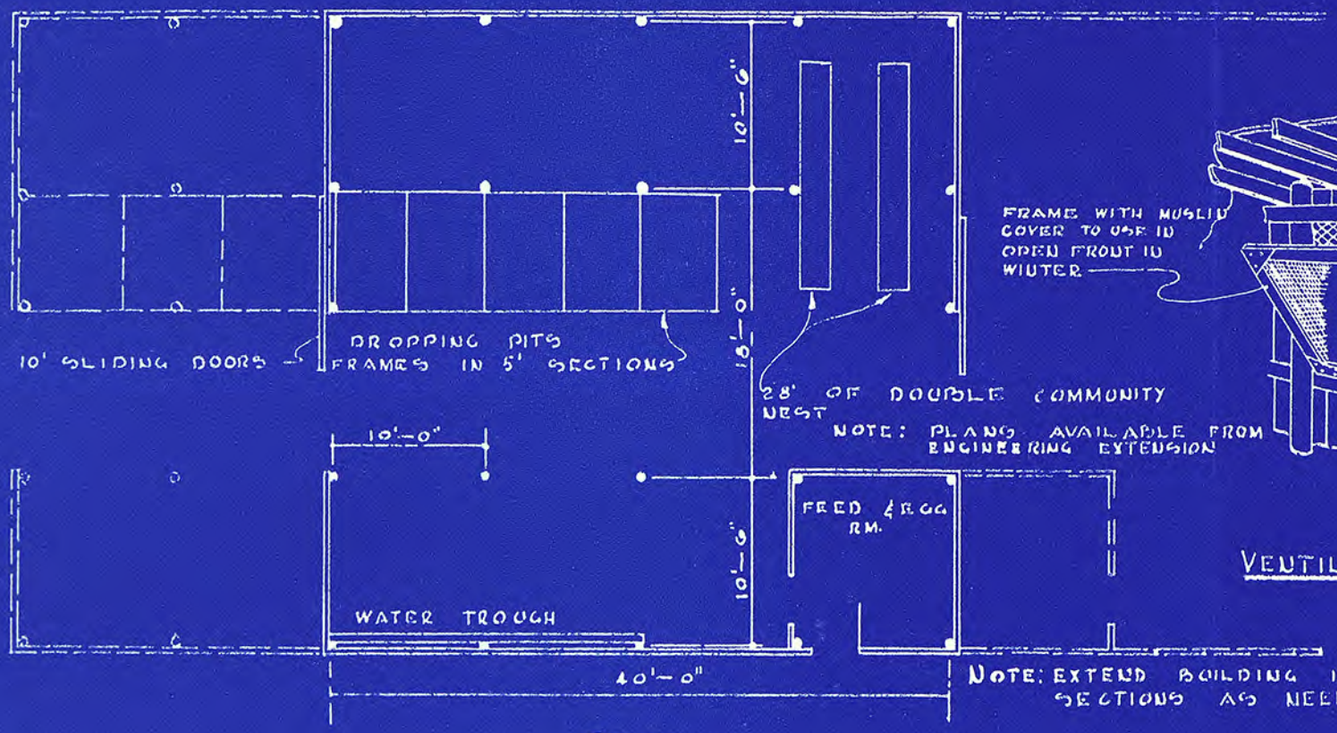
Under floor plan operations, the number of birds in the flock at the beginning of each two-weeks period was determined and multiplied by the actual number of days in each period. Each bird was allotted 0.28 pounds of mash per day. This rate of consumption was multiplied by the product of the number of birds and days.

For cage layer systems, the same general method was followed. However, feed consumption was calculated on a monthly basis for 1,000 layers at the rate of 0.25 pounds of mash per bird per day.

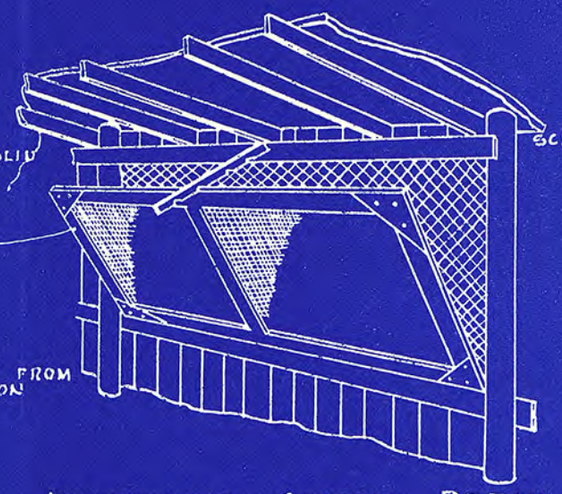
Total pounds of mash consumed each month were rounded to tons and multiplied by the monthly price of mash per ton.

Appendix D

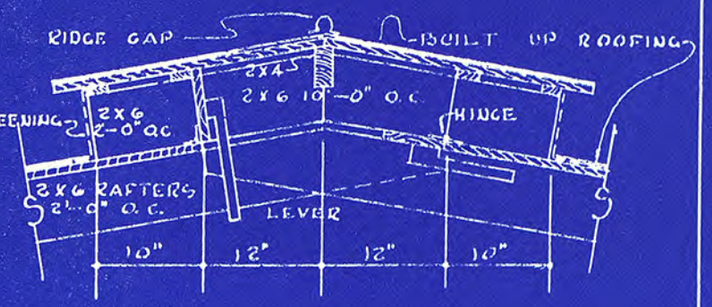
PLANS AND DIAGRAMS



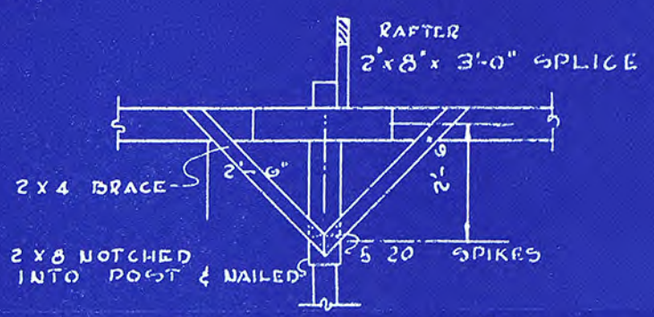
PLAN



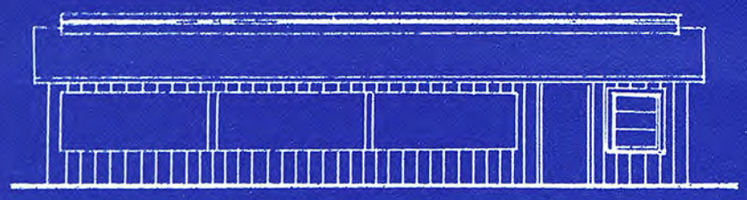
VENTILATOR CURTAIN DETAIL



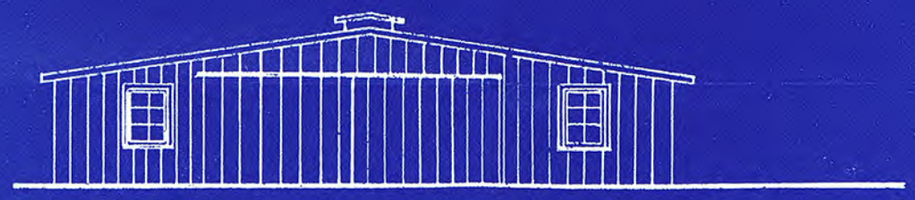
ROOF VENT DETAIL



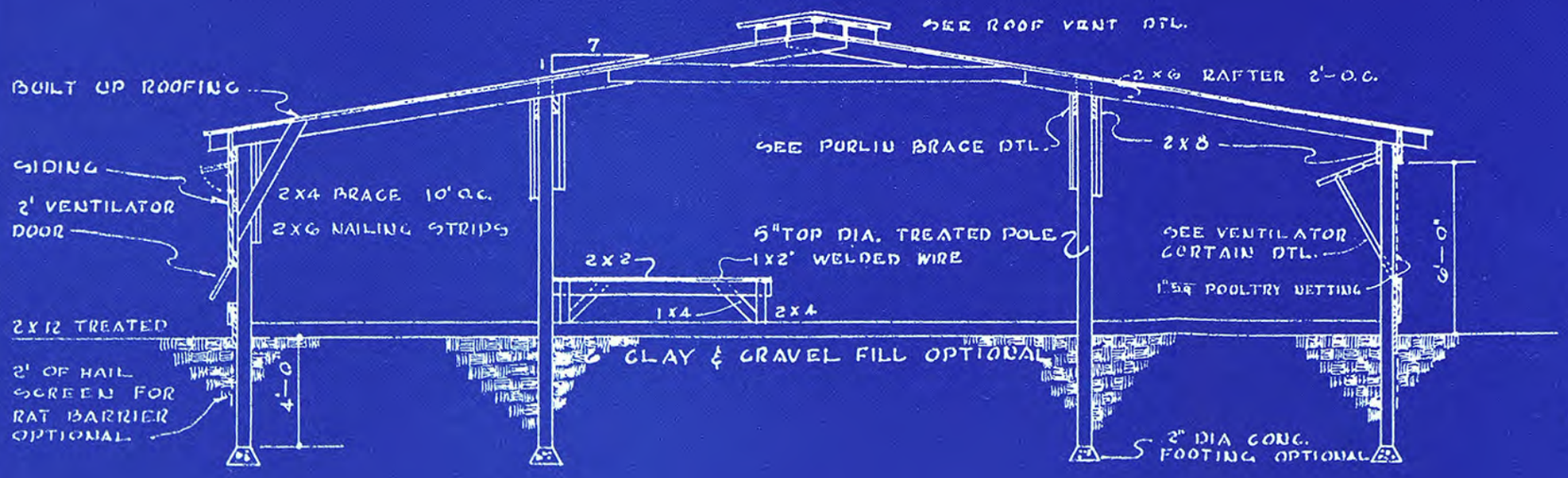
DETAIL OF PURLIN BRACES



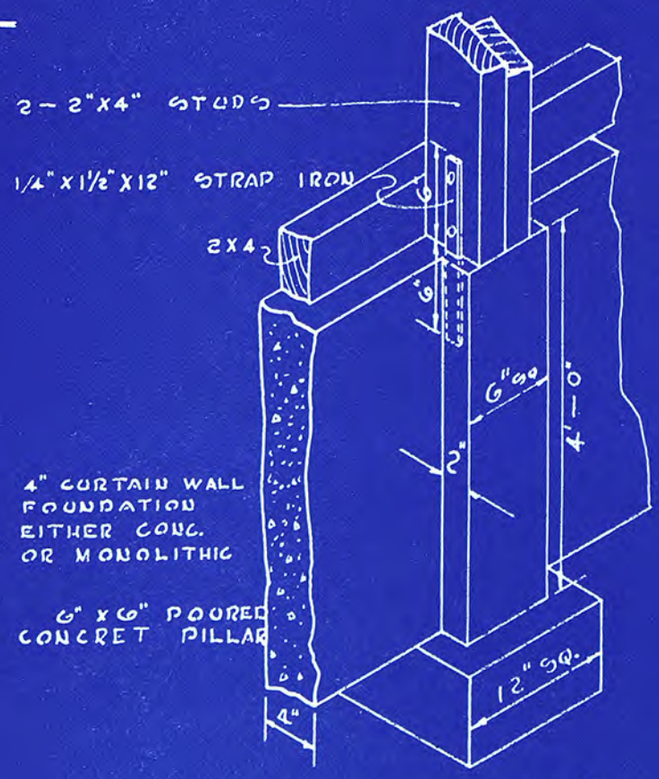
SOUTH ELEVATION



WEST ELEVATION



SECTION B-B



OPTIONAL FOUNDATION

KANSAS POLE TYPE LAYING HOUSE PLAN Nº 72-734

The KANSAS POLE TYPE LAYING HOUSE

L 22

KANSAS STATE COLLEGE EXTENSION SERVICE

MANHATTAN, KANSAS

The Kansas Pole Type Laying House

Leo Wendling — Extension Architect
M. E. Jackson — Extension Poultry Specialist
M. A. Seaton — Extension Poultry Specialist

Poultry laying flocks in Kansas must be increased in size in order that they may be operated as a definite farm enterprise and on an economical basis. A pole type laying house has been designed to accommodate these larger flocks. A large poultry house properly constructed and equipped will reduce labor, improve egg quality, and house a sufficient number of birds to increase the volume of egg production to make it a profitable farm project.

Quality egg marketing programs are based upon larger flocks producing a sufficient volume of quality eggs. Larger farm poultry flocks will contribute to a quality egg program by affording facilities for confining laying birds and in this way encourage the production of clean eggs. By frequent marketing of eggs the producer can take better advantage of a quality egg outlet. Increased net returns from quality eggs will increase interest in poultry production and be responsible for developing additional large flocks.

The pole type laying house illustrates one of the most economical methods of providing adequate housing for the larger laying flocks. Pole framing as used in this structure is one of the recognized satisfactory framing systems for farm buildings. Its principal advantage is low original cost. Factors responsible for this lower cost include less materials and less labor required for construction, particularly skilled labor. Erection in accordance with recognized standards is essential for satisfactory pole construction. This is best accomplished by securing and using a reliable set of plans when erecting pole structures.

LOCATION OF THE POULTRY HOUSE

Make the laying house an integral part of the over-all farmstead plan. This laying house is designed to face south. However, in some locations it may face southeast or east. Place the structure on a relatively level site with good drainage. Locate it to the east, north, or west of the dwelling at a site readily accessible from the farm courtyard. Allow sufficient area to permit expansion at a future date. Provide a good windbreak to the north and west of the laying house to protect it from winter storms.

SIZE

The laying house size is determined by the number of hens to be kept. Three feet of floor space per bird is adequate when a large number of birds are housed together as a unit. The 40 foot x 40 foot basic unit will accommodate 500 hens, and each added 10 foot section, approximately 150 hens.

The ease by which this laying house can be expanded in 10 foot units is a feature of the plan. The larger unit definitely reduces the labor requirement per bird and allows more efficient use of equipment.

VENTILATION

The ventilating system features economy of installation, operation simplicity, and wide range of flexibility to meet changing conditions insofar as temperature and moisture are concerned. Air intake is provided by a 4 foot open front equipped with muslin curtains to be used when necessary, to prevent drafts or moisture blowing in. Air outlet for winter ventilation is provided by a continuous duct at the ridge. This duct is designed so that air out-take can be easily controlled. For additional summer ventilation a 12 inch ventilator door is located at the rear eave line and a 24 inch door is located 18 inches above the floor along the rear wall. In addition, end windows may be removed and the larger end doors opened. The very low pitched roof controls the center height and aids in maintaining a more uniform and warm winter temperature in the house without requiring a straw loft. This system, if given reasonable attention, will remove odors and excess moisture from the laying house and at the same time effectively buffer sudden temperature fluctuations. A strong ammonia odor or continual damp litter in a laying house is evidence of a need for more ventilation.

CONSTRUCTION

Poles provide the main support for the structure. They carry all loads of the building, and anchor the structure against wind movement both vertically and laterally. Therefore, it is essential to place the poles at least 4 feet deep and have a minimum 5 inch top diameter. Use home-grown or commercially processed poles. Treat the poles at least 2 feet above the grade line. (Consult your County Agricultural Agent for information on varieties, preparation, and treatment of home-produced poles.)

All structural framing materials should be of No. 2 grade or its equivalent. If preferred, native sawed lumber can be substituted. When native lumber is used, it should be covered.

A number of materials will serve satisfactorily for siding. The most common include exterior plywood, weatherproofed insulation board, one inch lumber such as car siding, ship-lap, or 1 x 12's with cracks batted. Rough one inch lumber (native) covered with roll siding, aluminum, or sheet metal is satisfactory. The 2 x 12 base board should be treated timber and extend 3 to 6 inches below the grade level.

The roof as shown is too flat to use any type of roofing material other than a built-up felt roof over solid decking of one inch lumber or weatherproofed insulation board. The minimum for such a roof would be two layers of felt, mopped, lapped, and secured according to manufacturer's specifications. Other roofing materials such as aluminum or galvanized sheet roofing can be used if the roof pitch is increased to a minimum of ⅛, that is, a 3 foot rise to a 12 foot run. If such materials are used, they should be placed over solid sheathing to avoid condensation problems.

No floor other than an earth or clay and gravel fill is required. This has proved satisfactory where a deep built-up litter is used.

ELECTRIC LIGHTS

Use two rows of lights for the 40 foot laying house. For most uniform light distribution, place a row of lights along each line of center poles, placing the fixture at the center point between each pole in the line. Mount the fix-

tures at the ceiling height and include a 10 or 12 inch reflector. Place several additional electric outlets to provide for water heaters, debeakers, and an automatic feeder.

EQUIPMENT LOCATION

Locate the equipment in the laying house for maximum labor efficiency. Group the equipment according to activity. That is, have all of each item, such as nests, waterers, feeders or droppings pits located in a definite area. Have the feed and egg room in a central location for efficiency. Use large doors to permit cleaning with power equipment.

BILL OF MATERIALS
Plan No. 72-734

USE	MATERIALS		REQUIRED No.	
Description	Size	Length	40' x 40'	10' Addition
Pole, Treated	5" top dia.	14'	12	2
Pole, Treated	5" top dia.	12'	10	2
Purlins, Ventilator Framing	2 x 6	10'	16	4
Purlins	2 x 8	10'	16	4
Rafters, Nailing Girts	2 x 6	12'	120	25
Bracing	2 x 8	12'	7	2
Bracing	2 x 4	10'	18	4
Ventilator Framing	2 x 4	12'	10	3
Studding Feed Room	2 x 4	8'	16	
Base Board (Treated)	2 x 12	10'	14	2
Ventilator Board (Rear)	1 x 12	10'	4	1
Rafter Ties	1 x 6	14'	38	10
Sheathing Roof	1 x 6	Random	2000 bd. ft.	500 bd. ft.
Siding, Ventilator (Top) Feed Room (Shiplap)	1 x 6	10'	1540 bd. ft.	110 bd. ft.
Framing (Muslin Curtain)	1 x 2	10'	15	5
Roofing Roll (2 layers)			36 sqs.	9 sqs.
Cement Feed Room Floor	Sk		12	
Sand & Gravel Feed Room Floor	Yd		2	
Windows	6 lt. barn sash		5	11
Muslin (Open Front)	4 ft. roll		120 sq. ft.	40 sq. ft.
Poultry Netting	1" mesh		300 sq. ft.	50 sq. ft.
Door Track		22'	2	
Guttering			80'	20'
Down Spout			2	

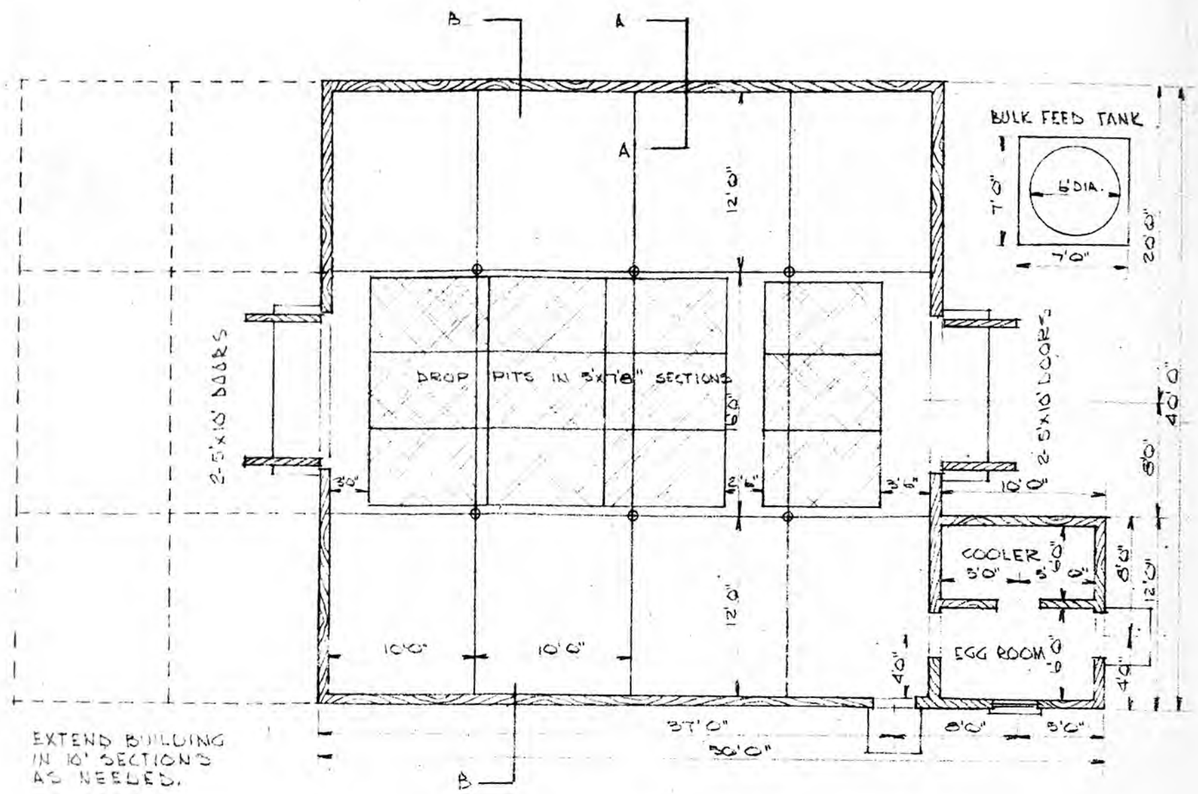
NOTE: Materials list for laying house only. (Equipment, hardware, and miscellaneous supplies excluded.)

For additional information on Pole Construction technique, consult County Agricultural Agents or Extension Engineering Department, Kansas State College, Manhattan, Kansas.

Separate plans are available upon request for equipment shown.

K A N S A S S T A T E C O L L E G E
E X T E N S I O N S E R V I C E
MANHATTAN, KANSAS

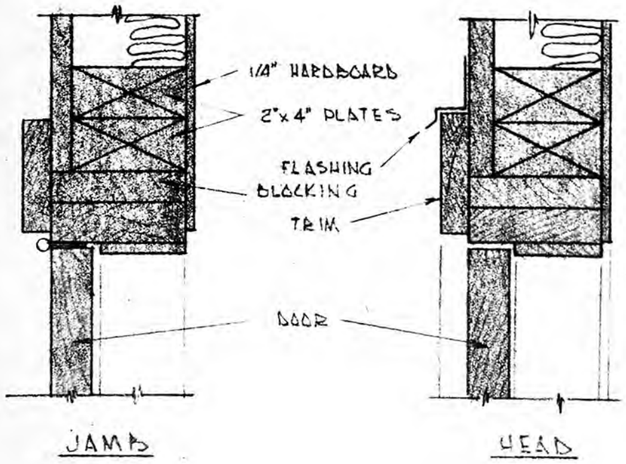
Cooperative Extension Work in Agriculture and Home Economics, Kansas State College of Agriculture and Applied Science and the United States Department of Agriculture. Paul W. Griffith, Acting Director. 1-56—10M

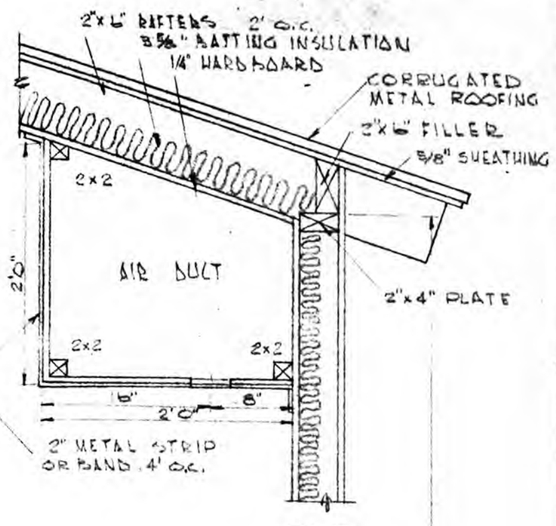


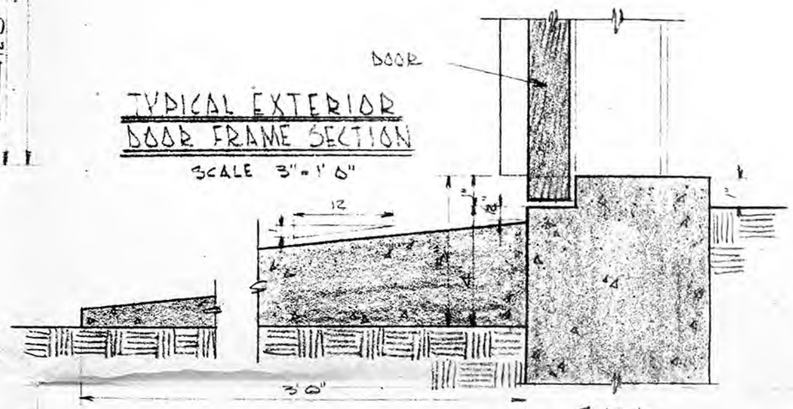
EXTEND BUILDING IN 10' SECTIONS AS NEEDED.

FLOOR PLAN

SCALE 1/8"=1'0"



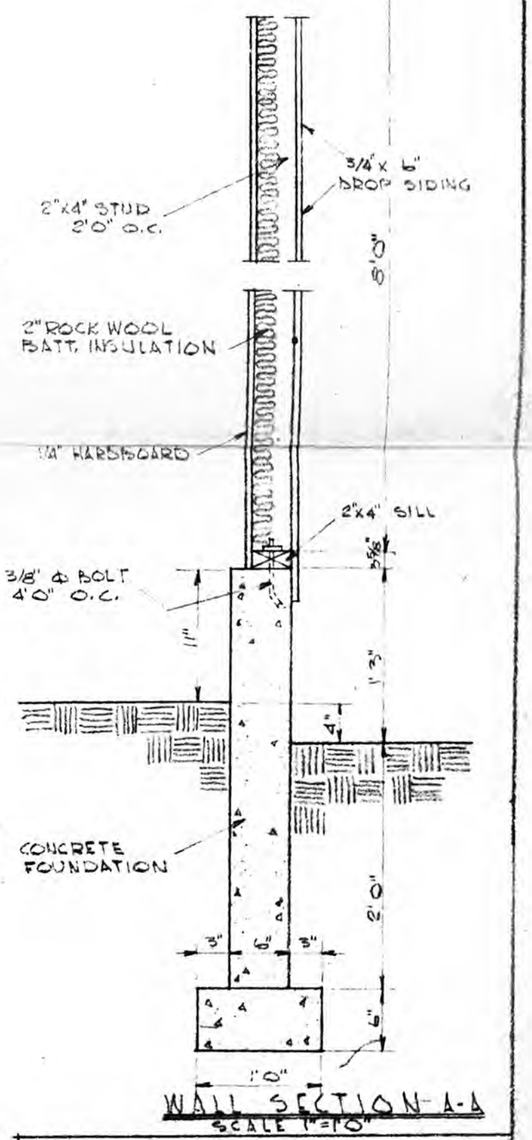




TYPICAL EXTERIOR DOOR FRAME SECTION

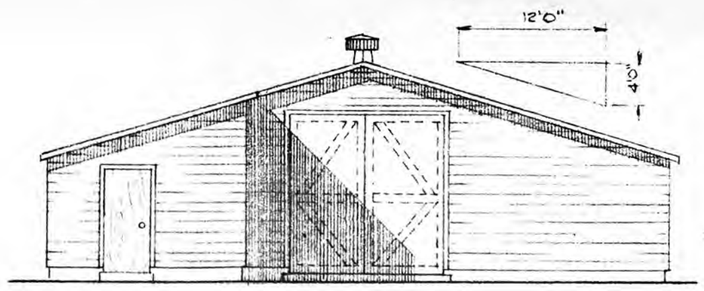
SCALE 3"=1'0"

SILL



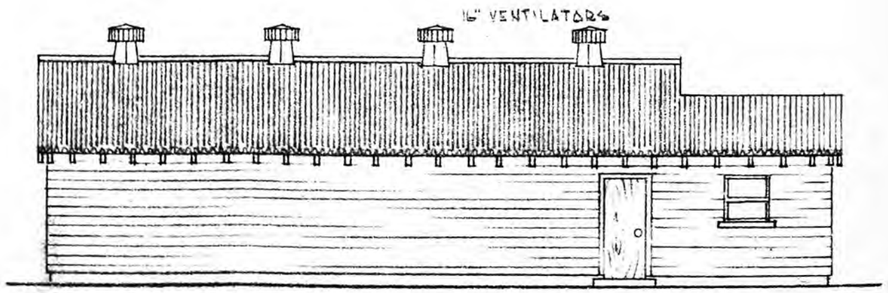
WALL SECTION A-A

SCALE 1"=1'0"



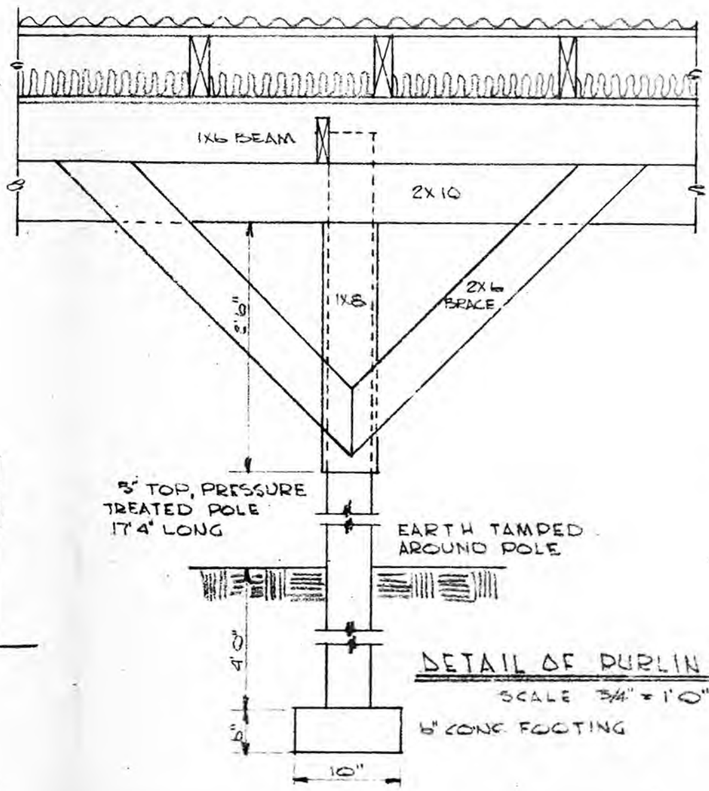
FRONT ELEVATION

SCALE 1/8"=1'0"



SIDE ELEVATION

SCALE 1/8"=1'0"



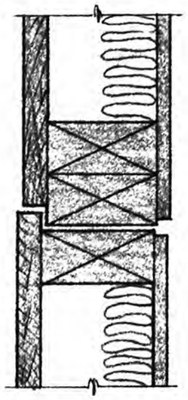
DETAIL OF PURLIN BRACES

SCALE 3/4"=1'0"

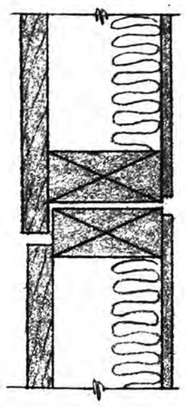
ENGINEERING EXTENSION
KANSAS STATE COLLEGE
MANHATTAN, KANSAS

A HOUSE
FOR
LAYING HENS

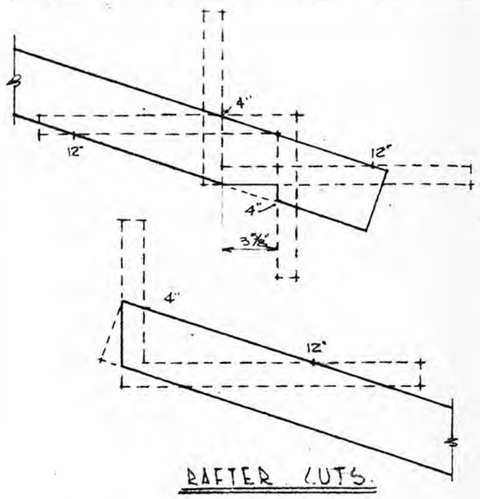
PLAN NO. 72-735 10 MAR 58	DRAWN BY PDJ CHECKED BY APPROVED BY LI-W	SHEET 1/2



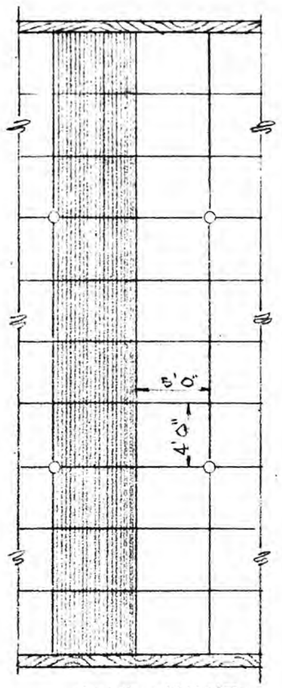
HEAD



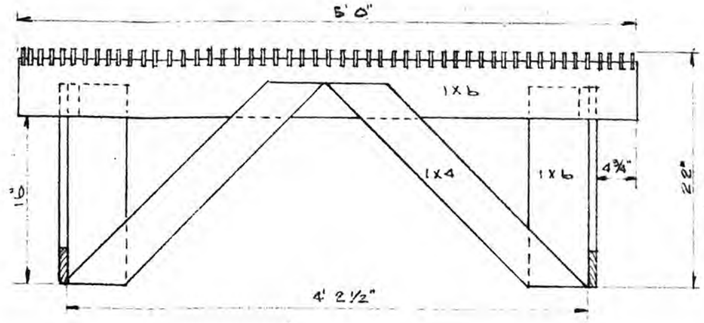
JOINT



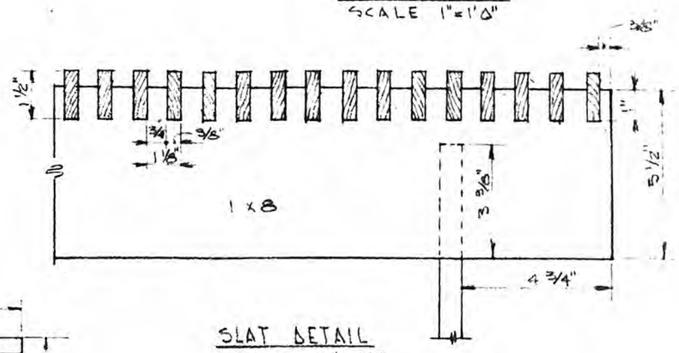
RAFTER CUTS.



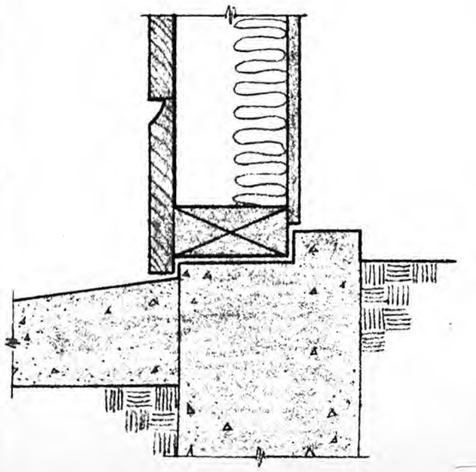
PLAN LAYOUT
SCALE 1/8"=1'0"



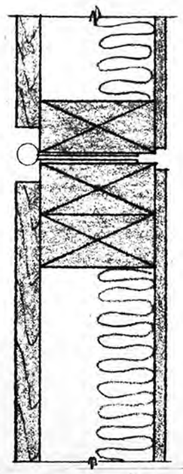
FRONT VIEW
SCALE 1"=1'0"



SLAT DETAIL
SCALE 3"=1'0"

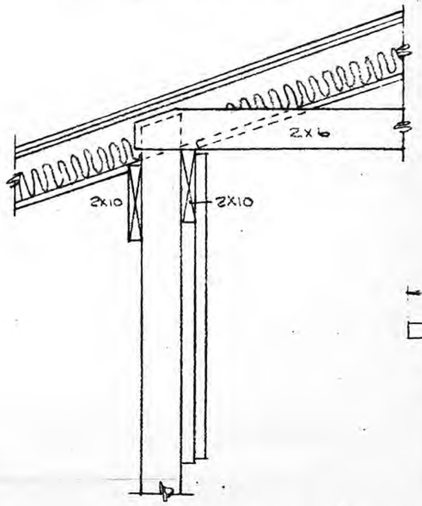


SILL

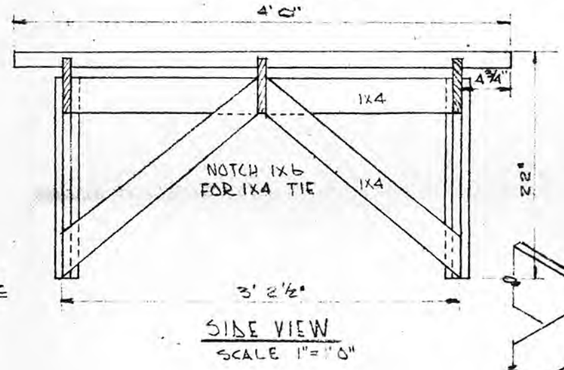


JAMB

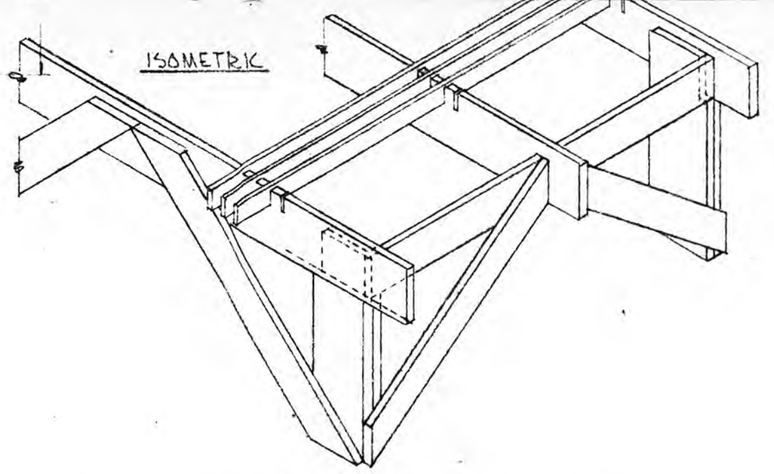
DOUBLE DOOR DETAIL
SCALE 3"=1'0"

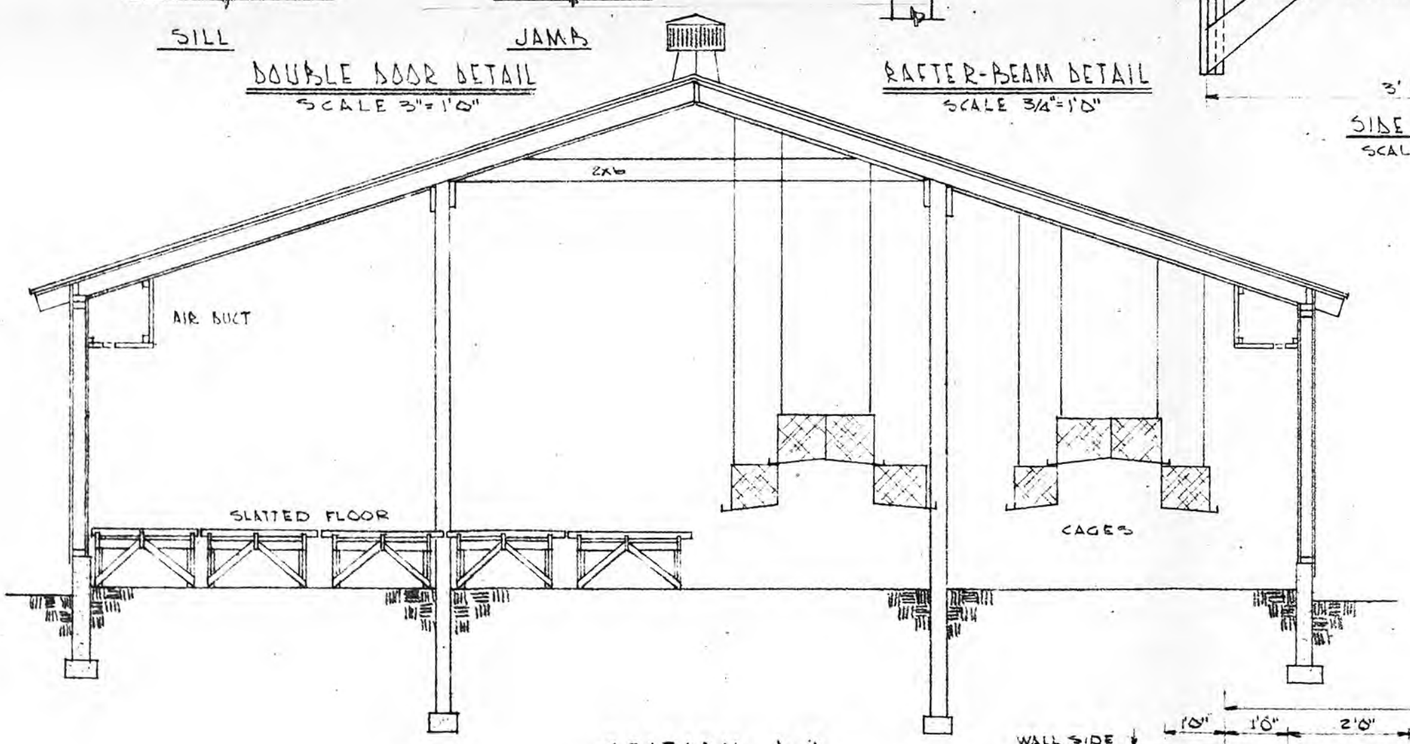


RAFTER-BEAM DETAIL
SCALE 3/4"=1'0"



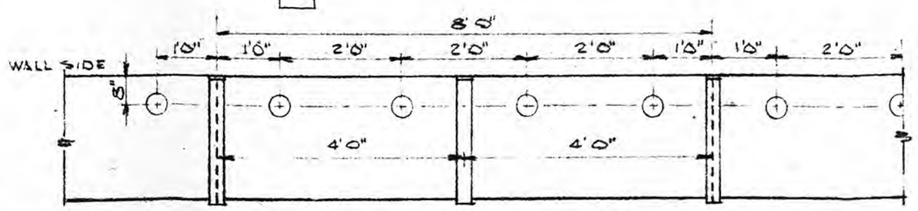
SIDE VIEW
SCALE 1"=1'0"





SECTION A-A
SCALE 1/4"=1'0"

5" DIA. HOLES - 2'0" O.C.
SECTIONS IN 8'0" LENGTHS
2" METAL STRIPS (OR BANDS)
4'0" O.C.



AIR DUCT DETAIL (BOTTOM VIEW)
SCALE 1/2"=1'0"

REQUIRED AIR FLOW FOR 40'x40' HOUSE
DURING SUMMER, 7000 CFM AGAINST ⅛" STATIC PRESSURE.
USE ONE 3500 CFM FOR EACH AIR DUCT.

SLATTED FLOOR DETAILS

ENGINEERING EXTENSION
KANSAS STATE COLLEGE
MANHATTAN, KANSAS

A HOUSE
FOR
LAYING HENS

PLAN NO.	DRAWN BY BJ	SHEET
72-735	CHECKED BY	2 / 2
10 MAR 58	APPROVED BY LTW	

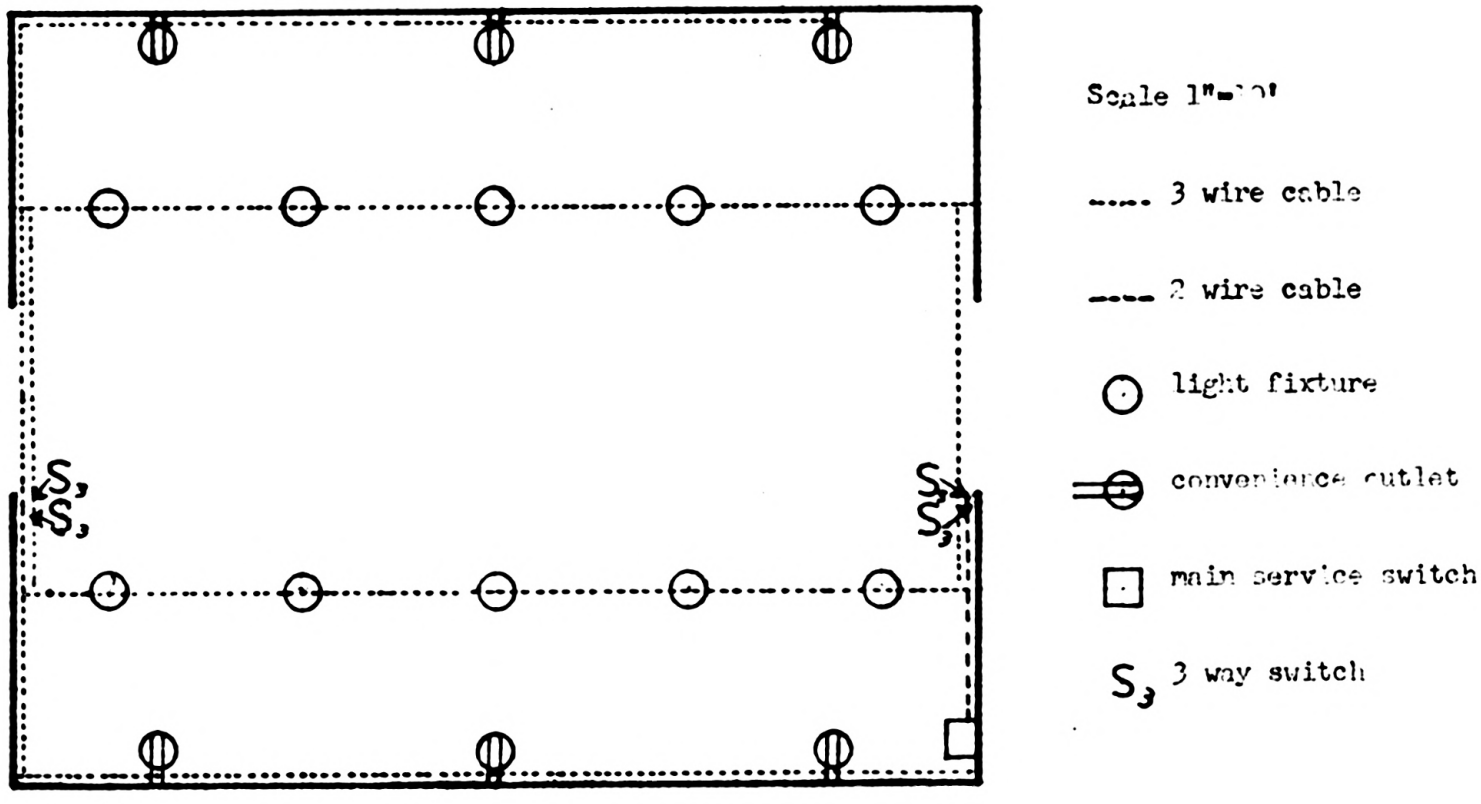


Fig. 3. A diagram showing the wiring system for a 40' by 50' open-front laying house adapted for cage systems and floor plan operations with slatted floors.

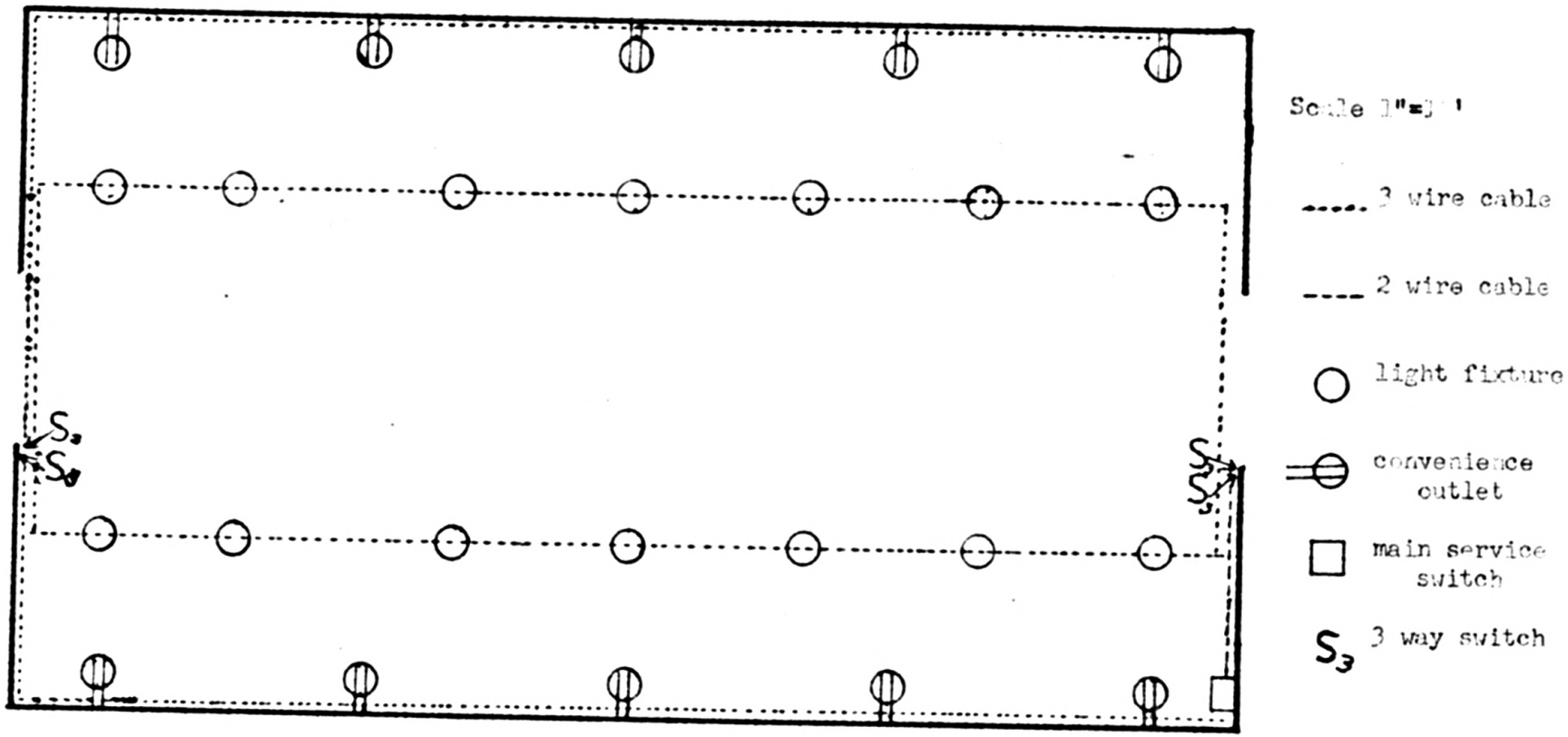


Fig. 4. A diagram showing the wiring system for a 40' by 70' open-front laying house adapted for floor plan operations with litter.

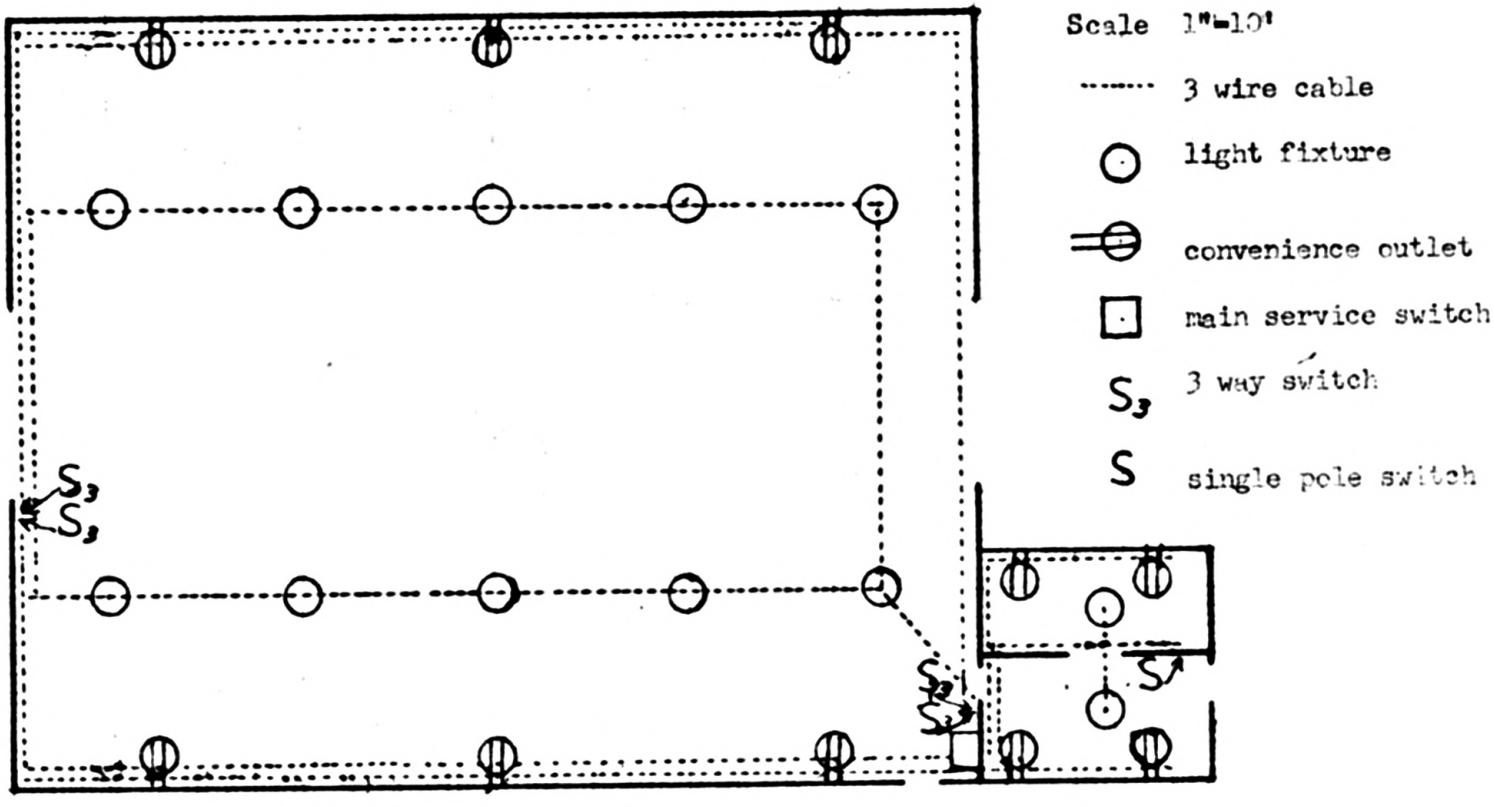


Fig. 5. A diagram showing the wiring system for a 40' by 50' completely-enclosed laying house, including egg room, adapted for cage systems and floor plan operations.

ALWAYS make certain what disease is in your flock as quickly as possible before treatment. Only when the disease is known, can proper treatment be given. See your local veterinarian or poultry pathologist, or bring your birds to the Veterinary Diagnostic Laboratory at Kansas State College. The laboratory will make examinations for infectious or other animal diseases without charge.

Dead birds are of little value for diagnosis. Bring diseased, live birds to the laboratory. Give the laboratory information on age of birds, original number purchased, where purchased, number affected, number lost, any recent change in feeds or feeding length of time, dates when losses were experienced, number of days birds were sick before death,. symptoms seen in birds, treatment birds may have received, and whether there has been any similar sickness in previous years.

KANSAS STATE COLLEGE EXTENSION SERVICE

L. 26 Manhattan, Kansas July, 1955

Cooperative Extension Work in Agriculture and Home Economics, Kansas State College of Agriculture and the United States Department of Agriculture Acts of May 8 and June 30, 1914. L. C. Williams, director. 7-55—5M

Fig. 6. Plan 77-802, how to build a poultry disposal pit.

Advantages of a Disposal Pit

A disposal pit saves labor and time. It is not necessary to dig a hole or start a fire each time a chicken or turkey dies.

It has no noticeable odor if tightly covered, so pit can be built near the poultry house.

Poultry or small animals decompose rapidly without chemicals.

It can be used all year, even when the ground is frozen or it is raining.

Chickens cannot be dug up by dogs or rats.

Warning

Dead birds must be buried or burned immediately for a good disease control program. Kill birds too sick to recover, and dispose of them promptly and properly. It is advisable never to return a sick bird to the flock, even though it apparently recovers.

Locating and Building the Pit

A pit six feet square and six feet deep is large enough with normal mortality for a flock of 2,500 layers, 22,000 broilers, or 5,500 turkeys. The deeper the pit, the more rapid the decomposition. Less than six feet deep slows decomposition too much in the winter time. Dead birds decompose rapidly without the use of quicklime or other chemicals, and will operate better when such chemicals are not used.

Locate the pit conveniently close to the brooder house or laying house. For turkeys, it may be more convenient to have another pit near the road to the range. The pit must be located at least 100 feet from the water supply.

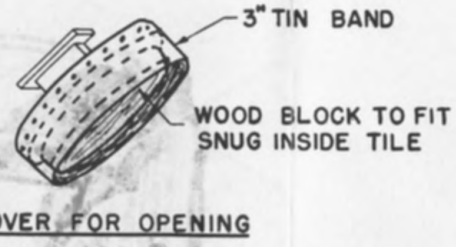
The surface drainage should be away from the pit. Decomposition is slowed when water stands in the pit. It is wise to locate the pit so that prevailing winds take any possible odors away from the buildings. There are no appreciable odors when the pit is tightly covered. However, when the lid is accidentally not put on tightly, there may be odors.

Dig a shoulder or ledge at the top of the pit two feet wider than the pit, and one foot below the ground surface. This is the support for the cover.

Case up the pit to prevent caving in of the sides. You may use rough crib lining—1" x 6" and spaced 2" to 3" apart. These boards should be creosoted inside and out. The framing should be 2" x 4" in a wood constructed pit. The pit may be walled with brick if constructed in an area which is sandy or has poor drainage. Cover the pit with two layers of two inch creosoted plank. Then cover with twelve inches of dirt well sloped for good drainage.

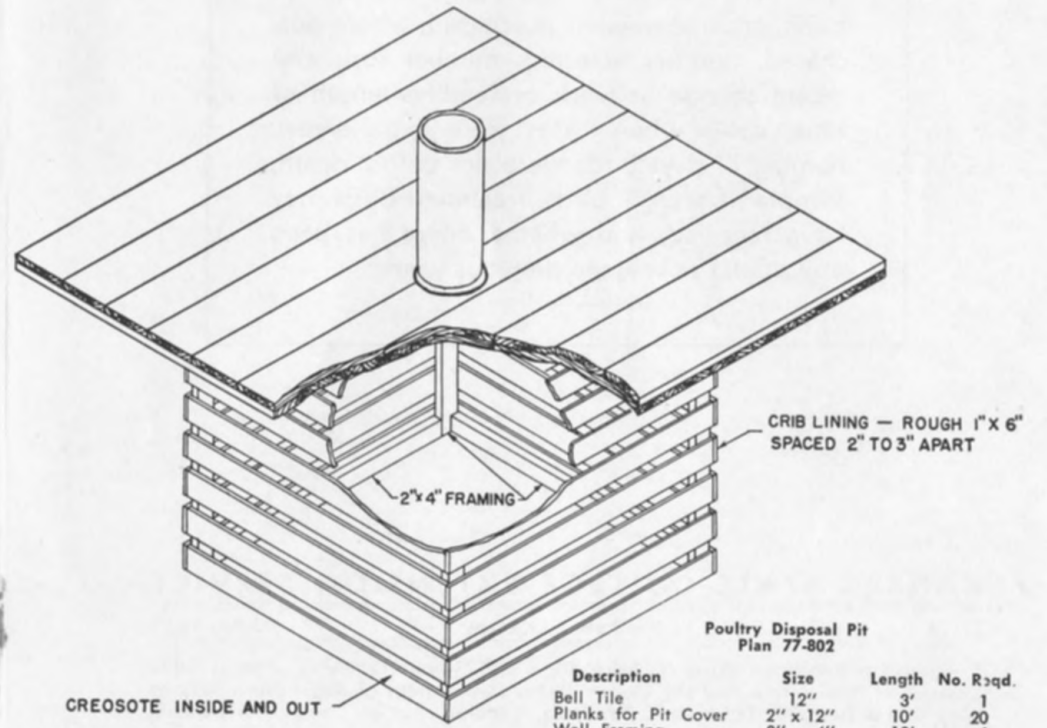
Use a twelve inch tile on top (bell end down) and three feet long for the opening of the pit. Fit with a tight cover, using a 3" tin band with a wood block to fit snug inside the tile.

Occasional painting with malathion on the inside of the entry pipe should control flies.



COVER FOR OPENING

FULL SECTION VIEW



ISOMETRIC VIEW

Poultry Disposal Pit
Plan 77-802

Description	Size	Length	No. Reqd.
Bell Tile	12"	3'	1
Planks for Pit Cover	2" x 12"	10'	20
Well Framing	2" x 4"	12'	6
Crib Lining	1" x 6"	12'	16
Tin Band for Cover	3"	40"	1

Fig. 6. Plan 77-802, how to build a poultry disposal pit.

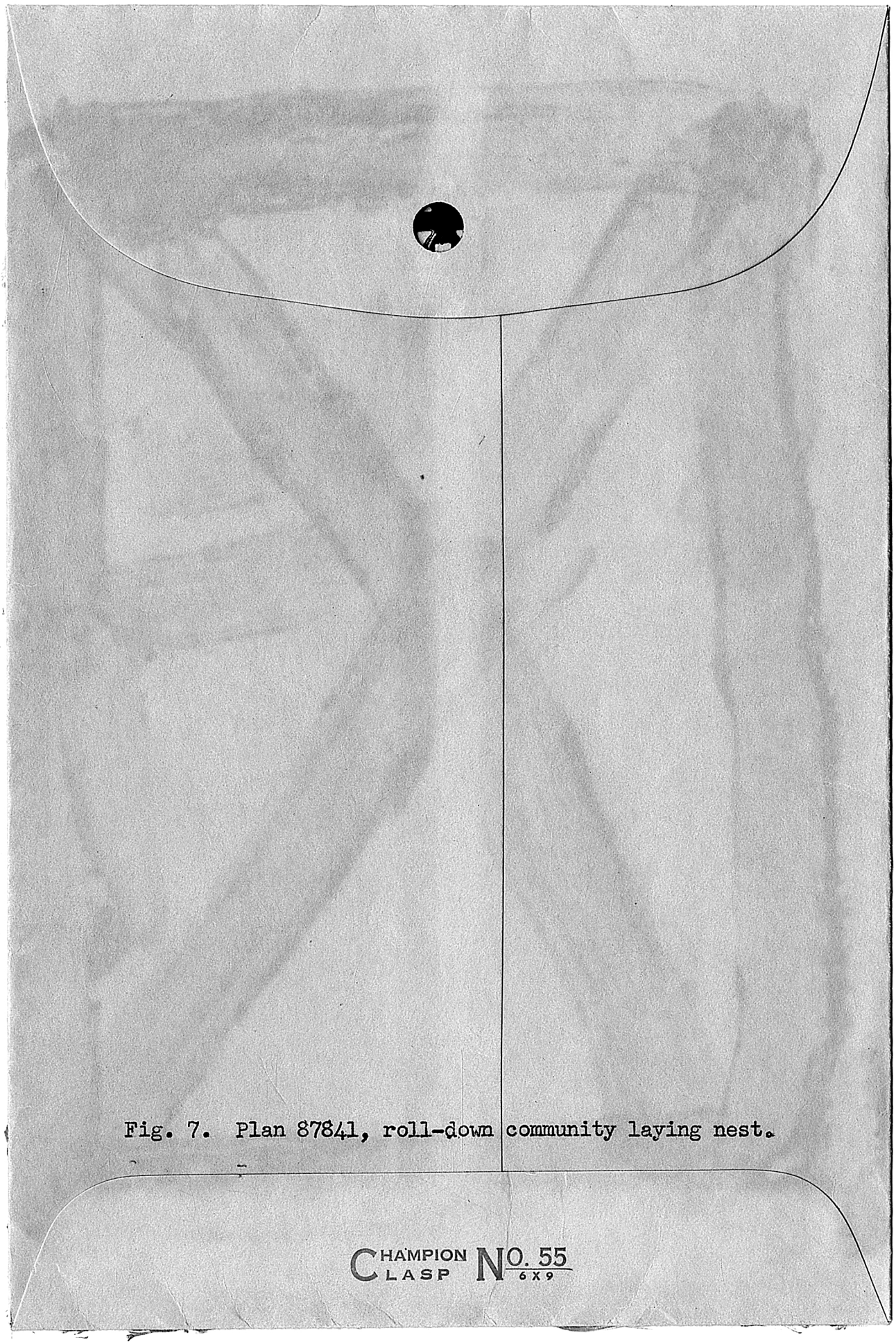


Fig. 7. Plan 87841, roll-down community laying nest.

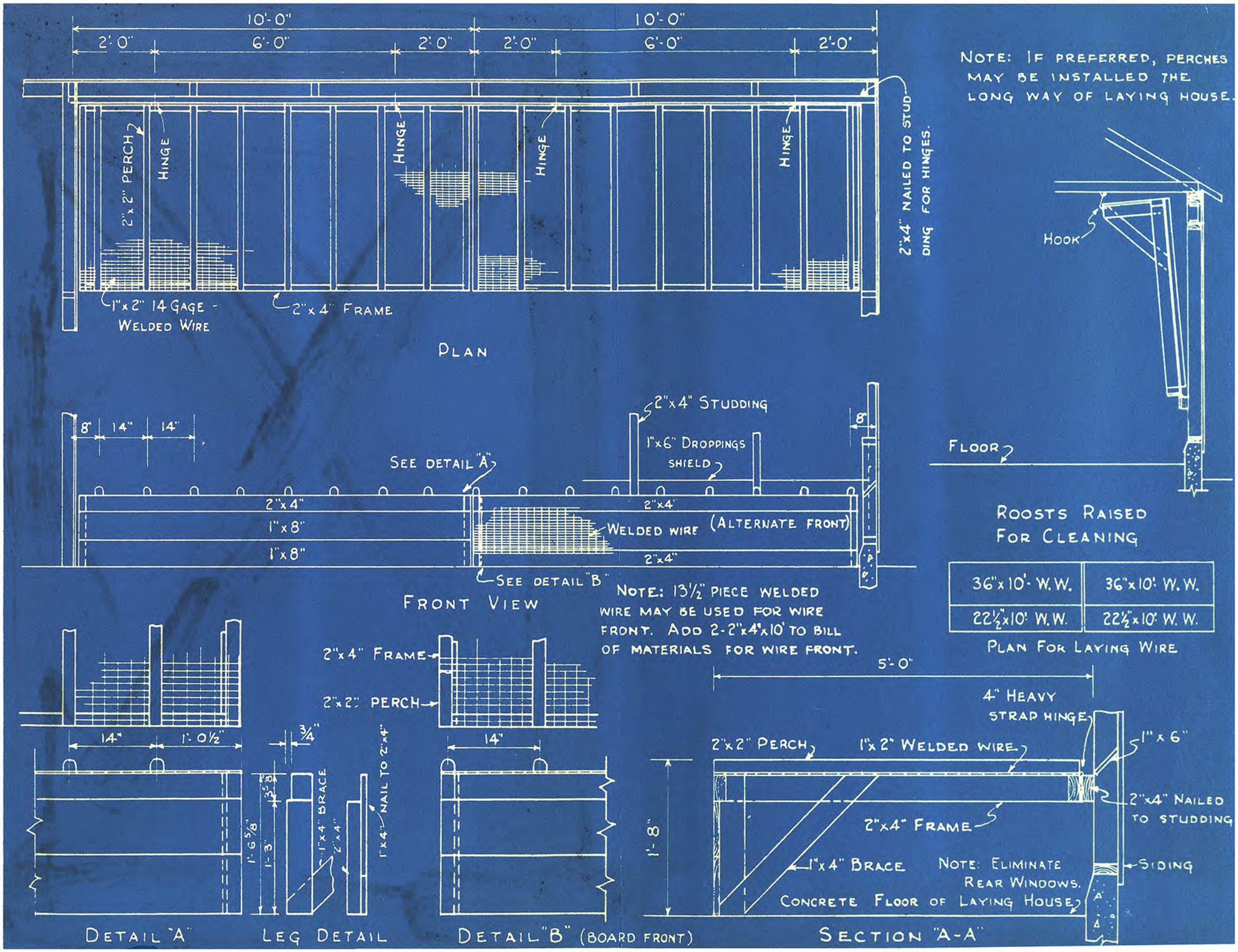


Fig. 8. Circular 189, droppings pit for laying house.

Appendix A—Tables 1-33

Table 1. Cage layer system and floor plan operation (40' x 50' completely-enclosed house with litter): Construction requirements and costs of lumber, hardware and labor.

Item	Number	Material Requirements	Size	Length	Unit Price (dollars)	Materials Cost (dollars)	Labor[1] Skilled (hours)	Labor[1] Unskilled (hours)
Pole, treated	8	—	5" top	18'	—	—	2.00	2.00
Purlins	10	334 bd. ft.	2x10	20'	.15	50.10	8.00	2.00
Nailing strips, purlin braces	5	54 bd. ft.	2x8	8'	.15	8.10	1.30	.32
Ridge pole	5	50 bd. ft.	2x6	10'	.15	7.50	1.30	.30
Rafters	50	1200 bd. ft.	2x6	24'	.15	180.00	31.20	7.20
Cross rafter beam	5	90 bd. ft.	2x6	18'	.15	13.50	2.34	.54
Filler blocks, purlin bracing	15	300 bd. ft.	2x6	20'	.15	45.00	7.80	1.80
Sheathing	130	1734 bd. ft.	8"	20'	.11	190.74	26.00	6.94
"	21	140 bd. ft.	8"	10'	.11	15.40	2.10	.56
Studs and sills	71	379 bd. ft.	2x4	8'	.15	56.85	9.09	2.23
Studs, plates and sills	67	447 bd. ft.	2x4	10'	.15	67.05	10.73	2.68
Studs	32	256 bd. ft.	2x4	12'	.15	38.40	6.14	1.53
Studs and bracing	14	131 bd. ft.	2x4	14'	.15	19.65	3.14	.79
Shiplap	250	1250 bd. ft.	6"	10'	.15	187.50	22.50	6.25
"	14	56 bd. ft.	6"	8'	.15	8.40	1.01	.28
"	88	704 bd. ft.	6"	16'	.15	105.60	12.67	3.52
Sill	4	43 bd. ft.	2x4	16'	.15	6.45	1.03	.26
Frame for air duct	39	104 bd. ft.	2x2	8'	.15	15.60	2.50	.62
Hardboard	117	3744 sq. ft.	¼"x4'x8'	—	.09	336.96	17.72	3.74
Corrugated metal	—	2150 sq. ft.	—	—	.12	258.00	19.35	4.30
Concrete	—	1832 cu. yds.	—	—	13.35	244.57	45.00	27.48
Metal strips	26	—	½"	28"	.12	3.12	.75	.75
Doors	4	—	5'x10'	—	—	—	35.00	4.00
Door, interior	1	1	3'x6'8"	—	15.12	15.12	4.00	1.00
Door, exterior	1	1	3'x6'8"	—	18.45	18.45	4.00	1.00
Insulation	—	1872 sq. ft.	2"	—	.06	112.32	5.62	.93
Insulation	—	2362 sq. ft.	3 5/8"	—	.08	188.96	7.09	1.18
Anchor bolts	59	59	3/8"	6"	.10	5.90	1.00	.50
Down spout	3	30 lin. ft.	—	10'	.20	6.00	1.50	1.50
Guttering	—	124 lin. ft.	—	—	.24	29.70	2.25	2.25
Egg cooler door	3	24 bd. ft.	2x6	8'	.15	3.60	4.58	1.14
Egg cooler door	10	54 bd. ft.	1x8	8'	.15	8.10	.81	.22

Table 1. (concl.)

Item	Number	Material Requirements	Size	Length	Unit Price (dollars)	Materials Cost (dollars)	Labor[1] Skilled (hours)	Labor[1] Unskilled (hours)
Door	1	--	2'8"x6'8"	--	17.76	17.76	4.00	1.00
Hinges	6 pr.	6 pr.	--	6"	.90	5.40	--	--
Hinges	4 pr.	4 pr.	--	4"	.85	3.40	--	--
Hinges, cooler door	2 pr.	2 pr.	--	8"	1.50	3.00	--	--
Nails, lead head	86 lbs.	86 lbs.	--	--	.32	27.52	--	--
Nails	32 lbs.	32 lbs.	16d	--	.15	4.80	--	--
Nails	100 lbs.	100 lbs.	8d	--	.15	15.00	--	--
Laying out the building	--	--	--	--	--	--	3.00	.54
Labor requirements (hours)							306.52	91.35
Hourly labor rates[2] (dollars)							2.65	1.25
Total construction costs						2323.52	812.28	114.19

[1]Based on per unit estimates as given by Barr, H. J. and Sammet, L. L. Farm Structures. John Wiley & Sons, New York. January, 1950, p. 621.

[2]The hourly wage rate for skilled labor was the prevailing carpenter's wage scale in effect at Manhattan, Kansas, during April of 1958. This information was provided by a local contractor. For unskilled labor, the wage rate was estimated.

Table 2. Cage layer system and floor plan operation (40' x 50' open-front house with slatted floors): Construction requirements and costs of lumber, hardware and labor.

Item	Number	Material Requirements	Size	Length	Unit Price (dollars)	Materials Cost (dollars)	Labor[1] Skilled (hours)	Labor[1] Unskilled (hours)
Pole, treated	14	--	5" top	14'	6.11	85.54	3.5	3.5
" "	12	--	5" top	12'	5.15	61.80	3.0	3.0
Purlins, ventilator framing	20	200 bd. ft.	2x6	10'	.15	30.00	4.8	1.2
Purlins,	20	267 bd. ft.	2x8	10'	.15	40.05	6.408	1.602
Rafters, nail girts	145	1740 bd. ft.	2x6	12'	.15	261.00	45.24	10.44
Bracing	9	144 bd. ft.	2x8	12'	.15	21.60	3.744	.864
"	22	147 bd. ft.	2x4	10'	.15	22.05	3.822	.882
Ventilator framing	13	104 bd. ft.	2x4	12'	.15	15.60	2.704	.624
Base board	16	320 bd. ft.	2x12	10'	.20	64.00	7.68	1.92
Ventilator board (rear)	5	50 bd. ft.	1x12	10'	.15	7.50	1.2	.3
Rafter ties	48	336 bd. ft.	1x6	14'	.15	50.40	8.736	2.016
Insulation board	--	2500 sq. ft.	25/37	--	.14	350.00	17.5	5.00
Shiplap	--	1530 bd. ft.	1x6	10'	.15	229.50	27.54	7.65
Framing (muslin curtain)	20	200 lin. ft.	1x2	10'	.04	8.00	.884	.204
Roofing, roll	--	45 squares	65#	--	3.50	157.50	11.25	--
Windows (barn sash)	3	--	6 ft.	--	3.81	11.43	9	1.5
Muslin	--	160 sq. ft.	4' roll	--	.026	4.16	.4	--
Poultry netting	--	350 sq. ft.	1" mesh	--	.05	17.50	.875	--
Hinges	--	6 pr.	--	6"	.90	5.40	--	--
Guttering	--	100 lin. ft.	--	--	.24	24.00	2.00	2.00
Down spout	2	20 lin. ft.	--	10'	.20	4.00	1.00	1.00
Doors	4	--	5x10	--	--	--	35.2	4
Nails	--	27 lbs.	16d	--	.15	4.05	--	--
Nails	--	90 lbs.	8d	--	.15	13.50	--	--
Nails	--	2 lbs.	6d	--	.15	.30	--	--
Laying out the building	--	--	--	--	--	--	3	--
Labor requirements (hours)							199.48	47.69
Hourly labor rates[2] (dollars)							2.65	1.25
Total construction cost (dollars)						1488.88	528.62	59.61

[1]Based on per unit estimates as given by Barr, H. J. and Sammet, L. L. Farm Structures. John Wiley & Sons, New York. January, 1950, p. 621.

[2]The hourly wage rate for skilled labor was the prevailing carpenter's wage scale in effect at Manhattan, Kansas, during April of 1958. This information was provided by a local contractor. For unskilled labor, the wage rate was estimated.

Table 3. Floor plan operation (40' x 70' open-front house): Construction requirements and costs of lumber, hardware and labor.

Item	Number	Material Requirements	Size	Length	Unit Price (dollars)	Materials Cost (dollars)	Labor[1] Skilled (hours)	Labor[1] Unskilled (hours)
Pole, treated	18	—	5" top	14'	6.11	109.98	4.50	4.50
" "	16	—	5" top	12'	5.15	82.40	4.00	4.00
Purlins, ventilator framing	28	280 bd. ft.	2x6	10'	.15	42.00	6.72	1.68
Purlins	28	374 bd. ft.	2x8	10'	.15	56.10	8.98	2.24
Rafters, nail girts	195	2340 bd. ft.	2x6	12'	.15	351.00	60.84	14.04
Bracing	13	208 bd. ft.	2x8	12'	.15	31.20	5.41	1.25
"	30	200 bd. ft.	2x4	10'	.15	30.00	5.20	1.20
Ventilator framing	19	152 bd. ft.	2x4	12'	.15	22.80	3.95	.91
Base board	20	400 bd. ft.	2x12	10'	.20	80.00	9.60	2.40
Ventilator board (rear)	7	70 bd. ft.	1x12	10'	.15	10.50	1.68	.42
Rafter ties	68	476 bd. ft.	1x6	14'	.15	71.40	12.37	2.86
Insulation board	3500	3500 bd. ft.	25/37	—	.14	490.00	24.50	7.00
Shiplap	1750	1750 bd. ft.	1x6	10'	.15	262.50	31.50	8.75
Framing (muslin curtain)	30	300 lin. ft.	1x2	10'	.04	12.00	1.30	.30
Roofing roll (2 layers)	63	63 sq. ft.	65#	—	3.50	220.50	15.75	—
Windows (barn sash)	3	—	6 lt.	—	3.81	11.43	9.00	1.50
Muslin	—	240 sq. ft.	4' roll	—	.026	6.24	.60	—
Poultry netting	—	450 sq. ft.	1" mesh	—	.05	22.50	1.13	—
Hinges	—	6 pr.	6" strap	—	.90	5.40	—	—
Guttering	—	140 lin. ft.	—	140'	.24	33.60	2.80	2.80
Downspout	2	20 lin. ft.	—	10'	.20	4.00	1.00	1.00
Doors	4	—	5'10'	—	—	—	35.20	4.00
Nails	—	32 lbs.	16d	—	.15	4.80	—	—
Nails	—	128 lbs.	8d	—	.15	19.20	—	—
Nails	—	3 lbs.	6d	—	.15	.45	—	—
Laying out the building	—	—	—	—	—	—	3.00	—
Labor requirements (hours)							249.00	60.8
Hourly labor rates[2] (dollars)							2.65	1.25
Total construction cost (dollars)						1980.00	659.93	76.06

[1]Based on per unit estimates as given by Barr, H. J. and Sammet, L. L. Farm Structures. John Wiley & Sons, New York. January, 1950, p. 621.

[2]The hourly wage rate for skilled labor was the prevailing carpenter's wage scale in effect at Manhattan, Kansas, during April of 1958. This information was provided by a local contractor. For unskilled labor, the wage rate was estimated.

Table 4. 12' x 12' egg room for cage layer system and floor plan operations (all open-front houses): Requirements and costs of lumber, hardware and labor.

Item	Number	Material Requirements	Size	Length	Unit Price (dollars)	Materials Cost (dollars)	Labor[1] Skilled (hours)	Labor[1] Unskilled (hours)
Studs and sills	16	86 bd. ft.	2x4	8'	.15	12.90	2.06	.52
Studs, sills, and plates	18	120 bd. ft.	2x4	10'	.15	18.00	2.88	.72
Studs, plates	12	96 bd. ft.	2x4	12'	.15	14.40	2.30	.58
Rafters and studs	6	56 bd. ft.	2x4	14'	.15	8.40	1.46	.34
Shiplap	44	220 bd. ft.	6"	10'	.15	33.00	3.96	1.10
Hardboard	25	800 sq. ft.	4x8	—	.09	72.00	4.00	.80
Concrete	—	4.22 cu. yd.	—	—	13.35	56.34	10.55	6.33
Anchor bolts	8	—	3/8	6"	.10	.80	.25	
Sheathing	21	140 bd. ft.	8"	10'	.11	15.40	2.10	.56
Corrugated metal	—	160 sq. ft.	26"	8'	.12	19.20	1.44	.32
Doors, interior	1	—	3'x6'8"	—	15.12	15.12	4.00	1.00
Doors, exterior	1	—	3'x6'8"	—	18.45	18.45	4.00	1.00
Insulation	—	520 sq. ft.	3 5/8"	—	.08	41.60	1.56	.26
Insulation	—	180 sq. ft.	2"	—	.06	10.80	.54	.09
Nails, lead head	—	6 lbs.	—	—	.32	1.92	—	—
Nails	—	3 lbs.	16d	—	.15	.45	—	—
Nails	—	14 lbs.	8d	—	.15	2.10	—	—
Guttering	—	24 lin. ft.	—	—	.24	5.76	.25	.25
Down spout	1	10 lin. ft.	—	10'	.20	2.00	.50	.50
Cooler door	3	24 bd. ft.	2x6	8'	.15	3.60	4.58	1.14
Cooler door	10	54 bd. ft.	1x8	8'	.15	8.10	.81	.22
Hinges for cooler door	—	4 pr.	—	8"	1.50	6.00	—	—
Hinges for other doors	—	3 pr.	—	4"	.85	2.55	—	—
Labor requirements (hours)							47.24	15.73
Hourly labor rate[2] (dollars)							2.65	1.25
Total construction cost (dollars)						368.89	125.19	19.66

[1]Based on per unit estimates as given by Barr, H. J. and Sammet, L. L. Farm Structures. John Wiley & Sons, New York. January, 1950, p. 621.

[2]The hourly wage rate for skilled labor was the prevailing carpenter's wage scale in effect at Manhattan, Kansas, during April of 1958. This information was provided by a local contractor. For unskilled labor, the wage rate was estimated.

Table 5. Requirements and costs of materials and labor for wiring (40' x 70' open-front house for floor plan operation with litter).

Item	Number	Unit price (dollars)	Cost (dollars)
Main switch 100 ampere	1	5.30	5.30
Breakers	4	2.80	11.20
3 wire #12 cable (Rx)	396 ft.	.12	47.52
2 wire #12 cable (Rx)	15 ft.	.07	1.05
Flourescent tubes 15 watt	14	1.00	14.00
Fixtures for flourescent tubes	14	4.95	69.30
Boxes for lights	14	.81	11.34
Time clock	1	11.95	11.95
Outlet boxes	10	.48	4.80
Outlets	10	.63	6.30
Outlet plates	10	.14	1.40
Three way switches	4	1.14	4.56
Switch plates	4	.14	.56
Switch boxes	4	.48	1.92
Total for materials			191.20
Labor			191.20
Total			382.40

Source: 1958 prices as quoted by an electrical contractor at Manhattan, Kansas.

Table 6. Requirements and costs of materials and labor for wiring (40' x 50' open-front house for cage layer system and floor plan operation with slatted floor).

Item	Number	Unit price (dollars)	Cost (dollars)
Main service switch 70 ampere	1	5.30	5.30
Breakers	4	2.80	11.20
3 wire #12 cable (Rx)	300 ft.	.12	36.00
2 wire #12 cable (Rx)	15 ft.	.07	1.05
Flourescent tubes 15 watt	10	1.00	10.00
Fixtures for flourescent tubes	10	4.95	49.50
Boxes for lights	10	.81	8.10
Time clock	1	11.95	11.95
Outlet boxes	6	.48	2.88
Outlets	6	.63	3.78
Outlet plates	6	.14	.84
Three-way switches	4	1.14	4.56
Switch plates	4	.14	.56
Switch boxes	4	.48	1.92
Total for materials			147.64
Labor			147.64
Total			295.28

Source: 1958 prices as quoted by an electrical contractor at Manhattan, Kansas.

Table 7. Requirements and costs of materials and labor for wiring (40' x 50' completely-enclosed house for cage layer system and floor plan operation with litters).

Item	Number	Unit Price (dollars)	Cost (dollars)
Main service switch 100 ampere	1	10.50	10.50
Breakers[1]	8	2.80	22.40
3 wire #12 cable (Rx)	431 ft.	.12	51.72
Flourescent tubes 15 watt	10	1.00	10.00
Fixtures for flourescent tubes	10	4.95	49.50
Boxes for lights	10	.81	8.10
Time clock	1	11.95	11.95
Outlet boxes	6	.48	2.88
Outlets	6	.63	3.78
Outlet plates	6	.14	.84
Three-way switches	4	1.14	4.56
Switch plates	4	.14	.56
Switch boxes	4	.48	1.92
Total for materials			178.71
Labor			178.71
Total			357.42

[1]One breaker was used for each circuit.

Source: 1958 prices as quoted by an electrical contractor at Manhattan, Kansas.

Table 8. Requirements and costs of materials and labor for wiring the egg room (completely-enclosed and open-front houses).

Item	Number	Unit Price (dollars)	Cost (dollars)
3 wire #12 cable (Rx)	67	.12	8.04
2-48" flourescent strips (light fixtures)	2	23.00	46.00
48" flourescent tubes	4	1.20	4.80
Outlet boxes	4	.48	1.92
Outlets	4	.63	2.52
Outlet plates	4	.14	.56
Single light switch	1	.83	.83
Switch box	1	.48	.48
Switch plate	1	.14	.14
Total for materials			65.29
Labor			65.29
Total			130.58

Source: 1958 prices as quoted by an electrical contractor at Manhattan, Kansas.

Table 9. Requirements and costs of materials and labor for plumbing (all houses with floor plan operations).

Item[1]	Number	Unit price[2] (dollars)	Cost (dollars)
Pipe	120.5 ft.	.255	30.73
Elbows	2	.21	.42
Tee	1	.31	.31
Faucet	1	.89	.89
Soil pipe	35 ft.	.45	15.75
Garden hose	5.5 ft.	.12	.66
Total for materials			48.76
Labor			48.76
Total			97.52

[1]Three-fourths inch pipe and couplings were used for inlets. Garden-hoses connected to 4 inch soil pipe were used for drains.

[2]1958 prices as quoted by Manhattan, Kansas, plumbing firms and hardwares.

Table 10. Requirements and costs of materials and labor for plumbing (all houses with cage layer systems).

Item[1]	Number	Unit price[2] (dollars)	Cost (dollars)
Pipe	184 ft.	.255	46.92
Tees	4	.31	1.24
Crosses	4	1.02	4.08
Elbows	5	.21	1.05
Couplings	8	.20	1.60
Faucets	12	.89	10.68
Soil pipe	54	.45	24.30
Garden hose	80	.12	9.60
Y's garden hose	4	.65	2.60
Total for materials			102.07
Labor			102.07
Total			204.14

[1]Three-fourths inch pipe and couplings were used for inlets. Garden-hoses connected to 4 inch soil pipe were used for drains.

[2]1958 prices as quoted by Manhattan, Kansas, plumbing firms and hardwares.

Table 11. Requirements and costs of materials and labor for plumbing the egg room (completely-enclosed and open-front houses).

Item[1]	Number	Unit price[2] (dollars)	Cost (dollars)
Soil pipe	30 ft.	.516	15.48
Pipe	20 ft.	.255	5.10
Tee	1	.31	.31
Elbows	2	.21	.42
Faucet	1	.89	.89
Floor drain	1	7.50	7.50
Total for materials			29.70
Labor			29.70
Total			59.40

[1]Three-fourths inch pipe and couplings were used for inlets. Garden-hoses connected to 4 inch soil pipe were used for drains.

[2]1958 prices as quoted by Manhattan, Kansas, plumbing firms and hardwares.

Table 12. Cage layer systems: Number of pullet replacements in the laying flock during successive 3-months in each 15-months rotation period.

3-months period	Replacements[1]	
	Rate per month (percent)[2]	Per 3-months period (number)
1st[3]	3 1/3	100
2nd	4	120
3rd	6	180
4th	8	240
5th	12	360

[1]For layers removed through culling and mortality.
[2]Percentage of 1,000 birds each month.
[3]Beginning in September for the first 15-months rotation period.

Table 13. Cage layer systems: Numbers and ages of layers, by months and rotation periods, 1,000-bird laying flock.

15-months rotation period	Month	Age of layer (months)[1]													
		6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		Number of layers														
First	September	1,000														
	October		1,000													
	November			1,000												
	December	40[2]			960											
	January		80			920										
	February			120			880									
	March	60			120			820								
	April		120			120			760							
	May			180			120			700						
	June	80			180			120			620					
	July		160			180			120			540				
	August			240			180			120			460			
	September	120			240			180			120			340		
	October		240			240			180			120			220	
	November			360			240			180			120			100
Second	December	100			360			240			180			120		
	January		100			360			240			180			120	
	February			100			360			240			180			120
	March	120			100			360			240			180		
	April		120			100			360			240			180	
	May			120			100			360			240			180
	June	180			120			100			360			240		
	July		180			120			100			360			240	
	August			180			120			100			360			240
	September	240			180			120			100			360		
	October		240			180			120			100			360	
	November			240			180			120			100			360
	December	360			240			180			120			100		
	January		360			240			180			120			100	
	February			360			240			180			120			100

Table 13. (concl.)

15-months rotation period	Month	Age of layer (months)[1]													
		6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		Number of layers														
Third	March	100			360			240			180			120		
	April		100			360			240			180			120	
	May			100			360			240			180			120
	June	120			100			360			240			180		
	July		120			100			360			240			180	
	August			120			100			360			240			180
	September	180			120			100			360			240		
	October		180			120			100			360			240	
	November			180			120			100			360			240
	December	240			180			120			100			360		
	January		240			180			120			100			360	
	February			240			180			120			100			360
	March	360			240			180			120			100		
	April		360			240			180			120			100	
	May			360			240			180			120			100
Fourth	June	100			360			240			180			120		
	July		100			360			240			180			120	
	August			100			360			240			180			120
	September	120			100			360			240			180		
	October		120			100			360			240			180	
	November			120			100			360			240			180
	December	180			120			100			360			240		
	January		180			120			100			360			240	
	February			180			120			100			360			240
	March	240			180			120			100			360		
	April		240			180			120			100			360	
	May			240			180			120			100			360
	June	360			240			180			120			100		
	July		360			240			180			120			100	
	August			360			240			180			120			100

[1]Age at beginning of the month.
[2]Initial replacements of pullets.

Table 14. Floor plan operations: Number of layers removed from the flock seasonally through culling and mortality, by age of layers.

Age of layers (months)	Layers removed (culled and died)[1]	
	Per two-weeks period	During 3 months
	Number of layers	
6-8	5	30
9-11	10	60
12-14	10	60
15-17	25	150
18-20	50[2]	200[3]

[1]During each two-weeks period.
[2]Number removed in the 18th and 19th months only.
[3]At the end of the 20th month all remaining birds were sold as culls.

Table 15. Floor plan operations: Numbers and ages of layers, by months in any 15-month rotation period.

Month in the rotation	Age of layers[1] (months)	Number of layers
1st	6	1,000
2nd	7	990
3rd	8	980
4th	9	970
5th	10	950
6th	11	930
7th	12	910
8th	13	890
9th	14	870
10th	15	850
11th	16	800
12th	17	750
13th	18	700
14th	19	600
15th	20	500

[1] Age at the beginning of the month.

Table 16. Rate of lay in relation to age of layers, by type of housing and management practice.

Type of housing	Age of layers (months)	Management practice: Floor plan operations	Management practice: Cage systems
		Rate of lay (percent)[1]	
Completely-enclosed	6-8	65	65
	9-11	75	75
	12-14	72	72
	15-17	65	70
	18-20	60	65
Open-front	6-8	65	65
	9-11	75	75
	12-14	70	70
	15-17	60	65
	18-20	55	65

[1]The rate of lay applied to the number of layers in flocks at the beginning of each two-week's period.

Table 17. Floor plan operation (completely-enclosed house with litter): Number of layers, rate of lay, and total egg production, by months and rotation periods.

15-months rotation period	Month	Number of layers	Rate of lay (percent)	Days in half-month (number)	Egg production Per day (number)	Egg production Per month (dozen)
First	September	1,000	65	15	650	
		995	65	15	647	1,621
	October	990	65	15	644	
		985	65	16	640	1,658
	November	980	65	15	637	
		975	65	15	634	1,589
	December	970	75	15	728	
		960	75	16	720	1,870
	January	950	75	15	712	
		940	75	16	705	1,830
	February	930	75	14	698	
		920	75	14	690	1,619
	March	910	72	15	655	
		900	72	16	648	1,681
	April	890	72	15	641	
		880	72	15	634	1,594
	May	870	72	15	626	
		860	72	16	619	1,608
	June	850	65	15	552	
		825	65	15	536	1,360
	July	800	65	15	520	
		775	65	16	504	1,322
	August	750	65	15	488	
		725	65	16	471	1,238
	September	700	60	15	420	
		650	60	15	390	1,012
	October	600	60	15	360	
		550	60	16	330	890
	November	500	60	15	300	
		496	60	15	298	748

Table 17. (continued)

15-months rotation period	Month	Number of layers	Rate of lay (percent)	Days in half-month (number)	Egg production Per day (number)	Egg production Per month (dozen)
Second	December	1,000	65	15	650	
		995	65	16	647	1,675
	January	990	65	15	644	
		985	65	16	640	1,658
	February	980	65	14	637	
		975	65	14	634	1,483
	March	970	75	15	728	
		960	75	16	720	1,870
	April	950	75	15	712	
		940	75	15	705	1,771
	May	930	75	15	698	
		920	75	16	690	1,792
	June	910	72	15	655	
		900	72	15	648	1,629
	July	890	72	15	641	
		880	72	16	634	1,644
	August	870	72	15	626	
		860	72	16	619	1,608
	September	850	65	15	552	
		825	65	15	536	1,360
	October	800	65	15	520	
		775	65	16	504	1,322
	November	750	65	15	488	
		725	65	15	471	1,199
	December	700	60	15	420	
		650	60	16	390	1,045
	January	600	60	15	360	
		550	60	16	330	890
	February	500	60	14	300	
		496	60	14	298	698

Table 17. (continued)

15-months rotation period	Month	Number of layers	Rate of lay (percent)	Days in half-month (number)	Egg production Per day (number)	Egg production Per month (dozen)
Third	March	1,000	65	15	650	
		995	65	16	647	1,675
	April	990	65	15	644	
		985	65	15	640	1,605
	May	980	65	15	637	
		975	65	16	634	1,642
	June	970	75	15	728	
		960	75	15	720	1,810
	July	950	75	15	712	
		940	75	16	705	1,830
	August	930	75	15	698	
		920	75	15	690	1,792
	September	910	72	15	655	
		900	72	15	648	1,639
	October	890	72	15	641	
		880	72	16	634	1,647
	November	870	72	15	626	
		860	72	15	619	1,556
	December	850	65	15	552	
		825	65	16	536	1,405
	January	800	65	15	520	
		775	65	16	504	1,322
	February	750	65	14	488	
		725	65	14	471	1,119
	March	700	60	15	420	
		650	60	16	390	1,045
	April	600	60	15	360	
		550	60	15	330	862
	May	500	60	15	300	
		496	60	16	298	772

Table 17. (concl.)

15-months rotation period	Month	Number of layers	Rate of lay (percent)	Days in half-month (number)	Egg production Per day (number)	Egg production Per month (dozen)
Fourth	June	1,000	65	15	650	
		995	65	15	647	1,621
	July	990	65	15	644	
		985	65	16	640	1,658
	August	980	65	15	637	
		975	65	16	634	1,642
	September	970	75	15	728	
		960	75	15	720	1,810
	October	950	75	15	712	
		940	75	16	705	1,830
	November	930	75	15	698	
		920	75	15	690	1,735
	December	910	72	15	655	
		900	72	16	648	1,683
	January	890	72	15	641	
		880	72	16	634	1,647
	February	870	72	14	626	
		860	72	14	619	1,452
	March	850	65	15	652	
		825	65	16	636	1,405
	April	800	65	15	520	
		775	65	15	504	1,280
	May	750	65	15	488	
		725	65	16	471	1,238
	June	700	60	15	420	
		650	60	15	390	1,012
	July	600	60	15	360	
		550	60	16	330	890
	August	500	60	15	300	
		496	60	16	298	772

Table 18. Floor plan operation (open-front house with litter): Number of layers, rate of lay, and total egg production, by months and rotation period.

15-months rotation period	Month	Number of layers	Rate of lay (percent)	Days in half-month (number)	Egg production Per day (number)	Egg production Per month (dozen)
First	September	1,000	65	15	650	
		995	65	15	647	1,621
	October	990	65	15	644	
		985	65	16	640	1,658
	November	980	65	15	637	
		975	65	15	634	1,588
	December	970	75	15	728	
		960	75	16	720	1,869
	January	950	75	15	712	
		940	75	16	705	1,831
	February	930	75	14	698	
		920	75	14	690	1,619
	March	910	70	15	637	
		900	70	16	630	1,636
	April	890	70	15	623	
		880	70	15	616	1,549
	May	870	70	15	609	
		860	70	16	602	1,564
	June	850	60	15	510	
		825	60	15	495	1,256
	July	800	60	15	480	
		775	60	16	465	1,220
	August	750	60	15	450	
		725	60	16	435	1,142
	September	700	55	15	385	
		650	55	15	358	928
	October	600	55	15	330	
		550	55	16	302	816
	November	500	55	15	275	
		496	55	15	273	685

Table 18. (continued)

15-months rotation period	Month	Number of layers	Rate of lay (percent)	Days in half-month (number)	Egg production Per day (number)	Egg production Per month (dozen)
Second	December	1,000	65	15	650	
		995	65	16	647	1,675
	January	990	65	15	644	
		985	65	16	640	1,658
	February	980	65	14	637	
		975	65	14	634	1,483
	March	970	75	15	728	
		960	75	16	720	1,870
	April	950	75	15	712	
		940	75	15	705	1,771
	May	930	75	15	698	
		920	75	16	690	1,792
	June	910	70	15	637	
		900	70	15	630	1,584
	July	890	70	15	623	
		880	70	16	616	1,600
	August	870	70	15	609	
		860	70	16	602	1,564
	September	850	60	15	510	
		825	60	15	495	1,256
	October	800	60	15	480	
		775	60	16	465	1,220
	November	750	60	15	450	
		725	60	15	435	1,106
	December	700	55	15	385	
		650	55	16	358	959
	January	600	55	15	330	
		550	55	16	302	815
	February	500	55	14	275	
		496	55	14	273	639

Table 18. (continued)

15-months rotation period	Month	Number of layers	Rate of lay (percent)	Days in half-month (number)	Egg production Per day (number)	Egg production Per month (dozen)
Third	March	1,000	65	15	650	
		995	65	16	647	1,675
	April	990	65	15	644	
		985	65	15	640	1,605
	May	980	65	15	637	
		975	65	16	634	1,642
	June	970	75	15	728	
		960	75	15	720	1,810
	July	950	75	15	712	
		940	75	16	705	1,830
	August	930	75	15	698	
		920	75	16	690	1,792
	September	910	70	15	637	
		900	70	15	630	1,584
	October	890	70	15	623	
		880	70	16	616	1,600
	November	870	70	15	609	
		860	70	15	602	1,514
	December	850	60	15	510	
		825	60	16	495	1,298
	January	800	60	15	480	
		775	60	16	465	1,220
	February	750	60	14	450	
		725	60	14	435	1,032
	March	700	55	15	385	
		650	55	16	358	959
	April	600	55	15	330	
		550	55	15	302	790
	May	500	55	15	275	
		496	55	16	273	708

Table 18. (con'cl.)

15-months rotation period	Month	Number of layers	Rate of lay (percent)	Days in half-month (number)	Egg production Per day (number)	Egg production Per month (dozen)
Fourth	June	1,000	65	15	650	
		995	65	15	647	1,621
	July	990	65	15	644	
		985	65	16	640	1,658
	August	980	65	15	637	
		975	65	16	634	1,642
	September	970	75	15	728	
		960	75	15	720	1,810
	October	950	75	15	712	
		940	75	16	705	1,830
	November	930	75	15	698	
		920	75	15	690	1,735
	December	910	70	15	637	
		900	70	16	630	1,636
	January	890	70	15	623	
		880	70	16	616	1,600
	February	870	70	14	609	
		860	70	14	602	1,413
	March	850	60	15	510	
		825	60	16	495	1,298
	April	800	60	15	480	
		775	60	15	465	1,181
	May	750	60	15	450	
		725	60	16	435	1,142
	June	700	55	15	385	
		650	55	15	358	929
	July	600	55	15	330	
		550	55	16	302	815
	August	500	55	15	275	
		496	55	16	276	833

Table 19. Cage layer system (open-front house): Monthly rate of lay and total monthly egg production, by age of layer.

Age of layer[1] (months)	Rate of lay (percent)	Monthly egg production, by size of flocks, for 28, 30, and 31 day months.								
		100 layers			120 layers			180 layers		
		28 days	30 days	31 days	28 days	30 days	31 days	28 days	30 days	31 days
		Number of eggs								
6, 7, 8	65	1,820	1,950	2,015	2,184	2,340	2,418	3,276	3,510	3,627
9, 10, 11	75	2,100	2,250	2,325	2,520	2,700	2,790	3,780	4,050	4,185
12, 13, 14	70	1,960	2,100	2,170	2,352	2,520	2,604	3,528	3,780	3,906
15, 16, 17	65	1,820	1,950	2,015	2,184	2,340	2,418	3,276	3,510	3,627
18, 19, 20	65	1,820	1,950	2,015	2,184	2,340	2,418	3,276	3,510	3,627

Table 19. (cont'd.)

Age of layer[1] (months)	Rate of lay (percent)	Monthly egg production, by size of flocks, for 28, 30 and 31 day months.					
		240 layers			360 layers		
		28 days	30 days	31 days	28 days	30 days	31 days
		Number of eggs					
6, 7, 8	65	4,368	4,680	4,836	6,552	7,020	7,254
9, 10, 11	75	5,040	5,400	5,580	7,560	8,100	8,370
12, 13, 14	70	4,704	5,040	5,208	7,056	7,560	7,812
15, 16, 17	65	4,368	4,680	4,836	6,552	7,020	7,254
18, 19, 20	65	4,368	4,680	4,836	6,552	7,020	7,254

[1]Age at the beginning of the month.

Table 20. Cage layer system (completely-enclosed house): Monthly rate of lay and total monthly egg production, by age of layer.

Age of layer[1] (months)	Rate of lay (percent)	Monthly egg production, by size of flocks, for 28, 30 and 31-day months.								
		100 layers			120 layers			180 layers		
		28 days	30 days	31 days	28 days	30 days	31 days	28 days	30 days	31 days
		Number of eggs								
6, 7, 8	65	1,820	1,950	2,015	2,184	2,340	2,418	3,276	3,510	3,627
9, 10, 11	75	2,100	2,250	2,325	2,520	2,700	2,790	3,780	4,050	4,185
12, 13, 14	72	2,016	2,160	2,232	2,419	2,592	2,678	3,629	3,888	4,018
15, 16, 17	70	1,960	2,100	2,170	2,352	2,520	2,604	3,528	3,780	3,906
18, 19, 20	65	1,820	1,950	2,015	2,184	2,340	2,418	3,276	3,510	3,627

Table 20. (concl.)

Age of layer[1] (months)	Rate of lay (percent)	Monthly egg production, by size of flocks, for 28, 30 and 31 day months.					
		240 layers			360 layers		
		28 days	30 days	31 days	28 days	30 days	31 days
		Numbers of eggs					
6, 7, 8,	65	4,368	4,680	4,836	6,552	7,020	7,254
9, 10, 11	75	5,040	5,400	5,580	7,560	8,100	8,370
12, 13, 14	72	4,838	5,184	5,357	7,258	7,776	8,035
15, 16, 17	70	4,704	5,040	5,208	7,056	7,560	7,812
18, 19, 20	65	4,368	4,680	4,836	6,552	7,020	7,254

[1]Age at the beginning of the month.

Table 21. Cage layer system (completely-enclosed house): Composition of 1,000 bird laying flock and monthly egg production, by months and rotation period.

15-months rotation period	Month	Flock composition: Age of layers (months)	Flock composition: Number of layers	Monthly egg production, by grades and sizes: A large	A medium	B large	C	Inedible
				Number of eggs				
First	September	6	1,000	780	8,834	58	9,789	39
	October	7	1,000	3,909	12,695	20	3,486	40
	November	8	1,000	8,229	10,004	19	1,170	78
	December	6	40	32	365	2	405	2
		9	960	15,512	6,049	45	603	111
	January	7	80	313	1,015	2	279	3
		10	920	17,009	3,680	22	556	128
	February	8	120	922	1,121	2	131	8
		11	880	15,431	2,476		462	111
	March	6	60	48	548	4	607	2
		9	120	1,939	756	6	75	14
		12	820	15,630	1,867	18	659	128
	April	7	120	454	1,474	2	405	5
		10	120	2,147	464	3	70	16
		13	760	14,446	1,543		328	99
	May	8	180	1,530	1,861	4	218	14
		11	120	2,330	734		70	17
		14	700	13,515	1,344		687	78
	June	6	80	62	707	5	783	3
		9	180	2,815	1,098	8	109	20
		12	120	2,214	264	3	93	18
		15	620	10,012	1,706		1,250	52
	July	7	160	626	2,031	3	558	6
		10	180	3,327	720	4	109	25
		13	120	2,357	252		54	15
		16	540	8,214	2,098		1,359	47
	August	8	240	2,041	2,480	5	290	20
		11	180	3,494	561		105	25
		14	120	2,317	230		118	14
		17	460	6,967	1,797	10	1,168	40

Table 21. (continued)

15-months rotation period	Month	Flock composition: Age of layers (months)	Flock composition: Number of layers	Monthly egg production, by grades and sizes: A large	A medium	B large	C	Inedible
				Number of eggs				
First	September	6	120	93	1,060	7	1,175	5
		9	240	3,753	1,463	11	146	27
		12	180	3,320	397	4	140	27
		15	120	1,938	330		242	10
		18	340	4,376	1,425	6	796	27
	October	7	240	939	3,046	5	836	10
		10	240	4,436	960	6	145	33
		13	180	3,536	378		80	24
		16	120	1,825	466		302	11
		19	220	2,748	1,086	5	576	18
	November	8	360	2,963	3,601	7	421	28
		11	240	4,509	724		135	32
		14	180	3,363	334		171	20
		17	120	1,759	454	2	295	10
		20	100	1,170	497	2	273	8
Second	December	6	100	81	913	6	1,011	4
		9	360	5,817	2,268	17	226	42
		12	240	4,575	546	5	193	38
		15	180	3,004	512		375	15
		18	120	1,595	520	2	290	10
	January	7	100	391	1,270	2	348	4
		10	360	6,654	1,440	8	218	50
		13	240	4,714	504		107	32
		16	180	2,738	699		453	16
		19	120	1,499	592	3	314	10
	February	8	100	768	934	2	109	7
		11	360	6,313	1,013		189	45
		14	240	4,185	416		213	24
		17	180	2,463	635	3	413	14
		20	120	1,310	557	2	306	9
	March	6	120	97	1,095	7	1,214	15
		9	100	1,616	630	5	63	11
		12	360	6,862	820	8	289	56
		15	240	4,005	682		500	21
		18	180	2,394	780	4	435	14

Table 21 (continued)

15-months rotation period	Month	Flock composition: Age of layers (months)	Flock composition: Number of layers	Monthly egg production, by grades and sizes: A large	A medium	B large	C	Inedible
				Number of eggs				
Second	April	7	120	454	1,474	2	405	5
		10	100	1,789	387	2	59	13
		13	360	6,844	731		155	46
		16	240	3,533	902		585	20
		19	180	2,176	860	4	456	14
	May	8	120	1,020	1,241	2	145	10
		11	100	1,941	312		58	14
		14	360	6,950	691		354	40
		17	240	3,635	938	5	609	21
		20	180	2,176	925	4	508	14
	June	6	180	140	1,590	11	1,762	7
		9	120	1,877	731	5	73	14
		12	100	1,845	220	2	78	15
		15	360	5,814	990		726	30
		18	240	3,089	1,006	5	561	19
	July	6	180	145	1,643	11	1,821	7
		9	120	1,939	756	6	75	14
		12	100	1,906	228	2	80	16
		15	360	6,007	1,024		750	31
		18	240	3,192	1,040	5	580	19
	August	8	180	1,530	1,861	4	218	14
		11	120	2,330	374		70	17
		14	100	1,931	192		98	11
		17	360	5,453	1,406	8	914	31
		20	240	2,902	1,233	5	677	19
	September	6	240	187	2,120	14	2,349	10
		9	180	2,815	1,098	8	109	20
		12	120	2,214	264	3	93	18
		15	100	1,615	270		202	8
		18	360	4,633	1,509	7	843	28
	October	7	240	939	3,046	5	836	10
		10	180	3,327	720	4	109	25
		13	120	2,357	252		54	15
		16	100	1,521	388		252	9
		19	360	4,498	1,777	7	943	29

Table 21. (continued)

15-months rotation period	Month	Flock composition: Age of layers (months)	Flock composition: Number of layers	Monthly egg production, by grades and sizes: A large	A medium	B large	C	Inedible
				Number of eggs				
Second	November	8	240	1,975	2,401	4	281	19
		11	180	3,382	543		101	24
		14	120	2,242	223		114	13
		17	100	1,466	378	2	246	8
		20	360	4,212	1,790	7	983	28
	December	6	360	290	3,286	22	3,642	14
		9	240	3,878	1,512	11	151	28
		12	180	3,431	410	4	145	28
		15	120	2,003	341		250	10
		18	100	1,330	433	2	242	8
	January	7	360	1,407	4,570	7	1,255	15
		10	240	4,436	960	6	145	33
		13	180	3,536	378		80	24
		16	120	1,825	466		302	11
		19	100	1,249	494	2	262	8
	February	8	360	2,765	3,361	7	393	26
		11	240	4,209	675		126	30
		14	180	1,744	173		89	10
		17	120	1,642	424	2	275	9
		20	100	1,092	464	2	255	7
Third	March	6	100	81	913	6	1,011	4
		9	360	5,817	2,268	17	226	42
		12	240	4,575	546	5	193	38
		15	180	3,004	512		375	15
		18	120	1,595	520	2	290	10
	April	7	100	378	1,229	2	337	4
		10	360	6,439	1,393	8	211	49
		13	240	4,562	487		104	31
		16	180	2,650	677		438	15
		19	120	1,451	573	2	304	10
	May	8	100	851	1,034	2	120	8
		11	360	6,990	1,121		209	50
		14	240	4,634	460		236	27
		17	180	2,727	703	4	457	15
		20	120	1,451	617	2	338	10

Table 21 (continued)

15-months rotation period	Month	Flock composition: Age of layers (months)	Flock composition: Number of layers	Monthly egg production, by grades and sizes: A large	A medium	B large	C	Inedible
				Number of eggs				
Third	June	6	120	93	1,060	7	1,175	5
		9	100	1,564	610	4	61	11
		12	360	6,641	793	8	280	54
		15	240	3,876	660		484	20
		18	180	2,317	755	3	421	14
	July	7	120	469	1,524	2	418	5
		10	100	1,848	400	2	61	14
		13	360	7,071	755		161	48
		16	240	3,651	932		604	21
		19	180	2,249	889	4	471	14
	August	8	120	1,020	1,241	2	145	10
		11	100	1,941	312		58	14
		14	360	6,950	691		354	40
		17	240	3,635	938	5	609	21
		20	180	2,176	925	4	508	14
	September	6	180	140	1,590	11	1,762	7
		9	120	1,877	731	5	73	14
		12	100	1,845	220	2	78	15
		15	360	5,814	990		726	30
		18	240	3,089	1,006	5	561	19
	October	7	180	704	2,285	4	627	7
		10	120	2,218	480	3	72	17
		13	100	1,964	210		45	13
		16	360	5,476	1,399		906	31
		19	240	2,998	1,185	5	629	19
	November	8	180	1,481	1,801	3	211	14
		11	120	2,254	362		68	16
		14	100	1,868	186		95	11
		17	360	5,277	1,361	8	884	30
		20	240	2,808	1,193	5	655	19
	December	6	240	193	2,191	14	2,428	10
		9	180	2,909	1,134	8	113	21
		12	120	2,287	273	3	96	19
		15	100	1,669	284		208	9
		18	360	4,788	1,560	7	870	29

Table 21. (continued)

15-months rotation period	Month	Flock composition: Age of layers (months)	Flock composition: Number of layers	Monthly egg production, by grades and sizes: A large	A medium	B large	C	Inedible
				Number of eggs				
Third	January	7	240	939	3,046	5	836	10
		10	180	3,327	720	4	109	25
		13	120	2,357	252		54	15
		16	100	1,521	388		252	9
		19	360	4,498	1,777	7	943	29
	February	8	240	1,843	2,241	4	262	18
		11	180	3,156	507		94	23
		14	120	2,093	208		106	12
		17	100	1,368	353	2	229	8
		20	360	3,931	1,671	7	917	26
	March	6	360	290	3,286	22	3,642	14
		9	240	3,878	1,512	11	151	28
		12	180	3,431	410	4	145	28
		15	120	2,003	341		250	10
		18	100	1,330	433	2	242	8
	April	7	360	1,362	4,423	7	1,214	14
		10	240	4,293	929	5	140	33
		13	180	3,421	366		78	23
		16	120	1,767	451		292	10
		19	100	1,209	478	2	253	8
	May	8	360	3,061	3,722	7	435	29
		11	240	4,659	748		140	33
		14	180	3,476	345		177	20
		17	120	1,817	469	3	305	10
		20	100	1,209	514	2	282	8
Fourth	June	6	100	78	883	6	979	4
		9	360	5,630	2,195	16	219	40
		12	240	4,427	529	5	187	36
		15	180	2,907	495		363	15
		18	120	1,545	503	2	281	9
	July	7	100	391	1,270	2	348	4
		10	360	6,654	1,440	8	218	50
		13	240	4,714	504		107	32
		16	180	2,738	699		453	16
		19	120	1,499	592	3	314	10

Table 21. (continued)

15-months rotation period	Month	Flock composition: Age of layers (months)	Flock composition: Number of layers	Monthly egg production, by grades and sizes: A large	A medium	B large	C	Inedible
				Number of eggs				
Fourth	August	8	100	851	1,034	2	120	8
		11	360	6,990	1,121		209	50
		14	240	4,634	460		236	27
		17	180	2,727	703	4	457	15
		20	120	1,451	617	2	338	10
	September	6	120	93	1,060	7	1,175	5
		9	100	1,564	610	4	61	11
		12	360	6,641	793	8	280	54
		15	240	3,876	660		484	20
		18	180	2,317	755	3	421	14
	October	7	120	469	1,524	2	418	5
		10	100	1,848	400	2	61	14
		13	360	7,071	755		161	48
		16	240	3,651	932		604	21
		19	180	2,249	889	4	471	14
	November	8	120	988	1,201	2	140	9
		11	100	1,879	301		56	14
		14	360	6,726	669		342	39
		17	240	3,518	907	5	590	20
		20	180	2,106	895	4	491	14
	December	6	180	145	1,643	11	1,821	7
		9	120	1,939	756	6	75	14
		12	100	1,906	228	2	80	16
		15	360	6,007	1,024		750	31
		18	240	3,192	1,040	5	580	19
	January	7	180	704	2,285	4	627	7
		10	120	2,218	480	3	72	17
		13	100	1,964	210		45	13
		16	360	5,476	1,399		906	31
		19	240	2,998	1,185	5	629	19
	February	8	180	1,382	1,681	3	197	13
		11	120	2,104	338		63	15
		14	100	1,744	173		89	10
		17	360	4,925	1,270	7	826	28
		20	240	2,621	1,114	4	612	17

Table 21. (concl.)

15-months rotation period	Month	Flock composition: Age of layers (months)	Flock composition: Number of layers	Monthly egg production, by grades and sizes: A large	A medium	B large	C	Inedible
				Number of eggs				
Fourth	March	6	240	193	2,191	14	2,428	10
		9	180	2,909	1,134	8	113	21
		12	120	2,287	273	3	96	19
		15	100	1,669	284		208	9
		18	360	4,788	1,560	7	870	29
	April	7	240	908	2,948	5	810	9
		10	180	3,220	697	4	105	24
		13	120	2,281	244		52	15
		16	100	1,472	376		244	8
		19	360	4,352	1,720	7	913	28
	May	8	240	2,041	2,480	5	290	20
		11	180	3,494	561		105	25
		14	120	2,317	230		118	14
		17	100	1,515	390	2	254	9
		20	360	4,352	1,850	7	1,016	29
	June	6	360	281	3,180	21	3,524	14
		9	240	3,753	1,463	11	146	27
		12	180	3,320	397	4	140	27
		15	120	1,938	330		242	10
		18	100	1,287	419	2	234	8
	July	7	360	1,407	4,570	7	1,255	15
		10	240	4,436	960	6	145	33
		13	180	3,536	378		80	24
		16	120	1,825	466		302	11
		19	100	1,249	494	2	262	8
	August	8	360	3,061	3,722	7	435	29
		11	240	4,659	748		140	33
		14	180	3,476	345		177	20
		17	120	1,817	469	3	305	10
		20	100	1,209	514	2	282	8

Table 22. Cage layer system (open-front house): Composition of 1,000-bird laying flock and monthly egg production, by months and rotation periods.

15-months rotation period	Month	Flock composition: Age of layers (months)	Flock composition: Number of layers	Monthly egg production by grades and sizes: A large	A medium	B large	C	Inedible
				Number of eggs				
First	September	6	1,000	780	8,834	58	9,789	39
	October	7	1,000	3,909	12,695	20	3,486	40
	November	8	1,000	8,229	10,004	19	1,170	78
	December	6	40	32	365	2	405	2
		9	960	15,512	6,049	45	603	111
	January	7	80	313	1,015	2	279	3
		10	920	17,009	3,680	22	556	128
	February	8	120	922	1,121	2	131	8
		11	880	15,431	2,476		462	111
	March	6	60	48	548	4	607	2
		9	120	1,939	756	6	75	14
		12	820	15,196	1,815	18	641	124
	April	7	120	454	1,474	2	405	5
		10	120	2,147	464	3	70	16
		13	760	14,045	1,500		319	96
	May	8	180	1,530	1,861	4	218	14
		11	120	2,330	734		70	17
		14	700	13,139	1,307		668	76
	June	6	80	62	707	5	783	3
		9	180	2,815	1,098	8	109	20
		12	120	2,152	257	2	91	18
		15	620	9,297	1,584		1,161	48
	July	7	160	626	2,031	3	558	6
		10	180	3,327	720	4	109	25
		13	120	2,291	245		52	16
		16	540	7,628	1,948		1,262	43
	August	8	240	2,041	2,480	5	290	20
		11	180	3,494	561		105	25
		14	120	2,253	224		115	13
		17	460	6,470	1,668	9	1,085	37

Table 22. (continued)

15-months rotation period	Month	Flock composition: Age of layers (months)	Flock composition: Number of layers	Monthly egg production, by grades and sizes: A large	A medium	B large	C	Inedible
				Number of eggs				
First	September	6	120	93	1,060	7	1,175	5
		9	240	3,753	1,463	11	146	27
		12	180	3,228	386	4	136	26
		15	120	1,799	307		225	9
		18	340	4,376	1,425	6	796	27
	October	7	240	939	3,046	5	836	10
		10	240	4,436	960	6	145	33
		13	180	3,437	367		78	24
		16	120	1,695	433		280	10
		19	220	2,748	1,086	5	576	18
	November	8	360	2,963	3,601	7	421	28
		11	240	4,509	724		135	32
		14	180	3,270	325		166	19
		17	120	1,633	421	2	274	10
		20	100	1,170	497	2	273	8
Second	December	6	100	81	913	6	1,011	4
		9	360	5,817	2,268	17	226	42
		12	240	4,448	531	5	188	36
		15	180	2,789	475		348	15
		18	120	1,595	520	2	290	10
	January	7	100	391	1,270	2	348	4
		10	360	6,654	1,440	8	218	50
		13	240	4,583	490		104	31
		16	180	2,543	649		421	14
		19	120	1,499	592	3	314	10
	February	8	100	768	934	2	109	7
		11	360	6,313	1,013		189	45
		14	240	4,069	405		207	23
		17	180	2,287	590	3	383	13
		20	120	1,310	557	2	306	9
	March	6	120	97	1,095	7	1,214	15
		9	100	1,616	630	5	63	11
		12	360	6,671	797	8	281	55
		15	240	3,719	634		464	19
		18	180	2,394	780	4	435	14

Table 22. (continued)

15-months rotation period	Month	Flock composition: Age of layers (months)	Flock composition: Number of layers	Monthly egg production, by grades and sizes: A large	A medium	B large	C	Inedible
				Number of eggs				
Second	April	7	120	454	1,474	2	405	5
		10	100	1,789	387	2	59	13
		13	360	6,653	711		151	45
		16	240	3,280	838		543	19
		19	180	2,176	860	4	456	14
	May	8	120	1,020	1,241	2	145	10
		11	100	1,941	312		58	14
		14	360	6,757	672		344	39
		17	240	3,376	870	5	566	19
		20	180	2,176	925	4	508	14
	June	6	180	140	1,590	11	1,762	7
		9	120	1,877	731	5	73	14
		12	100	1,793	214	2	76	15
		15	360	5,398	920		674	28
		18	240	3,089	1,006	5	561	19
	July	6	180	145	1,643	11	1,821	7
		9	120	1,939	756	6	75	14
		12	100	1,853	222	2	78	15
		15	360	5,578	950		697	29
		18	240	3,192	1,040	5	580	19
	August	8	180	1,530	1,861	4	218	14
		11	120	2,330	374		70	17
		14	100	1,877	187		95	11
		17	360	5,063	1,306	7	849	29
		20	240	2,902	1,233	5	677	19
	September	6	240	187	2,120	14	2,349	10
		9	180	2,815	1,098	8	109	20
		12	120	2,152	257	2	91	18
		15	100	1,500	255		187	8
		18	360	4,633	1,509	7	843	28
	October	7	240	939	3,046	5	836	10
		10	180	3,327	720	4	109	25
		13	120	2,291	245		52	16
		16	100	1,413	360		234	8
		19	360	4,498	1,777	7	943	29

Table 22. (continued)

15-months rotation period	Month	Flock composition: Age of layers (months)	Flock composition: Number of layers	Monthly egg production, by grades and sizes: A large	A medium	B large	C	Inedible
				Number of eggs				
Second	November	8	240	1,975	2,401	4	281	19
		11	180	3,382	543		101	24
		14	120	2,180	217		111	12
		17	100	1,361	351	2	228	8
		20	360	4,212	1,790	7	983	28
	December	6	360	290	3,286	22	3,642	14
		9	240	3,878	1,512	11	151	28
		12	180	3,336	398	4	141	27
		15	120	1,859	317		232	10
		18	100	1,330	433	2	242	8
	January	7	360	1,407	4,570	7	1,255	15
		10	240	4,436	960	6	145	33
		13	180	3,437	367		78	24
		16	120	1,695	433		280	10
		19	100	1,249	494	2	262	8
	February	8	360	2,765	3,361	7	393	26
		11	240	4,209	675		126	30
		14	180	3,052	303		155	18
		17	120	1,524	393	2	256	9
		20	100	1,092	464	2	255	7
Third	March	6	100	81	913	6	1,011	4
		9	360	5,817	2,268	17	226	42
		12	240	4,448	531	5	188	36
		15	180	2,789	475		348	15
		18	120	1,595	520	2	290	10
	April	7	100	378	1,229	2	337	4
		10	360	6,439	1,393	8	211	49
		13	240	4,435	474		101	30
		16	180	2,461	628		407	14
		19	120	1,451	573	2	304	10
	May	8	100	851	1,034	2	120	8
		11	360	6,990	1,121		209	50
		14	240	4,505	448		229	26
		17	180	2,532	653	4	424	15
		20	120	1,451	617	2	338	10

Table 22. (continued)

15-months rotation period	Month	Flock composition: Age of layers (months)	Flock composition: Number of layers	Monthly egg production, by grades and sizes: A large	A medium	B large	C	Inedible
				Number of eggs				
Third	June	6	120	93	1,060	7	1,175	5
		9	100	1,564	610	4	61	11
		12	360	6,456	771	8	272	53
		15	240	3,599	613		449	19
		18	180	2,317	755	3	421	14
	July	7	120	469	1,524	2	418	5
		10	100	1,848	400	2	61	14
		13	360	6,875	734		156	47
		16	240	3,390	866		561	19
		19	180	2,249	889	4	471	14
	August	8	120	1,020	1,241	2	145	10
		11	100	1,941	312		58	14
		14	360	6,757	672		344	39
		17	240	3,376	870	5	566	19
		20	180	2,176	925	4	508	14
	September	6	180	140	1,590	11	1,762	7
		9	120	1,877	731	5	73	14
		12	100	1,793	214	2	76	15
		15	360	5,398	920		674	28
		18	240	3,089	1,006	5	561	19
	October	7	180	704	2,285	4	627	7
		10	120	2,218	480	3	72	17
		13	100	1,910	204		43	13
		16	360	5,085	1,298		842	29
		19	240	2,998	1,185	5	629	19
	November	8	180	1,481	1,801	3	211	14
		11	120	2,254	362		68	16
		14	100	1,817	181		92	10
		17	360	4,900	1,264	7	821	28
		20	240	2,808	1,193	5	655	19
	December	6	240	193	2,191	14	2,428	10
		9	180	2,909	1,134	8	113	21
		12	120	2,224	265	3	94	18
		15	100	1,550	264		193	8
		18	360	4,788	1,560	7	870	29

Table 22. (continued)

15-months rotation period	Month	Flock composition: Age of layers (months)	Flock composition: Number of layers	Monthly egg production, by grades and sizes: A large	A medium	B large	C	Inedible
				Number of eggs				
Third	January	7	240	939	3,046	5	836	10
		10	180	3,327	720	4	109	25
		13	120	2,291	245		52	16
		16	100	1,413	360		234	8
		19	360	4,498	1,777	7	943	29
	February	8	240	1,843	2,241	4	262	18
		11	180	3,156	507		94	23
		14	120	2,034	202		104	12
		17	100	1,270	328	2	213	7
		20	360	3,931	1,671	7	917	26
	March	6	360	290	3,286	22	3,642	14
		9	240	3,878	1,512	11	151	28
		12	180	3,336	398	4	141	27
		15	120	1,859	317		232	10
		18	100	1,330	433	2	242	8
	April	7	360	1,362	4,423	7	1,214	14
		10	240	4,293	929	5	140	33
		13	180	3,326	355		76	23
		16	120	1,640	419		272	9
		19	100	1,209	478	2	253	8
	May	8	360	3,061	3,722	7	435	29
		11	240	4,659	748		140	33
		14	180	3,379	336		172	19
		17	120	1,688	435	2	283	10
		20	100	1,209	514	2	282	8
Fourth	June	6	100	78	883	6	979	4
		9	360	5,630	2,195	16	219	40
		12	240	4,304	514	5	182	35
		15	180	2,699	460		337	14
		18	120	1,545	503	2	281	9
	July	7	100	391	1,270	2	348	4
		10	360	6,654	1,440	8	218	50
		13	240	4,583	490		104	31
		16	180	2,543	649		421	14
		19	120	1,499	592	3	314	10

Table 22. (continued)

15-months rotation period	Month	Flock composition: Age of layers (months)	Flock composition: Number of layers	Monthly egg production, by grades and sizes: A large	A medium	B large	C	Inedible
				Number of eggs				
	August	8	100	851	1,034	2	120	8
		11	360	6,990	1,121		209	50
		14	240	4,505	448		229	26
		17	180	2,532	653	4	424	15
		20	120	1,451	617	2	338	10
	September	6	120	93	1,060	7	1,175	5
		9	100	1,564	610	4	61	11
		12	360	6,456	771	8	272	53
		15	240	3,599	613		449	19
		18	180	2,317	755	3	421	14
	October	7	120	469	1,524	2	418	5
		10	100	1,848	400	2	61	14
		13	360	6,875	734		156	47
		16	240	3,390	866		561	19
		19	180	2,249	889	4	471	14
	November	8	120	988	1,201	2	140	9
		11	100	1,879	301		56	14
		14	360	6,539	650		333	38
		17	240	3,267	842	5	547	19
		20	180	2,106	895	4	491	14
	December	6	180	145	1,643	11	1,821	7
		9	120	1,939	756	6	75	14
		12	100	1,853	222	2	78	15
		15	360	5,578	950		697	29
		18	240	3,192	1,040	5	580	19
	January	7	180	704	2,285	4	627	7
		10	120	2,218	480	3	72	17
		13	100	1,910	204		43	13
		16	360	5,085	1,298		842	29
		19	240	2,998	1,185	5	629	19
	February	8	180	1,382	1,681	3	197	13
		11	120	2,104	338		63	15
		14	100	1,695	169		86	10
		17	360	4,573	1,179	7	767	26
		20	240	2,621	1,114	4	612	17

Table 22. (concl.)

15-months rotation period	Month	Flock composition: Age of layers (months)	Flock composition: Number of layers	Monthly egg production, by grades and sizes: A large	A medium	B large	C	Inedible
				Number of eggs				
Fourth	March	6	240	193	2,191	14	2,428	10
		9	180	2,909	1,134	8	113	21
		12	120	2,224	265	3	94	18
		15	100	1,550	264		193	8
		18	360	4,788	1,560	7	870	29
	April	7	240	908	2,948	5	810	9
		10	180	3,230	697	4	105	24
		13	120	2,218	237		50	15
		16	100	1,367	349		226	8
		19	360	4,352	1,720	7	913	28
	May	8	240	2,041	2,480	5	290	20
		11	180	3,494	561		105	25
		14	120	2,253	224		115	13
		17	100	1,406	363	2	236	8
		20	360	4,352	1,850	7	1,016	29
	June	6	360	281	3,180	21	3,524	14
		9	240	3,753	1,463	11	146	27
		12	180	3,228	386	4	136	26
		15	120	1,799	307		225	9
		18	100	1,287	419	2	234	8
	July	7	360	1,407	4,570	7	1,255	15
		10	240	4,436	960	6	145	33
		13	180	3,437	367		78	24
		16	120	1,695	433		280	10
		19	100	1,249	494	2	262	8
	August	8	360	3,061	3,722	7	435	29
		11	240	4,659	748		140	33
		14	180	3,379	336		172	19
		17	120	1,688	435	2	283	10
		20	100	1,209	514	2	282	8

Table 23. Cage layer systems: Seasonal grade and size distribution of eggs.

Month of lay	Age of layers (months)	Percentage distribution						
		A large[2]	A medium[2]	B large	C[1]			
					A small B medium	Undergrades and peewees	Inedibles	Total
1	6	4.0	45.3	0.3	46.0	4.2	0.2	100.0
2	7	19.4	63.0	0.1	16.1	1.2	0.2	100.0
3	8	42.2	51.3	0.1	4.0	2.0	0.4	100.0
4	9	69.5	27.1	0.2	.7	2.0	0.5	100.0
5	10	79.5	17.2	0.1	.6	2.0	0.6	100.0
6	11	83.5	13.4	—	.5	2.0	0.6	100.0
7	12	85.4	10.2	0.1	1.2	2.4	0.7	100.0
8	13	88.0	9.4	—	.6	1.4	0.6	100.0
9	14	86.5	8.6	—	1.4	3.0	0.5	100.0
10	15	76.9	13.1	—	4.7	4.9	0.4	100.0
11	16	70.1	17.9	—	5.6	6.0	0.4	100.0
12	17	69.8	18.0	0.1	5.9	5.8	0.4	100.0
13	18	66.0	21.5	0.1	7.0	5.0	0.4	100.0
14	19	62.0	24.5	0.1	8.0	5.0	0.4	100.0
15	20	60.0	25.5	0.1	9.0	5.0	0.4	100.0

[1]Grade C for budgeting purposes was the sum of A small, B medium, undergrades, and peewees.
[2]Includes grades AA and A.

Source: 12-months data were obtained from the First National Bank of Tribune, Greeley County, Kansas, which handled financing arrangements for local producers. Data represent actual gradings of eggs for three cage-layer operators whose pullets began laying in October, 1956. Data for the last 3 months were estimated.

Table 24. Floor plan operations: Seasonal grade and size distribution of eggs.

Month of lay	Age of layers (months)	Percentage distribution						
					C[1]			
		A large[2]	A medium[2]	B large	A small	Undergrades	Inedibles	Total
1	6	2.5	40.0	5.3	45.0	7.0	.2	100.0
2	7	6.0	63.0	3.8	26.0	1.0	.2	100.0
3	8	49.0	40.8	1.8	3.2	5.0	.2	100.0
4	9	51.6	43.0	1.0	.8	3.0	.6	100.0
5	10	76.8	16.2	1.0	.5	4.8	.7	100.0
6	11	80.8	12.0	1.1	—	5.0	1.1	100.0
7	12	82.5	12.0	1.1	—	3.0	1.4	100.0
8	13	85.6	6.8	1.6	—	5.0	1.0	100.0
9	14	84.5	7.5	1.5	—	5.5	1.0	100.0
10	15	77.8	12.0	3.1	—	6.0	1.1	100.0
11	16	76.2	13.8	5.0	—	4.0	1.0	100.0
12	17	77.2	10.0	6.0	—	5.5	1.3	100.0
13	18	87.8	1.6	6.0	—	3.2	1.4	100.0
14	19	88.7	1.0	5.9	—	3.2	1.2	100.0
15	20	86.7	1.5	6.0	—	4.4	1.4	100.0

[1]Grade C for budgeting purposes was the sum of A small and undergrades.

[2]Includes grades AA and A.

Sources: 15-months data for the percentages of A large, A medium and A small were obtained from the Kidwell Poultry Farm and Hatchery, Enterprise, Kansas. Data represented actual gradings of eggs from one floor plan operation for the period, October 1956 through December 1957. Data representing 10-months actual gradings of eggs from another flock at the same poultry farm were the basis for estimating the percentages of B large, undergrades and inedibles.

Table 25. Cage layer system (completely-enclosed house): Receipts from eggs, by months and rotation periods, 1000-bird laying flock.

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
First	September	A large	65	42.9	27.88
		A medium	736	32.5	239.20
		B large	5	28.5	1.42
		C	816	16.5	134.64
	October	A large	326	42.8	139.53
		A medium	1,058	30.4	321.63
		B large	2	29.0	.58
		C	290	16.4	47.56
	November	A large	686	41.4	284.00
		A medium	834	30.5	254.37
		B large	2	26.3	.53
		C	98	16.2	15.88
	December	A large	1,295	39.1	506.34
		A medium	534	32.8	175.15
		B large	4	28.9	1.16
		C	84	18.4	15.46
	January	A large	1,444	37.3	538.61
		A medium	391	33.2	129.81
		B large	4	29.1	1.16
		C	70	21.6	15.12
	February	A large	1,363	38.1	519.30
		A medium	300	34.8	104.40
		B large	0	32.3	.00
		C	49	24.5	12.00
	March	A large	1,468	37.3	547.56
		A medium	264	34.6	91.34
		B large	2	31.5	.63
		C	112	25.3	28.34
	April	A large	1,421	35.7	507.30
		A medium	290	32.7	94.83
		B large	0	29.4	.00
		C	67	24.2	16.21
	May	A large	1,448	36.0	521.28
		A medium	328	32.6	106.93
		B large	0	29.8	.00
		C	81	23.8	19.28

Table 25. (continued)

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
First	June	A large	1,258	35.5	446.59
		A medium	315	31.5	99.22
		B large	1	27.7	.28
		C	186	22.1	41.11
	July	A large	1,210	37.8	457.38
		A medium	425	31.5	133.88
		B large	1	25.8	.26
		C	173	18.6	32.18
	August	A large	1,235	40.0	494.00
		A medium	422	31.9	134.62
		B large	1	26.9	.27
		C	140	17.4	24.36
	September	A large	1,123	42.9	481.77
		A medium	390	32.5	126.75
		B large	2	28.5	.57
		C	208	16.5	34.32
	October	A large	1,124	42.8	481.07
		A medium	495	30.4	150.48
		B large	1	29.0	.29
		C	162	16.4	26.57
	November	A large	1,147	41.4	474.86
		A medium	468	30.5	142.74
		B large	1	26.3	.26
		C	108	16.2	17.50
Second	December	A large	1,256	39.1	491.10
		A medium	396	32.8	129.89
		B large	2	28.9	.58
		C	175	18.4	32.20
	January	A large	1,333	37.3	497.21
		A medium	375	33.2	124.50
		B large	1	29.1	.29
		C	120	21.6	25.92
	February	A large	1,253	38.1	477.39
		A medium	296	34.8	103.01
		B large	1	32.3	.32
		C	102	24.5	24.99

Table 25. (continued)

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
Second	March	A large	1,248	37.3	465.50
		A medium	334	34.6	115.56
		B large	2	31.5	.63
		C	208	25.3	52.62
	April	A large	1,233	35.7	440.18
		A medium	363	32.7	118.70
		B large	1	29.4	.29
		C	138	24.2	33.40
	May	A large	1,310	36.0	471.60
		A medium	342	32.6	111.49
		B large	1	29.8	.30
		C	140	23.8	33.32
	June	A large	1,064	35.5	377.72
		A medium	378	31.5	119.07
		B large	2	27.7	.55
		C	267	22.1	59.01
	July	A large	1,099	37.8	415.42
		A medium	391	31.5	123.17
		B large	2	25.8	.52
		C	276	18.6	51.34
	August	A large	1,179	40.0	471.60
		A medium	422	31.9	134.62
		B large	1	26.9	.27
		C	165	17.4	28.71
	September	A large	955	42.9	409.70
		A medium	438	32.5	142.35
		B large	3	28.5	.86
		C	300	16.5	49.50
	October	A large	1,054	42.8	451.11
		A medium	515	30.4	156.56
		B large	1	29.0	.29
		C	183	16.4	30.01
	November	A large	1,106	41.4	457.88
		A medium	445	30.5	135.73
		B large	1	26.3	.26
		C	144	16.2	23.33

Table 25. (continued)

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
Second	December	A large	911	39.1	356.20
		A medium	498	32.8	163.34
		B large	3	28.9	.87
		C	369	18.4	67.90
	January	A large	1,038	37.3	387.17
		A medium	572	33.2	189.90
		B large	1	29.1	.29
		C	170	21.6	36.72
	February	A large	954	38.1	363.47
		A medium	425	34.8	147.90
		B large	1	32.3	.32
		C	95	24.5	23.28
Third	March	A large	1,256	37.3	468.49
		A medium	397	34.6	137.36
		B large	2	31.5	.63
		C	175	25.3	44.28
	April	A large	1,290	35.7	460.53
		A medium	363	32.7	118.70
		B large	1	29.4	.29
		C	116	24.2	28.07
	May	A large	1,388	36.0	499.68
		A medium	328	32.6	106.93
		B large	1	29.8	.30
		C	113	23.8	26.89
	June	A large	1,208	35.5	428.84
		A medium	323	31.5	101.74
		B large	2	27.7	.55
		C	202	22.1	44.64
	July	A large	1,274	37.8	481.57
		A medium	375	31.5	118.12
		B large	1	25.8	.26
		C	143	18.6	26.60
	August	A large	1,310	40.0	524.00
		A medium	342	31.9	109.10
		B large	1	26.9	.27
		C	140	17.4	24.36

Table 25. (continued)

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
Third	September	A large	1,064	42.9	456.46
		A medium	378	32.5	122.85
		B large	2	28.5	.57
		C	267	16.5	44.06
	October	A large	1,113	42.8	476.36
		A medium	463	30.4	140.76
		B large	1	29.0	.29
		C	190	16.4	31.16
	November	A large	1,141	41.4	472.37
		A medium	409	30.5	124.74
		B large	1	26.3	.26
		C	159	16.2	25.76
	December	A large	987	39.1	385.92
		A medium	454	32.8	148.91
		B large	3	28.9	.87
		C	310	18.4	57.04
	January	A large	1,054	37.3	393.14
		A medium	515	33.2	170.98
		B large	1	29.1	.29
		C	183	21.6	39.53
	February	A large	1,033	38.1	393.57
		A medium	415	34.8	144.42
		B large	1	32.3	.32
		C	134	24.5	32.83
	March	A large	911	37.3	339.80
		A medium	498	34.6	172.31
		B large	3	31.5	.94
		C	369	25.3	93.36
	April	A large	1,004	35.7	358.43
		A medium	554	32.7	181.16
		B large	1	29.4	.29
		C	165	24.2	39.93
	May	A large	1,185	36.0	426.60
		A medium	483	32.6	157.46
		B large	1	29.8	.30
		C	112	23.8	26.66

Table 25. (continued)

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
Fourth	June	A large	1,216	35.5	431.68
		A medium	384	31.5	120.96
		B large	2	27.7	.55
		C	169	22.1	37.35
	July	A large	1,339	37.8	503.87
		A medium	375	31.5	118.13
		B large	1	25.8	.26
		C	120	18.6	22.32
	August	A large	1,388	40.0	555.20
		A medium	328	31.9	104.63
		B large	1	26.9	.27
		C	113	17.4	19.66
	September	A large	1,208	42.9	518.23
		A medium	323	32.5	104.98
		B large	2	28.5	.57
		C	202	16.5	33.33
	October	A large	1,274	42.8	545.27
		A medium	375	30.4	114.00
		B large	1	29.0	.29
		C	143	16.4	23.45
	November	A large	1,268	41.4	524.95
		A medium	331	30.5	100.96
		B large	1	26.3	.26
		C	135	16.2	21.87
	December	A large	1,099	39.1	429.71
		A medium	391	32.8	128.25
		B large	2	28.9	.58
		C	276	18.4	50.78
	January	A large	1,113	37.3	415.15
		A medium	463	33.2	153.72
		B large	1	29.1	.29
		C	190	21.6	41.04
	February	A large	1,065	38.1	405.76
		A medium	381	34.8	132.59
		B large	1	32.3	.32
		C	149	24.5	36.51

Table 25. (concl.)

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
Fourth	March	A large	987	37.3	368.15
		A medium	454	34.6	157.08
		B large	3	31.5	.94
		C	310	25.3	78.43
	April	A large	1,019	35.7	363.78
		A medium	499	32.7	163.17
		B large	1	29.4	.29
		C	177	24.2	42.83
	May	A large	1,143	36.0	411.48
		A medium	459	32.6	149.63
		B large	1	29.8	.30
		C	149	23.8	35.46
	June	A large	882	35.5	313.11
		A medium	482	31.5	151.83
		B large	3	27.7	.83
		C	357	22.1	78.90
	July	A large	1,038	37.8	392.36
		A medium	572	31.5	180.18
		B large	1	25.8	.26
		C	170	18.6	31.62
	August	A large	1,185	40.0	474.00
		A medium	483	31.9	154.08
		B large	1	26.9	.27
		C	112	17.4	19.49

Table 26. Cage layer system (open front house): Receipts from eggs, by months and rotation periods, 1000-bird laying flock.

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
First	September	A large	65	42.9	27.88
		A medium	736	32.5	239.20
		B large	5	28.5	1.42
		C	816	16.5	134.64
	October	A large	326	42.8	139.52
		A medium	1,058	30.4	321.63
		B large	2	29.0	.58
		C	290	16.4	47.56
	November	A large	686	41.4	284.00
		A medium	834	30.5	254.37
		B large	2	26.3	.53
		C	98	16.2	15.88
	December	A large	1,295	39.1	506.34
		A medium	534	32.8	175.15
		B large	4	28.9	1.16
		C	84	18.4	15.46
	January	A large	1,444	37.3	538.61
		A medium	391	33.2	129.81
		B large	2	29.1	.58
		C	70	21.6	15.12
	February	A large	1,363	38.1	519.30
		A medium	300	34.8	104.40
		B large		32.3	.00
		C	49	24.5	12.00
	March	A large	1,432	37.3	534.14
		A medium	260	34.6	89.96
		B large	2	31.5	.63
		C	110	25.3	27.83
	April	A large	1,387	35.7	495.16
		A medium	286	32.7	93.52
		B large		29.4	.00
		C	66	24.2	15.97
	May	A large	1,417	36.0	510.12
		A medium	325	32.6	105.95
		B large		29.8	.00
		C	80	23.8	19.04

Table 26. (continued)

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
First	June	A large	1,194	35.5	423.87
		A medium	304	31.5	95.76
		B large	1	27.7	.28
		C	179	22.1	39.56
	July	A large	1,156	37.8	436.97
		A medium	412	31.5	129.78
		B large	1	25.8	.26
		C	165	18.6	30.69
	August	A large	1,188	40.0	475.20
		A medium	411	31.9	131.11
		B large	1	26.9	.27
		C	133	17.4	23.14
	September	A large	1,104	42.9	473.62
		A medium	387	32.5	125.78
		B large	2	28.5	.57
		C	206	16.5	33.99
	October	A large	1,105	42.8	472.94
		A medium	491	30.4	149.26
		B large	1	29.0	.29
		C	160	16.4	26.24
	November	A large	1,129	41.4	467.41
		A medium	464	30.5	141.52
		B large	1	26.3	.26
		C	106	16.2	17.17
Second	December	A large	1,228	39.1	480.15
		A medium	392	32.8	128.58
		B large	2	28.9	.58
		C	172	18.4	31.64
	January	A large	1,306	37.3	487.14
		A medium	370	33.2	122.84
		B large	1	29.1	.29
		C	117	21.6	25.27
	February	A large	1,229	38.1	468.25
		A medium	292	34.8	101.62
		B large	1	32.3	.32
		C	100	24.5	24.50

Table 26. (continued)

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
Second	March	A large	1,208	37.3	450.58
		A medium	327	34.6	113.14
		B large	2	31.5	.63
		C	205	25.3	51.87
	April	A large	1,196	35.7	426.97
		A medium	356	32.7	116.41
		B large	1	29.4	.29
		C	135	24.2	32.67
	May	A large	1,272	36.0	457.92
		A medium	335	32.6	109.21
		B large	1	29.8	.30
		C	135	23.8	32.13
	June	A large	1,025	35.5	363.88
		A medium	372	31.5	117.18
		B large	2	27.7	.55
		C	262	22.1	57.90
	July	A large	1,059	37.8	400.30
		A medium	384	31.5	120.96
		B large	2	25.8	.52
		C	271	18.6	50.41
	August	A large	1,142	40.0	456.80
		A medium	413	31.9	131.75
		B large	1	26.9	.27
		C	159	17.4	27.66
	September	A large	941	42.9	403.69
		A medium	437	32.5	142.02
		B large	2	28.5	.57
		C	298	16.5	49.17
	October	A large	1,039	42.8	444.69
		A medium	512	30.4	155.65
		B large	1	29.0	.29
		C	181	16.4	29.68
	November	A large	1,092	41.4	452.09
		A medium	442	30.5	134.81
		B large	1	26.3	.26
		C	142	16.2	23.00

Table 26. (continued)

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
Second	December	A large	891	39.1	348.38
		A medium	496	32.8	162.69
		B large	3	28.9	.87
		C	367	18.4	67.53
	January	A large	1,019	37.3	380.09
		A medium	569	33.2	188.91
		B large	1	29.1	.29
		C	168	21.6	36.29
	February	A large	1,054	38.1	401.57
		A medium	433	34.8	150.68
		B large	1	32.3	.32
		C	99	24.5	24.26
Third	March	A large	1,228	37.3	458.04
		A medium	392	34.6	135.63
		B large	2	31.5	.63
		C	172	25.3	43.52
	April	A large	1,264	35.7	451.25
		A medium	358	32.7	117.07
		B large	1	29.4	.29
		C	113	24.2	27.35
	May	A large	1,361	36.0	489.96
		A medium	323	32.6	105.30
		B large	1	29.8	.30
		C	110	23.8	26.18
	June	A large	1,169	35.5	415.00
		A medium	317	31.5	99.86
		B large	2	27.7	.55
		C	198	22.1	43.76
	July	A large	1,236	37.8	467.21
		A medium	368	31.5	115.92
		B large	1	25.8	.26
		C	139	18.6	25.85
	August	A large	1,272	40.0	508.80
		A medium	335	31.9	106.87
		B large	1	26.9	.27
		C	135	17.4	23.49

Table 26. (continued)

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
Third	September	A large	1,025	42.9	439.73
		A medium	372	32.5	120.90
		B large	2	28.5	.57
		C	262	16.5	43.23
	October	A large	1,076	42.8	460.53
		A medium	454	30.4	138.02
		B large	1	29.0	.29
		C	184	16.4	30.18
	November	A large	1,105	41.4	457.47
		A medium	400	30.5	122.00
		B large	1	26.3	.26
		C	154	16.2	24.95
	December	A large	972	39.1	380.05
		A medium	451	32.8	147.93
		B large	3	28.9	.87
		C	308	18.4	56.67
	January	A large	1,039	37.3	387.55
		A medium	512	33.2	169.98
		B large	1	29.1	.29
		C	181	21.6	39.10
	February	A large	1,020	38.1	388.62
		A medium	512	34.8	178.18
		B large	1	32.3	.32
		C	132	24.5	32.34
	March	A large	914	37.3	340.92
		A medium	496	34.6	171.62
		B large	3	31.5	.95
		C	367	25.3	92.85
	April	A large	986	35.7	352.00
		A medium	550	32.7	179.85
		B large	1	29.4	.29
		C	163	24.2	39.45
	May	A large	1,166	36.0	419.76
		A medium	480	32.6	156.48
		B large	1	29.8	.30
		C	110	23.8	26.18

Table 26. (continued)

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
Fourth	June	A large	1,188	35.5	421.74
		A medium	380	31.5	119.70
		B large	2	27.7	.55
		C	167	22.1	36.91
	July	A large	1,306	37.8	493.67
		A medium	370	31.5	116.55
		B large	1	25.8	.26
		C	117	18.6	21.76
	August	A large	1,361	40.0	544.40
		A medium	323	31.9	103.04
		B large	1	26.9	.27
		C	110	17.4	19.14
	September	A large	1,169	42.9	501.50
		A medium	317	32.5	103.02
		B large	2	28.5	.57
		C	198	16.5	32.67
	October	A large	1,236	42.8	529.01
		A medium	368	30.4	111.87
		B large	1	29.0	.29
		C	139	16.4	22.80
	November	A large	1,232	41.4	510.05
		A medium	324	30.5	98.82
		B large	1	26.3	.26
		C	131	16.2	21.22
	December	A large	1,060	39.1	414.46
		A medium	384	32.8	125.95
		B large	2	28.9	.58
		C	271	18.4	49.86
	January	A large	1,076	37.3	401.35
		A medium	454	33.2	150.73
		B large	1	29.1	.29
		C	184	21.6	39.74
	February	A large	1,031	38.1	392.81
		A medium	373	34.8	129.80
		B large	1	32.3	.32
		C	144	24.5	35.28

Table 26. (concl.)

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
Fourth	March	A large	972	37.3	362.56
		A medium	451	34.6	143.59
		B large	3	31.5	.95
		C	308	25.3	77.92
	April	A large	1,005	35.7	358.79
		A medium	496	32.7	162.19
		B large	1	29.4	.29
		C	175	24.2	42.35
	May	A large	1,129	36.0	406.44
		A medium	456	32.6	148.66
		B large	1	29.8	.30
		C	147	23.8	34.99
	June	A large	862	35.5	306.01
		A medium	480	31.5	151.20
		B large	3	27.7	.83
		C	355	22.1	78.46
	July	A large	1,019	37.8	385.18
		A medium	569	31.5	179.24
		B large	1	25.8	.26
		C	168	18.6	31.25
	August	A large	1,166	40.0	466.40
		A medium	480	31.9	153.12
		B large	1	26.9	.27
		C	109	17.4	18.97

Table 27. Floor plan operation (completely-enclosed house with litter): Receipts from eggs, by months and rotation periods.

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
First	September	A large	41	42.9	17.59
		A medium	649	32.5	210.92
		B large	86	28.5	24.51
		C	842	16.5	138.93
	October	A large	99	42.8	42.37
		A medium	1,045	30.4	317.68
		B large	63	29.0	18.27
		C	448	16.4	73.47
	November	A large	779	41.4	322.51
		A medium	648	30.5	197.64
		B large	29	26.3	7.63
		C	130	16.2	21.06
	December	A large	965	39.1	377.32
		A medium	804	32.8	263.71
		B large	19	28.9	5.49
		C	71	18.4	13.06
	January	A large	1,405	37.3	524.06
		A medium	297	33.2	98.60
		B large	18	29.1	5.24
		C	97	21.6	20.95
	February	A large	1,308	38.1	498.35
		A medium	194	34.8	67.51
		B large	18	32.3	5.81
		C	81	24.5	19.84
	March	A large	1,387	37.3	517.35
		A medium	202	34.6	69.89
		B large	18	31.5	5.67
		C	50	25.3	12.65
	April	A large	1,364	35.7	486.95
		A medium	108	32.7	35.32
		B large	26	29.4	7.64
		C	80	24.2	19.36
	May	A large	1,399	36.0	489.24
		A medium	121	32.6	39.45
		B large	24	29.8	7.15
		C	88	23.8	20.94

Table 27. (continued)

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
First	June	A large	1,058	35.5	375.59
		A medium	163	31.5	51.34
		B large	42	27.7	11.63
		C	82	22.1	18.12
	July	A large	1,007	37.8	380.65
		A medium	183	31.5	57.64
		B large	66	25.8	17.03
		C	53	18.6	9.86
	August	A large	956	40.0	382.40
		A medium	124	31.9	39.56
		B large	74	26.9	19.91
		C	68	17.4	11.83
	September	A large	889	42.9	381.38
		A medium	16	32.5	5.20
		B large	61	28.5	17.38
		C	32	16.5	5.28
	October	A large	789	42.8	337.69
		A medium	9	30.4	2.74
		B large	53	29.0	15.37
		C	28	16.4	4.59
	November	A large	649	41.4	268.69
		A medium	11	30.5	3.36
		B large	45	26.3	11.84
		C	33	16.2	5.35
Second	December	A large	42	39.1	16.42
		A medium	670	32.8	219.76
		B large	89	28.9	25.72
		C	871	18.4	160.26
	January	A large	99	37.3	36.93
		A medium	1,045	33.2	346.94
		B large	63	29.1	18.33
		C	448	21.6	96.77
	February	A large	727	38.1	276.99
		A medium	605	34.8	210.54
		B large	27	32.3	8.72
		C	121	24.5	29.64

Table 27. (continued)

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
Second	March	A large	965	37.3	359.94
		A medium	804	34.6	278.18
		B large	19	31.5	5.98
		C	71	25.3	17.96
	April	A large	1,360	35.7	485.52
		A medium	287	32.7	93.85
		B large	18	29.4	5.29
		C	94	24.2	22.75
	May	A large	1,448	36.0	521.28
		A medium	215	32.6	70.09
		B large	20	29.8	5.96
		C	89	23.8	21.18
	June	A large	1,344	35.5	477.12
		A medium	195	31.5	61.42
		B large	18	27.7	4.99
		C	49	22.1	10.83
	July	A large	1,407	37.8	531.85
		A medium	112	31.5	35.28
		B large	26	25.8	6.71
		C	82	18.6	15.25
	August	A large	1,359	40.0	453.60
		A medium	121	31.9	38.60
		B large	24	26.9	6.46
		C	88	17.4	15.31
	September	A large	1,058	42.9	453.88
		A medium	163	32.5	52.98
		B large	42	28.5	11.97
		C	82	16.5	13.53
	October	A large	1,007	42.8	431.00
		A medium	183	30.4	55.63
		B large	66	29.0	19.14
		C	53	16.4	8.69
	November	A large	926	41.4	383.36
		A medium	120	30.5	36.60
		B large	73	26.3	19.20
		C	65	16.2	10.53

Table 27. (continued)

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
Second	December	A large	918	39.1	358.94
		A medium	17	32.8	5.58
		B large	63	28.9	18.21
		C	33	18.4	6.07
	January	A large	789	37.3	294.30
		A medium	9	33.2	2.99
		B large	53	29.1	15.42
		C	28	21.6	6.05
	February	A large	605	38.1	230.51
		A medium	10	34.8	3.48
		B large	42	32.3	13.57
		C	31	24.5	7.60
Third	March	A large	42	37.3	15.67
		A medium	670	34.6	231.82
		B large	89	31.5	28.04
		C	871	25.3	220.36
	April	A large	96	35.7	34.27
		A medium	1,011	32.7	330.60
		B large	61	29.4	17.93
		C	434	24.2	105.03
	May	A large	805	36.0	289.90
		A medium	670	32.6	218.42
		B large	29	29.8	8.64
		C	135	23.8	32.13
	June	A large	934	35.5	331.57
		A medium	778	31.5	245.07
		B large	18	27.7	4.99
		C	69	22.1	15.25
	July	A large	1,405	37.8	531.09
		A medium	297	31.5	93.55
		B large	18	25.8	4.64
		C	97	18.6	18.04
	August	A large	1,448	40.0	579.20
		A medium	215	31.9	68.58
		B large	20	26.9	5.38
		C	89	17.4	15.49

Table 27. (continued)

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
Third	September	A large	1,345	42.9	577.00
		A medium	195	32.5	63.38
		B large	18	28.5	5.13
		C	49	16.5	8.08
	October	A large	1,410	42.8	603.48
		A medium	112	30.4	34.05
		B large	26	29.0	7.54
		C	82	16.4	13.45
	November	A large	1,315	41.4	544.41
		A medium	117	30.5	35.68
		B large	23	26.3	6.05
		C	86	16.2	13.93
	December	A large	1,093	39.1	427.36
		A medium	169	32.8	55.43
		B large	44	28.9	12.72
		C	84	18.4	15.46
	January	A large	1,007	37.3	375.61
		A medium	183	33.2	60.76
		B large	66	29.1	19.21
		C	53	21.6	11.45
	February	A large	863	38.1	328.80
		A medium	112	34.8	38.98
		B large	67	32.3	21.64
		C	61	24.5	14.94
	March	A large	918	37.3	342.41
		A medium	17	34.6	5.88
		B large	63	31.5	19.84
		C	33	25.3	8.35
	April	A large	764	35.7	272.75
		A medium	9	32.7	2.94
		B large	51	29.4	14.99
		C	28	24.2	6.78
	May	A large	669	36.0	240.84
		A medium	12	32.6	3.91
		B large	46	29.8	13.71
		C	34	23.8	8.09

Table 27. (continued)

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
Fourth	June	A large	41	35.5	14.56
		A medium	649	31.5	204.44
		B large	86	27.7	23.82
		C	842	22.1	186.08
	July	A large	99	37.8	37.42
		A medium	1,045	31.5	329.18
		B large	63	25.8	16.25
		C	448	18.6	83.33
	August	A large	805	40.0	322.00
		A medium	670	31.9	213.73
		B large	29	26.9	7.80
		C	135	17.4	23.49
	September	A large	934	42.9	400.69
		A medium	778	32.5	252.85
		B large	18	28.5	5.13
		C	69	16.5	11.39
	October	A large	1,405	42.8	601.34
		A medium	297	30.4	90.29
		B large	18	29.0	5.22
		C	97	16.4	15.91
	November	A large	1,402	41.4	580.43
		A medium	208	30.5	63.44
		B large	19	26.3	4.99
		C	87	16.2	14.09
	December	A large	1,388	39.1	542.71
		A medium	202	32.8	66.26
		B large	19	28.9	5.49
		C	50	18.4	9.20
	January	A large	1,410	37.3	525.93
		A medium	112	33.2	37.18
		B large	26	29.1	7.57
		C	82	21.6	17.71
	February	A large	1,227	38.1	467.49
		A medium	109	34.8	37.93
		B large	22	32.3	7.11
		C	80	24.5	19.60

Table 27. (concl.)

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
Fourth	March	A large	1,093	37.3	407.69
		A medium	169	34.6	58.47
		B large	44	31.5	13.86
		C	84	25.3	21.25
	April	A large	975	35.7	348.08
		A medium	177	32.7	57.88
		B large	64	29.4	18.82
		C	51	24.2	12.34
	May	A large	956	36.0	344.16
		A medium	124	32.6	40.42
		B large	74	29.8	22.05
		C	68	23.8	16.18
	June	A large	889	35.5	315.60
		A medium	16	31.5	5.04
		B large	61	27.7	16.90
		C	32	22.1	7.07
	July	A large	789	37.8	298.24
		A medium	9	31.5	2.84
		B large	53	25.8	13.67
		C	28	18.6	5.21
	August	A large	669	40.0	267.60
		A medium	12	31.9	3.83
		B large	46	26.9	12.37
		C	34	17.4	5.92

Table 28. Floor plan operation (open-front house with litter or slatted floors): Receipts from eggs, by months and rotation periods.

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
First	September	A large	41	42.9	17.59
		A medium	649	32.5	210.92
		B large	86	28.5	24.51
		C	842	16.5	138.93
	October	A large	99	42.8	42.37
		A medium	1,045	30.4	317.68
		B large	63	29.0	18.27
		C	448	16.4	73.47
	November	A large	779	41.4	322.51
		A medium	648	30.5	197.64
		B large	29	26.3	7.63
		C	130	16.2	21.06
	December	A large	965	39.1	377.32
		A medium	804	32.8	263.71
		B large	19	28.9	5.49
		C	71	18.4	13.06
	January	A large	1,405	37.3	524.06
		A medium	297	33.2	98.60
		B large	18	29.1	5.24
		C	97	21.6	20.95
	February	A large	1,308	38.1	498.35
		A medium	194	34.8	67.51
		B large	18	32.3	5.81
		C	81	24.5	19.84
	March	A large	1,350	37.3	503.55
		A medium	196	34.6	67.82
		B large	18	31.5	5.67
		C	49	25.3	12.40
	April	A large	1,326	35.7	473.38
		A medium	105	32.7	34.34
		B large	25	29.4	7.35
		C	78	24.2	18.88
	May	A large	1,322	36.0	475.92
		A medium	117	32.6	38.14
		B large	23	29.8	6.85
		C	86	23.8	20.47

Table 28. (continued)

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
First	June	A large	977	35.5	346.84
		A medium	151	31.5	47.56
		B large	39	27.7	10.80
		C	75	22.1	16.58
	July	A large	930	37.8	351.54
		A medium	168	31.5	52.92
		B large	61	25.8	15.74
		C	49	18.6	9.11
	August	A large	882	40.0	352.80
		A medium	114	31.9	36.37
		B large	68	26.9	18.29
		C	63	17.4	10.96
	September	A large	815	42.9	349.64
		A medium	15	32.5	4.88
		B large	55	28.5	15.68
		C	30	16.5	4.95
	October	A large	725	42.8	310.30
		A medium	8	30.4	2.43
		B large	48	29.0	13.92
		C	26	16.4	4.26
	November	A large	594	41.4	245.92
		A medium	11	30.5	3.36
		B large	41	26.3	10.78
		C	30	16.2	4.86
Second	December	A large	42	39.1	16.42
		A medium	670	32.8	219.76
		B large	89	28.9	25.72
		C	871	18.4	160.26
	January	A large	99	37.3	36.93
		A medium	1,045	33.2	346.94
		B large	63	29.1	18.33
		C	448	21.6	96.77
	February	A large	727	38.1	276.99
		A medium	605	34.8	210.54
		B large	27	32.3	8.72
		C	121	24.5	29.64

Table 28. (continued)

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
Second	March	A large	965	37.3	359.94
		A medium	804	34.6	278.18
		B large	19	31.5	5.98
		C	71	25.3	17.96
	April	A large	1,360	35.7	485.52
		A medium	287	32.7	93.85
		B large	18	29.4	5.29
		C	94	24.2	22.75
	May	A large	1,448	36.0	521.28
		A medium	215	32.6	70.09
		B large	20	29.8	5.96
		C	89	23.8	21.18
	June	A large	1,370	35.5	463.98
		A medium	190	31.5	59.85
		B large	17	27.7	4.71
		C	48	22.1	10.61
	July	A large	1,307	37.8	517.86
		A medium	109	31.5	34.34
		B large	25	25.8	6.45
		C	80	18.6	14.88
	August	A large	1,322	40.0	528.80
		A medium	117	31.9	37.32
		B large	23	26.9	6.19
		C	86	17.4	14.96
	September	A large	977	42.9	419.13
		A medium	150	32.5	48.75
		B large	40	28.5	11.40
		C	75	16.5	12.38
	October	A large	930	42.8	398.04
		A medium	168	30.4	51.07
		B large	61	29.0	17.69
		C	49	16.4	8.04
	November	A large	854	41.4	353.56
		A medium	111	30.5	33.86
		B large	66	26.3	17.36
		C	61	16.2	9.88

Table 28. (continued)

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
Second	December	A large	842	39.1	329.22
		A medium	15	32.8	4.92
		B large	58	28.9	16.76
		C	31	18.4	5.70
	January	A large	723	37.3	269.68
		A medium	8	33.2	2.66
		B large	48	29.1	13.97
		C	26	21.6	5.62
	February	A large	554	38.1	211.07
		A medium	10	34.8	3.48
		B large	38	32.3	12.27
		C	28	24.5	6.86
Third	March	A large	42	37.3	15.67
		A medium	670	34.6	231.82
		B large	89	31.5	28.04
		C	871	25.3	220.36
	April	A large	96	35.7	34.27
		A medium	1,011	32.7	330.60
		B large	61	29.4	17.93
		C	434	24.2	105.03
	May	A large	805	36.0	289.90
		A medium	670	32.6	218.42
		B large	29	29.8	8.64
		C	135	23.8	32.13
	June	A large	934	35.5	331.57
		A medium	778	31.5	245.07
		B large	18	27.7	4.99
		C	69	22.1	15.25
	July	A large	1,405	37.8	531.09
		A medium	297	31.5	93.55
		B large	18	25.8	4.64
		C	97	18.6	18.04
	August	A large	1,488	40.0	579.20
		A medium	215	31.9	68.58
		B large	20	26.9	5.38
		C	89	17.4	15.49

Table 28. (continued)

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
Third	September	A large	1,307	42.9	560.70
		A medium	190	32.5	61.75
		B large	17	28.5	4.84
		C	48	16.5	7.92
	October	A large	1,370	42.8	586.36
		A medium	109	30.4	33.14
		B large	25	29.0	7.25
		C	80	16.4	13.12
	November	A large	1,279	41.4	529.51
		A medium	114	30.5	34.77
		B large	23	26.3	6.05
		C	83	16.2	13.45
	December	A large	1,010	39.1	394.91
		A medium	156	32.8	51.17
		B large	40	28.9	11.56
		C	78	18.4	14.35
	January	A large	930	37.3	346.89
		A medium	168	33.2	55.78
		B large	61	29.1	17.75
		C	49	21.6	10.58
	February	A large	797	38.1	303.66
		A medium	103	34.8	35.84
		B large	62	32.3	20.03
		C	57	24.5	13.96
	March	A large	842	37.3	314.07
		A medium	15	34.6	5.19
		B large	58	31.5	18.27
		C	31	25.3	7.84
	April	A large	701	35.7	250.26
		A medium	8	32.7	2.62
		B large	47	29.4	13.82
		C	25	24.2	6.05
	May	A large	614	36.00	221.04
		A medium	11	32.6	3.59
		B large	42	29.8	12.52
		C	31	23.8	7.38

Table 28. (continued)

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
Fourth	June	A large	41	35.5	14.56
		A medium	649	31.5	204.44
		B large	86	27.7	23.82
		C	842	22.1	186.08
	July	A large	99	37.8	37.42
		A medium	1,045	31.5	329.18
		B large	63	25.8	16.25
		C	448	18.6	83.33
	August	A large	805	40.0	322.00
		A medium	670	31.9	213.73
		B large	29	26.9	7.80
		C	135	17.4	23.49
	September	A large	934	42.9	400.69
		A medium	778	32.5	252.85
		B large	18	28.5	5.13
		C	69	16.5	11.39
	October	A large	1,405	42.8	601.34
		A medium	297	30.4	90.29
		B large	18	29.0	5.22
		C	97	16.4	15.91
	November	A large	1,402	41.4	580.43
		A medium	208	30.5	63.44
		B large	19	26.3	4.99
		C	87	16.2	14.09
	December	A large	1,350	39.1	527.85
		A medium	196	32.8	64.29
		B large	18	28.9	5.20
		C	49	18.4	9.02
	January	A large	1,370	37.3	511.01
		A medium	109	33.2	36.19
		B large	25	29.1	7.28
		C	80	21.6	17.28
	February	A large	1,194	38.1	454.91
		A medium	106	34.8	36.89
		B large	21	32.3	6.78
		C	78	24.5	19.11

Table 28. (concl.)

15-months rotation period	Month	Grades and sizes of eggs	Monthly production (dozens)	Price (cents per dozen)	Value of eggs (dollars)
Fourth	March	A large	1,010	37.3	376.73
		A medium	156	34.6	53.98
		B large	40	31.5	12.60
		C	78	25.3	19.73
	April	A large	900	35.7	321.30
		A medium	163	32.7	53.30
		B large	59	29.4	17.35
		C	47	24.2	11.37
	May	A large	882	36.0	317.52
		A medium	114	32.6	37.16
		B large	68	29.8	20.26
		C	63	23.8	14.99
	June	A large	815	35.5	289.32
		A medium	15	31.5	4.72
		B large	56	27.7	15.51
		C	30	22.1	6.63
	July	A large	723	37.8	273.29
		A medium	8	31.5	2.52
		B large	48	25.8	12.38
		C	26	18.6	4.84
	August	A large	722	40.0	288.80
		A medium	12	31.9	3.83
		B large	50	26.9	13.45
		C	31	17.4	6.44

Table 29. Cage layer systems: Consumption of feed, price of feed, and total feed cost, by months and rotation periods, 1,000-bird laying flock.

15-months rotation period	Month	Days in month (number)	Mash Consumption[1] Pounds	Tons	Price of mash (dollars/ton)	Cost of mash (dollars)
First	September	30	7,500	3.750	74.92	280.95
	October	31	7,750	3.875	74.32	287.99
	November	30	7,500	3.750	74.18	278.18
	December	31	7,750	3.875	73.88	286.28
	January	31	7,750	3.875	74.85	290.04
	February	28	7,000	3.500	74.40	260.40
	March	31	7,750	3.875	75.00	290.62
	April	30	7,500	3.750	75.52	283.20
	May	31	7,750	3.875	76.50	296.44
	June	30	7,500	3.750	75.98	284.92
	July	31	7,750	3.875	75.38	292.10
	August	31	7,750	3.875	75.08	290.94
	September	30	7,500	3.750	74.92	280.95
	October	31	7,750	3.875	74.32	287.99
	November	30	7,500	3.750	74.18	278.18
Total		456	114,000	———	———	4,269.18
Grit[2] (1,368 pounds @ $1.50 per hundredweight)						20.52
TOTAL FEED COST						4,289.70
Second	December	31	7,750	3.875	73.88	286.28
	January	31	7,750	3.875	74.85	290.04
	February	28	7,000	3.500	74.40	260.40
	March	31	7,750	3.875	75.00	290.62
	April	30	7,500	3.750	75.52	283.20
	May	31	7,750	3.875	76.50	296.44
	June	30	7,500	3.750	75.98	284.92
	July	31	7,750	3.875	75.38	292.10
	August	31	7,750	3.875	75.08	290.94
	September	30	7,500	3.750	74.92	280.95
	October	31	7,750	3.875	74.32	287.99
	November	30	7,500	3.750	74.18	278.18
	December	31	7,750	3.875	73.88	286.28
	January	31	7,750	3.875	74.85	290.04
	February	28	7,000	3.500	74.40	260.40
Total		455	113,750	———	———	4,258.78
Grit[2]						20.52[3]
TOTAL FEED COST						4,279.30

Table 29. (concl.)

15-months rotation period	Month	Days in month (number)	Mash Consumption: Pounds	Mash Consumption: Tons	Price of mash (dollars/ton)	Cost of mash (dollars)
Third	March	31	7,750	3.875	75.00	290.62
	April	30	7,500	3.750	75.52	283.20
	May	31	7,750	3.875	76.50	296.44
	June	30	7,500	3.750	75.98	284.92
	July	31	7,750	3.875	75.38	292.10
	August	31	7,750	3.875	75.08	290.94
	September	30	7,500	3.750	74.92	280.95
	October	31	7,750	3.875	74.32	287.99
	November	30	7,500	3.750	74.18	278.18
	December	31	7,750	3.875	73.88	286.28
	January	31	7,750	3.875	74.85	290.04
	February	28	7,000	3.500	74.40	260.40
	March	31	7,750	3.875	75.00	290.62
	April	30	7,500	3.750	75.52	283.20
	May	31	7,750	3.875	76.50	296.44
Total		457	114,250	———	———	4,292.32
Grit[2]						20.52[3]
TOTAL FEED COST						4,312.84
Fourth	June	30	7,500	3.750	75.98	284.92
	July	31	7,750	3.875	75.38	292.10
	August	31	7,750	3.875	75.08	290.94
	September	30	7,500	3.750	74.92	280.95
	October	31	7,750	3.875	74.32	287.99
	November	30	7,500	3.750	74.18	278.18
	December	31	7,750	3.875	73.88	286.28
	January	31	7,750	3.875	74.85	290.04
	February	28	7,000	3.500	74.40	260.40
	March	31	7,750	3.875	75.00	290.62
	April	30	7,500	3.750	75.52	283.20
	May	31	7,750	3.875	76.50	296.44
	June	30	7,500	3.750	75.98	284.92
	July	31	7,750	3.875	75.38	292.10
	August	31	7,750	3.875	75.08	290.94
Total		457	114,250	———	———	4,290.02
Grit[2]						20.52[3]
TOTAL FEED COST						4,310.54

[1]Based on 0.25 pound per layer per day.
[2]Based on 0.3 pound per 100 layers per day.
[3]To save recalculating and because actual costs for each period would differ only slightly, the cost of grit for each period for budgeting purposes was that of the first 15-months rotation period.

Table 30. Floor plan operations: Number of layers, feed consumption, price of feed and total feed cost, by months and rotation periods.

15-months rotation period	Month	Days in half-month period	Number of layers	Mash consumption[1] Pounds	Tons	Price of mash (dollars/ton)	Cost of mash (dollars)
First	September	15	1,000	4,200			
		15	995	4,179	4.189	74.92	313.84
	October	15	990	4,158			
		16	985	4,413	4.285	74.32	318.46
	November	15	980	4,116			
		15	975	4,095	4.105	74.18	304.51
	December	15	970	4,074			
		16	960	4,301	4.187	73.88	309.34
	January	15	950	3,990			
		16	940	4,211	4.100	74.85	306.88
	February	14	930	3,646			
		14	920	3,606	3.626	74.40	269.77
	March	15	910	3,822			
		16	900	4,032	3.927	75.00	294.52
	April	15	890	3,738			
		15	880	3,696	3.717	75.52	280.71
	May	15	870	3,654			
		16	860	3,853	3.753	76.50	287.10
	June	15	850	3,570			
		15	825	3,465	3.715	75.98	282.27
	July	15	800	3,360			
		16	775	3,472	3.416	75.38	257.50
	August	15	750	3,150			
		16	725	3,248	3.199	75.08	240.18
	September	15	700	3,940			
		15	650	2,730	3.335	74.92	249.58
	October	15	600	2,520			
		16	550	2,464	2.492	74.32	185.20
	November	15	500	2,100			
		15	496	2,083	2.091	74.18	155.11
Total		456	—	107,886	———	———	4,054.97
Grit[2] (1,145 pounds @ $1.50 per hundred weight)							17.18
TOTAL FEED COST							4,072.15

Table 30. (continued)

15-months rotation period	Month	Days in half-month period	Number of layers	Mash consumption[1] Pounds	Mash consumption[1] Tons	Price of mash (dollars/ton)	Cost of mash (dollars)
Second	December	15	1,000	4,200			
		16	995	4,458	4.329	73.88	319.83
	January	15	990	4,158			
		16	985	4,413	4.285	74.85	320.73
	February	14	980	3,842			
		14	975	3,822	3.832	74.40	285.10
	March	15	970	4,074			
		16	960	4,301	4.187	75.00	314.02
	April	15	950	3,990			
		15	940	3,948	3.969	75.52	299.74
	May	15	930	3,906			
		16	920	4,122	4.014	76.50	307.07
	June	15	910	3,822			
		15	900	3,780	3.801	75.98	288.80
	July	15	890	3,738			
		16	880	3,942	3.840	75.38	289.46
	August	15	870	3,654			
		16	860	3,853	3.753	75.08	281.78
	September	15	850	3,570			
		15	825	3,465	3.715	74.92	278.33
	October	15	800	3,360			
		16	775	3,472	3.416	74.32	253.88
	November	15	750	3,150			
		15	725	3,045	3.097	74.18	229.74
	December	15	700	3,940			
		16	650	2,912	3.426	73.88	253.11
	January	15	600	2,520			
		16	550	2,464	2.492	74.85	186.53
	February	14	500	1,960			
		14	496	1,944	1.952	74.40	145.23
Total		455	—	107,825	———	———	4,053.35
Grit[2]							17.18[3]
TOTAL FEED COST							4,070.53

Table 30. (continued)

15-months rotation period	Month	Days in half-month period	Number of layers	Mash consumption[1] Pounds	Mash consumption[1] Tons	Price of mash (dollars/ton)	Cost of mash (dollars)
Third	March	15	1,000	4,200			
		16	995	4,458	4.329	75.00	324.68
	April	15	990	4,158			
		15	985	4,137	4.147	75.52	313.18
	May	15	980	4,116			
		16	975	4,368	4.242	76.50	324.51
	June	15	970	4,074			
		15	960	4,032	4.053	75.98	307.95
	July	15	950	3,990			
		16	940	4,211	4.100	75.38	309.06
	August	15	930	3,906			
		16	920	4,122	4.014	75.08	301.37
	September	15	910	3,822			
		15	900	3,780	3.801	74.92	284.77
	October	15	890	3,738			
		16	880	3,942	3.840	74.32	285.39
	November	15	870	3,654			
		15	860	3,612	3.633	74.18	269.50
	December	15	850	3,570			
		16	825	3,696	3.633	73.88	268.41
	January	15	800	3,360			
		16	775	3,472	3.416	74.85	255.69
	February	14	750	2,940			
		14	725	2,842	2.891	74.40	215.09
	March	15	700	3,940			
		16	650	2,912	3.426	75.00	256.95
	April	15	600	2,520			
		15	550	2,310	2.415	75.52	182.38
	May	15	500	2,100			
		16	496	2,222	2.161	76.50	165.32
Total		458	—	108,204	———	———	4,064.25
Grit[2]							17.18[3]
TOTAL FEED COST							4,081.43

Table 30. (continued)

15-months rotation period	Month	Days in half-month period	Number of layers	Mash consumption[1] Pounds	Mash consumption[1] Tons	Price of mash (dollars/ton)	Cost of mash (dollars)
Fourth	June	15	1,000	4,200			
		15	995	4,179	4.189	75.98	318.28
	July	15	990	4,158			
		16	985	4,413	4.285	75.38	323.00
	August	15	980	4,116			
		16	975	4,368	4.242	75.08	318.49
	September	15	970	4,074			
		15	960	4,032	4.053	74.92	303.65
	October	15	950	3,990			
		16	940	4,211	4.100	74.32	304.71
	November	15	930	3,906			
		15	920	3,864	3.885	74.18	288.19
	December	15	910	3,822			
		16	900	4,032	3.927	73.88	290.13
	January	15	890	3,738			
		16	880	3,942	3.840	74.85	287.42
	February	14	870	3,410			
		14	860	3,371	3.390	74.40	252.22
	March	15	850	3,570			
		16	825	3,696	3.633	75.00	272.48
	April	15	800	3,360			
		15	775	3,255	3.307	75.52	249.74
	May	15	750	3,150			
		16	725	3,248	3.199	76.50	244.72
	June	15	700	3,940			
		15	650	2,730	3.835	75.98	291.38
	July	15	600	2,520			
		16	550	2,464	2.492	75.38	187.85

Table 30. (concl.)

15-months rotation period	Month	Days in half-month period	Number of layers	Mash consumption[1] Pounds	Mash consumption[1] Tons	Price of mash (dollars/ton)	Cost of mash (dollars)
Fourth	August	15	500	2,100			
		16	496	2,222	2,161	75.08	162.25
Total		457	—	108,081	———	———	4,094.51
Grit[2]							17.18[3]
TOTAL FEED COST							4,111.69

[1] Based on 0.28 pound per layer per day.
[2] Based on 0.3 pound per 100 layers per day.
[3] To save recalculating and because actual costs for each period would differ only slightly, the cost of grit for each period for budgeting purposes was that of the first 15-months rotation period.

Table 31. The price of laying mash, by months.

Month	Seasonal Index[1]	Price[2] (dollars per ton)
January	99.8	74.85
February	99.2	74.40
March	100.0	75.00
April	100.7	75.52
May	102.0	76.50
June	101.3	75.98
July	100.5	75.38
August	100.1	75.08
September	99.9	74.92
October	99.1	74.32
November	98.9	74.18
December	98.5	73.88

[1]Average seasonal indexes were calculated by expressing actual mid-month prices paid by Kansas farmers for laying mash during the period, 1953-1957 as a percentage of a 12-month centered moving average. The resulting percentages for individual months were averaged to arrive at the seasonal index for each month. The 12 monthly average indexes were totaled and adjusted so as to average 100 percent for the year. The adjusted averages constitute the index of seasonal variation.

[2]Seasonally adjusted, based on a price of $75.00 per ton, bulk feed basis.

Table 32. Seasonal prices of eggs, by grades and sizes.

Month	Price[1]			
	A large[2]	A medium[2]	B large	C
	Cents per dozen			
January	37.3	33.2	29.1	21.6
February	38.1	34.8	32.3	24.5
March	37.3	34.6	31.5	25.3
April	35.7	32.7	29.4	24.2
May	36.0	32.6	29.8	23.8
June	35.5	31.5	27.7	22.1
July	37.8	31.5	25.8	18.6
August	40.0	31.9	26.9	17.4
September	42.9	32.5	28.5	16.5
October	42.8	30.4	29.0	16.4
November	41.4	30.5	26.3	16.2
December	39.1	32.8	28.9	18.4

[1]The 1953-57 average of monthly means of daily prices paid to producers at country points in the Kansas City market area with returns based on actual gradings, cases returned.
[2]Includes a 2.5 cent premium over the quoted market price.

Source: Kansas City Daily Drovers Telegram.

Table 33. The value of layers for inventory purposes, by age of layer.

Age of layer (months)	Value of layer[1] (dollars)	Age of layer (months)	Value of layer[1] (dollars)
6	2.25	14	1.27
7	2.13	15	1.15
8	2.01	16	1.02
9	1.89	17	.89
10	1.76	18	.77
11	1.64	19	.65
12	1.52	20	.53
13	1.39	21	.41[2]

[1]A straight line was plotted on a graph connecting the values of layers at six months of age ($2.25) and at 21 months of age when sold as culls ($.41). The values of layers at other ages were then determined readily from the graph.

[2]The value of cull layers was based on the monthly average of daily prices of light hens on the Kansas City market during 1953-57, weighted seasonally by the estimated number of hens and cocks commercially slaughtered in the United States during 1954-1957.

Sources: Kansas City Daily Drovers Telegram (for prices)
Dairy & Poultry Market News, Agricultural Marketing Service, USDA (for commercial slaughter)

CAPITAL INVESTMENT REQUIREMENTS, COSTS AND RETURNS OF THE EGG ENTERPRISE IN KANSAS UNDER ALTERNATIVE TYPES OF LAYING HOUSES (COMPLETELY-ENCLOSED AND OPEN-FRONT) AND POULTRY MANAGEMENT SYSTEMS (CAGES AND FLOOR PLANS)

by

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Objectives of this study were: (1) to determine the capital investment in laying stock, housing and equipment at 1957-58 price levels for a 1,000 bird laying flock in Kansas under alternative types of housing and poultry management practices, and (2) to prepare a budget of costs and returns for the egg enterprise for each type of house and practice.

The alternative types of management practices and laying houses were:

Cage layer systems:

40' x 50' completely-enclosed house

40' x 50' open-front house

Floor plan operations:

40' x 50' completely-enclosed house (with litter)

40' x 50' open-front house (with slatted floors)

40' x 70' open-front house (with litter)

The budgeting method was used in this study. Initial total investment in houses and equipment and the average annual investment in laying stock were determined. Costs and returns for four successive 15-month rotation periods were computed and then converted to a 12-months basis. The use of a 15-month rotation period takes into account the maximum productive life that a layer may profitably be kept in the flock.

A group of poultry husbandmen, agricultural economists, and extention agricultural engineers served in an advisory capacity. This group helped formulate certain basic assumptions underlying the study and were directly responsible for detailed budget standards relating to the technology of egg production, economic costs, and specifications on housing and equipment, respectively.

For cage layer systems, investment in housing and equipment for the

open-front house totaled $5,731 as compared with $6,961 for the enclosed house. Higher investment in the enclosed house reflects additional construction materials, more labor for carpentry and electrical work and need of a mechanical ventilation system. Investment in housing and equipment for floor plan operations ranged from $5,594 for the 40 x 70 feet open-front house to $5,828 for the enclosed house.

A larger investment in housing and equipment in the enclosed cage house than in the enclosed floor plan house was due primarily to the cage equipment and added plumbing requirements of the cage house.

Investment in housing and equipment per layer in flocks for an average 12-month period was greater for most floor plan operations than for cage systems. This investment was as follows: Floor plan operations--open-front house (slatted floors), $6.68; 40 by 70 feet open-front house, $6.77; enclosed house, $6.95; cage layer systems--open-front house, $5.73; and enclosed house, $6.69.

Total investment in laying stock in cage systems was $210 per year more than for floor plan operations and reflected a continuous replacement program to keep cages at 100 percent of capacity whereas no replacements were made in floor plan flocks during any 15-month rotation period.

Total costs per year for the egg enterprise were greater for cage layer systems than for floor plan operations. However, higher gross returns per layer and lower enterprise costs per layer resulted in a much higher net return to labor and management for cage systems.

Total returns to labor and management for each house were as follows: Cage layer systems--enclosed house, $1,144; open-front house, $1,263; floor plan operations--enclosed house, $242; open-front house (slatted floors), $241; and 40 x 70 feet open-front house, $251.

Net returns to labor and management per layer ranged from $ .29 per year for the two 40 x 50 feet floor plan houses to $1.26 for the open-front house with cage layer system.