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KANSAS STATE COLLEGE OF AGRICULTURE

AND APPLIED SCIENCE

MANHATTAN, KANSAS

A SECOND POULTRY SURVEY IN KANSAS



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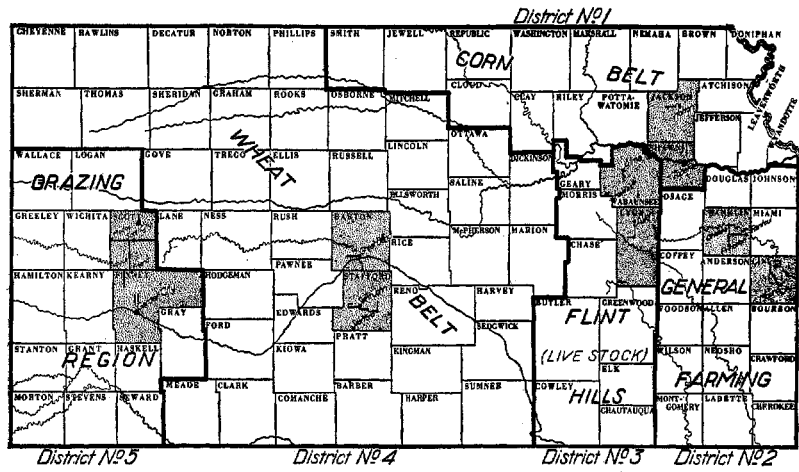


Fig. 1.—Map of Kansas showing the five districts classified according to the type of agriculture pursued; also the location of the two counties surveyed in each district. In 1926 counties with and without agricultural agents were used in each district with the exception of No. 1, where farm bureaus had been organized in both Shawnee and Jackson counties for some years. All counties surveyed in 1940 had farm bureaus.

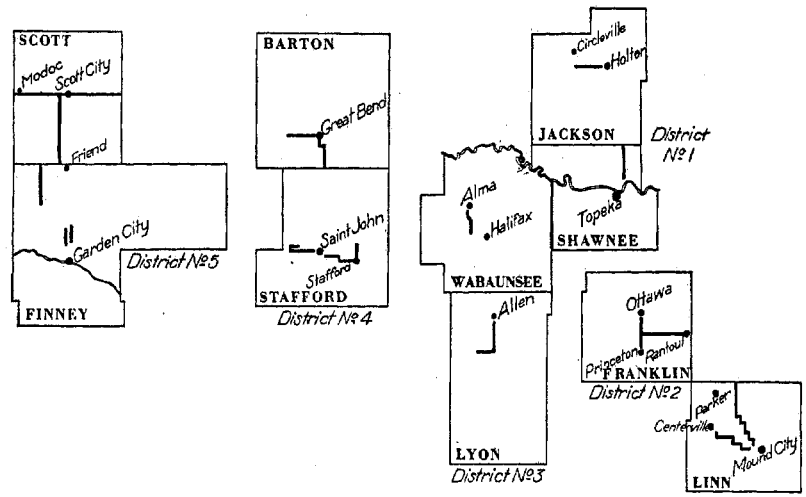


Fig. 2.—The exact territory covered in the ten counties surveyed is indicated by the heavy black lines. Main roads and sideroads were traveled in each county except Jackson, where the main road was followed. The difference in the length of the lines in the east and west portions is due to the difference in population in these sections. One had to travel many miles in the central and west portions of the state to find twenty-five farms.

A SECOND POULTRY SURVEY IN KANSAS¹

LOYAL F. PAYNE

INTRODUCTION

During the summer of 1926 a poultry survey was made of 250 representative Kansas farms. The survey included portions of ten different counties in five sections of the state, each of which represented a different type of farming. The counties surveyed were not exceptional for poultry work, but were selected as being typical of the sections covered. There were 25 farms visited in each of the 10 counties. A starting point was established in each county and from that point every farm (with a few exceptions) was visited as the surveyor traveled along the road until a total of 25 was reached. Of the 25 farmers interviewed in each county 12 lived on main traveled roads and 13 lived on side roads in all except Jackson county where all farms were on improved roads.

At that time 63 of the 105 Kansas counties had Farm Bureau organizations. Six of the counties chosen had County Agents. A member of the resident or extension poultry staff conducted the survey. A responsible person, usually the wife or the husband on the farm, was sought to answer the 95 questions designed to give an accurate picture of all phases of the poultry enterprise on each farm visited. While many of the answers were obtained by direct questions, some were by discussion, while others, such as quality of stock, evidence of disease, sanitation, types of houses, breeds and varieties present on the farm and similar questions, were observed and recorded by the surveyor. The dimensions of each poultry house were measured by the person conducting the survey.

The counties surveyed in the five districts are shown in Figure 1, and the approximate location of roads traveled in each county is shown in Figure 2.

A SECOND SURVEY

In July, 1940, a second survey was made over the same routes covered in the first survey (Fig. 2). Many of the same farms were visited, and there had been many changes in the personnel on the farms during the 14 years elapsed since the first survey.

The 1926 survey was repeated to ascertain what changes had occurred in the poultry enterprise since the last survey 14 years previous. While the state and federal statistics on poultry are good, they are of necessity limited to information obtained by correspond-

1. Contribution No. 141 from the Department of Poultry Husbandry.

Acknowledgment.—The material in this bulletin was collected with the cooperation of the Division of College Extension of Kansas State College. M. A. Seaton and E. R. Halbrook, extension poultry specialists, made the survey in districts 4 and 5. D. C. Warren and H. M. Scott of the Poultry Department, Kansas State College, surveyed districts 2 and 3 and the author obtained the information in district 1. The author gratefully acknowledges the assistance of B. B. Bohren, M. I. Darrow, M. B. Davis and E. M. Burt in calculating, checking and tabulating the results.

ence or census takers not familiar with poultry and usually they give only the number and value of poultry produced. The policy followed by the state and federal agencies in recent years of changing either the date or nature of information obtained also makes it impossible to compare poultry statistics over any long period of time.

A survey such as reported on the following pages is of value to those charged with the educational and experimental poultry work in a state since it goes much further than statistics in revealing the true conditions which prevail on the ordinary farms. A house-to-house study such as reported here gives a rather typical cross section of conditions as they exist in the areas visited. With such information at hand, those in charge of teaching, research and extension poultry work for the state have a better understanding of actual conditions which exist and should thus be in a better position to plan the future program of work more wisely than would be possible in the absence of such information,

The questions used in 1926 were repeated in the 1940 survey and a number of new ones added, making a total of 116 questions which will be found in the appendix. The added questions cover situations which did not exist in 1926.

A detailed report of the information obtained, accompanied by a discussion of each main heading considered, is given in Tables 1 to 13, inclusive. After the information obtained on the survey is presented for each phase of work covered the present practices as recommended by the Department of Poultry Husbandry, Kansas State College, are given. In handling figures, decimals are used in the tables while whole numbers are used in most instances in the manuscript. Where the fraction is 0.5 or more one is added, if it is 0.4 or less it is dropped.

INFORMATION OBTAINED ON THE SURVEY

TYPES OF FARMS VISITED

An attempt was made to classify the farms visited according to the major enterprise followed on each farm. A farmer who kept 400 or more mature chickens was classed as a poultry farmer. Such a classification for commodities other than poultry can be only suggestive and should not be taken too literally as many farmers carry several enterprises which obviously precludes accurate groupings into specific classes.

While the number of farms visited (250) is small in proportion to the total number in the state, it was felt that the method of selection used was fairly representative of the state and to that end would give a general idea of conditions and practices actually used at the time the study was made.

The results are presented in tables by districts for 1940 and for the entire state for 1940 and 1926.

The type, tenancy and size of farm on the 250 farms visited on the survey is shown in Table 1. It will be noted that general farm-



FIG. 3.—One of the few remaining semimonitor poultry houses as it appeared in 1926. The lower picture shows the same house in 1940. Note that the upper windows were removed and the front was boarded up. The windows were used to close the lower open front. This house, located in District 3, was built in 1923.

TABLE 1.—Types of farms visited

	District 1		District 2		District 3		District 4		District 5		All farms.				
	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	1940.		1926.		
											Num-ber.	Per-cent.	Num-ber.	Per-cent.	
Type of Farming Practiced (a):															
General	47	94	50	100	34	68	20	40	19	38	170	68	141	56	
Grain	2	4			7	14	26	52	24	48	59	24	58	23	
Livestock					7	14	3	6	1	2	11	5	23	9	
Poultry					1	2	1	2			3	1	9	4	
Dairy					1	2			5	10	6	2	8	3	
Fruit													4	2	
Hay													4	2	
Market gardening	1	2									1	0	3	1	
Totals	50	100	50	100	50	100	50	100	50	100	250	100	250	100	
Tenancy (b):															
Farms owned	30	64	19	40	32	64	35	73	25	52	141	58	160	64	
Farms rented	17	36	29	60	17	34	13	27	22	46	98	41	87	35	
Farms leased					1	2			1	2	2	1	3	1	
Size of Farms (c):															
Largest farm	350		480		560		694		5,120		5,120		30,000		
Smallest farm	2		10		40		20		10		2		1		
Average of all farms	108		154		181		255		544		249		212		

ing predominates in Districts 1 and 2, while Districts 3, 4 and 5 include grain, livestock, dairying and some poultry in addition to general farming. Fruit and hay, which had a place in the 1926 survey, were not reported as commercial enterprises in 1940. Market gardening was found on only three farms. District 3, which includes the bluestem region, still maintains its lead over other districts in livestock production. However, for all districts the percentage of livestock farms declined from 9 to 5, grain farming remained about the same, while general farming increased from 56 to 69 percent from 1926 to 1940. It is interesting to note that the type of farming became more diversified as one traveled west from District 3. The reverse was true in 1926. Specialized farming prevailed in central and western Kansas and diversified farming was found in eastern Kansas, particularly in Districts 1 and 2. The fact that dairy production prevailed on 12 percent of the farms visited in District 5, whereas there were none in 1926, is revealing. One commercial poultry farm was reported in each of Districts 3, 4 and 5.

The percentage of farms owned by operators declined from 64 to 58.

The size of farms increased from 212 to 249 acres over the 14-year period. The range in size was from 2 acres for the smallest to 5,120 acres for the largest. The average size of farm in the federal census for 1940 was 308 acres. Of interest to poultrymen is the relation of size to number of farms in the state. As the number of farms increases, the poultry population increases, and conversely if the size of the farms continues to increase and the number of farms decreases, the poultry population is apt to decrease. The farms increased in size from east to west. The average number of acres reported per farm was 108, 154, 181, 255 and 544 for Districts 1 to 5 respectively. For the same districts in 1926 the size of farms averaged 96, 143, 234, 221 and 368 acres.

NUMBER, DISTRIBUTION AND QUALITY OF STOCK

The average number of chickens per farm November 1, 1939, was 125 compared with 183 on the same date in 1926 (Table 2a). This number diminished rapidly to an average of 91 on April 1 and 76 on July 1, 1940. Numbers for the last two dates were not obtained on the first survey.

TABLE 2.—Number, distribution and quality of stock

	District 1	District 2	District 3	District 4	District 5	All farms.						
						1940.	1926.					
Chickens (a):												
Average Size of Flocks (Nov. 1, 1939)												
Number of pullets.....	71	71	51	73	77	68	99					
Number of hens.....	34	51	115	30	32	53	77					
Number of males.....	9	6	1	4	2	4	6					
Number of capons.....	0	0	0	0	0	0	1					
Totals.....	112	127	167	107	111	125	183					
(April 1, 1940)												
Number of hens.....	78	85	120	36	85	89	.....				
Number of males.....	3	0.3	1	3	2	2	.....				
Totals.....	81	85	121	39	87	91	.....				
(July 1, 1940)												
Number of hens and pullets.....	67	76	110	56	65	75	.....				
Number of males.....	2	0.3	1	2	1	1	.....				
Totals.....	69	76	111	58	66	76	.....				
Size of Flocks (Nov. 1, 1939) (b)												
	Farms.		Farms.		Farms.		Farms.		Farms.		Farms.	
	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.
50 and under.....	10	20	7	14	7	14	16	32	13	26	53	21
51 - 150.....	23	46	27	54	14	28	19	38	25	50	108	43
151 - 250.....	16	32	16	32	20	40	12	24	10	20	74	30
251 - 350.....	1	2	8	16	2	4	1	2	12	5
400 and over.....	1	2	1	2	1	2	3	1
Totals.....	50	100	50	100	50	100	50	100	50	100	250	100

TABLE 2.—Continued

	District 1		District 2		District 3		District 4		District 5		All farms.			
	Farms.		Farms.		Farms.		Farms.		Farms.		1940.		1926.	
	Number.	Per-cent.	Number.	Per-cent.	Number.	Per-cent.	Number.	Per-cent.	Number.	Per-cent.	Number.	Per-cent.	Number.	Per-cent.
Distribution of Large Flocks (Nov. 1, 1939) (c)														
200 - 249.....	4	8	9	18	11	22	6	12	4	8	34	14	.....	.....
250 - 299.....	1	2	.....	.....	4	8	1	2	1	2	7	3	.....	.....
300.....	.....	.....	.....	.....	4	8	1	2	.....	.....	5	2	.....	.....
301 and over.....	.....	.....	.....	.....	2	4	.....	.....	1	2	3	1	.....	.....
Totals.....	5	10	9	18	21	42	8	16	6	12	49	20	.....	.....
Quality of Flocks (d)														
Good.....	24	50	14	32	16	31	13	28	10	24	77	34	36	14
Medium.....	23	48	25	57	25	56	24	52	21	50	118	52	98	39
Poor.....	1	2	5	11	6	13	9	20	11	26	32	13	116	46
Frequency of breeds and varieties (e)														
White Leghorn.....	24	48	21	42	27	54	25	50	20	40	117	46.8	67	26.8
White Plymouth Rock.....	11	22	17	34	15	30	11	22	15	30	69	27.6	12	4.8
Rhode Island Red.....	17	34	1	2	9	18	11	22	10	20	48	19.2	67	26.8
Buff Orpington.....	8	16	3	6	.....	.....	8	16	9	18	28	11.2	29	11.6
New Hampshire.....	4	8	.....	.....	4	8	12	24	.....	.....	20	8.0	.....	.....
Barred Plymouth Rock.....	8	16	2	4	1	2	3	6	2	4	16	6.4	34	13.6
White Wyandottes.....	3	6	3	6	.....	.....	.....	.....	6	12	12	4.8	20	8.0
Buff Plymouth Rock.....	3	6	1	2	.....	.....	2	4	.....	.....	6	2.4	3	1.2
Bantams.....	6	12	.....	.....	.....	.....	.....	.....	.....	.....	6	2.4	.....	.....
Jersey White Giants.....	2	4	1	2	.....	.....	.....	.....	.....	.....	3	1.2	.....	.....
Brown Leghorn.....	1	2	1	2	.....	.....	.....	.....	1	2	3	1.2	8	3.2
Anconas.....	1	2	1	2	.....	.....	.....	.....	.....	.....	2	.8	10	4.0
White Minorcas.....	1	2	.....	.....	1	2	.....	.....	.....	.....	2	.8	2	.8
Speckled Sussex.....	1	2	.....	.....	.....	.....	.....	.....	.....	.....	1	.4	.....	.....
White Langshan.....	1	2	.....	.....	.....	.....	.....	.....	.....	.....	1	.4	.....	.....

TABLE 2.—*Concluded*

	District 1		District 2		District 3		District 4		District 5		All farms.			
	Farms.		Farms.		Farms.		Farms.		Farms.		1940.		1920.	
	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.
<i>Frequency of breeds and varieties—Concluded</i>														
Buff Minorca					1	2					1	.4	2	.8
Rhode Island White							1	2		1	.4	11	4.4	
Crossbreds	8	16	2	4	21	42	4	8	2	4	37	14.8	40	16.0
Mongrel	1	2	8	16	3	6	2	4	2	4	16	6.4	58	23.2
Buff Leghorn													7	2.8
Buff Wyandottes													3	1.2
Black Minorca													1	.4
Light Brahma													1	.4
Silver Campine													1	.4
Silver Laced Wyandotte													1	.4
White Orpington													1	.4
Totals	100	*	61	*	82	*	79	*	67	*	389	*	378	*
<i>Poultry Other than Chickens (f)</i>														
Turkeys	2	4	6	12	3	6	4	8	16	32	31	12.4	31	12.4
Geese	2	4	3	6	3	6	1	2	0	0	9	3.6	28	11.2
Ducks	6	12	2	4	2	4	1	2	2	4	12	4.8	24	9.6
Guineas	8	16	3	6	0	0	5	10	2	4	18	7.2	14	5.6
Totals	18	36	14	28	8	16	11	22	20	40	70	28.0	97	38.8

* These columns will not total 100 percent as many farms kept more than one breed of poultry and the percents are based on the number of farms visited.

November 1 probably represents the date of maximum adult chickens on the farm and the minimum number would be during the middle or late summer. A seasonal decline from November to July is expected. The extent of the decline is determined somewhat by the market price of poultry products during that period. If egg prices are good and feed is plentiful, a larger percentage of the laying flock will be retained. These conditions were not favorable during the spring of 1940, hence the above reduction in size of flocks is probably greater than the average over a period of years. The ratio of pullets and hens, 1 to 1.3, is not far from the 1:1 that is recommended. Some producers keep an equal number while others advocate two pullets to one hen where the production of market eggs is the main objective. For the April and July reports all females were recorded as hens.

Poultry raising and livestock production apparently go together since District 3 showed the largest average having 167 birds per farm, and also led in livestock production. It was also high in 1926 with an average of 273 birds per farm. District 4 showed the smallest number on both surveys. It will be noted, however, that District 5 in southwest Kansas averaged 112 compared with 112 for District 1 in northeast Kansas. The respective figures for 1926 showed 137 for 5 and 179 for 1. This difference of 42 birds per farm or 23 percent for the two districts in the first survey had practically disappeared in 1940. This and later evidence as shown in Figure 11, page 56, indicates a definite shifting of poultry population from the eastern to the western part of the state. This maybe a temporary situation due to crop failures in the corn producing section of the state.

Not a capon was reported on any of the 250 farms in the survey. There was an average of 3 per farm in District 3 in 1926. Few farmers, if any, in Kansas produce large numbers of capons consistently over a period of years as is done with turkeys, ducks and occasionally geese. Amateurs for the most part attempt to produce capons for a year or two, then give it up, probably because of the large number of slips and failure to attain the enormous size reported in advertisements. Good profits can be made raising capons by those who understand the business and follow it consistently as a major enterprise.

It is encouraging to note the marked increase in the quality of flocks for the surveys (Table 2b). Those flocks classified as being of good quality were reported on only 14 percent of the farms in 1926 and 34 percent in 1940. With fewer birds per farm, apparently there was more house room and more feed per bird, hence the evils of overcrowding and scanty foraging were partly overcome. District 1 led with half the flocks being classed as good quality. In the first survey 46 percent of the flocks were listed as of poor quality while only 14 percent were so listed in 1940.

FREQUENCY OF BREEDS AND VARIETIES

The shifting in popularity of varieties of poultry kept was perhaps one of the most significant changes during the 14-year period (Table 2c). White Leghorns and Rhode Island Reds tied for first place in 1926, each being found on 26.8 percent of the farms. In the recent study White Leghorns ranked first with 46.8 percent. White Plymouth Rocks increased from 4.8 to 27.6 percent for second place while Rhode Island Reds decreased from 26.8 to 19.2 percent for third place. The White Leghorns led by a large majority in each of the five districts. The Rhode Island Reds led the White Rocks in District 1 and tied in District 4. The New Hampshire, a variety developed since 1926 and closely related to the Rhode Island Reds, was found on 20 (8 percent) of the farms reporting for the state as a whole and on 24 percent of the farms in District 4.

The increase in New Hampshires may be attributed to a hatchery in Great Bend which has been active in promoting the variety the last few years. It will be noted that Barred Plymouth Rocks and White Wyandottes, once quite popular, are decreasing. Crossbreds remained about the same, but there was a marked decrease in the number of mongrels found. District 2 still ranks last in number of standard-bred flocks kept. The percentage of mongrel flocks was 16 at the time of the last study and 40 for the first survey. There is much to be desired in the further reduction of mongrel flocks in District 2.

The 25 different varieties found is far too many if a quality egg and poultry program is to make headway in Kansas. Uniformity of products is impossible where so many varieties exist. There is a strong sentiment among the leading hatcherymen and poultry packers that four or five varieties of chickens are sufficient for all practical purposes. It is encouraging to note that of the 25 varieties listed, the first five in Table 2c constitute 72 percent of the total.

A rather large increase in the number of farms keeping turkeys was expected, but this did not materialize. Perhaps the data are not typical of specialized enterprises such as turkey production, or it might mean that the increase from a few hundred thousand in 1926 to approximately a million for the state in 1940 is the result of increased size of turkey flocks rather than an increase in number of flocks. This is as it should be. The production of high quality turkeys is a task for specialists. Unless several hundred are produced in a flock they do not receive the care essential for best results.

The production of ducks and geese decreased while guineas showed a small gain.

It is recommended that a larger number of farmers who are successful with poultry keep a flock of 300 hens as one of the major farm enterprises and those who are not especially interested in poultry production reduce the size of their flocks to about 30 which would be sufficient to provide home needs. This recommendation was made by the Kansas Poultry Industry Council in the belief that

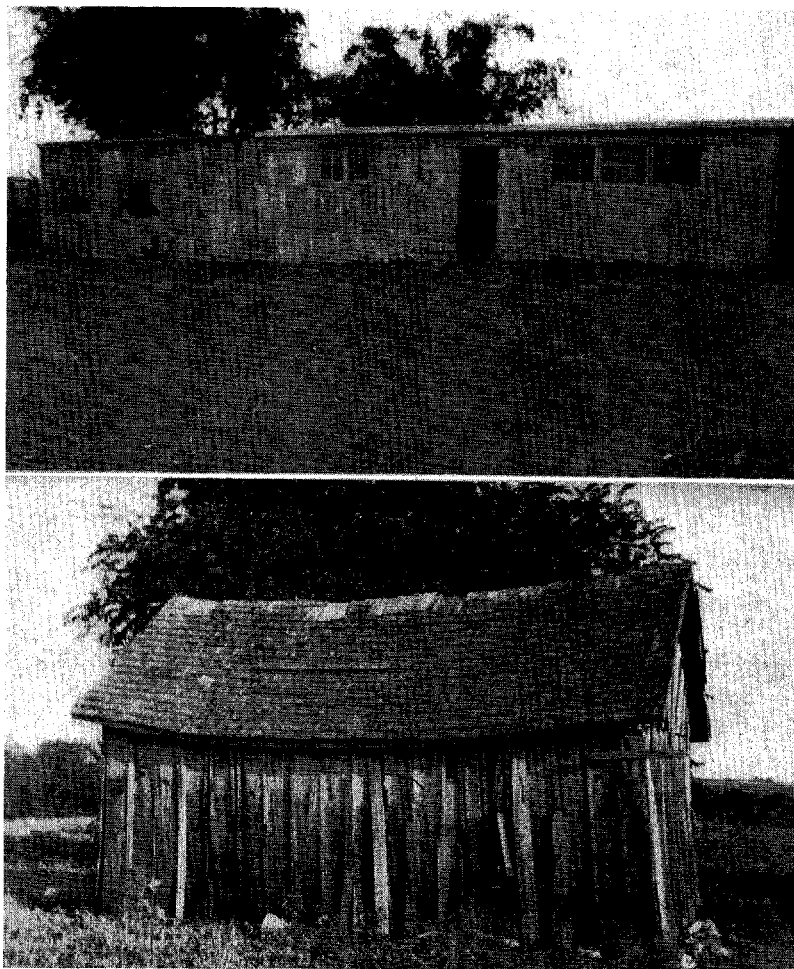


FIG. 4.—(Top) A 12' by 54' laying house in District 1. It was built in 1915. (Lower) A house built of native lumber more than fifty years ago and is in a bad state of repair. The tenants had been unsuccessful in persuading the owner, who lived in another state, to have it improved or a new one built.

TABLE 3.—Housing conditions

	District 1		District 2		District 3		District 4		District 5		All farms			
	1919		1920		1922		1929		1931		1940.		1926.	
	1919		1920		1922		1929		1931		1924		1912	
Average year houses were built.....	1919		1920		1922		1929		1931		1924		1912	
Size of houses:	409 sq. ft.		510 sq. ft.		474 sq. ft.		401 sq. ft.		376 sq. ft.		421 sq. ft.		403 sq. ft.	
Average floor space of hen house.....	2.3 sq. ft.		4.0 sq. ft.		2.8 sq. ft.		3.7 sq. ft.		3.4 sq. ft.		3.1 sq. ft.		2.2 sq. ft.	
Average floor space per bird.....	2.3 sq. ft.		4.0 sq. ft.		2.8 sq. ft.		3.7 sq. ft.		3.4 sq. ft.		3.1 sq. ft.		2.2 sq. ft.	
	Farms.		Farms.		Farms.		Farms.		Farms.		Farms.		Farms.	
	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.
Sufficient floor space for size of flock.....	26	52	23	46	19	39	27	60	20	44	115	48.7	80	32.0
Farms using droppings boards.....	18	38	12	24	22	46	20	41	17	36	89	37.0	44	17.6
Farms using droppings pits.....	3	6	0	0	0	0	2	4	0	0	5	2.1		
Farms using dust baths.....	19	59	30	61	17	35	4	8	0	0	70	31.3	157	62.8
Farms using feed hoppers.....	27	56	23	47	39	81	34	72	24	55	147	62.3	94	37.6
Farms having satisfactory housing conditions.....	16	38	20	41	27	55	17	35	13	29	93	39.8	45	18.0

much better quality eggs will be produced on the farms maintaining larger flocks.

Table 2e shows that 21 percent of the farms had 50 or fewer mature chickens, 43 percent reported 51 to 150, while 30 percent contained 151 to 250. Only 5 percent came within the 251 to 350 bracket and 3 farms or 1 percent had 400 or more and were classified as commercial. The largest flock was 600, located in District 5.

The distribution by districts of the larger flocks is shown in Table 2f. It shows that 49 farms or about 20 percent of all surveyed kept flocks of 200 or more birds. The majority of the large flocks were in District 3. Only 5 farms reported 300 chickens. This number is recommended as being well adapted to farms where poultry is to constitute one of the important enterprises on the farm.

HOUSING CONDITIONS

The popularity of poultry during the 1920's resulted in overcrowded conditions in the poultry houses on many farms. This led to insanitary quarters, reduced egg production and lowered quality of stock. With approximately the same housing facilities in 1940, but with fewer birds per farm, conditions in the poultry house were less congested. This resulted in better quality stock, less mortality and higher egg production per bird. Adequate housing space, $3\frac{1}{2}$ to 4 square feet of floor space per bird, is essential to high production.

As further evidence of the increased interest in poultry production in central and western Kansas, it will be noted in Table 3 that the average year the houses were built was 1929 and 1931 for Districts 4 and 5, respectively, while those in the other three districts were constructed seven to twelve years earlier. Age in construction is no drawback, provided the houses have been kept in good repair. Too often the older houses are not repaired nor do they include many new features which have been found essential for best results. A few houses were found which the owner claimed had been built for 50 years. In all such cases they were in a poor state of repair. (Fig. 4.)

The increase from 2.2 to 3.1 square feet of floor space per bird for all farms shows an approach to the ideal requirement of 4 square feet reported in District 2 or it may be the result of a number of vacant houses found. Districts 1 and 3 still show a crowded condition in laying houses. There was sufficient floor space for size of flock on about one-half of the farms visited. This was a marked improvement over the previous survey when less than one-third of the flocks had adequate room.

The number of poultry houses in which droppings boards had been installed had more than doubled during the past 14 years. Droppings pits, which were not in use in 1926, were found on 2 percent of the farms in 1940. They were in use in Districts 1 and 4 and not in the others. The desire to use droppings pits as a substitute for droppings boards recurs about once in each generation. The Romans used the pits and we hear of them periodically down through

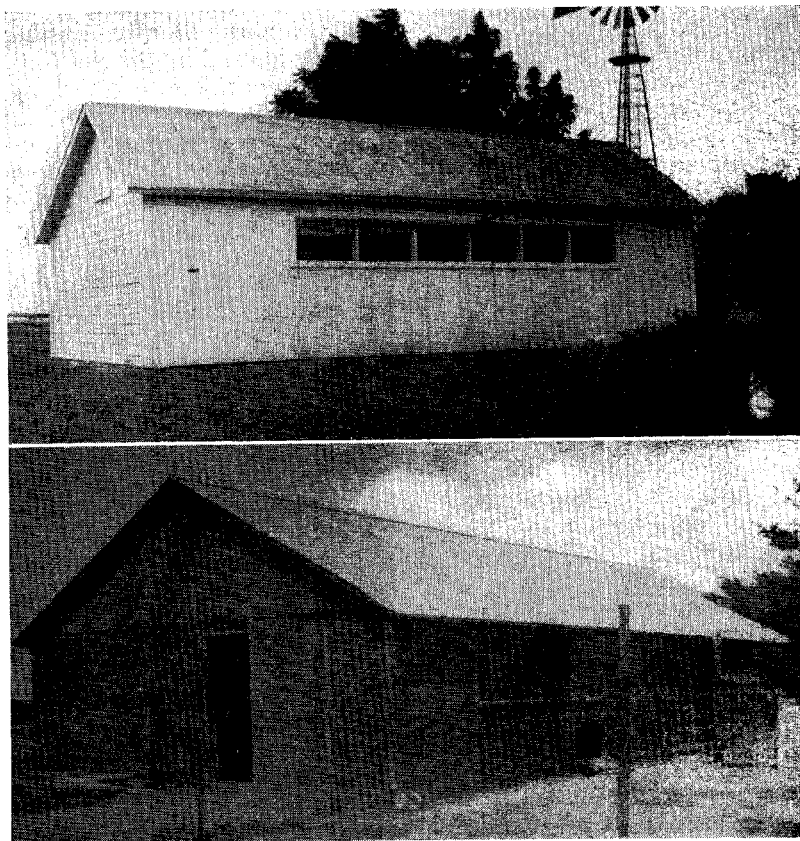


FIG. 5.—(Top) This 15' by 30' open front straw loft house was located on a rented farm in District 1. Note the galvanized iron roof. (Lower) An adobe block house in Scott county, District 5. The iron roofs on both houses are in good condition. Iron is one of the most satisfactory materials for covering a poultry house provided some form of insulation or the free circulation of air is provided for.

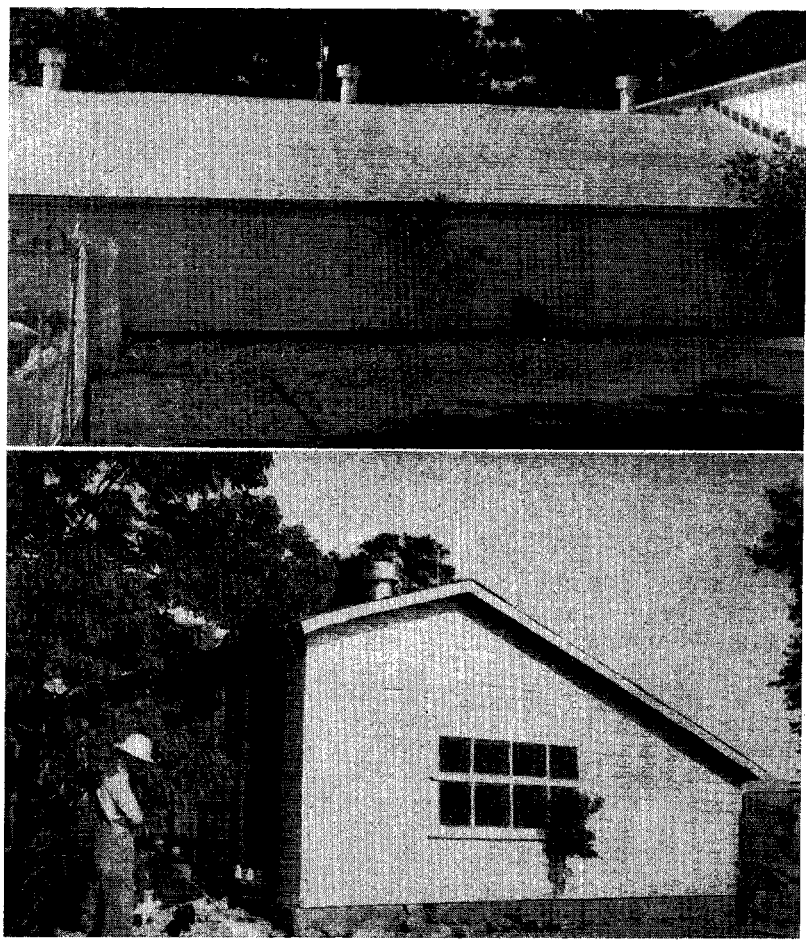


FIG. 6.—Two views of a poultry house with walls and roof covered with automobile tags. The surplus tags were obtained in Topeka and they give a unique appearance and proved quite satisfactory for enclosing the building.

the ages. At present their use is being advocated by some producers and a few educators.

The use of dust baths in the laying house is an outmoded idea which declined one-half or from 63 to 31 percent. Feed hoppers increased from 38 to 62 percent. This indicates the adoption of improved methods and more sanitary feeding conditions which should result in fewer intestinal infections.

An increase from 18 to 40 percent in the proportion of houses being satisfactory in all conditions indicates definite progress.

HOUSE CONSTRUCTION

Further information on the types of poultry houses used, material for construction of same and other details of general interest are given in Table 4.

The open front house for laying hens is recommended. The amount of open space may vary from one-fourth to one-third of the area of the front wall. To put it another way, 1 square foot of open front should be provided for each 10 square feet of floor space.

It will be noted that 67 percent of the houses visited provided open fronts ranging from less than one-fifth to two-thirds or more of the front wall area compared with 53 percent in this bracket in 1926. The fact that 67 percent provided some openings in the fronts of the houses is encouraging. District 1 led all others with 81 percent open front houses.

The shed roof house still leads in popularity with the gable roof a fairly close second. The semimonitor is still more popular than its efficiency justifies. It might well be replaced with the uneven span where the gable type is not satisfactory.

As for roofing material, shingles rank first with 54 percent or an increase of 8 percent since 1926. Sheet iron shows the most rapid increase in popularity. It was used on 24 percent of the farms or three times the number used formerly. It is advisable to use iron roofs over straw lofts or other insulation material or where there is free circulation of air underneath to avoid excessive heat during the summer.

The use of straw lofts has been quite generally accepted during the last 14 years. Whereas formerly less than 2 percent were found in use, in 1940 20 percent were recorded. Other materials such as boards, fodder, plaster, etc., were used only occasionally. Once poultry producers recognize the added comfort to the hens resulting from the use of a straw loft and realize it is not a harboring place for sparrows, rats, mice and mites, where properly constructed, it is not likely they will be without it.

Dirt floors still prevailed in 165 houses or on two-thirds of the farms. Concrete and wood followed in the order named. Since good floors are expensive, if funds are limited, it is better to construct a satisfactory laying house without a floor than to postpone building until one can afford a complete house. The floor can be added at

TABLE 4.—House construction

	District 1		District 2		District 3		District 4		District 5		All farms.			
	Farms.		Farms.		Farms.		Farms.		Farms.		1940.		1926.	
	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.
Types of Fronts (a)														
Open two-thirds or more of front area.....	1	2.5	1	2.7	2	6.7					4	2.5	3	1.2
Open one-half of front area.....	3	7.6	2	5.4	6	20.0			2	6.5	13	8.0	13	5.2
Open one-third of front area.....	10	25.6	3	8.1	6	20.0	13	50.0	15	48.4	47	28.8	39	15.6
Open one-fourth of front area.....	5	12.8	10	27.0	1	3.3	5	19.2	5	16.1	26	16.0	21	8.4
Open one-fifth of front area.....	9	23.6	12	32.4	8	26.7	7	26.9	3	9.7	39	23.9	32	12.8
Open less than one-fifth of front area.....	11	28.2	9	24.3	7	23.3	1	3.8	6	19.4	34	20.9	25	10.0
Total open front houses.....	39	81	37	74	30	63	26	53	31	66	163	67.4	133	53.2
Types of Roofs (b)														
Shed.....	24	47	32	70	13	27	19	41	28	61	116	48.8	126	50.4
Gable.....	14	27	10	22	21	44	22	47	16	35	83	34.9	91	36.4
Semi-monitor.....	5	10	4	8	6	12	3	6	2	4	20	8.4	12	4.8
Uneven span.....	8	16			8	17	3	6			19	8.0	19	7.6
Monitor.....													1	.4
Totals.....	51	100	46	100	48	100	47	100	46	100	238	100	249*	99.6*
Roofing Material (c)														
Shingles.....	23	46	21	42	36	71	29	63	23	48	132	54.1	114	45.6
Sheet iron and car tags.....	9	18	20	40	8	15	10	22	12	26	59	24.2	21	8.4
Roofing paper.....	17	34	9	18	7	14	7	15	12	26	52	21.3	70	28.0
Uncovered boards.....	1	2										.4	40	16.0
Straw.....													4	1.6
Totals.....	50	100	50	100	51	100	46	100	47	100	244	100	249*	99.6*

TABLE 4.—*Concluded*

	District 1		District 2		District 3		District 4		District 5		All farms.			
	Farms.		Farms.		Farms.		Farms.		Farms.		1940.		1926.	
	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.
Types of Lofts (d)														
Straw.....	12	26	3	6	7	15	15	31	11	23	48	19.9	4	1.6
Boards.....	3	6			2	4			1	2	6	2.4	4	1.6
Fodder.....	1	2									1	.4	No record	
Plaster.....					1	2					1	.4	No record	
Card board.....					1	2					1	.4	No record	
Insulating.....							1	2			1	.4	No record	
Types of Floors (e)														
Dirt.....	32	67	38	74	34	67	30	61	31	66	165	65.7	196	78.4
Concrete.....	16	33	9	18	16	31	16	33	15	32	72	28.7	37	14.8
Wood.....	4	8	4	8	1	2	3	6	1	2	13	5.2	14	5.6
Tile.....	1	2									1	.4	1	.4
Stone.....													1	.4
Totals.....	53	100	51	100	51	100	49	100	47	100	251	100	249*	99.6*
Types of Wall Construction (f)														
Wood.....	46	98	47	100	43	79	40	89	40	78	216	88.6	236	94.4
Stone.....						11						2.5	1	.4
Sheet iron.....	1	2			2	4	3	7			6	2.5	3	1.2
Tile.....					2	4	2	4			4	2.0	2	.8
Adobe.....											4	1.6		
Stucco.....											4	1.6		
Concrete.....					1	2			2	4	5	1.2	4	1.6
Wood and stone.....													2	.8
Straw or fodder.....													1	.4
Totals.....	47	100	47	100	54	100	45	100	51	100	244	100	249*	99.6*

* One farm in district No. 1 had a flock of chickens, but did not have a poultry house.

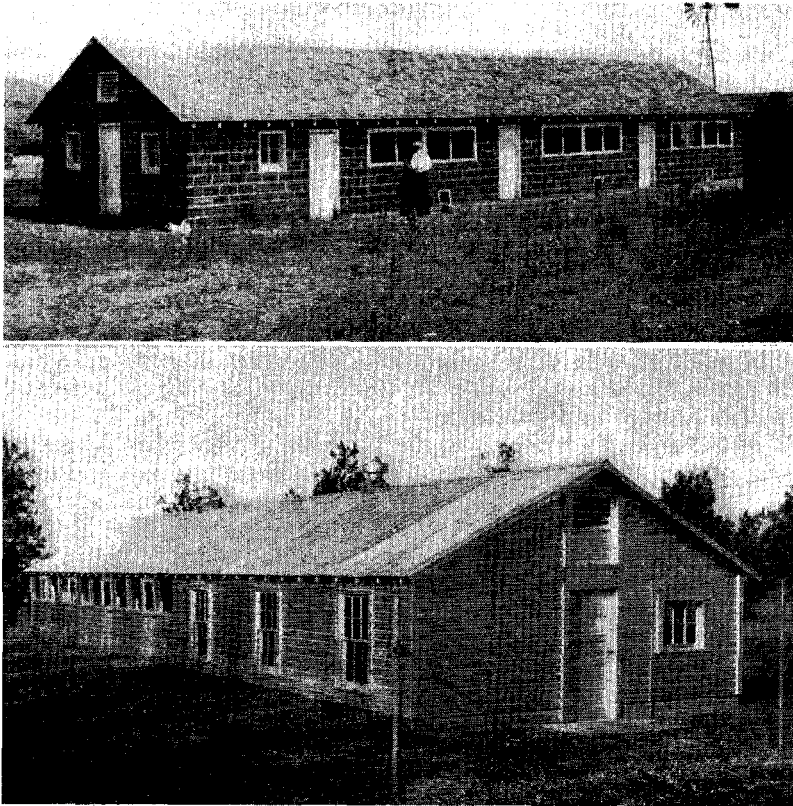


FIG. 7.—(Top) The Kansas type open front, straw loft laying house for 300 hens. It may be built of wood or tile. There are three rooms, each 20 feet square, and a service room 10' by 20' at the left end for mixing and storing feed and supplies. (Lower) A straw loft house similar in size but of wood construction. The roof is of galvanized iron and has no sheathing except 1" by 4" pieces placed 2 feet on center to which the sheet iron is nailed.

some future time. The floor should not be neglected because it is made of dirt. The upper three inches should be removed once a year and replaced with clean gravel. Where gravel is not available, remove the upper surface of dirt floor and use crank case oil to saturate the ground. This discourages vermin and keeps down the dust. Four to six inches of litter should be used on all types of floors.

Hollow tile 3" by 12" by 12" laid on well-tamped earth and covered with 1 inch of concrete makes an ideal floor. Where tile is expensive a 3-inch concrete floor is second choice. For wall construction wood was employed in about 89 percent of the cases.

INCUBATION

Perhaps more change has come about in incubation than any other branch of the poultry industry. A rapidly increasing percentage of farmers have quit hatching chicks in small farm incubators and go to commercial hatcheries for them. Table 5 shows that only 33 percent of the chicks raised were hatched on the farm in 1940 whereas about 85 percent followed this practice in 1926. The largest percentage of chicks hatched on farms was in District 2. Many who do not hatch chicks at home take the eggs to the hatchery where they are custom hatched. The number following this practice increased from 2 to 15 percent for all farms while the chicks bought increased from 13 to 52 percent. In other words 67 percent of the chicks reared were from commercial hatcheries in 1940 as against 15 percent 14 years previous. In District 5 practically 80 percent of the chicks were from hatcheries.

Of those chicks hatched on the farm, 29 percent were by setting hens. More than half were hatched by artificial methods and about 14 percent used both methods. This is in marked contrast to the results found during the first survey when 56 percent used hens and 20 percent used small incubators. These incubators were in more general use in District 3 the past season than elsewhere.

For all farms 57 percent purchased baby chicks and 16 percent had eggs from their farms custom hatched while 11 percent bought sexed chicks, that is, all pullets or all cockerels (Table 5c). A total of the first two figures indicates that 73 percent of the farmers patronized commercial hatcheries in 1940 while only 18 percent went to this source for chicks in 1926.

The average incubator capacity for farms having incubators dropped from 308 to 276 eggs per incubator and for all farms from 137 to 39 eggs.

Dependence upon commercial hatcheries is a natural development in this era of specialization. A hatchery operator is a specialist in his field. He spends half the year hatching and selling chicks and much of the remainder of his time is devoted to selecting, blood testing and improving the flocks which supply the hatching eggs.

TABLE 5.—Incubation

	District 1		District 2		District 3		District 4		District 5		All farms.			
											1940.		1926.	
	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.
Baby Chick Population (1940) per Farm (a)														
Average number of chicks hatched on the farm.....	59	33.0	99	46.7	101	34.8	76	27.7	36	20.5	74	32.8	362	84.6
Average number of chicks bought.....	92	51.4	84	39.6	146	50.4	140	51.1	128	72.7	118	52.2	56	13.1
Average number of chicks custom hatched.....	28	15.6	29	13.7	43	14.8	58	21.2	12	6.8	34	15.0	10	2.3
Total average number of chicks.....	179	100.0	212	100.0	290	100.0	274	100.0	176	100.0	226	100.0	428	100.0
	Farms.		Farms.		Farms.		Farms.		Farms.		Farms.		Farms.	
	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.
Methods of Incubation (b)														
Natural.....	21	57	12	27	10	20	9	20	10	24	62	28.7	139	55.6
Artificial.....	7	19	27	60	35	72	30	68	25	62	124	57.4	49	19.6
Both.....	9	24	6	13	4	8	5	12	6	14	30	13.9	62	24.8
Totals.....	37	100	45	100	49	100	44	100	41	100	216	100.0	250	100.0
Procurement of Baby Chicks (c)														
Farms buying baby chicks.....	28	56	21	42	32	64	31	62	31	62	143	57.0	36	14.4
Farms having eggs custom hatched.....	9	24	8	21	8	17	7	17	1	3	33	16.3	10	4.0
Farms buying sexed chicks.....	1	3	4	10	5	11	7	16	5	13	22	11.0		
Farms selling baby chicks.....			12	27							12	5.2	10	4.0
Farms having incubators.....	9	3.6*	7	2.8*	16	6.4*	2	.8*	1	.4*	35	14.0*	101	40.4*
	Egg capacity.		Egg capacity.		Egg capacity.		Egg capacity.		Egg capacity.		Egg capacity.		Egg capacity.	
Average Incubator Capacity (d)														
For farms owning incubators.....	284		263		295		155		230		276		308	
For all farms.....	51		37		94		6		5		39		137	

* These columns will not total 100 percent as more than one method was used on many farms to procure chicks, and the percents are based on the number of farms visited.

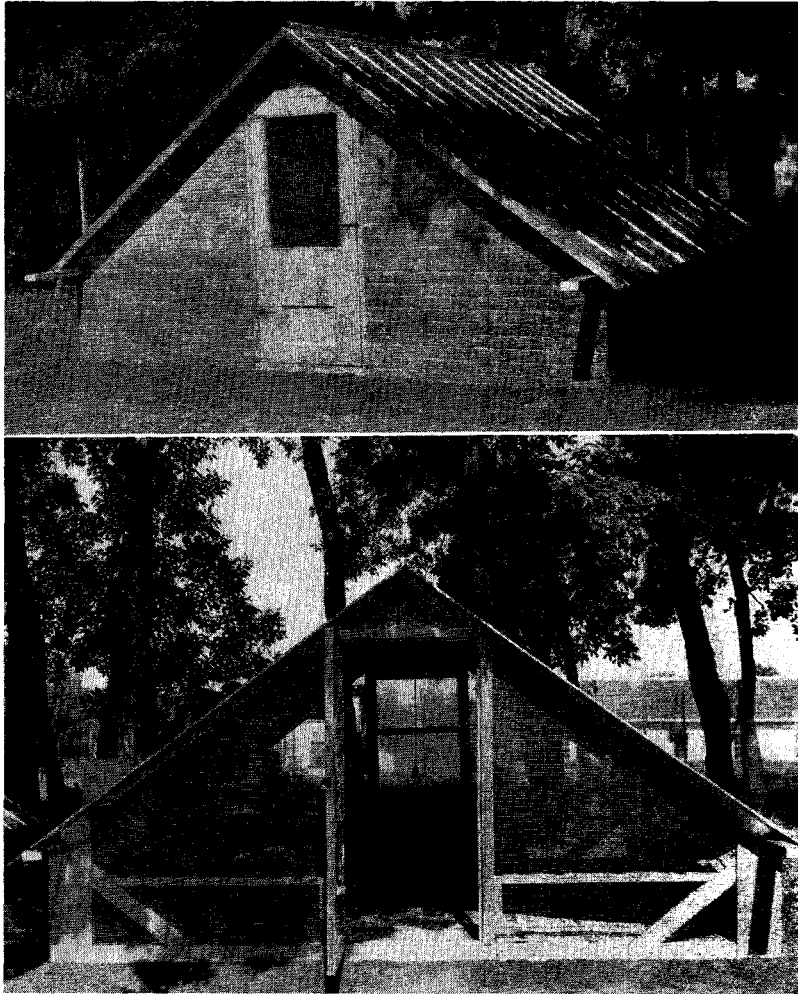


FIG. 8.—A combination brooding and rearing house covered with galvanized iron. The view above shows the house when used for brooding. Below, the panels in front and rear have been removed for rearing chicks until mature. The floor is covered with $\frac{3}{4}$ -inch hardware cloth. With the free circulation of air through the house the chickens do not appear to suffer more from heat in midsummer than in houses constructed of wood.

BROODING LOSSES

The first comparison in Table 6 is to note that 20 percent of the chicks brooded by hens were lost the first 10 weeks compared with 10 percent by artificial methods. The second comparison of interest is between results by the two methods in 1940 and 1926. The losses were 7.6 percent less by natural brooding and 20.6 percent less by artificial brooding. A part of this difference might be credited to the smaller number of chicks reared per farm by natural methods in 1926. However, this would not explain the improvement by artificial methods since a much larger number was brooded by the latter method in 1940 than in 1926. It probably means that farmers have better equipment, know more about operating artificial brooders and give them better care than was the case during the middle twenties.

While the losses from all methods of brooding chicks to 10 weeks of age is still high (Table 6c), it shows marked improvement during the past 14 years. If this loss can be reduced another 7 percent during the next 10 to 15 years, it will be about as low as can be expected under the circumstances. The widespread interest among hatchery operators in eradicating pullorum disease by means of the agglutination test has probably contributed more to the reduction of chick mortality than any other one practice. Further proof of this is comparatively high mortality of 20 percent by natural brooding and only 10 percent by artificial brooding. Those who brood with hens do not as a rule have their flocks tested for pullorum while many who brood artificially do test for this chick disease. This subject of brooding is presented at greater length in Table 7.

TABLE 6.—*Brooding Losses*

	District 1		District 2		District 3		District 4		District 5		All farms.			
											1940.		1926.	
	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.
Brooding Losses by Natural Methods (a)														
Average number of chicks brooded.....	134	100	144	100	156	100	92	100	113	100	128	100	204	100
Average number raised to ten weeks.....	107	79.9	122	84.7	120	76.9	76	82.6	85	75.2	102	79.7	147	72.1
Average number lost first ten weeks.....	27	20.1	22	15.3	36	23.1	16	17.4	28	24.8	26	20.3	57	27.9
Brooding Losses by Artificial Methods (b)														
Average number of chicks brooded.....	207	100	240	100	275	100	340	100	269	100	266	100	158	100
Average number raised to ten weeks.....	183	88.4	212	88.3	254	92.4	318	93.5	235	87.4	240	90.2	110	69.6
Average number lost first ten weeks.....	24	11.6	28	11.7	21	7.6	22	6.5	34	12.6	26	9.8	48	30.4
Brooding Losses by All Methods (c)														
Average number of chicks brooded.....	151	100	183	100	247	100	216	100	164	100	192	100	428	100
Average number raised to ten weeks.....	131	86.8	145	79.2	209	84.6	160	74.1	106	64.6	150	78.1	303	70.8
Average number lost first ten weeks.....	20	13.2	38	20.8	38	15.4	56	25.9	58	35.4	42	21.9	125	29.2

BROODING PRACTICES

It is evident that another reason for reduced mortality is less crowding in the brooder house as shown in Table 7. The average number of chicks per square foot was 1.9 in the last study and 3.6 in the first survey. From 2 to 2.5 chicks per square foot can be brooded together comfortably where all conditions are satisfactory. The number of brooder houses used on farms increased from 36 to 79 percent, 74 of which were portable. The practice of moving brooder houses to clean ground each year is most commendable, a practice used by 78 percent of the producers in 1926 and 73 percent in 1940. The details giving the adoption of these practices by districts may be studied in Table 7b.

The practice of brooding chicks on clean ground each year cannot be overemphasized. By "clean ground" is meant land over which adult poultry has not ranged for two or more years and on which the droppings and litter from the poultry houses have not been scattered. Perhaps the largest loss of chicks is due to exposure to ground infested areas. Intestinal worms, coccidia, the bacillus of white diarrhea, tubercle bacillus, blackhead and numerous other disease-producing organisms live in the ground when expelled from the bodies of older birds. These parasites are nourished, matured, and maintained by older chickens which are infested. These infested individuals are usually allowed free range and since the parasites are frequently contained in the droppings the entire premises may become infected. If baby chicks range upon this same ground there is no escaping heavy infestation, resulting in high mortality. The most practical way to prevent such losses is to adopt a three-year rotation plan for the brooder houses. For example, locate them east of the farm buildings one year, south the next year, west or north the third year and east again the fourth year or some similar system which fits into the farm scheme and cropping system to the best advantage. These ranges should be some distance from the laying house. Many farmers prefer to keep the mature birds confined in yards about the laying house in which case all land outside the yards would be safe for brooding chicks.

An interesting feature in a study of this kind is to note the adoption and popularization of equipment and practices little known or used at the time of the first study. An example is the air blast oil burning brooder stove (Table 712). Not one was reported in 1926 while it heads the list with 59 or 24 percent used in 1940. Its use has increased rapidly as a result of efficiency, economy, dependability and the small labor requirements for its care. Conversely coal stove brooders declined in use from about 20 to 10 percent. Wood stoves have doubled in popularity while electric brooders were found on almost 3 percent of the farms as against none in 1926. The electric brooders were confined to Districts 1 and 4. As high voltage electric lines are further extended through the rural sections, the use of electric brooders will continue to increase. They compare favorably with air blast brooders in efficiency and economy with even a lower

TABLE 7.—*Concluded*

	District 1		District 2		District 3		District 4		District 5		All farms.			
	Farms.		Farms.		Farms.		Farms.		Farms.		1940.		1926.	
	Num- ber.	Per- cent.	Num- ber.	Per- cent.	Num- ber.	Per- cent.	Num- ber.	Per- cent.	Num- ber.	Per- cent.	Num- ber.	Per- cent.	Num- ber.	Per- cent.
Feeding of Chicks First Week (d)														
Feeding mash only first week	29	73	29	59	27	54	40	82	36	81	161	69.4	117	46.8
Feeding grain only first week	6	15	12	24	7	14	5	10	3	7	33	14.2	106	42.4
Feeding both mash and grain first week			1	2	12	24	2	4	3	7	18	7.8	27	10.8
Other feeds used to start chickens	5	12	7	14	4	8	2	4	2	5	20	8.6		
Milk used first week	11	27	11	23	15	31	13	35	14	33	64	29.1	183	73.2
Kind of Feed Used (e)														
Home mixed	2	5			2	4	7	15	5	13	16	7.9		
Local mill	1	3	12	38	4	9	6	12	6	16	29	14.4		
K. S. C. all-purpose	6	16	1	3	6	13	7	15	9	24	29	14.4		
Concentrate	1	3			3	6					4	2.0		
Others	27	73	19	59	32	68	28	58	18	47	124	61.4		
Farms Brooding Different Aged Chicks Together (f)	15	36	16	40	8	16	12	29	20	48	71	33.2	186	74.4
Farms Permitting Chicks to Run With Older Birds (g)	32	76	20	48	32	65	26	68	21	72	131	65.8	237	94.8

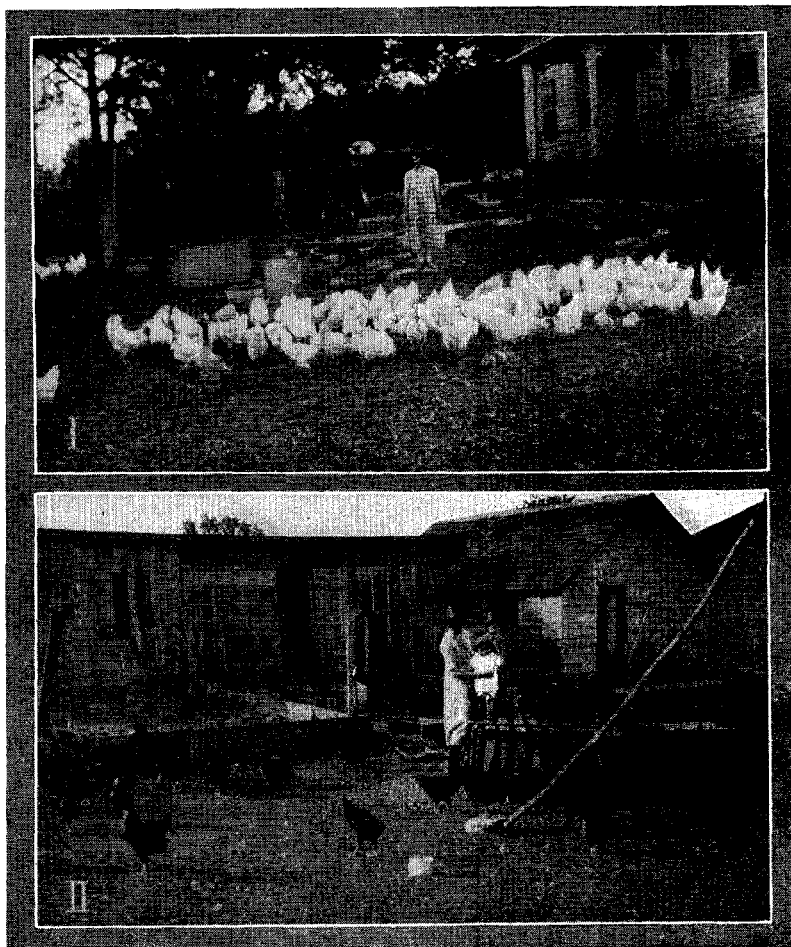


FIG. 9.—(I) An attractive flock of Rhode Island Whites. The little chicks, however, had a slight chance of getting their portion of grain when they had to compete with mature stock. The "chick creep" provided in ((II) prevented interference by the adult stock. The size and sturdy qualities of the young birds indicated that they had been well fed.

labor cost, The original cost is high compared with other brooders, and excess moisture is a problem which can be solved by using wire floors.

Table 7d supplies data on methods of feeding young chicks. The feeding of mash only the first week was practiced by 69 percent of the flock owners in the last study as against 47 percent during the first study. Fourteen years ago 42 percent of Kansas flock owners fed grain only as a starting feed whereas only 14 percent used this method in the last study. This is an indication of the marked change which has come about in feeding chicks. A few years ago it was the custom to start chicks on low protein feed and increase this nutrient as the chicks matured. It was eventually realized, however, that chicks make their most rapid growth early in life during which time they require a maximum protein intake. As they approach maturity they require less protein, hence feeding practices have been reversed during the decade of 1930 to 1940. Mash feeds are higher in protein than grain feeds, hence more than two-thirds of the producers visited started their chicks on all-mash rations. The combination of grain and mash was used by comparatively few.

There was a marked reduction in the percentage supplying milk the first week. This may be attributed to the fact that most commercial feeds incorporate dry milk in the mash.

Additional information collected in the last study included the sources of chick feeds used (Table 7e). About 8 percent were mixing their feeds at home, 14 percent were buying from local mills, an equal percentage were using the Kansas State College all-purpose mash and about 2 percent fed concentrates. Sixty-one percent used feeds from other sources which were commercial mashes for the most part. It is likely that the use of concentrates will become increasingly important in the future. Concentrates provide the proteins, vitamins and minerals which the farmer does not produce. It is logical for him to buy one bag of these nutrients to feed with several bags of home grown grain, such as corn, wheat, oats, barley, kafir and milo, rather than buy complete feed mixtures including the whole grains or their by-products at prices well above what it has cost him to produce them. The use of concentrates on the farm is too new to evaluate accurately at this time. There is, however, considerable research work in progress which should eventually reveal the proper place for concentrates in the feeding program.

Fewer farmers are brooding chicks of different ages together as shown by the figures. Seventy-four percent followed this practice in 1926 compared to 33 percent in 1940. Also fewer farmers permitted chicks to run with old stock, as the figures show. These practices are harmful to growing chicks, hence they should be further reduced.

The importance of adequate brooding equipment should be stressed in order that chick losses in the future might be further reduced. The practice of buying chicks with no suitable place to brood them is still followed by too many people. High death rate or stunted

growth are sure to follow where chicks are kept in baskets or boxes next to the kitchen stove or in an ordinary room with wood burning stove, or numerous other homemade contrivances poorly adapted for keeping chicks comfortable. It is a great satisfaction to have a clean, well-heated, fully equipped room ready for the chicks when they come and even a greater delight to watch their rapid growth after they get off to a good start.

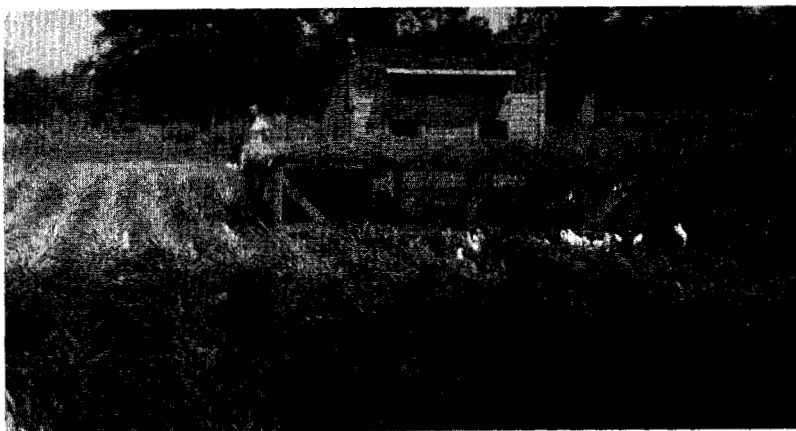


FIG. 10.—Sudan grass planted in rows near the chicken yard makes good shade for the chickens during the heat of the day. The rows can be kept reasonably free from weeds by cultivation.

The successful brooding and rearing of the chicks is the most important task connected with the poultry enterprise. If the chick is stunted in any way by chilling, overheating, overcrowding, poor ventilation, improper feeding, parasitism or general neglect, the results of the year ahead are impaired. Such stunting means higher mortality, slow growth, late maturity, reduced egg production and lower body weight, terminating in increased cost of production and lower income. The opposite to the above should prevail where good chicks are given proper brooding conditions, feed and care from start to finish.

MANAGEMENT OF THE FLOCK

A summary of the different methods of flock management which were encountered on this survey is presented in Table 8. It will be noted that 35 percent of all flock owners used litter in the hen house all year. While this does not appear to be a large percentage, it is a fair increase over the 10 percent 14 years previous. The other appalling fact in Table 8 is that about 18 percent use no litter at any season of the year.

Straw was used for litter on about three-fourths of the farms. Hay ranked second. Sand or ground corncobs make good litter, however the former was used on only one farm and the latter not at all. Dry cobs put through a hammer mill with a three-fourths inch screen and placed on the floor to a depth of two to three inches will remain in fairly good condition for six months. It takes about 1200 pounds for a room 20 feet square or its equivalent in floor space. Such a room will accommodate 100 hens.

There is perhaps more room for improvement in extending the more general use of litter in the laying houses than any other one branch of management. Litter offers an opportunity for exercise as the birds scratch and hunt for feed. It is extremely helpful in keeping the quarters sanitary as it absorbs moisture, disperses droppings and prevents feed from coming in contact with filthy dirt. Litter also adds greatly to the comfort of the birds by keeping their feet off the cold floor during the winter months and by preventing bruises, bumble foot, etc., at all seasons of the year. Lastly litter greatly reduces the number of dirty eggs produced. If the floor is well covered with litter a large portion of the mud carried into the house on the hens feet will be removed before the hen reaches the nest.

Table 8c shows the manner of handling the flocks during the winter months. Almost two-thirds of the flock owners confined the hens and pullets to the houses in cold weather. This commendable practice shows a remarkable improvement over the 6 percent who followed this system in 1926. The figures pertaining to the handling of pullets and hens separately are not complete, hence are omitted from this table.

The two- and three-year-old hens which have been left after culling are first choice for breeders. Since they lay very little during the winter, it is well to let them have free range all winter, providing a well-protected shelter for inclement weather. They will pick up the waste grain scattered about the farm buildings and regain vigor for the approaching hatching season in the spring.

An interesting study is given in Table 8d which reveals the changes occurring in persons caring for the poultry flock. While the wife still leads by taking the responsibility on 54 percent of the farms, this is a decline of 18 percent from the figure given on the first survey. It is probably a good omen for the poultry industry to note the increased coöperation of husband and wife from 17 to 23 percent

TABLE 8.—Management of Flocks

	District 1		District 2		District 3		District 4		District 5		All farms.			
	Farms.		Farms.		Farms.		Farms.		Farms.		1940.		1926.	
	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.
Use of Litter in Hen Houses (a)														
Litter used all year	11	24	24	60	21	44	11	24	12	26	79	34.5	24	9.6
Litter used in summer					5	10					5	2.2		
Litter used in winter	33	70	1	2	20	42	26	55	25	53	105	45.8	162	64.8
No litter used	3	6	15	38	2	4	10	21	10	21	40	17.5	64	25.6
Totals	47	100	40	100	48	100	47	100	47	100	229	100.0	250	100.0
Straw used as litter (b)														
Straw used as litter	41	82	30	60	44	88	36	72	34	78	185	74.0	160	64.0
Hay used as litter	1	2	2	4	1	2	2	4	3	6	9	3.6	12	4.8
Fodder used as litter					1	2					1	.4	13	5.2
Sand used as litter	1	2									1	.4		
Alfalfa chaff used as litter	1	2									1	.4		
Leaves used as litter													1	.4
Flock Management During Winter (c)														
Hens and pullets on free range	41	87	5	10	21	44	8	18	14	33	89	38.5	198	79.2
Hens and pullets confined	6	13	43	90	27	56	37	32	29	67	142	61.5	14	5.6
Persons Caring for Poultry (d)														
Wife	19	39	44	90	25	51	19	41	21	48	128	54.0	181	72.4
Wife and husband	15	31	1	2	13	27	14	31	12	27	55	23.2	42	16.8
Husband	4	8	3	6	3	6	11	24	6	14	27	11.4	15	6.0
Daughter	2	4	1	2			1	2			4	1.7	4	1.6
Wife, husband and daughter					4	8					4	1.7		
Wife and daughter	2	4			1	2	1	2			4	1.7	2	.8
Husband and daughter													1	.4
Son	2	4									2	.8	1	.4
Wife and son	4	8			2	4			1	2	7	3.0	4	1.6
Wife, husband and son	1	2									1	.4		
Wife, son and daughter					1	2					2	.8		
Wife, husband, son and daughter									3	7	3	1.3		
Totals	49	100	49	100	49	100	46	100	44	100	237	100.0	250	100.0
Percent of Farms Keeping Feed Records	15		2		8		6		9		7.9		5.6	
Percent of Farms Keeping Egg Records	13		2		16		8		9		9.6		12.4	

and also to see the even greater increased interest of husbands which almost doubled. It is our observation that when the men on the farms become interested in poultry, better stock, improved equipment, good management, and the feeding of more complete rations prevail. Poultry production is well adapted to a joint interest and cooperative effort and where 200 to 300 mature birds are kept, there is need for assistance from the men to do the heavy work. It is obvious from the figures given that the sons and daughters contribute very little to the poultry enterprise.

The last two lines of Table 8d show that very few flock owners keep poultry records. It is hoped there will be much improvement in record keeping during the next few years.

FEEDING PRACTICES

The feeding practices found on this survey are given in detail in Table 9. It should be kept in mind when comparing results of the surveys of 1940 and 1926 that feed conditions on farms were vastly different for the two periods. Good crops prevailed quite generally over the state during the middle twenties, whereas the crops did not yield so abundantly during the period 1930-1940.

Usually poultry is more abundant on the farm when there is plenty of feed. When the crop yield is low and it becomes necessary to buy feed, poultry flocks are reduced in size. The small corn crops the past five years have probably been largely responsible for reduced poultry population, especially in eastern Kansas.

Poultry was fed all year by 89 percent of the farms visited. This differs only slightly from the practice used on the early survey. The percentage is high in all but District 3 where only 71 percent fed all year.

The feeding of grain on the floor or bare ground was the most common practice. Wheat led all other grains in popularity, being fed on 61 percent of the farms. Yellow corn was second with 52 percent and kafir third with 34 percent. Oats, milo, white corn and barley followed in the order named. The use of white corn dropped from 47 to 6 percent. This cannot be credited entirely to vitamin consciousness as the increase was not in yellow corn but in wheat, which is also deficient in carotene, the precursor of vitamin A. An interesting statement is quoted from page 36, Kansas bulletin 245, published in January, 1928, giving the results of the first survey as follows: "Yellow corn in the ration is a good preventive of nutritional roup. White corn, fed on 46.8 percent of the farms, does not contain vitamin A and therefore these flocks are in danger of contracting nutritional roup if the ration is not supplemented with a green feed or green feed substitute." The figures in Table 9b show how white corn has been almost omitted from the poultry diet. This change in feeding practice is not attributed to the above reason but it is probably due to a scarcity of both white and yellow corn and the greater availability of wheat.

While the percentage of farmers feeding oats during the two

TABLE 9.—Feeding Practices

	District 1		District 2		District 3		District 4		District 5		All farms.			
	Farms.		Farms.		Farms.		Farms.		Farms.		1940.		1926.	
	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.
Manner of Feeding (a)														
Poultry fed all year	46	96	44	90	35	71	44	92	45	98	214	89.2	218	87.2
Poultry not fed all year	2	4	5	10	14	29	4	8	1	2	26	10.8	32	12.8
Totals	48	100	49	100	49	100	48	100	46	100	240	100.0	250	100.0
Feeding of Grains (b)														
Grain fed all year	45	94	47	96	48	98	47	98	44	98	231	96.7	218	87.2
Grain fed on bare ground or floor	27	48	27	54	29	51	25	46	22	43	130	48.3	233	93.2
Grain fed in litter	7	12	15	30	6	11	9	16	12	24	49	18.2	70	28.0
Grain fed in troughs or hoppers	23	40	8	16	21	38	21	38	17	33	90	33.5	10	4.0
Wheat fed	28	56	12	24	40	80	39	78	33	66	152	60.8	73	29.2
Yellow corn fed	37	44	6	12	33	66	31	62	22	44	129	51.6	160	64.0
o Kafir fed	23	46	16	32	35	70	9	18	2	4	85	34.0	193	77.2
Oats fed	7	14	2	4	22	44	6	12	.....	.....	37	14.8	39	15.6
Milo fed .....	.....	.....	2	4	2	4	10	20	14	28	28	11.2	38	15.2
White corn fed	3	6	6	12	2	4	.....	.....	3	6	14	5.6	117	46.8
Barley fed .....	.....	.....	.....	.....	.....	.....	2	4	8	16	10	4.0	9	3.6
Cane fed .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	2.4
Other grains fed	8	16	31	62	1	2	7	14	4	8	51	20.4	7	2.8
Feeding of Mash (c)														
Mash fed all year	12	25	16	33	36	73	16	33	15	33	95	39.7	76	30.4
Mash fed during fall	4	14	7	25	2	13	19	36	5	19	37	24.3	70	28.0
Mash fed during winter	21	72	14	50	9	56	20	38	13	50	77	50.7	.....	.....
Mash fed during spring	4	14	6	21	4	25	12	23	7	27	33	21.7	.....	.....
Mash fed dry	30	60	26	52	43	86	34	68	21	42	154	61.6	110	44.0
Mash fed wet	5	10	2	4	15	30	3	6	3	6	28	11.2	36	14.4

TABLE 9.—*Concluded*

	District 1		District 2		District 3		District 4		District 5		All farms.			
	Farms.		Farms.		Farms.		Farms.		Farms.		1940.		1926.	
	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.
Type of Mash Fed (d)														
Home mixed mash.....	12	35	6	19	26	47	14	30	9	31	67	34.2		
Local mill mash.....	1	3	9	28	3	5	5	11	4	14	22	11.2		
K. S. C. all-purpose mash.....	3	9	3	9	7	13	8	18	8	28	29	14.8		
Concentrate mash.....	1	3	2	6	6	11	2	4	3	10	14	7.1		
Other mash.....	17	50	12	38	13	24	17	37	5	17	64	32.7		
Milk fed to poultry.....	24	50	23	47	33	67	27	56	33	72	140	58.3	199	79.6
Feeding of Green Feed (e)														
Green feed fed during fall, winter and early spring.....	36	75	27	55	35	85	31	65	34	76	163	70.6	150	60.0
Wheat or rye pasture.....	17	38	28	93	30	48	27	69	20	48	122	56.0	10	4.0
Alfalfa leaves.....	19	42	1	3	10	16	5	13	16	38	51	23.4	129	51.6
Oats.....	3	7	1	3	9	15	3	8			16	7.3		
Alfalfa meal.....	2	4			2	3	2	5			10	4.6		
Grass.....	2	4			5	8					7	3.2		
Sudan.....					2	3	2	5			4	1.8		
Alfalfa range.....					1	2			2	4	3	1.4		
Tubers.....					2	3					2	.9	4	1.6
Lettuce.....	2	4									2	.9		
Rape.....					1	2					1	.5		
Sprouted grain.....													7	2.8
Water Warmed in Winter.....	42	89	27	59	39	81	23	50	22	48	153	65.7	195	78.0
Feed Cooked in Winter.....	11	23	6	12	8	40					25	11.7	65	26.0

surveys remained about the same, interest in this grain is increasing rapidly. When kept in hoppers before confined birds, oats may reduce the tendency to pick feathers.

Only slightly more than one-third of the flock owners were feeding mash all year while 51 percent fed mash during the winter and about 22 percent during the spring. About two-thirds of the flock owners were feeding the mash dry which is recommended. The percentage of farmers who feed mash most of the year is usually in proportion to the profits obtained from the flock. It is not that they do not know that mash should be fed, but that feed costs and prices for poultry products do not always justify the practice under farm conditions. Most farmers know poultry cannot produce many eggs when fed grain only. As the feed-egg ratio becomes more favorable a proportionally larger number resume the use of mash feeds.

It will be observed that 34 percent fed home mixed mash, 11 percent purchased mash from a local mill, 15 percent used the Kansas State College all-purpose mash, 7 percent purchased a concentrate (protein, minerals and vitamin) to mix with home grown feed, while 33 percent used mash from other sources. This included all of the different commercial feeds available on the local market. It will be recalled that 61 percent used other sources of mash for chicks (Table 7e). This indicates that commercial feeds are more generally used for growing chicks than for mature birds.

Commercial feeds were used by 50 percent of the farmers in District 1 and by 17 percent in District 5, whereas the Kansas all-purpose ration was fed by only 9 percent in District 1 and 28 percent in District 5.

Milk was fed to poultry on 58 percent of the farms as against 80 percent on the first survey. One possible reason for this is that most commercial feeds include dry milk which is a substitute for liquid milk. When the latter is used as the principal source of protein, it should be supplied at the rate of 4 gallons a day per 100 hens.

Table 9e shows a marked increase in the practice of supplying green feed. Winter wheat or rye pasture heads the list with 56 percent, followed by alfalfa leaves 23, oats 7, alfalfa meal 5, grass 3, Sudan 2, and alfalfa range, tubers, lettuce and rape. Green feed was used extensively in all districts. Farmers have come to realize this is an excellent supplement to the grain and mash ration. It not only provides many of the essential nutrients but it materially reduces losses from nutritional roup which formerly took a large toll.

Water makes up about two-thirds of the egg and a frozen water bucket is not conducive to high egg production. Two-thirds of the farms visited warmed the water for the chickens during the winter months. This was less than the 78 percent on the first study. Whether the water is warm is not so important as it is to make sure unfrozen water is before the birds throughout the day. The cooking of poultry feed is not necessary and the practice is decreasing as shown by the figures.

BREEDING

Table 10 presents information on reproducing the flock, including the selection of females and males and the sale of hatching eggs. The flock owners are doing 58 percent of their own culling, as compared to 14 years ago when 52 percent followed this practice. Hatchery operators culled 16 percent of the flocks while professional cullers handled less than 3 percent. District 3 led with 87 percent of the flocks culled by all methods followed closely by District 5 with 80 percent. Only 31 percent of the flocks were culled in District 2. Systematic culling each year is one of the surest methods of increasing profits from the flock. Most hatchery operators have men qualified to do this work and they are usually available in those cases where the owner does not care to undertake the task.

One of the most conspicuous declines is in the percentage of male birds purchased. This figure was 78 percent in 1926 and 29 percent in 1940. Males used from the home flock increased from 10 to 66 percent for the two periods. The practice of trading males with the neighbor, which is of doubtful value, declined one-half.

The marked decline in the percentage of flock owners purchasing breeding males is another indication of lack of interest in improving poultry flocks during the depression years. Good males can be grown in one's own flock where the best birds are selected and mated. However, this requires special breeding pens which are not usually available. The use of males from one's own flock too often means no selection whatever, which is a reflection on the poultry enterprise. It would not be practiced in any other branch of livestock breeding. As a general rule great care is used in locating sires for the sheep, swine and cattle herds, and it is also important to locate the best males available for the poultry flocks. A poultry improvement program has been in operation in Kansas for 18 years, the purpose of which has been to provide superior breeding stock for farm flocks. Good males are available in most of the common varieties and they should be used more generally over the state. New males should be introduced every 3 to 5 years.

A comparatively small number, 29 or 12 percent, of flock owners sold hatching eggs either privately or to hatchery operators. This in part might account for the lack of interest in good breeding males.

TABLE 10.—Breeding

	District 1		District 2		District 3		District 4		District 5		All farms.			
	Farms.		Farms.		Farms.		Farms.		Farms.		1940.		1926.	
	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.
Selection of Females:														
Flocks culled by owners.....	20	62	5	33	26	59	11	37	31	78	93	57.8	131	52.4
Flocks culled by professional cullers.....	1	3	3	20							4	2.5	13	5.2
Flocks culled by county agricultural agents.....									1	2	1	.6	8	3.2
Flocks culled by hatchery operators.....	5	16	7	47	1	2	10	33	3	8	26	16.1		
Flocks culled by others than above.....	6	19			17	39	9	30	5	12	37	23.0		
Flocks culled by state inspectors.....													2	.8
Total flocks culled.....	32	68	15	31	42	87	30	62	36	80	155	65.4	154	61.6
Selection of Males:														
Males purchased (as grown birds or raised from eggs bought).....	22	61	7	15	5	38	4	17	2	10	40	28.6	194	77.6
Males traded with neighbors.....	5	14			2	16					7	5.0	25	10.0
Males used from own breeding.....	9	25	39	85	6	46	20	83	19	90	93	66.4	24	9.6
Hatching Eggs Sold:														
To private parties.....	1	2			3	6			2	4	6	2.4	83	33.2
To hatchery operators.....	3	6	10	20	1	2	8	16	1	2	23	9.2	9	3.6
Total selling hatching eggs.....	4	8	10	20	4	8	8	16	3	6	29	11.6	92	36.8

DISEASE AND PARASITES

Diseases and parasites are best controlled by maintaining clean houses, clean birds, clean feed and clean ranges. In short, cleanliness is one of the prime essentials for successful poultry farming. The unit value of the birds is not enough to justify individual treatment and there are very few remedies which effect a complete cure. Therefore, the most satisfactory way to combat poultry diseases and parasites is to prevent them getting started in the flock.

Table 11c shows that 40 percent of the farms surveyed maintained sanitary poultry houses and yards and 15 percent showed indications of diseases in the flocks. This is a marked improvement over conditions found in 1926 when only 28 percent was reported as sanitary and 38 percent showed indications of disease. Such progress is encouraging. It may be partly due to the less crowded conditions on the farms when the last study was made (Table 2a). With renewed interest in poultry and enlarged flocks it will be again necessary to keep a close watch on the sanitary conditions of houses and yards.

Table 11b indicates that 64 percent used one of several methods to treat the chickens for lice. While this was an increase of 22 percent over the first survey it is still too small a proportion of the flock owners in view of the effective treatments available. For many years no sure cure for lice was known. Different commercial powders and salves were sold for this purpose and they were effective for the time being. However, the birds required individual treatment so it was easy to neglect them. Sodium fluoride was later discovered not only to be more effective but one treatment was sufficient for several months. It could be used as a powder or as a dip when dissolved in water at the rate of one ounce per gallon. This also required the treatment of individual birds. The eradication of lice on chickens was made easy when it was discovered that nicotine sulphate, "Blackleaf 40," could be used for flock treatment. By using an oil can and a small brush, a thin film of this poisonous liquid is painted on the upper surface of the roosting poles 15 minutes before they are occupied by the birds and the body lice are soon suffocated by the lethal gas which is produced when the heat of the fowl's body causes the nicotine sulphate to vaporize. To be most effective, the treatment should be repeated in 10 days. It does not destroy all the head lice. Where one has the time to handle individual birds, two treatments of sodium fluoride a year will keep poultry lice under control at very small cost. It will be observed in Table 11b that 15 percent were using this method and 12 percent resorted to "Blackleaf 40." There is no excuse, with our present knowledge of control measures, for any one to have lousy poultry on the place.

Table 11a gives the methods used for eradicating mites. These pests are blood suckers and are much more serious than lice which live on the dandruff and scales about the feathers. Mites are summer parasites which inhabit cracks in the roosts and nests. They migrate to the bird's body at night, engorge with blood, then retire to their hiding place. To combat them the roosts, supports and adjoining

TABLE 11.—Diseases and Parasites

	District 1		District 2		District 3		District 4		District 5		All farms.			
	Farms.		Farms.		Farms.		Farms.		Farms.		1940.		1926.	
	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.
Treatment for Mites (a)														
Stock dip, paint and spray.....	4	8	1	2	9	18	1	2	3	6	18	7.2	71	28.4
Crank-case oil paint and spray.....	10	20	15	30	8	16	8	16	17	34	58	23.2	49	19.6
Creosote paint and spray.....	3	6	10	20	4	8			4	8	21	8.4	31	12.4
Kerosene paint and spray.....	2	4	3	6	2	4	2	4			9	3.6	27	10.8
Carbolic acid paint and spray.....	4	8					1	2			5	2.0	21	8.4
Carbolineum paint and spray.....					3	6	1	2	2	4	6	2.4	11	4.4
Whitewash paint.....	1	2			1	2	2	4	1	2	5	2.0	8	3.2
Salt and ashes.....													3	1.2
Gasoline.....													1	.4
Black leaf "40".....			1	2	3	6	1	2			5	2.0		
Carbide.....					3	6					3	1.2		
Combinations of above.....	4	8	3	6	9	18	8	16	10	20	34	13.6		
Spray material not indicated.....	10	20	1	2			1	2			12	4.8		
No treatment.....	12	24	16	32	8	16	25	50	13	26	74	29.7	28	11.2
Totals.....	50	100	50	100	50	100	50	100	50	100	250	100.0	250	100.0
Treatment for Lice (b)														
Commercial louse powder.....	6	12			2	4	3	6	7	14	18	7.2	70	28.0
Sodium fluoride dip or dust.....	7	14	6	12	12	24	4	8	8	16	37	14.8	59	23.6
Grease (lard and blue ointment).....	1	2	1	2					1	2	3	1.2	6	2.4
Stock dip.....					1	2					1	.4	4	1.6
Sulphur dust.....													3	1.2
Salt water or homemade powder.....													2	.8
Black leaf "40".....	4	8	2	4	7	14	9	18	7	14	29	11.6		
Dust or ashes bath.....							2	4	1	2	3	1.2		
No treatment.....	32	64	41	82	28	56	32	64	26	52	159	63.6	106	42.4
Totals.....	50	100	50	100	50	100	50	100	50	100	250	100.0	250	100.0
Sanitation and Disease (c)														
Conditions sanitary.....	16	38	20	41	27	55	17	35	13	29	93	39.9	70	28.0
Indications of disease.....	8	17	5	10	17	35	3	6	2	4	35	14.7	96	38.4

walls are painted with a penetrating and lasting disinfectant. One application a year, usually in April or May, is sufficient.

The survey showed that 70 percent of the farms visited used one or more of 13 different products for treating mites. The majority, 23 percent, used crank case oil. This is not because it is most effective but it is cheap and available on most farms. Creosote, stock dip, kerosene and carbolineum were used in the order named. Of this list carbolineum is the most satisfactory when applied with a brush in the undiluted form. It has penetrating, lasting and obnoxious qualities not possessed by the lighter weight oils, sprays and disinfectants. It is necessary to apply kerosene, stock dips, carbolic acid and crankcase oil every month or two to keep the mites under control, while one thorough application annually of carbolineum will suffice. Mites are so easily controlled by the above method that there is no excuse for having them in the poultry buildings.

MARKETING

Table 12a presents information on marketing eggs, production of quality eggs, marketing poultry, fattening before selling and the types of birds fattened. Selling eggs on the graded basis was the practice of 28 percent of the farms visited. Fourteen years previous none of the farms surveyed sold by this method. In fact there were very few places in Kansas in 1926 where eggs could be sold according to quality, size and cleanliness. District 3 maintains its lead in marketing as in other general practices, with Districts 4 and 5 second and third. District 2 did not report a single instance of selling on grade.

The local produce buyer purchased from 41 percent of the farmers visited, compared with 50 percent in 1926. The local grocery store was buying from 47 percent as against 43 percent on the first study. Outlets to private customers increased from 4 to 10 percent and five farmers in District 4 shipped their eggs to market.

The figures show a substantial increase from 27 to 47 percent in the proportion of producers visited who were producing infertile eggs during the summer. All districts in the state shared fairly evenly in this forward step. There was also a noticeable improvement in the location of nests, the covering of same and the use of material in the nests to prevent soiled and broken eggs. Broody coops were not so common as on the first survey. This might be the result of so many more Leghorns, 46 percent as against 27 percent, which are nonbroody. Eggs were marketed on an average of 1.7 times a week during the spring and summer and 1.3 times during the fall and winter.

In order for farmers to profit most by selling eggs on a graded basis it will be necessary to produce a large percentage of top grade eggs. The size should be increased and the quality maintained during all seasons of the year. Strains of birds which produce large eggs, 24 ounces or more per dozen, should be introduced onto the farms and only infertile eggs produced during the summer. Eggs

TABLE 12.—Marketing

	District 1		District 2		District 3		District 4		District 5		All farms.			
	Farms.		Farms.		Farms.		Farms.		Farms.		1940.		1926.	
	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.
Marketing Eggs (a)														
Eggs sold on graded basis.....	11	24			25	36	13	32	12	28	61	27.6		
Eggs sold to local buyer.....	21	40	18	31	32	64	19	39	16	33	106	40.9	126	50.4
Eggs sold to grocery stores.....	20	33	35	59	18	36	20	41	28	58	121	46.7	107	42.8
Eggs sold to private customers.....	12	22	6	10			5	10	4	8	27	10.4	10	4.0
Eggs shipped to market.....							5	10			5	2.0	2	.8
Production of Quality Eggs (b)														
Producing infertile eggs during summer.....	21	46	12	25	26	54	27	61	21	51	107	47.1	67	26.8
Nests well located to prevent breakage.....	31	67	28	57	29	62	27	64	23	53	138	60.8	111	44.4
Nests covered to produce clean eggs.....	32	70	17	35	38	81	26	60	27	63	140	61.4	106	42.4
Nesting materials used to produce clean eggs.....	41	89	34	71	46	98	38	88	37	88	196	86.7	185	74.0
Broody coops used to prevent heating of eggs.....	33	72	7	15	28	60	14	31	16	50	98	45.6	150	60.0
Marketing Poultry (c)														
Birds sold on grade.....	3	8	1	2	33	85	16	42	30	83	83	41.7		
Birds sold to local buyer.....	33	70	45	88	34	79	22	49	36	88	170	74.9	195	78.0
Birds sold to grocery stores.....	4	9	2	4	1	2	5	11			12	5.3	17	6.8
Birds sold to private customers.....	10	21	4	8	7	16	8	18	5	12	34	15.0	14	5.6
Birds shipped to packer.....					1	2	10	22			11	4.8	1	.4

TABLE 12.—*Concluded*

	District 1		District 2		District 3		District 4		District 5		All farms.			
	Farms.		Farms.		Farms.		Farms.		Farms.		1940.		1926.	
	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.
Fattening Birds before Selling (d)														
Pen fattened.....	6	12	2	4	6	12	.....	.....	.....	.....	14	5.6	61	24.4
Crate fattened.....	.....	.....	1	2	.....	.....	1	2	1	2	2	.8	6	2.4
Range fattened.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.4	.....	.....
Totals.....	6	12	3	6	6	12	1	2	1	2	17	6.8	67	26.8
Type of Birds Fattened (e)														
Hens.....	.....	.....	.....	.....	1	2	1	2	.....	.....	2	.8	49	19.6
Broilers.....	3	6	5	10	5	10	.....	.....	.....	.....	13	5.2	40	16.0
Males.....	.....	.....	1	2	.....	.....	1	2	.....	.....	2	.8	2	.8
Capons.....	.....	.....	.....	.....	1	2	.....	.....	.....	.....	1	.4	1	.4
Frequency of Marketing Eggs During Spring and Summer,	1.9 times per week		1.6 times per week		1.7 times per week		1.7 times per week		1.4 times per week		1.7 times per week		1.6 times per week	
Frequency of Marketing Eggs During Fall and Winter....	1.2 times per week		1.1 times per week		1.1 times per week		1.6 times per week		1.3 times per week		1.3 times per week		1.1 times per week	

should be gathered twice daily, stored in a cool cellar or basement overnight before casing and taken to market twice a week or oftener.

Market poultry was sold on the graded basis on 42 percent of the farms whereas none was sold on the grade in 1926. The opportunity producers now have to sell both eggs and poultry according to quality is one of the more progressive developments of the past decade. Local produce buyers got 75 percent of the business, about the same as 14 years previous. Districts 3, 4 and 5 led in this comparison. Grocery stores receive very little market poultry, being 5 and 7 percent for the two periods. The selling of birds to private customers increased from 6 to 15 percent and birds were shipped to packers in Districts 3 and 4.

Only 6 percent pen fattened birds before selling them. This was only one-fourth the number who practiced this method at the time of the first survey. Crate and range fattening was practiced by less than 1 percent each. Only 7 percent made any attempt to fatten before selling their poultry. This is much less than the 27 percent who fattened by one or more methods in 1926. Broilers were the type most generally fattened.

MISCELLANEOUS INFORMATION

Table 13 is the most interesting in some respects. Here we learn the attitude of producers, source of poultry information and the loss of poultry by automobiles on the highways.

While it was not wholly unexpected, the question "Do you consider poultry raising profitable?" brought varied replies. Of all the farms surveyed, 43 percent replied yes, 50 percent no, and 7 percent were uncertain. Quite the reverse was true in 1926 when 84 percent said yes, 11 percent no, and 5 percent were in doubt. These replies again reflect the serious conditions producers passed through during the 1930's. In many instances the high price paid for feed and the low price paid for poultry products were given as reasons poultry was not more profitable. Some fed scratch grain only, others fed nothing at all, a few purchased high priced feed at \$3.00 per 100 when home mixed feed, had it been available, could have been prepared for about half that amount. Further questioning revealed these conditions were not peculiar to the poultry enterprise only but they applied to most, if not all, of the other enterprises on the farm.

As to sources of information, practical experience led by a good margin with 63 percent. The radio was second with 27 percent. Poultry journals, County Agents, the College and government bulletins followed with 21, 20, 20, 18 and 10 percent, respectively. This totals more than 100 percent since many received information from more than one source. The County Agents were the only ones in this list which gained patronage as a source of information. All others declined since the study in 1926. At that time only about one-half the counties had agents. The original areas surveyed were purposely planned to include one county with and one without an agent in each of the five districts. In 1940 all of the counties surveyed had organized Farm Bureaus and County Agents.

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TABLE 13.—Miscellaneous Information

	District 1		District 2		District 3		District 4		District 5		All farms.			
	Farms.		Farms.		Farms.		Farms.		Farms.		1940.		1926.	
	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.
Profitableness of Poultry Raising														
Farms considering poultry profitable	23	51	28	58	16	34	15	35	14	36	96	43.2	209	83.6
Farms considering poultry unprofitable	22	49	20	42	15	32	28	65	25	64	110	49.6	28	11.2
Farms doubtful as to profits					16	34					16	7.2	13	5.2
Sources of Poultry Information*														
Practical experience	38	76	40	80	49	98	11	22	19	38	157	62.8	170	68.0
Radio	16	32	14	28	21	42	8	16	9	18	68	27.2	79	31.6
Poultry journals	5	10	7	14	26	52	5	10	10	20	53	21.2	146	58.4
County agent	5	10	14	28	5	10	12	24	15	30	51	20.4	25	10.0
Kansas State College	15	30	4	8	5	10	12	24	9	18	45	18.0	88	35.2
U. S. D. A. bulletins	3	6			3	6	9	18	11	22	26	10.4	51	20.4
Correspondence courses													2	.8
Other sources	5	10			1	2	11	22	4	8	21	8.4		
Farms Belonging to Farm Bureau	7	15	19	38	23	46	20	40	28	56	97	39.6		
Average Number per Farm of Poultry Killed Annually by Auto	8 birds		10 birds		17 birds		3 birds		6 birds		8.7 birds		9.2 birds	

* Many farms reported information received from more than one source.

SECOND KANSAS POULTRY SURVEY

It is obvious that many poultry inquiries which were formerly directed to the college and other agencies now go direct to the county Farm Bureau office. Of the 250 farms visited 97 or 40 percent were members of the Farm Bureau. District 5 led with 56 percent followed by districts 3, 4, 2 and 1 with 46, 40, 38 and 15 respectively.

The fact that an average of 9 chickens per farm were killed by autos showed no progress in this respect as the same number was destroyed in this manner at the time of the first survey. It is true there are many more autos now than then, but there were also 58 less chickens per farm (Table 2a) so the score remains about the same. Nine times 156,327 farms in Kansas, according to the 1940 census, equals 1,406,943 birds valued at 50 cents each would probably not be far wrong. At this figure the annual money loss from poultry killed on Kansas highways would be \$703,471.50.

The heaviest losses occurred in District 3 with an average of 17 per farm and the least in District 4 with an average of 3. The largest fatalities occurred during the summer months when many flocks are not fed and when they are attracted to the grain scattered along the roads at threshing and marketing time. The heavy Sunday and holiday traffic also takes a large toll. The best methods of reducing this loss is to fence the chickens out of the road, feed more liberally and select the more agile breeds. Confining the flock on Sunday and certain other days when traffic is heaviest would also reduce this loss.

SUMMARY

It was the original intention to repeat this survey in 1936 or ten years after the first one was made. Conditions resulting from crop failures, low prices, reduced purchasing power of consumers and a general depressed condition made it seem advisable to postpone the study to a more normal year. Perhaps few people would agree that normalcy had returned in 1940 but for reasons given in the introduction it was decided to repeat the study that year.

While the figures reveal a reduction of about 32 percent in number of chickens on farms, the percentage gain in the many improved practices in use at the time of the last survey should be noted. The last paragraph in Kansas bulletin 245 which gave the results of the 1926 survey is as follows:

"The authors are convinced that it is not more chickens and larger flocks that Kansas needs, but it is lower mortality of chicks hatched and greater production from hens kept that should engage the attention of producers in the future. Those who have learned the secret of economic production will survive longest and find poultry raising profitable."

While the thoughts expressed above have come true to a certain extent, they were, in the author's opinion, brought about by economic conditions which forced most producers to adopt the practices now in use.

There has been a shift in interest to the more productive varieties. Government figures report an average of 113 eggs a hen in Kansas

for 1938 which is a large increase over the average in 1926. Available space per bird in brooding and laying houses is much improved and more comfortable houses have been constructed. Figures from the College Extension office report in excess of 15,000 strawloft poultry houses in Kansas now in use.

There has been a marked change from hatching chicks at home to the purchasing of same at commercial hatcheries. Brooding losses to 10 weeks of age have been reduced 20 percent by artificial methods. More efficient brooder stoves are now in use and brooding practices show much improvement. While forward strides have been made in managing the laying flock, there is still room for much improvement in this department.

The increased tendency for the husband to cooperate more generally with the wife in caring for the poultry flock points toward better results in the future. The women folk of Kansas deserve much credit for holding on to the poultry enterprise during the years of depression. It was in fact "a life saver which kept many a farm family afloat." But the women need the sympathy, encouragement and assistance of the men to enable them to provide better stock, respectable houses and the necessary ingredients at the right time and in sufficient quantity for preparing and feeding a complete ration throughout the year.

Progress has been made in a general understanding of the requirements of a balanced ration. The importance of supplying protein and vitamins A, G and D as provided in meat scrap, fish meal, soybean oil meal and milk for the protein, and green feed and direct sunshine for the vitamins is generally understood as being necessary in addition to the home grown grains. They will be incorporated in the feeding program by an increasing number of producers as rapidly as economic conditions justify.

The demand for better breeding stock, especially progeny-tested males will, we believe, increase among the leading poultry breeders as conditions improve. The general adoption of standard uniform, supervised grades of eggs and market poultry would appear desirable. A better appreciation on the part of producers of what constitutes top grade poultry products and the ability of poultry packers to obtain all such products are worth in competition with other sections of the country is sorely needed. Kansans have rated well as producers of volume, but much is left to be desired in the improvement of the quality of their poultry products. A supervised uniform grading program should be a progressive step leading to further improvement in quality.

As we look to the future it now appears that what is needed in Kansas is more poultry enterprises and fewer poultry side lines on the farms. Perhaps there should be legions of flocks of 30 hens and thousands of flocks of 300 hens. A flock of 30 hens will provide eggs and poultry meat for a family of five without a surplus. For farmers with only a casual interest in poultry perhaps this number is sufficient. Where they keep 50 to 100 layers, they have a small surplus,

which for various reasons as poor equipment, small egg size and infrequent marketing, is usually of poor quality when it reaches the primary markets and especially the consumer. The volume of these low grade products is sufficient in the aggregate to establish a bad reputation for all poultry products which originate in areas where such practices exist.

In contrast with the above, those farmers who have been successful with and are interested in poultry production as an important enterprise on the farm find that a flock of 300 hens makes a very desirable unit. This number is large enough to justify good stock, adequate housing and proper feeding, care and management. Such a flock can be cared for on chore time and high quality products can be obtained throughout the year. Studies of records kept by members of the North Central Kansas Farm Management Association in 1938 for those keeping 300 hens showed an average cash return of \$608 per flock or 18 percent of the total cash income of \$3419 for all farm enterprises. The percentage returns from poultry tied for second place among the five major enterprises on these farms.

The above appears to be the best procedure to follow if a program for high quality poultry products is to be established in Kansas. Such an objective is necessary in view of strong competition with high quality products from other sections of the country. If Kansas producers cannot compete successfully on the quality shell egg markets of the country they may be forced to break, freeze or dry the surplus eggs and develop new markets for same.

APPENDIX

The questions listed below were used to secure the information reported in this bulletin.

POULTRY PRODUCTION QUESTIONNAIRE

A Survey on 25 Farms in Each of 10 Counties, July, 1940

Name..... Address.....
County..... Date..... No.....

DRAW A LINE UNDER SUITABLE WORD

1. (a) Breed and variety of chickens.....Crossbred (hybrid), mongrel.
- (b) Type of flock: Not graded, demonstration farm flock.
- (c) U. S. Approved, U. S. Verified, U. S. Certified, U. S. R. O. P., U. S. R. O. M.
- (d) U. S. pullorum tested, U. S. pullorum passed, U. S. pullorum clean.
- (e) A. P. A. registered.
- (f) Quality: Good, medium, poor.
- (g) Other breeds: Turkeys—Kansas approved, ducks, geese, guineas, capons.
2. (a) Size of farm.....acres.
- (b) Type of farming followed: General, grain, dairy, livestock, poultry, potato, fruit, market gardening, others.....
- (c) Is farm owned, rented or leased?

3. Number of birds	November 1, 1939.	April 1, 1940.	July 1, 1940.
Pullets—under 3 mo.			
Pullets—mature			
Hens			
Cockerels—under 3 mo.			
Cockerels—mature			
Cocks			
Capons—under 3 mo.			
Capons—mature			
Turkeys—under 3 mo.			
Turkeys—mature			
Ducks—under 3 mo.			
Ducks—mature			
Geese—under 3 mo.			
Geese—mature			
Guineas—under 3 mo.			
Guineas—mature			
Others			

HOUSES

4. (a) Number of laying houses.....; size.....
- (b) Number of brooder houses.....; size.....
- (c) Number of summer shelters.....; size.....
- (d) Type of roof on laying houses: Shed, gable, semimonitor, uneven span.
- (e) Material used: Roofing paper, shingles, sheet iron, straw.
- (f) Wall construction: Wood, tile, sheet iron, straw.
- (g) Year built.
5. (a) Open front: Yes, no.
- (b) Proportion of front wall open: $\frac{1}{8}$; $\frac{1}{4}$; $\frac{1}{6}$; or
- (c) Number of glass windows in front.....
- (d) Size..... Ends..... Rear.....
- (e) Glass substitutes: Yes, no. Number of windows Size.....
6. (a) Is loft used: Yes, no.
- (b) Type: Straw, fodder, hay, boards, muslin.
- (c) How long in use without changing materials.....
- (d) Pests in loft: Rats, mice, sparrows, mites.
7. Kind of floor: Dirt, oiled, wood, concrete, tile, gypsum, others.....
8. (a) Litter used: All year, summer, winter, none at all.
- (b) Kind: Straw, fodder, hay, shavings, commercial, cobs.
9. Are droppings boards used? Yes, no.
10. Are droppings pits used? Yes, no.
11. (a) Number of nests available?.....
- (b) Are nests well located? Yes, no.
- (c) Are they covered? Yes, no.
- (d) Is nesting material used? Yes, no.
- (e) Are broody coops used? Yes, no.
12. (a) Is an attempt made to control mites? Yes, no. How?.....
- (b) Is an attempt made to control lice? Yes, no. How?.....
13. Is mash hopper provided? Yes, no.

- 14. Winter care:
 - (a) Hens: Confined, free range.
 - (b) Pullets: Confined, free range.
 - (c) Hens and pullets: Confined, free range.
 - (d) Do you provide dust baths? Yes, no.

FEEDING FOR EGG PRODUCTION

- 15. Is there a period during the year when poultry is not fed? Yes, no.
Months.....
- 16. (a) Is grain fed throughout the year? Yes, no.
(b) In litter, in hoppers, on bare ground, bare floor.
- 17. (a) Is mash fed throughout the year? Yes, no. When: Fall, winter, spring, summer.
(b) Method: Dry, wet.
- 18. Mash used:
 - (a) Home mixed.....
 - (b) Local mill.....
 - (c) K. S. C. all-purpose.....
 - (d) Concentrate
 - (e) Others

(Name brand)
- 19. What is protein guarantee of mash fed?.....percent.
- 20. (a) Is milk fed? Yes, no.
(b) As a beverage, clabber, cottage cheese, dry, condensed buttermilk.
- 21. (a) Do you keep feed records? Yes, no.
(b) Do you keep production records? Yes, no.
(c) Egg production per hen per year.....
(d) How many chickens are killed by autos annually?
- 22. (a) Is green feed supplied in fall, winter, early spring? Yes, no.
(b) Kind: Wheat or rye pasture, sprouted grain, cabbage, tubers, alfalfa leaves, alfalfa meal, dehydrated alfalfa.
- 23. Do you feed cod liver oil? Yes, no.
- 24. Type of grain fed: Yellow corn, white corn, wheat, kafir, milo, mixed grain.
- 25. (a) Is water warmed during the winter? Yes, no.
(b) Do you cook poultry feed? Yes, no.
- 26. (a) Are general conditions sanitary? Yes, no.
(b) Indications of disease: Yes, no.
- 27. (a) Are birds specially fattened with grain or milk ration before selling? Yes, no.
(b) Method of fattening: Range, pen, crate.
(c) Type of birds fattened: Broilers, hens, males, capons, turkeys.

MARKETING

- 28. (a) To whom do you sell your poultry? Local poultry buyer, grocery store, ship direct to packer, private trade.
(b) Where are eggs kept before marketing? Cave, cellar (under house), living room, porch, feed room.
(c) How often do you take eggs to market? Spring and summer.....
....., Winter and fall.....
(d) To whom do you sell market eggs? Local poultry buyer, grocery store, ship to packer, ship to New York or other points, private trade.
(e) Are eggs sold on grade? Yes, no, part year, all year.
(f) Is poultry sold on grade? Yes, no, part year, all year.
(g) When are the following sold: Young chickens: Age.....Wt.....
Capons: Age.....Wt.....Turkeys: Age.....Wt.....

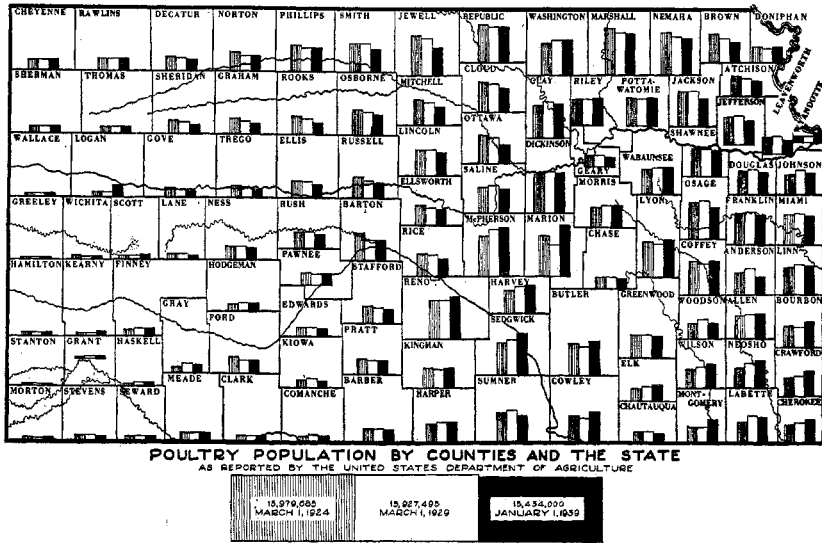


FIG. 11.—The numbers of chickens on farms by counties for 1924, 1929 and 1939. (From statistics of the Agricultural Marketing Service, United States Department of Agriculture.)

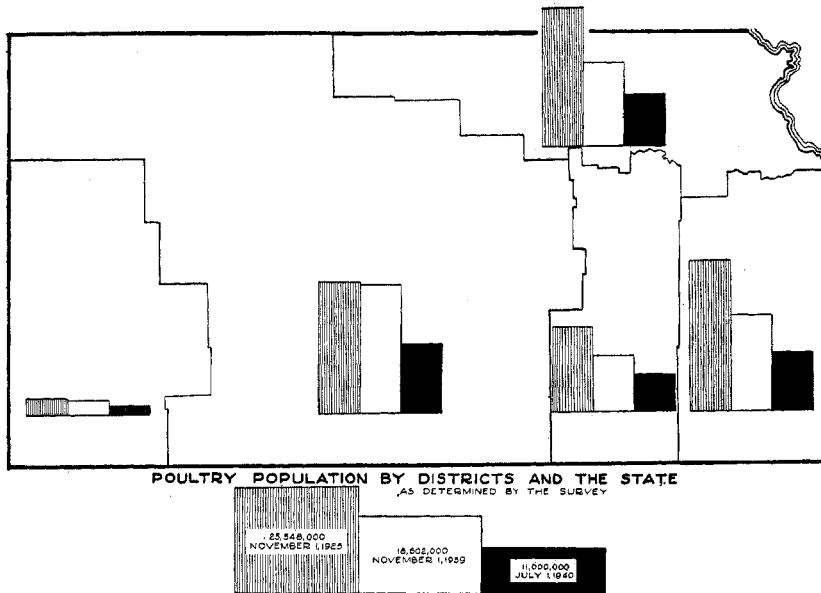


FIG. 12.—The distribution of poultry population by districts in Kansas. The percentage decrease from 1925 to 1939 was much greater in Districts 1, 2 and 3 than in Districts 4 and 5.