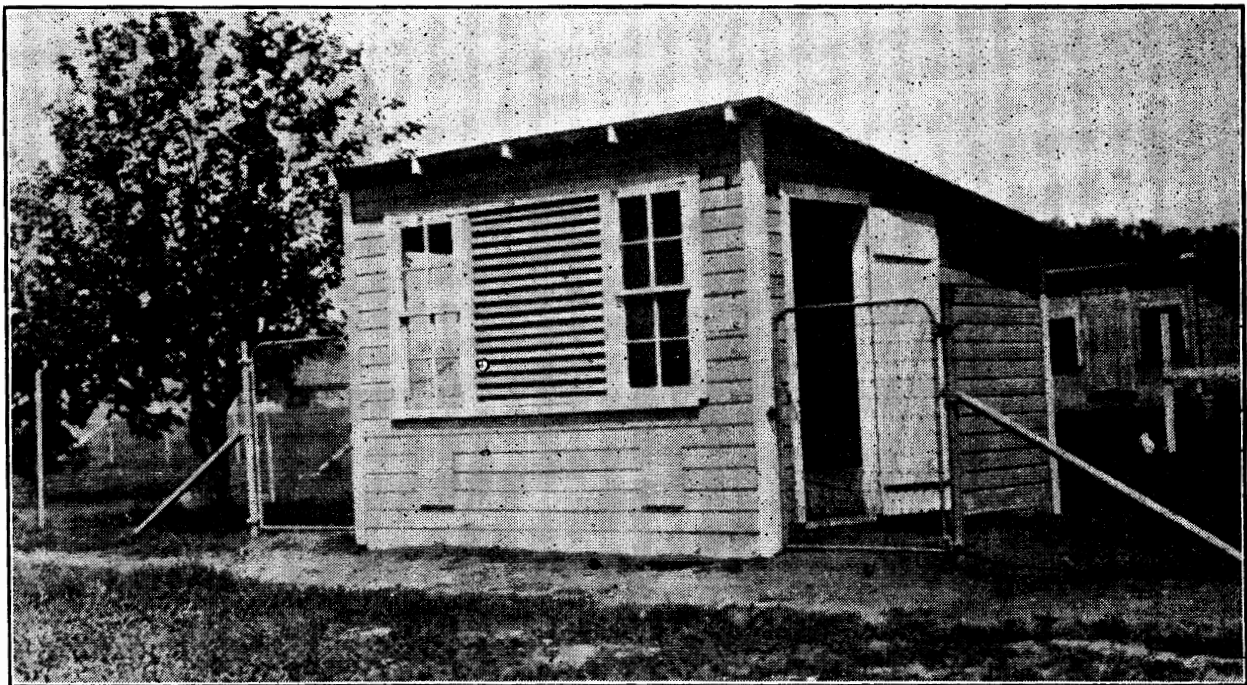


Bulletin No. 166.

OKLAHOMA  
AGRICULTURAL AND MECHANICAL COLLEGE  
AGRICULTURAL EXPERIMENT STATION  
STILLWATER, OKLAHOMA

The Value of  
Certain Scratch Grains  
In the Poultry Ration



EXPERIMENTAL HOUSE

By  
ROBT. PENQUITE, R. B. THOMPSON,  
and \*H. R. NAYLOR

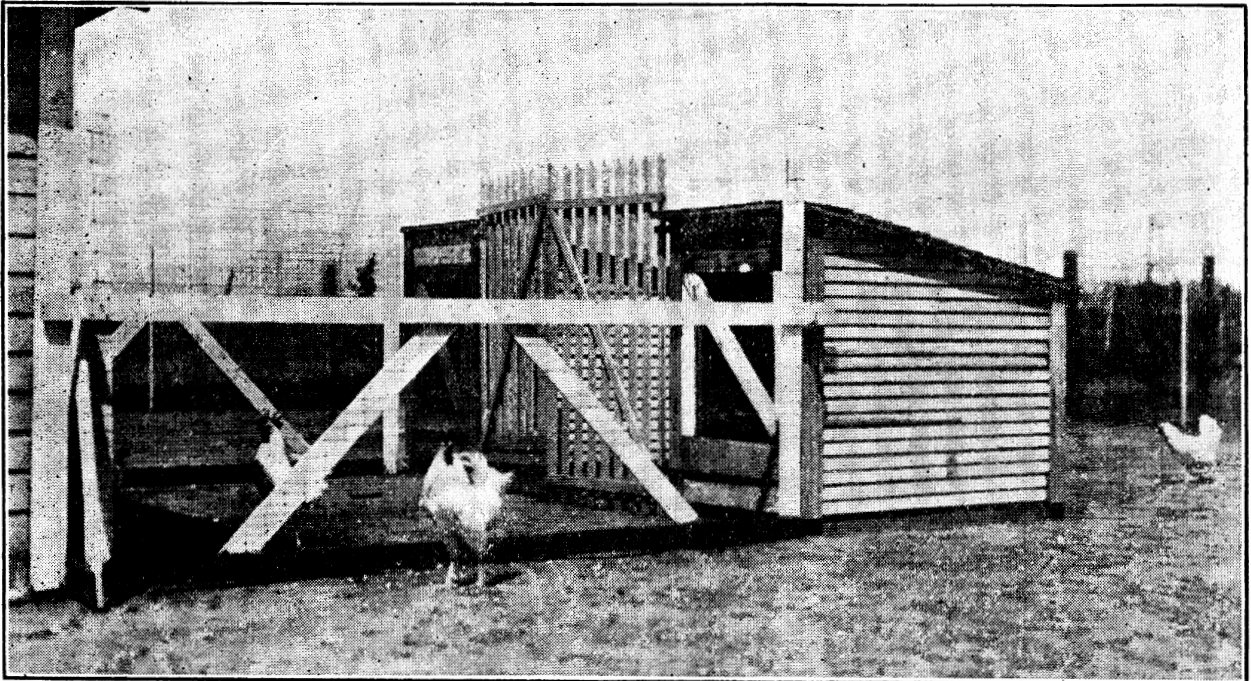
\*H. R. Naylor was in active charge of this project from November 1, 1923, until  
May 31, 1924.

## INTRODUCTION

Many poultrymen in Oklahoma feed a single scratch grain in the poultry ration, and usually feed the grain grown locally since the grains not grown locally are often higher in price. The question arises in the mind of the poultryman as to what extent it is necessary to supplement the ration with imported grains. The question also arises as to whether the grain fed furnishes the necessary food supplements essential for the building of a complete ration. This experiment was conducted to aid in answering some of these questions.

## HOUSING

The birds were housed in shed roof colony houses 12 x 12 feet. These houses had a partition running from front to back which divided them into two rooms 6 x 12 feet. The yard for each pen was 30 feet wide and 50 feet long. In each pen there was a house 3 x 5 feet which was used for confining the males that were used in the fertility and hatchability tests. These small houses had a run 5 feet wide and 12 feet long that was large enough to allow the males exercise.



NO. 1—STUD PEN AND HOUSE

## STOCK

The stock for the first year (1923-1924) consisted of Single Comb White Leghorn hens and males all selected as nearly alike as possible with regard to health, thrift, and vigor. The previous egg record was considered in selecting the hens.

The second year of the experiment (1924-1925) the stock consisted of hens that were used in the (1923-1924) experiment and pullets and cockerels

which were hatched from these hens. The pullets and cockerels were hatched March 12, 1924, in a Charters incubator. The machine was run at a constant temperature of 103°. During the first year there were fourteen females and one male in each pen. The second year not less than twenty females and three males were placed in each pen.

### THE RATION AND METHOD OF FEEDING

The first year (1923-1924) all pens were fed a mash consisting of 100 pounds of wheat bran, 100 pounds of barley meal, 100 pounds of wheat shorts, 100 pounds of meat scraps, 10 pounds of bone meal, and 1 pound of salt (NaCl). This mash was fed moist in the morning. Enough was fed to last the birds throughout the day, the grain feed being given in the evening about two hours before roosting time. The grain was fed in a deep straw litter for the purpose of inducing exercise and to encourage the greatest food consumption possible. In addition to the grain and mash each pen had access to water, oyster shell, and grit. In addition to the basal mash, pen I was fed cracked white corn as a scratch grain.

In addition to the basal mash, pen 2 was fed cracked white corn plus green feed. Each bird received about 1 cubic inch of green feed per day. The green feed was supplied in the form of sprouted oats and various other forms of succulent feed such as lettuce, cabbage, wheat and sudan grass. The oats were sprouted in a large room under electric light and were green before being fed. All the other green feeds were grown out of doors. In addition to the basal mash, pen 3 received cracked white corn and cod liver oil. About four percent cod liver oil was mixed in the mash. In addition to the basal mash, pen 4 received cracked yellow corn.

The pullets and cockerels that were used in the experiment the second year were fed for a starting feed as chicks, bran and raw eggs. This was mixed so it was quite crumbly and was fed during the day at intervals when the birds appeared hungry. Beginning on the fourth day, oat groats were sprinkled on the bran and egg mash. On the fourth day a chick mash was introduced and the birds were allowed this at all times. This chick mash consisted of the following: 40 pounds bran, 10 pounds fine ground yellow corn, 10 pounds fine ground bone, 10 pounds fine ground barley, 2 pounds dried buttermilk.

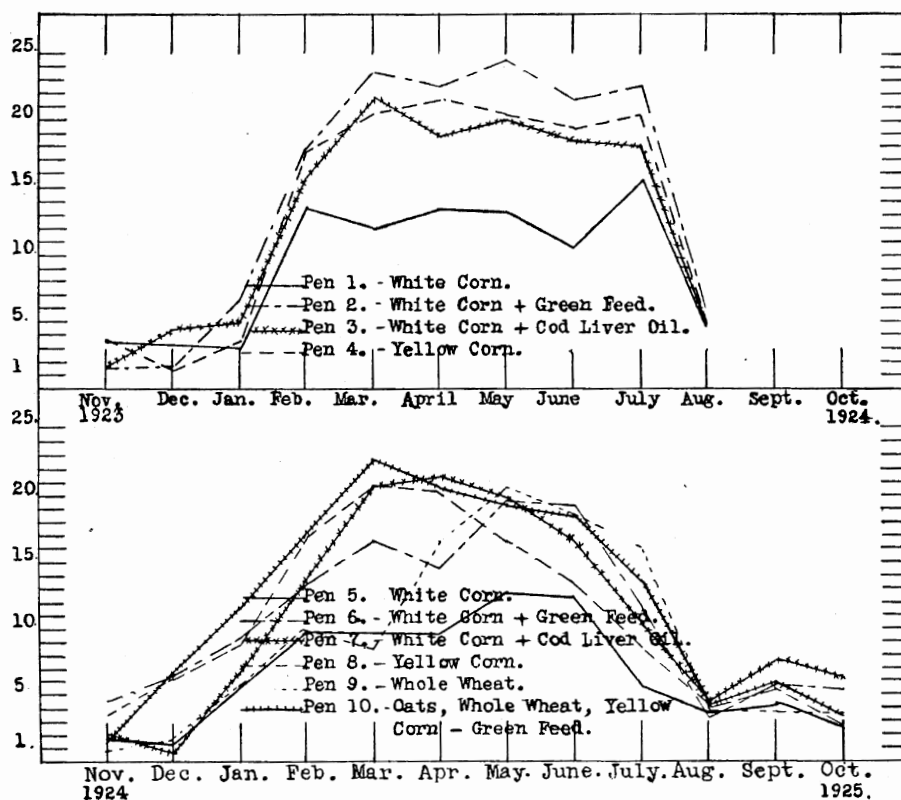
When the mash was introduced, the bran and egg feed was gradually decreased and the oat groats increased until by the tenth day the bran and egg was entirely eliminated. At ten days of age the chicks hatched from pens 1, 2, 3, and 4 were fed the rations given the adult birds in pens 1, 2, 3, and 4.

On October 1, 1924, eighteen of the most vigorous males were selected and placed in one pen. It was believed that the chances for securing fertility from the males during the breeding season would be lessened if they were not reasonably well grown. Some of the birds were not developing satisfactorily on the experimental rations. To obtain proper development before the cockerels were placed in the breeding pens, they were fed a mash consisting of 200 pounds wheat bran, 125 pounds meat scraps, 100 pounds of fine ground yellow corn, 100 pounds of pulverized barley, 100 pounds wheat shorts, 50 pounds alfalfa meal, 40 pounds cottonseed meal, 20 pounds dried buttermilk, and 6 pounds common salt (NaCl). In addition to the mash, they were fed heavy oats, cracked yellow corn and whole wheat as a scratch grain.

The mash was fed in an open hopper available to the birds at all times. Whole oats were fed about 10:00 o'clock in the morning. The oats made up about one-fourth of the total grain ration fed for the day. The wheat and corn were mixed in the following proportions: Four parts wheat and one part corn, fed about one and one-half hours before roosting time. The scratch grain was fed in a deep straw litter. Water, oyster shell, and grit

were available at all times. Also green feed was fed in abundance daily in the form of sprouted oats or sprouted barley.

FIG-I-  
AVERAGE EGGS PER HEN PER MONTH  
PENS-1-TO-10-INCLUSIVE



The second year of the experiment (1924-1925) pens 5, 6, 7, 8, and 9 were fed the base mash that was used in the (1923-1924) experiment while pen 10 was fed the mash that was used in developing the cockerels. The mash was fed dry and in open hoppers available to the birds at all times. In addition to the base mash, pen 5 was fed crashed white corn. In addition to the base mash, pen 6 was fed cracked white corn plus green feed. The green feed varied, cut grass, swiss chard, sprouted oats, chopped alfalfa, and sweet clover being used in season. The hens were fed all they would clean up in thirty minutes daily. In addition to the base mash, pen 7 was fed cracked white corn plus cod liver oil. About four percent cod liver oil was mixed in the mash. In addition to the base mash pen 8 was fed cracked yellow corn. In addition to the base mash, pen 9 was fed whole wheat. Pen 10 was fed the ration given to the cockerels. The same method that was used in feeding the cockerels was employed in feeding this pen.

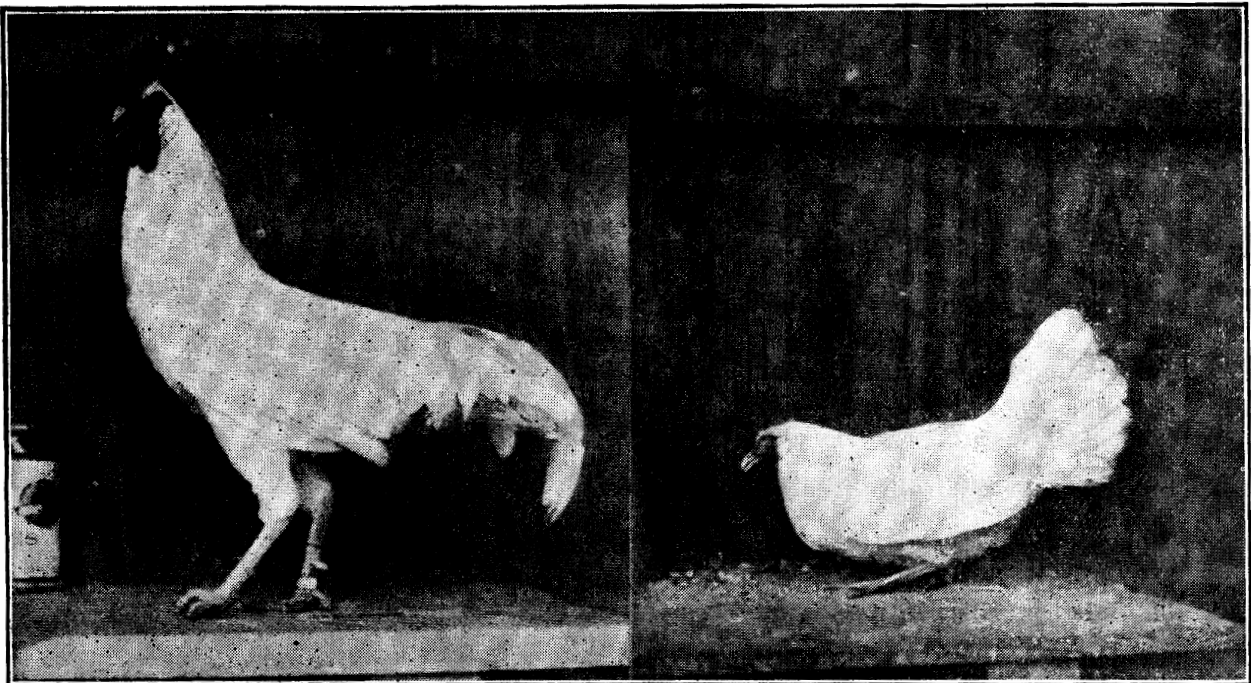
### FERTILITY

In determining the percent of eggs that were fertile, all eggs from each pen were saved for ten days previous to incubation. The first year (1923-1924) all eggs were set in a Charters incubator and the second year seven incubators were used in order to eliminate the possibility of one machine affecting the entire hatch. In each of the seven machines an equal proportion of eggs were set from each pen. This was done to keep conditions uniform. The eggs were set on the following dates: March 1, 1924; March 25, 1924; February 9, 1925; March 3, 1925, and March 26, 1925.

It is evident that these feeds did not affect the fertility during the hatching season as the fertility in all pens was good. The high percent fertility secured during the second hatching season might be explained in that one male was used for every seven females while the usual number of males for the lighter breeds is one male for every fifteen or twenty females. All males were kept in stud pens, and only allowed to run with the females long enough to obtain good fertility and while samples of spermatozoa were being collected.

### HATCHABILITY

The percent hatch from each pen is calculated from the number of fertile eggs set. Eggs that were infertile were not counted against the hatch. Although there is a variation between the hatching percent of pens 1 (cracked white corn), 2 (cracked white corn plus green feed), 3 (cracked white corn plus cod liver oil), and 4 (cracked yellow corn), these pens can be considered as giving fair hatches. Pens 8 (cracked yellow corn), 7 (cracked white corn plus cod liver oil), and 10 (oats, wheat, cracked yellow corn, and green feed), gave uniformly fair hatches. It was impossible to secure good hatches from pens 5 (cracked white corn), 6 (cracked white corn plus green feed), and 9 (whole wheat).



NO. 3—BIRDS FED WHITE CORN

TABLE 1

Egg production and mortality of hens and pullets and fertility and hatchability of eggs as effected by the different grains.

RATION	Average No of Eggs per Bird	Percent Dead Hens	Total No. of Eggs Set	Percent Fertility of all Eggs Set	Percent Hatchability of Fertile Eggs
Pen No. 1 ..... (White Corn)	67.5	50.0	120	95.8	71.3
Pen No. 2 ..... (White Corn plus Green Feed)	139.7	00.7	263	98.8	75.3
Pen No. 3 ..... (White Corn plus Cod Liver Oil)	122.1	00.7	242	93.3	70.7
Pen No. 4 ..... (Yellow Corn)	127.5	00.0	231	95.6	57.2
Pen No. 5 ..... (White Corn)	63.2	71.4	67	97.0	30.7
Pen No. 6 ..... (White Corn plus Green Feed)	120.2	31.8	267	93.2	37.6
Pen No. 7 ..... (White Corn plus Cod Liver Oil)	126.1	17.3	306	86.9	53.6
Pen No. 8 ..... (Yellow Corn)	125.0	00.0	320	97.5	48.5
Pen No. 9 ..... (Wheat)	78.8	70.0	79	92.4	38.3
Pen No. 10 ..... (Oats, Wheat, Yellow Corn plus Green Feed)	145.1	00.0	327	90.5	56.0

These averages for pens 1, 2, 3, and 4 are from November 1, 1923, to August 8, 1924. These averages for pens 5, 6, 7, 8, 9, and 10 are from November 1, 1924, to October 15, 1925.

#### RATE OF GROWTH OF THE CHICKS—1923-1924

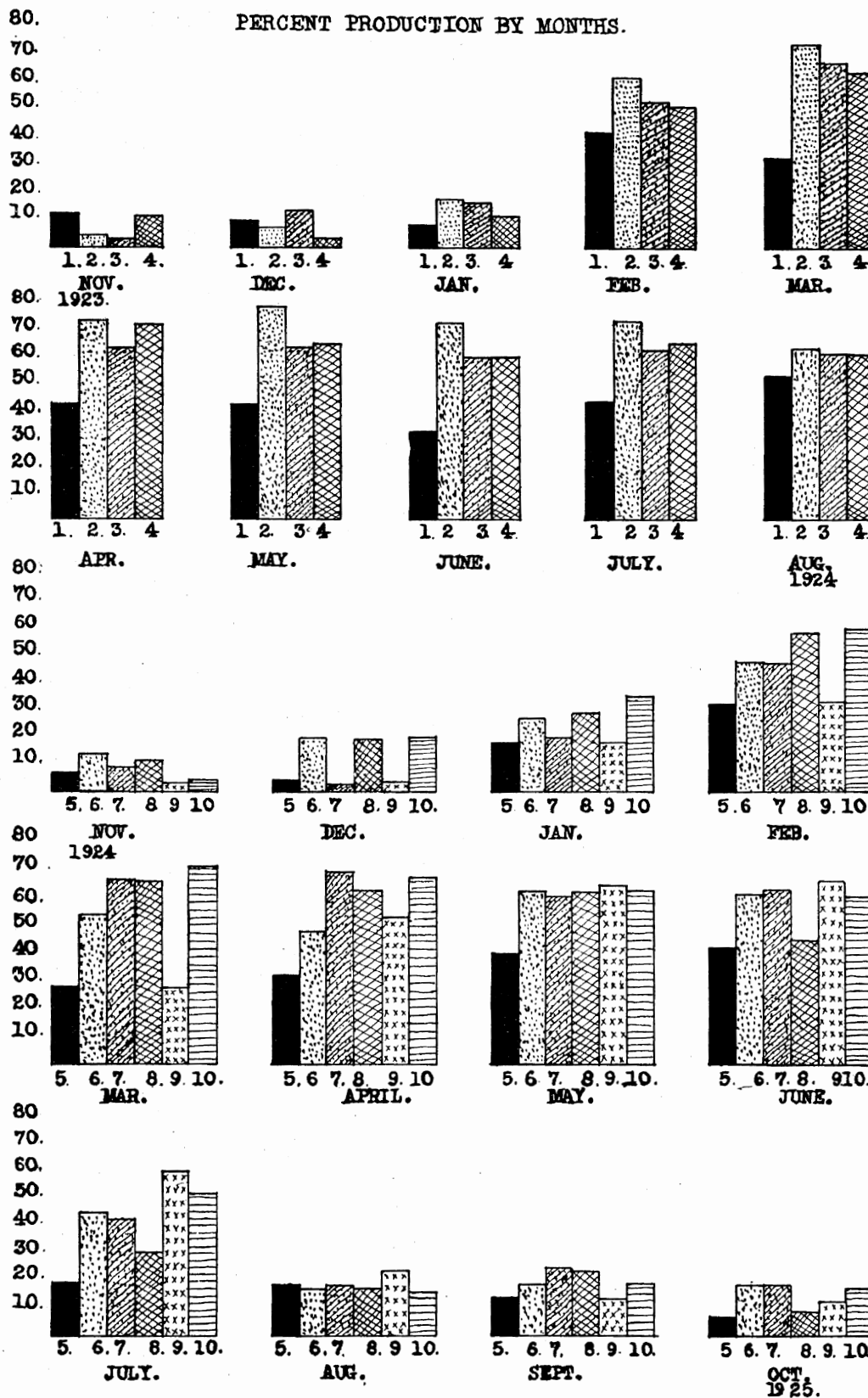
It was impossible to raise any of the chicks fed cracked white corn (pen 1) beyond five weeks of age, most of them dying before they reached this age. At five weeks of age all of the chicks were down on their legs, dying from mal-nutrition. In order to keep these chicks alive, they were divided equally among the other three pens. When in good condition, they were again placed on the cracked white corn ration. This time they gradually become weaker and weaker, and all except one cockerel died from vitamine A deficiency. This cockerel was used in the white corn pen the next year (1924-1925), but was never a strong healthy bird.

In the cracked white corn and green feed pen (pen 2) the chicks were healthy and grew normally but did not have the thrifty appearance of the birds fed cracked yellow corn. In the cracked white corn and green feed pen, only one or two chicks developed rickets. In the cod liver oil plus cracked white corn (pen 3) the chicks did not have a thrifty appearance when hatched but gave a normal growth curve throughout the period. In the cracked yellow corn pen (pen 4), the chicks were healthy and vigorous, making a good growth throughout the entire period.

In the second year of the experiment of 1924-1925, it was decided to abandon the observation on the rate of growth of the chicks due to inadequate brooding space. The chicks that were hatched from pens 5 (cracked white corn), 6 (cracked white corn plus green feed), and 9 (whole wheat), were not healthy when hatched and were, as a whole, weak and unthrifty. Many of the chicks from these pens died during the first few days of the brooding period.



FIG.-II-  
PERCENT PRODUCTION BY MONTHS.



### EGG PRODUCTION

The effect of these feeds upon egg production has been noticeable. Birds fed the cracked white corn as a scratch grain (pens 1 and 5) laid very few eggs during the year. The egg production for both years was very irregular. Cracked white corn as a single scratch grain in the poultry ration proved to be poor feed for egg production.

Cracked yellow corn (pens 4 and 8) proved to be much better than cracked white corn as a single scratch grain in the poultry ration for egg production. The birds fed cracked yellow corn were healthy and normal and laid regularly through the experimental period. Cracked white corn plus green feed (pens 2 and 6) and cracked white corn plus cod liver oil (pens 3 and 7) had about the same feeding value as cracked yellow corn (pens 4 and 8) when egg production is considered. Whole wheat (pen 9) fed as a single scratch grain proved to be little better than white corn. All birds in the whole wheat pen (pen 9) laid eggs fairly regularly, but were weak and emaciated at all times.

The birds fed the variety of grains, oats, wheat and cracked yellow corn, plus green feed were healthy and vigorous at all times and produced the largest number of eggs. This pen (pen 10) gave excellent results for the entire feeding period.

### GENERAL SUMMARY

1. The use of white corn as the only scratch grain in the poultry ration had a tendency to lower the hatchability and decrease the egg production.
2. Adult birds that were fed white corn were not healthy and many died from vitamine A deficiency.
3. In all of the lots fed white corn, the fertility was good but the hatchability was fair.
4. The chicks hatched from birds fed white corn did not have a thrifty appearance, and did not grow normally even after being transferred to an adequate diet.
5. White corn fed as the sole source of scratch grain apparently did not affect the fertility, but did decrease the hatchability of the eggs.
6. The white corn plus green feed, white corn plus cod liver oil, and the yellow corn were about equal in feeding value for egg production.
7. Wheat fed as the only scratch grain to poultry gave no better results than did white corn.
8. The birds that received wheat as a scratch grain were weak and emaciated throughout the experiment and the mortality was high.
9. The pen that was fed the variety of grains proved to be the healthiest, most thrifty, and produced the stongest chicks. These chick grew normally and were healthy and vigorous.
10. The fertility and hatchability in this pen was no better than the other pens, but the egg production was considerably increased by feeding a variety of grains in the scratch ration.