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## WILL POULTRY THRIVE ON GRAIN ALONE?

F. H. HALL AND W. P. WHEELER.

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\*Connected with Fertilizer Control.

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## WILL POULTRY THRIVE ON GRAIN ALONE?

F. H. HALL.

### **Cheap protein.**

In feeding poultry, as in feeding other animals and all plants, the nitrogenous compounds are the most expensive. We can economize in fertilizer-buying by selecting the brand or chemical whose composition proves it best and cheapest; in cattle-feeding, the shifting prices of the various by-products allow us to discriminate to our advantage in the purchase of protein; and a still wider difference separates the cost of nitrogenous materials in the many poultry foods. Fowls and ducks naturally eat considerable animal matter as well as vegetable foods. Can we economize here? Is the cheap protein of pea meal, oat meal, wheat bran or linseed meal as efficient as that in the more expensive animal meal, dried blood or fresh bone; or must we include some form of animal nitrogen in our rations to replace the grasshoppers and earth worms of natural poultry life?

### **Animal nitrogen best.**

Experiments made at the Station with chicks, pullets, cockerels and ducklings seem to indicate conclusively that part of the protein must be drawn from animal sources if we are to get the best results; and, with ducklings in particular, some form of animal food in addition to skim milk or curd seems essential for the maintenance of health and vigor.

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\*This is a brief review of Bulletin No. 149 of this Station on The Economy of Using Animal Food in Poultry Feeding, by W. P. Wheeler. Anyone specially interested in the detailed investigations will be furnished, on application, with a copy of the complete bulletin; and the names of those who so request will be placed on the Station mailing list to receive future bulletins, popular or complete as desired.

Two sets of trials were made with chicks. One lot in the first trial was carried from one-half week of age until twenty-five weeks old upon a grain mixture of corn meal (12), wheat flour (4), ground oats (2), wheat bran (1), wheat middlings (1), pea meal (1), and old process linseed meal (1), with wheat, corn, animal meal and fresh bone. The corresponding lot upon vegetable food received a grain mixture of pea meal (6), old process linseed meal (4), wheat bran (2), ground oats (2), high grade gluten meal (2), wheat middlings (1), and corn meal (1), with wheat, corn and skim milk or curd. The two rations were practically equivalent so far as amounts of protein are concerned, although the "animal meal" feed had a little wider nutritive ratio than the grain feed. The distinctive difference was that in the first ration about two-fifths of the protein came from animal sources, while in the other ration all came from grain except a little from skim milk. In the second trial the chicks were started at six weeks and carried for fourteen weeks, the contrasted rations being as in the first trial.

**Results  
with  
chicks.**

In each trial more food was eaten by the lot receiving animal protein, the gain in weight was more rapid and maturity was reached earlier, less food was required for each pound of gain and the cost of gain was less.

During the first twelve weeks of the first trial the chicks on animal meal gained 56 per ct. more than those on the vegetable diet, although they ate only 36 per ct. more; they required half a pound less of dry matter to gain one pound and each pound of gain cost only  $4\frac{1}{4}$  cents as compared with  $5\frac{1}{5}$  cents for the grain-fed birds.

During the next eight weeks the cost of gain was  $7\frac{1}{2}$  cents and  $11\frac{1}{5}$  cents, respectively. The animal meal chicks reached two pounds in weight more than five weeks before the others; they reached three pounds more than eight weeks sooner; and three pullets of the lot began laying four weeks earlier than any among the grain fed birds.

With the second lot of chicks, starting at six weeks of age, the differences were in the same direction, though not quite so strik-

ing ; thus showing that the great advantage of the animal nitrogen is in promoting quick, healthy growth and early maturity rather than increasing the tendency to fatten.

For the fourteen weeks of the second test, the more important comparative figures are shown in the table below :

COMPARATIVE GAINS OF CHICKS ON ANIMAL AND VEGETABLE FOOD.

Feed given.	For one pound gain.			
	Dry food required.	Cost of food.	Time.	
			First pound.	Second pound.
	<i>Lbs.</i>	<i>Cts.</i>	<i>Days.</i>	<i>Days.</i>
Meat meal ration....	4.6	5.6	47	30
Grain ration.....	5.2	7.1	61	38

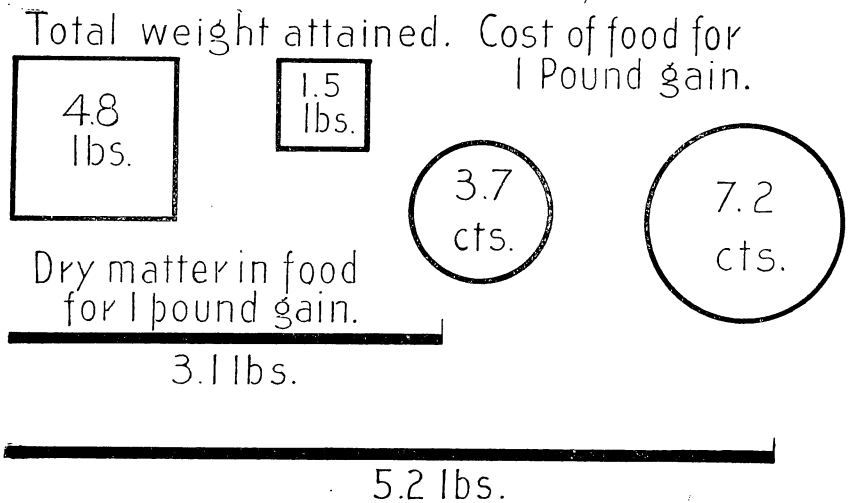
Feeding of the cockerels was begun in September when the birds were about three months old and they were fed for twelve weeks. Satisfactory gains were made for about eight weeks, the advantage being still with the animal foods ; as only 3 pounds of water-free food of the animal meal ration were required for a pound of gain against  $3\frac{4}{5}$  pounds of the grains. After this time the gain was not made economically by either lot.

The results were most convincing, almost startling, in the case of ducklings fed the contrasted rations. The two lots of ducklings were fed, respectively, on the first grain mixture mentioned for the chicks with corn meal, ground oats, animal meal, and a little skim milk and dried blood ; and on the second mixture with wheat bran, corn meal, ground oats and skim milk or curd. Both lots were fed green alfalfa ; and sand and coarse grit were freely supplied. As before, the vegetable ration contained a little more protein—its nutritive ratio was slightly narrower—but so much more of the other ration was eaten that each meat-fed duckling received more protein. Of this nearly one-half was from animal sources.

Before the experiment had been long under way it was noticed

that the "animal meal" birds were developing rapidly and evenly; but the grain-fed ducklings were becoming thin and uneven in size. It was sometimes almost pitiful to see the long-necked, scrawny, grain-fed birds, with troughs full of good, apparently wholesome food before them, standing on the alert and scrambling in hot haste after the unlucky grasshopper or fly which ventured into their pen; while the contented-looking meat-fed ducks lay lazily in the sun and paid no attention to buzzing bee or crawling beetle. The 32 meat-fed birds lived and thrived; but the vegetable food birds dropped off one by one, starved to death through lack of animal food, so that only 20 of the 33 were alive at the close of the fifteenth week of contrasted feeding. They were then fed for four weeks on the meat meal ration, and made nearly as rapid gains as the other lot at the same size, two months before; but they never quite overcame the disadvantage of their bad start on grains alone.

Some of the comparative averages for ten weeks **Results with** from birth, the period of profitable growth for the **ducks.** larger ducks, are shown graphically below, the first figure or upper line representing the meat fed birds in each instance :



In conclusion, then, it may be said that rations in **Meat best.** which from 40 to 50 per ct. of the protein was supplied by animal food gave more economical results than rations drawing most of their protein from vegetable sources. The chief advantage was in the production of rapid growth, although the cost of production is also in its favor. While inferior palatability may have had something to do with the marked results, especially with the ducks, the whole bearing of these experiments and others not yet reported seems to indicate that the superiority of the one ration is due to the presence in it of animal food.