

rate of egg production was obtained with the group receiving the diet supplemented with 0.25 percent phosphorus.

Feed utilization was associated very closely with the rate of egg production for the birds in this experiment. A substantial reduction in the amount of feed required to produce a dozen eggs was obtained when the diet was supplemented with 0.05 percent phosphorus. No further improvement in utilization of feed was noted when additional phosphorus was added to the diet.

Fifty percent of the birds died in the group which received the basal diet and 55 percent died in the group receiving the diet supplemented with 0.05 percent phosphorus. Significantly fewer birds died when the diet was supplemented with 0.10 percent phosphorus, and a further reduction in mortality was observed when the level of supplemental phosphorus was increased to 0.20 and 0.25 percent of the diet. The birds receiving diets containing low levels of phosphorus developed leg weakness and were unable to stand for several days prior to death. Many of these birds layed two to three eggs after this leg weakness occurred.

## EFFECT OF FEEDING VARIOUS LEVELS OF CALCIUM AND PHOSPHORUS TO HENS IN CAGES

### EXPERIMENT 5 (1960-61)

**Procedure.**—The calcium level was maintained at 2.3 percent in the first 4 experiments, therefore, in view of recent reports that egg shell quality could be greatly improved by feeding higher levels of calcium (Petersen *et al*, 1960 and Harms and Waldroup, 1961) it seemed desirable to determine whether these increased calcium levels would alter the phosphorus requirements of the laying hen.

Forty-eight groups, each containing 5 commercial egg production type pullets (Hy-line 934A) maintained in individual cages, were used in this experiment. These pullets were grown on a program similar to that used in Experiment 2, and were placed in cages at 23 weeks of age at which time the experiment was begun.

The composition of the basal diet, containing 2.0 percent calcium and 0.345 percent phosphorus, is shown in Table 1. This diet was modified by the addition of defluorinated phosphate and ground limestone to form 11 other experimental treatments