

as shown in Table 5. The factorial design included 3 levels of total calcium (2.0, 3.75, and 5.50 percent) and 4 levels of total phosphorus (0.345, 0.395, 0.445 and 0.80 percent). The amount of yellow corn, soybean meal and animal fat was varied in the experimental diets in order to keep them iso-caloric and iso-nitrogenous.

Daily collections of eggs were made and production records were kept for individual hens, however, rate of egg production is reported on a hen-day basis. At monthly intervals, thickness of shell of 1 egg was measured from each pullet that was laying. Measurements were made at the equatorial plane of the egg with a Starrett ratchet-stop micrometer calibrated in millimeters. This experiment was terminated at the end of the ninth month.

Results.—Increasing either the level of calcium or phosphorus in the diet resulted in significantly increasing rate of egg production (Table 5). Supplementing the basal diet, which contained 0.345 percent phosphorus, with 0.05 percent phosphorus resulted in improving rate of egg production by an average of approximately 8 percent when all levels of calcium were considered. Further increases in the level of supplemental phosphorus gave an improved rate of egg production.

Increasing the calcium content from 2 to 3.75 percent over all levels of phosphorus resulted in significantly increasing rate of egg production. Rate of egg production was comparable for the groups of hens receiving the diets containing 3.75 and 5.0 percent calcium. The calcium \times phosphorus interaction as measured by rate of egg production was not statistically significant.

As the level of supplemental phosphorus was increased the amount of feed required to produce a dozen eggs was significantly decreased (Table 5). Also feed utilization was significantly improved when the level of total calcium was increased from 2.0 to 3.75 percent. A further increase in calcium content did not affect feed utilization. These differences in feed utilization are not considered to be meaningful since rate of egg production varied greatly among the various groups, therefore, these differences are primarily attributed to differences in rate of egg production.

Thickness of egg shells was not influenced by the level of phosphorus in the diet (Table 5). Increasing the level of calcium from 2 to 3.75 percent resulted in significantly increasing thickness of egg shells. A further improvement in egg shells