to the fertilizer experiment, the calcium content decreased from 636 to 80 pounds per acre and the pH from 5.6 to 4.8. For this period there was an increase of phosphate and potash in the soil. These results indicate that soil in a 3-year rotation should receive 1 ton of lime per acre approximately every 5 years to maintain a calcium level high enough for good growth of legume crops.

In a study of the soil profile it was found that the calcium and magnesium decreased in the surface soil and some moved into the subsoil. Some of the potassium tended to move into the layer below 12 inches, but the largest concentration was in the top 6 inches. Most of the phosphorus remained in the top 6 inches of soil, with a slight movement into the second 6-inch layer. The latter is probably due to plowing deeper than 6 inches.

Soils data from 4 replications of the lime experiment for 1956, and 1957 are present in Table 32. These and unreported data indicate that 1 ton of lime applied approximately every 5 years would be required to maintain the original pH of 5.6. There was an increase in the phosphate, potash and calcium content of the limed plots, but in the plots without lime there was a loss of calcium. Two tons of lime applied approximately every 5 years would be required to maintain a pH of 6.3 in Norfolk loamy fine sand.

The effect of dolomitic lime on pH and the movement of phosphorus, calcium, magnesium and potassium in the soil is shown in Table 33. With 1 ton of lime applied to the soil there was very little movement of calcium into the second 6-inch layer of soil. With 2 tons of lime applied to the soil there was some movement of calcium into the 6- to 12-inch layer, but no movement into the 12- to 18-inch layer of soil. When 3 tons of lime were applied to the soil, calcium moved into the 12- to 18-inch layer of soil, but there was no movement of calcium below 18 inches.

There was a large movement of magnesium from the surface layer into the 18- to 24-inch and 24- to 30-inch layers. As most of the magnesium had moved into the 24- to 30-inch layer, deeper samples of the soil profile no doubt would have shown that large quantities of magnesium had moved into the layers of soil below 30 inches, and possibly a large quantity had been lost from the soil in the drainage water. Since magnesium moved down the soil profile much faster than calcium, magnesium deficiency was found on many more soils than calcium deficiency, and especially on old land that had never received dolomitic lime.