Field peas have been the most promising of legumes for maintaining soil nitrogen and organic matter at the branch experiment stations at Moro and Burns, Oregon [17]. On the dry land experiment farm at Moro it has been found practical to grow peas annually. Peas have a short season of growth, their residues decay readily, and they do not so thoroughly exhaust the soil moisture that succeeding crops "burn out" as occurs after deep-rooted legumes.

The possibilities for improvement of grain land in nitrogen and organic carbon has been indicated by Jones and Yates [9] and by De Turk [5]. In Idaho [8] and Utah [6] experiments, growth of field peas has proved beneficial on dry-farmed soils. Wood [18] listed field peas among legumes found to gain nitrogen in excess of that supplied. Abey [1] found the nitrogen fixed by peas was greater with poor or unfertilized soil. Lyon and Wilson [10] reported that 10 years of field pea green manuring with the crop planted in July and turned under in the fall gave a loss of 380 pounds of nitrogen an acre. Mooers [11] found a slight gain in nitrogen from the second decade of green manuring with cowpeas. Austrian winter peas are being used extensively in the South Atlantic states, where they are becoming one of the most highly valued green manures [3].

It has recently been shown [13] that it is entirely practicable to improve the soil's supply of organic matter by manuring, crop rotation, and moisture control. At the Oregon Agricultural Experiment Station a definite accumulation of soil nitrogen and organic carbon has resulted in 16 years from a 3-year rotation of barley, clover, and beans grown on Amity'silyt clay loam. The gain in soil nitrogen was 224 pounds an acre to plow depth under rainfall farming and 380 pounds with supplemental irrigation. Manure applied at the rate of 10 tons an acre each third year resulted in a gain of 320 pounds of nitrogen without and 408 pounds with irrigation. With rotation and manure used in combination the gain in nitrogen was 544 pounds without watering and 788 pounds an acre when irrigated.