NODULES on the roots of legumes appear and develop as the plant expands its leaves and approaches the production of seed. They appear to remain on the plant or on the stubble as long as their metabolism harmonizes with that of the plant and are lost apparently only when the plant or its root system is placed under adverse conditions. They derive carbohydrates from, must be nourished by, and demand other relations with the plant if they are to survive. When one or more of these physiological relations is disturbed, some of the nodules cease to perform any useful function, use up their stores, reach a senile condition, decompose through the activity of autolytic enzymes and microorganisms, and liberate their nitrogen and other constituents in the soil.

The content of nitrogen of nodules is usually much higher than that of any other part of the plant. According to Joshi (4), the content of nitrogen of the nodules of San-Hemp one week old was 10.81% of the dry weight, while that of nodules 6 weeks old was only 3.36%. It appeared possible that decomposing nodules have dissipated a portion of their nitrogen before visible detection of decomposition is evident. If nodules with varying contents of nitrogen are shed, they should behave like decomposing organic matter in the soil. Evidence that organic matter is available from plant roots is provided by the fact that the highest population of organisms in the soil capable of decomposing plant residues is found near the roots. Since the nodules are rich in nitrogen and decompose readily, the nitrogen they contain should be available or become available to any plant or organism growing on or in the soil.

Observations by Wilson (11) indicate that a reduction in the moisture content of a soil caused a shedding of nodules from Phaseolus and that new nodules succeeded the lost ones after the original content of moisture was restored. Wilson suggested that this alternate shedding of nodules and the development of new ones might occur several times during the growing period of the plant if moisture relations were changed. Each time the shedding occurred the nitrogen in the shed nodules was liberated in the soil. Conditions other than a lowering of the moisture may produce the same effect according to Giltner (2) and Leonard (5). Thus, environmental factors may cause the liberation and circulation of the nitrogen fixed in the nodules during the growing period of the plant.

Experiments by Lyon and Bizzell (7) showed that timothy grown in association with alfalfa, and oats grown either with peas or clover contained a higher content of nitrogen than when grown alone. The explanation of these findings was that the roots of these legumes...