Plowing with the moldboard plow, which places the residue at the bottom of the furrow, has been the common practice as the initial step in the preparation of a seedbed. It has been recognized for some time that maintaining residue on the surface is very helpful in controlling wind erosion and in the conservation of soil and water in areas of limited rainfall (1, 2, 6, 12).

Over a considerable portion of the Corn Belt it is the conventional practice to seed oats on cornstalk land by disking instead of plowing. The amount of residue remaining on the surface depends upon the condition of the disk and the number of operations, but in general the surface is reasonably well protected by residue.

The Missouri system of small grain and lespedeza (7), which has proved so popular in that state, is essentially a “trashy” system of farming, in that the seedbed is prepared with a disk or a field cultivator, leaving a considerable portion of the residue on the surface or mixed with the first few inches of surface soil. This practice has been shown to be effective in reducing the loss of soil and water (5).

The possibilities of maintaining residues on the surface in the production of intertilled crops were shown by Duley and Russel (3) in studies started in 1939. Shedd, Davidson, and Collins (9) started similar studies in 1939. Some of the more recent results of these studies have been reported by Shedd (4) and by Shedd and Norton (10).

The important problems of farm machinery and soil conservation have been reviewed by Nichols and Gray (8).

EXPERIMENTAL RESULTS AT AMES

At Ames the earliest investigations of practices which may be considered mulch culture were initiated in 1939. The primary object was to determine the possibility of reducing labor and power requirements for corn production rather than to control soil and water losses.

Replicated plot experiments were performed on a field on which soybeans had been grown the previous season. The soybeans had been threshed by combine and the straw left on the field. One series of plots was plowed and the soil was worked at the time of plowing by a section of rotary hoe attached to the plow (Fig. 1). This served to break clods and pack the lower layers of the seedbed. Initial preparation of the other series of plots was by tandem disk harrow.

The average yield of the plowed plots was 60.9 bushels per acre, while the average yield on disked plots was 58.2 bushels per acre. This difference was not statistically significant. The difference in expenditure for seedbed preparation amounted to $1.53 minutes per bushel on the plowed plots, while only 0.92 minute per bushel was required on the plots prepared by the disk harrow. The soybean straw left on the surface interfered considerably with corn planter operation and some bunches of straw left on the unplowed plots were hauled off the field after planting to avoid trouble in cultivating.

Plowing was compared with tandem disking, twice over, for corn production on another area where the previous crop had been corn. Analysis of yields show that 83.1 bushels per acre were secured from the disked areas while the

Fig. 1.—A section of rotary hoe, pulled backward on plowed plots at Ames to break clods and pack the soil. Note that the section may be weighted if desired.