

permit thorough cultivation alternating with the smothering crops. For the subjection of weeds no arrangement yet has proved so satisfactory as the three year rotation; first year hoe crops including corn, roots, rape and potatoes, followed the second year by the various cereals, and these are seeded down to clover for the hay crop of the third year. A more popular general rotation, the four year system, differs from the first in leaving the land two years in a mixed clover and timothy sod, instead of taking from it but the one crop of hay.

So far as the destruction of weeds is concerned the principles involved in the two rotations are precisely the same, and may be enumerated about as follows: In importance shallow plowing may be ranked high in the list. Many weeds are indigenous to our farms, and so full has the soil become of their seeds that every successive plowing turns them up in countless numbers. Every additional inch in depth of plowing implies the upturning of more seeds, and, at the same time, the burial for preservation of myriads more. By shallow cultivation in the fall the vast majority of the seeds in the top four inches of soil may be germinated, and then, by the use of improved machinery, destroyed at a minimum cost. Equal in importance to shallow plowing is the frequent introduction of hoe crops, as they permit the use of the most ingenious weeding devices, and besides, require the employment of hard labor, and where these two are skilfully and intelligently employed there is little chance for weeds surviving the summer.

Within the past few years the cultivation of grain crops has been made possible, its practice proved so successful, and its possibilities, especially in this line, so advantageous, that it well deserves notice here under a separate paragraph. The implements employed for such tillage are known as weeders, among which Breed's weeder, a tool made up of a single light beam to which long rake like teeth are attached, is a common example. Its light weight, while too slight to injure the strong growing grain, is sufficient to destroy the newly germinated and weak growing weeds, thus rendering the crop invaluable assistance by enabling it to far outgrow its plant enemies, and to successfully prevent their harmful development. With the hoe crops too the weeder may be used to great advantage. When the young plants are just breaking through the surface an ordinary scuffer