

NATURAL RECOVERY FROM CROPLAND

By G. E. KLIPPLE

MAN has been a chief factor disturbing the natural forces which maintain the plant cover of the earth's surface. He has cut down or burned much of the virgin timber and broken the sod of prairies and plains in his struggle for food, clothing, and shelter. Early settlers of the front range of the Colorado Rockies turned to cultivated crops to increase the food supply. Many acres of foot-hill valley land were cleared and broken out for crop production. Cultivation proved unprofitable after a time and now many areas have been abandoned to the natural forces influencing the region. Nature has accepted the responsibility and is doing her very best to heal the man made scars and cover the old fields with a blanket of permanent vegetation.

We are interested now in the way nature works to get the job done. In the course of a study by the Rocky Mountain Forest and Range Experiment Station, (1) to determine means for the rehabilitation of abandoned crop lands in Manitou Park we had an opportunity to observe the changes taking place on land that had been out of cultivation for periods of 3 months to 62 years. This wide range in the time during which nature's reclaiming forces have been at work in different fields gave us a fine chance to study the early, medium, and late stages of recovery.

The plants which offer first aid to abandoned fields are lowly barnyard weeds such as pigweeds, lambsquarters, knot-weeds, sunflowers and foxtails. Their sturdy, branched stems break the force of late summer's violent thunderstorms. They dry to a rather persistent stubble which holds winter's snows in place. Two or three seasons of this vigorous first aid

treatment makes it possible for the more healing perennial weeds and some grasses to become established. One-sided penstemon, butter-and-eggs toadflax, and trailing fleabane usually are the first of the perennials to appear. They are conspicuous due to the flower garden appearance their almost pure colonies give the old fields for a year or two. Other perennial plants like milk-vetch, thistle, dandelion, hairy goldaster and tumblegrass add their bit by invading the colonies of early perennials thereby developing a typical mixed weed plant cover. Weedy plants are dominant for eight or ten years after cultivation has ceased.

Soil building grasses like wheatgrass, needlegrasses, blue grama, and mountain muhly appear as single plants soon after the perennial weeds take over from the annual weeds. They pass unnoticed for several years unless we look carefully for them. Their fibrous roots are working steadily to increase their hold on the land. Gradually they gain strength and become able to compete on an equal footing with the weedy plants. This medium stage of the recovery is characterized by a mixed grass-weed plant cover. Here and there young ponderosa pines and Douglas firs, survivors from seedlings established during the weed stage, push their tops above the surrounding vegetation. Shrubby plants like fringed sagebrush and rose bushes usually have become established to some extent by the early grass-weed stage.

Changes in the plant cover become less abrupt as the time since cultivation increases. Nature does make slow but steady progress unless she is hampered by retarding factors such as erosion and heavy grazing use of the vegetation. The

grasses become more prominent and the weeds less so. There are changes also in the dominant grasses. The wheatgrasses and stipas give way to the gramas and mountain muhly. As the humus content and water holding capacity of the soil improve other species such as Arizona fescue, sedges, western yarrow, geraniums and groundsels become established. These species together with mountain muhly and little bluestem are the most abundant species found on areas which never were plowed. On the other hand the first aid annuals have not entirely given up. Individual small and unthrifty pigweed, lambsquarter, and sunflower plants still producing viable seeds can be found in bare spaces between grass clumps, 30 to 40 years after cultivation was stopped.

As the soil building progresses during the late stages of recovery the grasses take over more and more of the ground space. Plants of the numerous species compete with one another for the sunlight and moisture they need. Changes are gradual from season to season. Nature is striving for the best pos-



A First Year Annual Weed Crop in the Foreground with an Early Medium Recovery Field in the Middle Background.

sible balance between the grasses, weeds, and shrubs as she weaves her protecting blanket of vegetation for the life giving soil.

An Advanced Medium Recovery Field Abandoned About 15 Years but Protected from Grazing for the Past Ten Years.

