

ardent do they become sometimes that they insist on no cutting of timber, no grazing, and no hunting whatsoever.

But while seeking to preserve, they may easily set up conditions that will have an entirely opposite effect. What happens if man never cuts any trees? Often 30 or more seedlings start to a square foot, or over 100,000 to the acre. Competition for light, moisture, and soil nourishment is very severe and obviously many trees must die and be wasted before others can get room enough to reach large size. Eventually, old age, fungi, insects, or fire will destroy the remainder. This sort of protection has little in its favor. On the other hand, if man had harvested and used the surplus and mature trees before they rotted, the remaining trees would have grown faster. Harvesting need not mar the beauty of the landscape.

Denuded mountainsides, polluted water, and camp grounds frequently damaged by livestock have aroused the ire of nature lovers, but millions of acres in the West produce valuable forage that in many instances can be utilized without harm to recreational or aesthetic values. Livestock even contribute to these values. Bands of well-managed sheep grazing peacefully on the slopes add life to mountain scenery, and grazing cattle often draw attention to beautiful mountain meadows.

Even Game Must Be Thinned

Ruthless destruction of big game has brought about the closing of large areas to hunting. But even this sort of protection has its dangers. Game must eat. Their range can not be overstocked without damage. Regulated use of the surplus game is absolutely essential. Otherwise the herds will suffer from shortage of food, reduction in the rate of increase, and disease.

People seeking recreation in the forests get their diversion and refreshment by activities that stimulate both mind and body. Real physical recreation comes as the result of effort, and there is a real stimulus in the study of flowers, trees, rocks, and animals.

A scientific interest in making trees grow better and faster and an understanding of the difference between wise use and useless waste brings an added pleasure in forest recreation. With the increase in population and the growing concentration of people in cities, the desire and need for mountain playgrounds increase. The number of visitors to the national forests has jumped 1,000 per cent since 1917. More and more people are learning the value of outdoor recreation and feeling the need for it. But their recreational tastes can and should be developed to appreciate those arts which not only preserve, but produce more beauty, those arts which intelligently harvest forest crops that would otherwise be wasted.

DANA PARKINSON, *Forest Service.*

FOREST Restoration a Complicated Job on the Eastern National Forests

Within many of the eastern and southern national forests, cutting and disastrous fires have taken all the virgin timber on large areas and left the land almost totally devoid of merchantable growth. In many cases, repeated fires have destroyed seed trees and reproduction, and seriously lowered the productive capacity of the soil. Forest weeds,

such as pin cherry, hercules club, sassafras, and scrub oak, frequently cover such areas, and briars, annual weeds, grasses, ferns, and mosses are often abundant. Natural reforestation of the area by valuable timber species decreases because of the lack of seed trees and the unsuitable seed bed, while the undesirable cover increases.

Where such areas exist, careful planting surveys must be made to determine the amount of planting stock of suitable species and age classes that must be produced in the nursery for reforestation purposes. The chief forest nursery in the eastern region is located at Parsons, W. Va., on the Monongahela National Forest. It has an authorized capacity of 3,000,000 trees annually, largely red spruce transplants. (Fig. 60.)

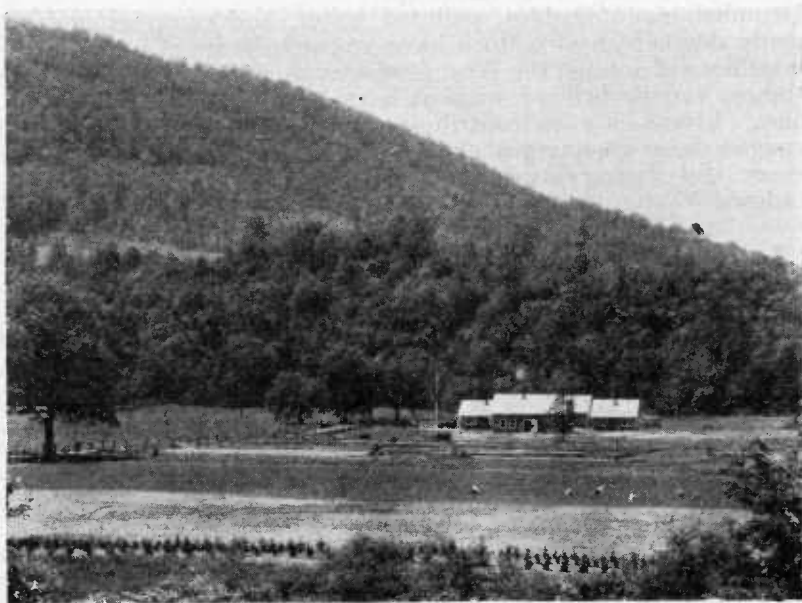


FIGURE 60.—The Parsons nursery, Monongahela National Forest, W. Va.

At Russellville, Ark., the Ozark nursery is operated on a basis of 1,000,000 shortleaf pine seedlings annually. Small experimental nurseries are located on the Ocala and Choctawhatchee National Forests in Florida.

Any reforestation program demands an adequate supply of seed. Many tree species grow over a wide geographic range, and it has been proven that seed from the southern portion of the range of a certain species is not suited to the production of planting stock for use in a decidedly more severe climate. It is essential, therefore, that seed be collected from thrifty trees in a location climatically similar to the area on which the young trees are to be planted.

The Handling of Planting Stock

Planting stock must be lifted just prior to the planting season, sorted, counted, bundled, packed, and shipped by train or truck to the planting site. Here it is heeled in until planted. Most of the planting

on eastern national forests is done in the early spring, although in the southern pine region, the planting season is from December to February. Planting camps are usually organized with sleeping quarters, mess tents, and tools. Planters are hired locally—farm or woods labor being preferred. Crews of from 10 to 14 men are used, each crew in charge of a trained foreman. On the more northern forests, such as the Monongahela and Allegheny, the square-hole method of planting is used. The hole is dug with a mattock or special planting hoe, the tree is set in the center of the hole, and the earth firmly tamped around it.

Conditions on the Monongahela, in West Virginia, are similar to those on the Allegheny National Forest in Pennsylvania. (Fig. 61.) The brush, if not too dense, provides some protection for the planted trees, and does not greatly hinder the work of planting. The ground cover, however, and especially the mass of roots in the top layer of soil, makes planting more difficult, and lessens the moisture available for the

planted trees. Well-developed planting stock carefully planted is essential in securing good survival. Norway pine and Norway spruce have given the most promising results so far on the Allegheny, while red spruce is best suited to the Monongahela.



FIGURE 61.—Crew at work on a typical area in need of planting, Allegheny National Forest, Pa.

On the Ozark National Forest in Arkansas, the areas to be planted

are old fields, most of which are no longer suited to cultivation. Short-leaf pine seedlings are planted on these areas in order to enable them to produce once more the crop for which they are best suited—timber.

In Florida, on the Choctawhatchee and Ocala National Forests, the problem is to plant longleaf pine on dry, sterile, sandy soils, devastated by repeated fires. The fire hazard is high, and scrubby oaks and other brush offer serious competition.

Experimentation to develop an effective technic prior to extensive reforestation is now under way on both the Choctawhatchee and Ocala.

With a tap-rooted species, such as longleaf or slash pine, the slit method of planting is satisfactory and economical. A vertical slit is made in the soil with a planting bar and the roots of the seedling are inserted in the slit, which is then closed by pressing the earth firmly against the roots with the planting bar and the heel.

Fire is the most serious enemy of planted forests. Plantations must be protected by firebreaks, roads, and trails, and during dangerous periods by lookouts and supplementary patrol.

Severe drought causes losses in plantations. Weak trees and those poorly planted are less able to survive extreme conditions than thrifty

trees carefully planted. Rabbits, porcupines, insects, and diseases may also become destructive to plantations.

On the Allegheny National Forest deer cause considerable injury by browsing the young trees. Areas which show evidence of intensive use by deer should not be planted.

White pine is not being planted extensively on eastern national forests because of the prevalence of the white pine weevil and the white-pine blister rust. This species is being used, however, to a limited extent on the Shenandoah, Natural Bridge, Unaka, and Pisgah National Forests. On the Shenandoah, wild currants and gooseberries (*Ribes* spp.), alternate hosts for the blister rust, occur and a definite program of eradication is under way. The disease, however, has not yet been found south of Pennsylvania. South of the Shenandoah there is little danger of infection of pine stands.

Artificial reforestation on the eastern national forests is by no means a simple task; it is complicated and arduous. Saw timber, pulpwood, and other forest products from acres now idle, and the regulation of stream flow will, however, justify the effort and cost.

L. S. GROSS, *Forest Service.*

FORESTRY Is an Aid to the Farmer in Controlling Erosion Soil is the farmer's greatest asset, and the prosperity of any nation is dependent upon this basic element. American farmers have had so much good farm land that its abundance has often led to careless use or even to complete destruction of this most valuable resource. Erosion or soil washing



FIGURE 62.—This steep hill land should have been kept in woodland. After a few years of careless and unprofitable cultivation it has been abandoned. The old corn rows running up and down hill are rapidly becoming a maze of gullies

has probably ruined more good farm land than any other single factor. (Fig. 62.)

Threatened loss of his farm by financial disaster would stir the owner to action, but gradual loss by erosion seldom worries him until