

this system, provided that the thinning has been carefully done, is considered to be equal to that of any other system, and it has the advantage over some of the other systems in that the produce is more easily removed from the ground. Where climatic conditions make it difficult to grow trees on cleared land this system should not be adopted. In districts where the rainfall is small the soil becomes hard and parched, and the trees have a struggle for existence until they are large enough to protect the soil from the sun and wind. Again, this condition would recur when the plantation has been well thinned, and would be prejudiced to the development of the trees into a large size. The soil will always deteriorate from exposure, and on hilly country it is liable to be washed away, so that the benefit of the accumulation of humus left by the first crop is lost to the next crop. Clear cutting is suitable only where the rainfall is sufficient, the land good, and the climatic conditions otherwise favourable to the growing of young trees. Another method in which clear cutting is adopted is to first form a plantation of a light-demanding species. When this is thinned sufficiently it is underplanted with a shade-enduring species, which is allowed to grow up amongst the original crop in a two-storied fashion until both the first and second crops are of equal height and of marketable size, when it is clear cut.

The other systems of growing high forest all provide for the formation or regeneration of the forest under the old crop. In some cases planting is done, while in others natural regeneration is effected by protecting the seedlings that spring up under the shelter-trees. Under all of these systems nature's methods, such as we may see illustrated in any of our native forests, is either copied or slightly modified.

In a natural forest, seeds which fall from mature trees often fail to germinate owing to the want of light. If, however, a large tree is blown over, a gap is made through which the light can penetrate to the ground, with the result that any seeds that may be on the ground germinate, and gradually grow up to take the place of the fallen tree. In a forest of this kind we find trees of all ages, from the seedling to the adult stage. In an artificial forest, nature's methods are assisted by the removal of trees and the protection of any seedling that spring up. Several methods are adopted to assist the natural regeneration of forests, but in every system seed-bearing trees must be left so as to insure a crop of seedlings to take the place of any trees that are removed. The system of selection by single trees, which most resembles nature's method, is not entirely satisfactory, because the removal of a single tree may not give sufficient light for the proper development of the seedlings. Again, the removal of large-sized trees through an uneven-aged forest, besides being costly, causes much damage to the growing stock. This system, more than any other, assures the protection of the soil, and is admirably adapted for forests where the protection of the soil is of paramount importance, such as catchment-areas for reservoirs, or the sources of streams which supply power for manufacturing. If instead of removing single trees to allow of natural regeneration by seed, trees throughout a whole compartment are removed evenly, in sufficient numbers to permit of the growth of seedlings, the work, being more concentrated, does not require so much skill, nor is it as costly. On the other hand, the disadvantages of this system are that seed-bearing trees may not be evenly distributed over the area to be restocked, and, consequently, an uneven growth of seedlings results, which can only be rectified by planting up the barren portions. In forests that are composed of more than one species in mixture, and it is desired to perpetuate each species in certain proportions, it may happen that one species may seed better than another, thus making it difficult to preserve the mixture in due proportions. Under this system a failure in getting a good crop of seedlings would probably leave the land unprotected too long, thus causing deterioration in the humus and a cessation of growth in the standing trees. The compartment system may be modified by regenerating the forest in strips instead of large compartments. By this method smaller portions are taken in hand, and thoroughly regenerated before another strip is prepared. When the whole block has been treated in this manner it is composed of strips of trees of varying ages.

Natural regeneration can also be effected by what is known as the "group system." Groups of seed-bearing trees are selected at points throughout the forest. These are thinned to allow of the germination of the seed, and when regeneration has been accomplished contiguous portions of the forest are taken in hand and dealt with in a similar manner. Thus the radius of each regenerated group gradually increases until one group merges into another group. This process is repeated until the whole of the forest has been regenerated, with the result that the area is stocked with groups of trees of varying ages. Under this system the soil on the areas thinned gets the protection of the surrounding dense forest, and currents of air are not so harmful as under the compartment or strip system. Another advantage is that the shelter-trees can be removed across land that has not been regenerated, and thus no young stock is damaged, and the work is thereby rendered much easier.

All of the systems which have been briefly described are capable of being modified to suit the special requirements of a locality. For instance, if timber of extra large size is required, some of the shelter-trees over an area regenerated by seed may be left to grow until the young crop is ready to cut. Species that are tender in their young state could be planted under the shelter-trees, instead of allowing the natural regeneration of the shelter species. This system is especially suitable for growing the broad-leaved species in districts where the frost damages their growth.

*Seed-supplies.*—The question of seed-supplies has in a great measure determined the species of trees that have been selected for extensive cultivation in our plantations. The seed-merchants of Europe and America deal especially in the species of trees that are used in afforestation work in the Northern Hemisphere, hence these are the only kinds that can be procured cheaply, and in fairly large and regular quantities. Many of the trees we have tried are well adapted for extensive cultivation here, but the uncertainty of getting supplies, and the high cost of the seed, rendered the extensive cultivation of them impossible. Imported tree-seeds are usually low in