mass of unbroken virgin forests. This is far from truth. The western forests have suffered from fires from time immemorial. Not only are there everywhere great areas burned by recent fires, but there is scarcely a forest in which there are not evidences of ancient fires. The forests are frequently broken, the trees scarred and defective, and the yield deficient because of old fire-injuries. Immense stretches are bare or covered with an immature growth where formerly some fire swept off the forest.

We can not count on meeting our needs by imports from other countries, nor can the East count on meeting its full needs from the West. The country should be selfsupporting in forest products, and each region should have a home supply which will meet its principal needs. We must stop our waste, reduce our extravagance in use, and increase our production by growth by fully 300 to 500 per cent.

Forests and Streams.

For many years foresters and others have given warning that the forest problem reaches further than the supply of timber and other products. There is an exceedingly intimate relation between the conservation of forests and the conservation of water. The forest is the best natural regulator of the run-off water. Any system of water conservation must, therefore, include a proper protection of the forest cover at the head-waters of rivers.

The general public does not appreciate the results which will follow the destruction of the cover of the mountains, because in most instances the process has not yet proceeded to a point to make its effects felt. Complaints are common from manufacturers and other users that the streams are becoming less regular as the forests are cut. Many measurements conclusively show that there is such an increasing irregularity, but the fact is that the mountains in most sections have as yet not been so denuded as to cause the worst results that might be feared. This is particularly so in the East. Thus in the South the forests may be cleared by cutting or fire and a new growth quickly springs up. Until the cover is re-established there is without doubt an effect on the runoff, but it is only a temporary effect. The conditions gradually re-establish themselves. But let the forests be continually denuded on the steep slopes; there will be a gradual change in the physiographic conditions. The beds of the streams will begin to be slightly deeper, there will be new channels formed where during storms the surface water runs off rapidly in a flood. After a time there is a swift change — the result perhaps of some exceptional storm - when the equilibrium of stream conditions is upset. There is a permanent change of conditions of run-off. The channels are all deepened, and torrent conditions exist. From

then on, every storm produces a flood of greater or less proportions. It is this point of permanent change of stream conditions which we most fear, and which will occur when forests are continually denuded. It has already occurred in many places in the West, where the recuperative power of vegetation is less vigorous than in the humid region. It has occurred widely in the Alps of Europe. When such torrent conditions are established, the mere restoration of the trees will not cure the evil. It is an engineering problem to control the water by artificial means, and as already proven in Europe this is a task of great magnitude and vast expense.

What the U.S. Government is doing.

What, then, is being done to protect the national forests so that they may perform their functions as water regulators and provide timber for the people's use? How far is forestry actually in practice?

The chief work so far is being done by the Government. A forest policy has been initiated. Nearly 200,000,000 acres of land have been set aside as forest reserves. Most of this lies in the high mountains. Much of it is as yet undeveloped and wild country, with few trails or roads. In the past fires burned so frequently in the mountains that there was a regular fire season when the forests were ablaze and the air full of When the National Forests were smoke. put under administration these fires were reduced at once, and for the last five years the loss on the National Forests has been exceedingly small. It seemed to the public as if the fire problem on the public lands was under way of solution. Those in charge of the forests realized, however, that a vast wilderness cannot be organized for perfect fire protection in a few years, because the fundamental first necessity to protect a forest is to open it up so that all parts are available for patrol and for moving men and equipment to fight fires. Nevertheless, the Forest Service, even with only a pitifully small protective force, has been able to hold down the fires to a minimum during the years of normal rainfall.

During 1910 there was exceptional drought, especially in the Northwest. The forests became exceptionally dry. Not only the surface layer of leaves, but even the humus in the usually damp woods, became excessively inflammable. In the northwestern forests the situation became critical as early as June. The early spring had been unusually dry, and then the summer rains failed. By July fires were springing up in great numbers, and in August the forests of the entire northern Rocky Mountains were threatened by fire. The climax was reached toward the end of August. Hundreds of fires had already been put out, but new ones continued to be started from various causes. Locomotive sparks, brush