General view of the Savenac Nursery seed beds, Lolo National Forest, Mont.

Our Reforestation Activities

Some Facts and Figures About Tree Planting on a Gigantic, Yet Still Insufficient, Scale

By Charles Frederick Carter

NOW that a comprehensive program for forest conservation has been formulated for the first time and submitted to Congress as the "Snell Bill," a brief inventory of our forest resources today and a summary of the efforts now being made to provide for the needs of tomorrow should be of interest, although such a survey is hardly flattering to the National vanity.

It is now forty-eight years since Congress first took cognizance of the necessity for Governmental action to conserve the Nation's forest resources by the passage of the timber culture act of 1873; thirty years since the first forest reserve law, designed to protect the sources of streams, was enacted; and twenty-four years since recommendations of the National Academy of Sciences, submitted pursuant to request from Congress, were formulated into what then seemed an adequate National forest policy. All this time we have continued to squander our forest resources with the prodigal folly

of the proverbial drunken sailor until at last we are confronted with the knowledge that they will be exhausted within a few years unless heroic measures are applied at once.

Figures from the National Forest Service fix the total original forest area of the United States at 822,238,000 acres, of which there remain approximately 463,000,000 acres of nominal forest. But only 30 per cent, or 137,000,000 acres is virgin forest. The rest includes 112,000,000 acres of second-growth saw timber, 133,000,000 acres of second-growth below saw-timber size and 81,000,000 acres which have been devastated by wasteful methods of cutting and by repeated fires, on which nothing of value is growing or likely to grow without a huge expenditure for reforestation. This totally devastated area is equal to the combined areas of France, Germany, Belgium, Holland, Denmark, Switzerland, Spain and Portugal. Besides the waste land there are approximately 245,000,000 acres bearing second-growth forest. In a large part of this forest wasteful cutting or excessive grazing have reduced production to a mere fraction of what it might be with proper handling. To convert such lands into valuable producing forests will, in many cases, involve expenditures as great as if the lands were devastated.

Of the meager remnant of merchantable timber at least 5,500,000 acres are cut over each year; and they are cut over much more closely than formerly with the result that after fires have killed out most of the young growth there is little or no chance for reproduction to start.

Destruction from various causes diminishes the visible supply even more rapidly than use. From 1915 to 1918 an average of 9,400,000 acres of forest land were burned over each year; and in 1910 and 1919 the area was considerably larger. Storms, too, take their toll, a single cyclone on January 27, 1921 cutting a swath through the magnificent forest on the Olympic peninsula 30 miles wide and 75 miles long, destroying 8,000,000,000 board feet of timber. Then the black pine beetle is destroying timber by the billions of feet in the Pacific Northwest.

Stated in another way timber is being cut at the rate of 26,000,000,000 cubic feet a year, or more than four times as fast as the new timber is growing; while that of saw-timber size is being cut and destroyed by fire, disease and insects at the rate of 56,000,000,000 board feet a year, or more than five and a half times the growth of such material.

In view of such facts as these, efforts to conserve what timber is left and to provide for the future assume a lively interest; for the physical and economic well-being of everybody is intimately associated with adequate forest resources.

It is, perhaps, only natural that the uninitiated should imagine that forests would have to be restored by planting. Data from the U. S. Forest Service show

that a total of 170,000 acres have been planted by the Service up to the end of June, 1920; 85,000 acres additional by the State Forestry Departments, and 350,000 acres by private individuals and corporations in 19 states. Adding the estimated planting in Nebraska, Kansas, Illinois, the Dakotas, Missouri, and Oklahoma would swell the private planting to a total of 750,000 acres, or a little more than a million acres planted by all the agencies that have been operating in this field in the United States, from the time when planting was first undertaken by the western settlers forty or fifty years ago, right down to the present time.

The Snell Bill appropriates \$1,000,000 yearly for five years for reforesting denuded lands in the National Forests. As the average cost of planting is \$10 an acre, this would provide for the reforesting of 100,000 acres a year. This is regarded as the maximum practi-

Planting crew setting out yellow pine, Pike National Forest, Colo.

White pine plantation 22 years old, on bare sand in Rhode Island for reclamation purposes

cable program by the National Forestry Program Committee representing professional foresters and a large number of organizations interested in forest conservation, although an ideal program would be 1,000,000 acres a year carried on uninterruptedly for 81 years. To reforest the 81,000,000 acres of hopelessly denuded land which should be growing timber both because it is needed and also because this land is fit for nothing else would require at the rate provided for in the Snell Bill 810 years and an original outlay of \$810,000,000. Now about 130 years are required to produce good merchantable saw-timber, and 30 to 40 years to produce pulp wood. If compound interest be computed on the capital required for such an undertaking for 40 to 130 years the unsophisticated may begin to understand why tree planting as a process of restoring forest lands is relatively a minor matter in the minds of foresters. A forester never plants trees if he can get Nature to do it for him. Furthermore, Nature, if given half a chance, will usually do it. Planting is the most expensive method of establishing a new stand of timber. It involves a relatively high initial investment which must be carried at compound interest during the entire period required for the timber crop to grow to merchantable size and to be harvested. When it is remembered that the 81,000,000 acres referred to as utterly denuded is but a fraction of the total acreage requiring attention it will readily be seen that something besides planting is required if the country is to have a timber supply at all commensurate with its needs a few years hence.

That something is fire protection. According to a statement by Col. W. B. Greeley, Chief Forester, of the U. S. Forest Service, 39 States contain approximately 325,000,000 acres of timbered and cut over land in State and private ownership requiring protection from fire, which is the first step toward providing a continuous supply of timber. Of this area 175,000,000 acres are almost wholly unprotected. There are from ten thousand to twenty-five thousand forest fires every year which destroy the young forest growth on eight to ten million acres every year, aside from large areas burned over annually of which no record can be obtained.

Effective protection of these 325,000,000 acres of forest land, according to Col. Greeley, lies at the bottom of any National policy of reforestation. Once this vast area is really protected from forest fires, three-fourths of our timber supply problem will be solved.

Since 1911 the U. S. Forest Service has cooperated in fire protection work in 10 to 25 States, expending from \$40,000 to \$125,000 per year of Federal funds. In that period State and county expenditures have increased from about \$250,000 a year to more than a million dollars while private expenditures have increased six or eight fold.

The cost of protecting forest lands from fire as reported by 26 States averages 2½ cents an acre. A forest protection budget for the United States, excluding National forests, would thus aggregate about \$8,125,000 a year, whereas the sums regularly available aggregate \$1,885,000, of which State and county appropriations represent \$1,060,000, private expenditures \$700,000 and the Federal appropriation \$125,000. In other words, only about 25 per cent of the necessary task of protecting forest lands from fire is being done today.

"Forest fires, particularly those caused by lightning," said Assistant Forester E. E. Carter, "can not be entirely eliminated, nor can man-caused forest fires be eliminated any more than can man-

Tree-planting in the Nebraska sand hills, showing furrows in which young trees are planted

caused fires in cities. In its essentials the problem of forest fires differs only in degree from the problem of man-caused city fires. The first essential is the recognition by every one of the danger and of the community loss from forest fires. The second is an organization to put out those which do occur while they are yet small. In some regions recognition of the serious loss to the community as well as to the land owner resulting from forest fires has not been developed. As a result fire fighting is more costly than will be necessary after the public is aroused. In some of the Western National forests a smaller force is now needed for fire protection just because the local public has acquired a more enlightened point of view regarding forest fires and has acquired the habit of being careful while in the woods.

"Forest fire protection, in my judgment, will reforest or keep cut-over land growing forest on hundreds of acres for every acre that has been or is likely to be reforested by planting. If fire protection alone will not restock the land with a new crop of trees a new crop can in many places be secured by leaving seed trees or in some types of forests by leaving the smaller trees when the mature crop is cut. Planting will have to be resorted to to reestablish forests on areas so badly burned or ruthlessly cut that a new crop can not be obtained by natural seeding.

"Part of the 81,000,000 acres so devastated by reckless cutting and by fire that it is no longer productive will have to be planted. Fire protection alone will restore the remainder. There will be little excuse for extensive planting outside these devastated areas. The exceptions will be where the need exists of securing quick indirect benefits such as the prevention of erosion, or in the Nebraska sand hills, or where local economic conditions justify extra expense to assure full stocking quickly."

The Snell Bill appropriates \$1,000,000 a year for fire protection in cooperation with States and through them with private agencies. In the Pacific Northwest there are some thirty organizations of timber owners cooperating with each other and with the State and

Federal Governments in fire protection. In Oregon and Washington laws have been passed making patrol of privately owned timber lands compulsory. Private contributions sometimes amount to as much as 20 to 30 cents an acre a year. The private owners also take care of a large proportion of denuded and restocking lands, regardless of whether it belongs to them or to the Government. In this territory natural reproduction is swift and sure if fire is only prevented from undoing what nature so laboriously accomplishes.

The Snell Bill also appropriates \$10,000,000 a year for 5 years for acquiring additional lands for National forests, which on June 30, 1920, aggregated 156,032,053 acres and which are intended to be conservation areas as well as a protection for waterheads. The Bill appropriates a grand total of \$71,250,000 distributed throughout a term of five years, the purpose including, in addition to those already mentioned, a survey of the forest resources and timber requirements of the Nation and forest research, investigations in wood utilization and a study of forest taxation, the effort being to distribute fairly the other forest expenses as well as the forester's share of ordinary governmental expense.

Among the States New York leads in reforestation. Not only does the State produce about 5,000,000 trees a year for reforestation, but paper mills and railroad companies maintain their own nurseries. From 1908 to 1920 the State planted 60,000,000 trees, which at the usual average of 1,000 trees an acre means 60,000 acres replanted. In 1920 the State planted approximately 8,000,000 trees while private owners planted 3,000,000 trees on cut-over land.

Massachusetts has been carrying on an active reforestation program for several years. Recently the State acquired 100,000 acres to be restocked as rapidly as nursery stock can be grown.

In the South, Louisiana leads in reforestation. A single lumber company has planted 3,000,000 trees. The lumber companies have united in conducting extensive educational campaigns in the schools. The State Department of Conservation has just started a competition for boys' clubs in planting and caring for trees. Texas is not far behind Louisiana.

Michigan planted 4,000,000 trees on State lands in 1920. Minnesota has done some reforestation, but the principal activities of the State have been in fire protection. Kansas and Nebraska have done considerable planting to check drifting sands in the West and the work has been notably successful. Florida, Missouri, and Ohio have recently enacted laws providing for reforestation. Most of the other States have done or are preparing to do something in the way of reforestation, but not yet on a scale large enough to be really effective.

Oriental Demand for American Lumber

JAPAN imported 77,000,000 feet of American lumber in 1920, according to a report appearing in the *Japanese-American Commercial Weekly*. A material reduction in prices, a decrease in freight rates, and the recent great fires in Japan are considered grounds for the belief that this demand will increase to about 100,000,000 feet in 1921. While the normal export of lumber to China amounts to about 200,000,000 feet annually, that of 1920 came to only 155,000,000 feet, though greater activity is expected in this market this year. A striking difference between the trade with Japan and China lies in the fact that while the former country buys practically all lumber for remanufacture, the latter imports lumber in manufactured form.

Broadcast seeding on high ridges in the wake of forest fires, Olympic National Forest, Washington