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# DEFORESTED AMERICA



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# DEFORESTED AMERICA



MAJOR GEORGE P. AHERN

WASHINGTON, D. C.

1928



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# Foreword

GIFFORD PINCHOT

FOR the last decade and more the essential fact about the forest situation in America has been winked at or overlooked in most public discussions of the subject. This fact is that our forests are disappearing at a rate that involves most serious danger to the future prosperity of our country, and that little or nothing that counts is being done about it.

Out of 822,000,000 acres of virgin forest only about one-eighth remains. Half of that remainder, roughly speaking, is held by the Government and is safe from devastation. The rest is being cut and burned with terrible speed. And there is nowhere in the world anything like a sufficient supply of the kinds of timber we use to take the place of what we are destroying.

In the following paper, Major Ahern sets forth the facts and their supporting details with authority. No one in America knows the situation better than he, and no one has ever brought together as comprehensive, as convincing, and as accurate a statement of the forest situation in the United States as is contained in the following pages.

As a young Army officer on the old frontier of the blanket Indian, Ahern personally explored 10,000 square miles of unmapped territory in the Rocky Mountains. His interest in the forest was thus aroused, and beginning in 1888 he mastered forestry—self-taught, for there were then no teachers of the subject on this continent.

For some ten years before the outbreak of the Spanish War, where he won a Silver Star and a Citation for gallantry in action, Major Ahern studied the forests of the Northwest. He saw the beginnings of forest devastation there, and earned the undying hatred of the plunderers, whose Senatorial spokesman declared that Ahern—West Pointer, experienced officer, and future Secretary of the Army War College in the World War—“should get nothing out of the Spanish War.”

After his military service in the Philippine Insurrection, Ahern in 1900 organized the Philippine Forest Service, and was at its head until the outbreak of the World War.

In these fifteen years he formulated the forest policy of the Islands, organized the protection and utilization of 40,000,000

acres of public timber lands, and by his foresight and technical skill laid the basis for a perpetual succession of better and better crops of timber.

What Major Ahern now preaches for America he has practiced with brilliant success in the Philippine Islands.

Whatever may be our theory, in practice we in the United States have steadily treated our forests (except those under public control) not as a farm on which to grow crops but as a mine whose useful product was to be gathered once and for all.

In the Philippines, Ahern not only provided for a perpetual succession of crops under Government control but secured the passage of a law forbidding the alienation of public land for sale or homestead until the Director of Forestry had certified that it was more valuable for agriculture than for forest purposes.

In 1897, at the Agricultural College of Montana, Major Ahern gave practical instruction in forestry. Thirteen years later he established and conducted the Philippine School of Forestry, and did it so successfully that out of a trained personnel of five hundred only five today are Americans.

Under the supervision of these men timber is sold under restrictions which insure perpetual succession of timber crops, and this system not only perpetuates the forests but has earned cash income enough to pay all the expenses of administration, all the expenses of the Forest School, and \$4,000,000 to boot as a surplus for the Island Treasury.

Major Ahern's success in forest conservation in the Philippines was built on Government control of lumbering. That is and has always been the foundation of such success throughout the world. And throughout the world the right of the Government to exercise such control in the public interest is recognized. Without it forest devastation has never been stopped anywhere. Without it forest devastation cannot be stopped in the United States.

The elimination of waste in the use of forest products is valuable. Like a palliative in medicine it may help the stricken patient feel better and live a little longer, but it will not cure his disease. The saving of waste cannot solve our forest problem.

Forest fires are steadily growing worse in America, and fire prevention is absolutely indispensable. But the axe carelessly used is the mother of forest fires. The axe and not fire is our greatest danger. Until the axe is controlled there can be no solution of the fire problem, or of the problem of forest devastation in America.

Over the National Forests, which cover one-fifth of our ultimate possible timber-growing area, and over an insignificant area of other public forests, we have established Government control of the axe. These forests are safe and will produce larger and larger crops of timber as time goes on. Over the other four-fifths of our forest land the axe holds unregulated sway. The National Forests are owned by the Government. On the privately owned lands we must control the axe through taxation (as in Senator Capper's Bill) or by other legal means. If not, the forests that are left will follow the road of those that are gone already.

The lumber industry is spending millions of dollars in the effort to forestall or delay the public control of lumbering, which is the only measure capable of putting an end to forest devastation in America. It is trying to fool the American people into believing that the industry is regulating itself and has given up the practice of forest devastation. That is not true, and Major Ahern has proved it beyond question in his most valuable paper.



# Introduction

THIS statement of the present forest situation in the United States is set forth with no pretense to form or style. No elaboration of the picture is necessary for the forester or lumberman. But the man in the street does not know the facts. If he knew the facts they would speak for themselves. They are here brought together as they have been established by the foremost authorities on the subject in America.

The facts tell a moving story of forest devastation, abandoned towns, abandoned farms, the closing down of hundreds of wood-using industries, etc., as the centers of lumber production shift from the Northeast to the Lake States, to the South and finally to the last stand in the Pacific Northwest. They tell of the continued and rapid disappearance of our remaining privately owned forests, on which we rely today for ninety-seven per cent. of our wood needs. *Throughout this study we find that the root of our troubles lies in destructive logging practice, unregulated slash, and the accompanying destructive forest fire. Why? A depressed lumber industry seeking cheaper production, adopts still higher speed in its operations in its effort to ward off the threatening banker. As a forest expert\* in the state of Washington states, "The lumber industry is almost deliberately destroying its own prosperity by a frenzied rush toward liquidation of the remaining timber holdings."*

The forest fire situation grows steadily worse. Much publicity is given to attempts at fire control, but the public does not know that the bulk of protection is for standing merchantable timber, logs and equipment, and not for cut-over land, our main reliance for future forest crops.

In 1919 the annual drain on our forest resources was estimated at four times the annual growth. If the estimate in 1919 even approximated the correct figure, this figure four today is much too small in the face of the rapid and continued depletion of capital stock.

The data today are more reliable than in the past. Foresters after careful study of the facts tell us that the virgin forests of the South will last less than ten years at the present rate of cutting, and that the privately owned forests of the Pacific Northwest will disappear or be removed from the mar-

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\*Professor B. P. Kirkland—May 1st, 1928.

ket in from twenty to twenty-five years. We have left today a mere remnant of forty-five million acres of privately owned virgin forests and from that vanishing fragment the larger part of our lumber is produced.

Publicly owned forests comprise one-fifth of our total forest area and furnish now but three per cent of our needs.

Second growth—soon to be the principal source of supply from present indications—will not supply one-half our wood needs.

Where will our great cities, the farms, the factories, the railroads, etc., obtain supplies as the forests disappear? Even our great lumber states are beginning to import more and more wood to meet their own needs. In the not distant future even the Pacific coast states will retain all of their production. (California consumes annually more lumber than it produces.<sup>64</sup>) We cannot expect anything from the farmer's woodlot, which is producing less than one-third of its capacity, and, according to reports, is decadent and approaching extinction.

The most serious phase of this appalling situation is that no alarm is shown at the Forest Service headquarters or by lumbermen. Although the principal facts here presented are acknowledged by the foresters at headquarters (see extract of E. A. Sherman's letter in the general summary) the public has been kept in ignorance of the situation.

We gave with a lavish hand millions of acres of timber land to railroads and canal companies, to soldiers, to settlers, and others. Such liberality tends to lower the value of this great natural resource in the minds of our people and makes it difficult to arouse sufficient action to stay this progressive devastation.

This devastation must be stayed if we are to survive as a nation.

# Chapter I

## IMPORTANT FACTORS IN OUR FOREST PROBLEM

The important factors in our forest problem today are:

The stand and distribution of virgin timber and second growth;

Annual depletion of our forest resources;

Reproduction and rate of tree growth; forest research;

Logging practice and forest protection;

The farmer's wood-lot;

Factors of cost of production and sale, including taxation, protection, interest, and other charges, market conditions, substitutes, etc.;

Last and of the greatest importance, attitude of governing authorities towards the forest products industry.

As stated in a 1926 report<sup>16</sup> by the National Lumber Manufacturer's Association: "All privately owned land is necessarily a commercial problem for its owners. The owner will make only such use of it as pays or promises to pay returns." This thought you will find repeated in different forms throughout these pages. We find in too many states the condition expressed by the Executive Secretary of the Oregon Reforestation Committee.<sup>13</sup> "It (the state) must show the forest owner a business proposition which gives fair promise of warranting the necessary investment in land, growing costs, and taxes. On the average the owner will lose less by giving the land to the state now than he will if he finances the growing of a new crop under the general property tax."

As Forester Reed expresses it:<sup>45</sup> "It is a race between annual rings and money in the bank."

In a bare century our vast virgin forests have almost disappeared. Forests that took many centuries to complete their grandest specimens have been swept away by ruthless, and ever-hurrying destructive logging practices. The centers of production have in this period moved from the Northeast to the Lake Region, then to the South, and now to the Pacific Northwest. The apologists for this uncivilized devastation, a black page in our history, merely tell us that the lumber industry is a business, conducted on business principles. Not only do they take no blame for what has happened, but, with apparent ignorance

of the forest situation, tell us there will be no shortage of lumber and that there will be sufficient for export, and that timber will soon take its place with cotton, corn and wheat as one of the crops of the United States. Such optimists with limited knowledge and vision are impressed by the rich forest soils of the South and Pacific Northwest, where very favorable climatic conditions promise well as far as Nature is concerned, but man steps in, even there, balks nature, and attempts to lead us along the disastrous road followed by China and Spain.

As the bulk of our forest products must always come from private forests, industrial or private forestry assumes a commercial standing of the highest order. But strange to relate, we find lacking here, what is considered an essential requirement in every great commercial enterprise, viz., an inventory of resources. Our leading forest research officers agree that our knowledge of the important factors in the U. S. forest problem today is very scanty. The nearest approach to an inventory of our forest resources is contained in the Capper (Senate) Report,<sup>10</sup> 1919 data, largely guesswork, the best obtainable at the time and now out of date.

What have we today that is any better? A mass of data may be found in the Forest Service files, and also some data collected by the comparatively young state forest organizations; some data may also be found in the Census Bureau, in the offices of the lumbermen's organizations, and elsewhere.

In this paper there will be presented:

(1) The forest situation as it is today and the outlook for second growth as indicated in the series of most reliable and recent manuscript reports of the U. S. Forest Service, one for each of the great forest regions, now being published under the general title "Timber Growing and Logging Practice" (see Bibliography Nos. 1 to 8). These reports usually include an introduction by Colonel Greeley, which states that the suggestions and recommendations are addressed to timber land owners. They also include, first steps and minimum requirements to prevent land from becoming barren, also additional proposed measures to bring about desirable forestry practice designed to grow reasonably complete crops of the more valuable timber trees. Their possible application through the exercise of police powers is also mentioned.

These reports are still under consideration by the Forest Service, but five, Show's,<sup>1</sup> Tillotson's,<sup>5</sup> Munger's,<sup>3</sup> Zon's,<sup>4</sup> and Koch & Cunningham's,<sup>2</sup> have reached the printers' hands. Let us hope that all of these reports will be published in the near future.



As these reports by competent research officers constitute the first serious investigation of the entire forested area, they are very interesting, and afford much food for thought. Although the studies were made for another purpose, and although they will be modified, edited, etc., they suffice to furnish light on the prospects for future wood supplies.

(2) A limited amount of other data on the present forest situation, including some data on forest fires.

(3) A glance over the industrial forestry situation both at home and abroad.

(4) Finally, a general summary of the facts presented.

We will learn thereby something of the views, the hopes, and the proposals of the men who must eventually contribute largely to the solution of this vital problem.

Sufficient light has been thrown on the entire forested region of the United States from the above-mentioned reports of research forest officers to visualize somewhat more clearly the picture of disappearing virgin forests, increasing areas of second growth, as well as increasing areas of denudation. Practically the entire discussion in this chapter is a digest of the reports mentioned, with an occasional comment by the present writer.

A typical report is entitled "Timber Growing and Logging Practices in the California Pine Region" by Show, 1926.<sup>1</sup>

## PRESENT CONDITION OF OUR VIRGIN AND SECOND GROWTH FORESTS

### *Virgin Timber—Area, Quantity, and Duration*

Present supplies are now received from two sources:

1. Virgin timber lands;
2. Second growth.

For the past eight years the acreage of virgin timber has been given officially<sup>10</sup> at 138 million, notwithstanding the fact that, according to Forest Service reports,<sup>12</sup> more than five million acres of virgin timber land are cut over annually. Of this total it has been estimated (W. N. Sparhawk) that 80 million acres were in private ownership and 58 million were in public forests.

The Capper Report<sup>10</sup> (1919 data) gives the following data on virgin timber:

	<i>Virgin Forest Acres</i>
Pacific Northwest.....	77,115,000
Southern States (11)	
Virginia to Texas.....	39,135,000
Lake States.....	10,100,000
Northeastern States (9).....	3,896,000
Central Hardwood Region.....	7,150,000
Total.....	137,396,000

An estimate (Jan., 1927)<sup>9</sup> of area and stand of virgin timber in the South is typical of what has happened in the past seven or eight years. In 1919 this area was given by the Capper Report<sup>10</sup> as 39 million acres (probably over-estimated); in January, 1927, the estimate<sup>9</sup> is 12,650,000 acres, a decline of 26,350,000 acres in less than eight years. Taking all of the above facts into consideration, we may conservatively place the total area of virgin timber in the United States today at not to exceed 100 million acres. Of this total probably less than half is privately owned and more than half under government ownership. The total stand of virgin timber in the South is now given at 75¾ billion board feet; the yearly cut at 8½ billion feet.<sup>9</sup> The duration of this virgin timber, the mainstay of the South, is not difficult to estimate. A 1928 U. S. Forest Service bulletin<sup>68</sup> states: "The end of virgin timber in the southern states is definitely in sight, while already the younger timber is being cut as fast as it grows."

The comments by well-informed foresters on the remaining virgin stands are interesting:

Koch (Dist. No. 1, Montana, Idaho and northeastern Washington) states in the *Journal of Forestry*, May, 1926:<sup>46</sup> "Local exhaustion of stumpage supplies even in the northwest states, the last reserve, is already closely impending, important mills will begin to shut down from lack of stumpage within ten to fifteen years, thirty years will see little timber left in the states of Montana, Idaho, and Washington, except in the National Forests." Koch also states, in the same article: "The privately owned timber of California and Oregon is but very little greater than the state of Washington has left, and their rate of cutting will doubtless very rapidly increase." Other foresters conversant with the present situation in the Pacific Northwest are beginning

to realize that within approximately thirty years the virgin stands in private ownership in that region will be cut out or removed from the market.

Fred Ames, Assistant District Forester of Washington and Oregon, states:<sup>64</sup> "A very recent compilation by a firm of forest engineers in Seattle shows that on the basis of the 1926 cut, there are only seventeen years of logging left on the privately owned timber lands of western Washington." This estimate is based on County Assessors' records from 1919 to date. The assessors estimate the remaining acreage at 2,667,125.

Forester Thornton T. Munger, Director, Pacific Northwest Experiment Station, states in a letter to the present writer, November 3, 1927, in reference to above estimate, that he believes that there are 3,787,000 acres of private commercial timber in western Washington. He goes on to state: "I rather think that there is considerable commercial timber probably included in my estimates on land which for taxation purposes falls below the 6,000 feet per acre class, and so is not included in the acreage (Assessor's acreages). Already there is some truck logging in western Washington which is cleaning up odds and ends as in the South."

The cut in Washington in 1926 was 7% over that of 1925. This total cut will probably increase for some years at even a greater rate, due to increased demands following decrease in cut in all but Pacific coast regions.

As for Oregon's national forests, which contain some 200 billion feet of timber, Munger<sup>57</sup> states: "A considerable proportion chiefly valuable as protection cover and for recreation and never a factor in the lumber industry of the State."

In the Lake States we learn<sup>4</sup> the amount of old mature timber left in the Lake States in private ownership is comparatively small; its area estimated (1919) at 10 million acres (in later report 7 million acres) for the entire region. A very large part of the area just mentioned is unmerchantable swamp timber. The life of the industry based on the old timber is estimated at less than twenty years.

The virgin stands in the Northeast and Central Hardwood Region and other states not mentioned are comparatively small in area, are more or less inaccessible, and exercise but little influence on the general timber market.

The experts on the ground, including foresters Fred S. Baker,<sup>46</sup> David Mason<sup>40</sup> and Elers Koch,<sup>46</sup> agree that the end of privately owned virgin timber is in sight. The forests in public ownership, part of which is virgin, furnish but 3% of the

present total lumber output, and according to Forest Service reports it is hoped to increase this output from National Forests from 8 to 10% annually for the next ten years. This means a possible annual output from the National Forests of not to exceed 2½ billion board feet of lumber by 1937.

Our lumber consumption reached a total of 46 billion board feet some years ago, and lately has run from 35 to 38 billion feet annually. What a shock our wood-using industries will receive when the available supply within ten years begins to approach the 20 billion mark. However, within ten years the far-seeing lumber baron of the Pacific Northwest will probably begin to withhold his virgin timber from the market, realizing that a little patience will enable him eventually to thus earn much greater returns for his high grade stock.

Great Britain through its Colonial Office has been gathering forest product statistics since 1920. At its 1927 conference in London, it was stated:<sup>63</sup> "In North America exploitation is proceeding so rapidly that taken in conjunction with loss from forest fires, and insect pests, the accessible virgin forests will probably be worked out within the next twenty years."

## *Second Growth—Our Main Reliance for the Future*

As leading forest experts agree that the end of privately owned virgin timber is in sight, and that the publicly owned timber will furnish but a fraction of our needs by 1937, what of the second growth, the principal remaining source of supply? A serious study of foreign sources of timber supply as a means of meeting our needs is discouraging. Hence the importance of our home-grown timber. Great expectations for adequate wood supplies are based on second growth in the South and Pacific Northwest. These expectations are doomed to disappointment if conditions continue as outlined in present reports.

The Capper Report<sup>10</sup> and the Pinchot Committee of the Society of American Foresters' report,<sup>11</sup> both issued in 1920, forcibly denounced the rapid rate of forest devastation, and with what result? A more appalling story of devastation (eight years later) is told in region after region, widespread reports of destructive logging, unregulated slash, uncontrolled and devastating forest fires, vast areas inadequately stocked or denuded, and in too many areas stocked with undesirable tree species.

Forest fires were considered at that time as too widespread and too devastating, and eloquent pleas were made for regula-

tion and control of the 32,500 fires sweeping over 7½ million acres of forest annually, the five-year average up to 1920 (probably underestimated). As evidence of the failure not only to heed the pleas for better slash and fire control, but also showing the rapidly increasing rate of devastation, the four-year record, 1923-26 is startling; an average of 87,076 fires per year sweeping over 23¼ million acres annually, and still more startling the 1927 record, 158,338 fires, sweeping over 30,625,460 acres. Yet fire control is possible, as the States of Pennsylvania and New Hampshire have shown.

All estimates seem to agree on the total forest area, 470 million acres. The forest area statistics for 1919 as usually given, here follow with an estimate by the writer for the areas in 1927 and 1937.

	1919 Million Acres	1927 (est.) Million Acres	1937 (est.) Million Acres
Virgin timber	138 {80 private 58 public	100 {45 private 55 public	79 {25 private 54 public
Woodlots	150	150	150
Restocking	102	120	131
Devastated	80	100	110
	<u>470</u>	<u>470</u>	<u>470</u>

## The Pacific Northwest

(Data taken from Show's Report<sup>1</sup>)

*California Pine Region*<sup>1</sup>—Area, 13,616,000 acres of forest land.

From Show's report<sup>1</sup> we learn that existing logging practices leave unproductive at least 40 per cent. of the private acreage cut over annually, and that the 60 per cent. is not reproducing satisfactorily; that the most pressing problem in the region is to keep private cut-over lands in productive shape; that it is hopeless to violate the intrinsic needs of the forest and expect the forest to continue; and that it is equally hopeless to propose desirable but unduly costly and impracticable methods of logging, slash disposal, or fire protection, and expect them to be voluntarily followed by a strongly competitive industry. He tells us that as a consequence of the urge for production and of the general indifference to the fate of cut-over lands, three main factors of denudation of forest lands have come into existence in California. These are fire, destructive methods of logging, and intensity

of cutting. In late years the high lead and high speed methods of power logging have come to be recognized as belonging definitely in the class of major factors of denudation.

Protection from fire is the most important single requirement to maintain cut-over lands in a productive condition. Uncontrolled fires wipe out timber growth on large areas and in addition make it impossible for the forest to return for decades, or in some cases centuries. The *present two to three per cent of cut-over lands burned annually* makes profitable management impossible. Slash fires usually wipe out not only the smaller reproduction, but seed trees as well; so that the return of the forest is a matter of decades.

Logging methods may and often do injure and destroy the advance reproduction and seed trees without which a new forest crop is impossible.

High lead yarding—imported from the Pacific Northwest about 1916, spread rapidly in the California pine region, and in 1921 out of twenty-five important operations, nineteen were using high lead wholly or in part. The high lead system, especially where high speed engines are used, results in very serious damage. At about 500 feet from the spar tree the damage is practically complete \* \* \* and the regularity with which this condition is found on all high lead settings makes it evident that it is inherent in the system.

The Forest Service has definitely decided that its use can not be sanctioned on its sale areas. The conclusion, according to Show,<sup>1</sup> is that with rare exception its use is incompatible with continued forest production. As logging machinery has developed, the cry has been ever for greater and greater speed. High speed machinery may be used with the ground, low, or high lead system, and is destructive with every one of them.

The high lead method referred to consists of transporting logs by suspended wire cables. The logs so transported, in their wide swing, wipe out trees of all ages that are found in the vicinity of the path followed. The network of such paths on a tract are close enough to make the land picture, after logging, one of devastation.

Cruise strips (tree counts) 96 miles in length were made in private cuttings and 53 per cent of all averaged less than one tree per acre over 18 inches in diameter; 2 per cent had an adequate number of seed trees left. Another strip 1½ miles long showed just one seedling and no live seed trees.

Forester Show in 1928<sup>64</sup> states that the high lead method of logging has been abandoned in several important operations.

In 1927, according to reports, the forest fire situation in California improved.

## *Western Oregon and Western Washington*

(Data taken from Munger's Report<sup>5</sup>)

The average logged area is devoid of living trees. Whatever reproduction takes place does so in spite of present methods, not as a result of them; 60 per cent is reforestation; 40 per cent is barren of useful tree growth. The 60 per cent is not bearing a fully stocked or uniformly well stocked stand of new growth; and is subject to fire because of inadequate protection. There are few lumbermen in this region whose precautions and protective organizations are really adequate to the risks at stake. Fire prevention activities are very much subordinated to the major business of getting out logs. Slash disposal and fire control must be made more effective than today to attain satisfactory timber growing. Too great an acreage is burned annually. The cut-over lands get a very small share of the protection funds. There are half a million acres of denuded land in this region. In addition to this a still larger acreage of land partially deforested and will become entirely deforested if not given fire prevention. If timberland owners and the state are to engage in timber growing and get the potential wealth out of logged-off land, these lands must get their full share of protection.

T. T. Munger states:<sup>57</sup> Private logging, with but two or three exceptions, being done without any thought of securing forest regrowth; careless slash burning, and inadequate fire protection; one-third reforestation; does not carry full stand; two-thirds will remain barren and unproductive, a liability to the commonwealth in its present condition. Private forests contain more than half the commercial timber, 208 billion feet. Of this 8 million acres is merchantable, the great preponderance too rocky, too rugged or too high altitude for agriculture.

Forest Inspector MacDaniels of Washington and Oregon states<sup>65</sup> that the area burned over annually is probably too much to permit the success of sustained yield management.

C. S. Chapman, Forester, Weyerhaeuser Timber Co.:<sup>64</sup> "It is true, however, that largely due to repeated fires, the stocking of cut-over areas in the Douglas fir belt is not what it should be by a very wide margin. And it is true that practical security from fire on reforestation lands cannot be guaranteed even through the practice of the most intensive protection measures. Reforestation areas are bearing a burden which together with fire protec-

tion charges is very likely to result in added abandonment of property unless a change is shortly forthcoming."

## *Montana, Idaho and Northeast Washington<sup>2</sup>*

(Data taken from Koch and Cunningham Report<sup>2</sup>)

Most cut-over white pine lands burn a second, probably a third and fourth time, and are in very bad shape for timber growing. In this region a critical forest fire situation occurs nearly every year. Many acres have been burned and reburned until there is no prospect of their reproducing for many years. The state of Idaho is practicing pretty good silviculture on its state forests and is protecting them from fire, but from present indications will not undertake sustained yield management. It does not, therefore, appear that second growth timber (Idaho and Western Montana) will be much of a factor as a saw timber supply in less than forty-five to fifty years from now. All agree that the forest fire protective association (timber land holders) will fall to pieces when the merchantable timber of its members is really cut out.

On the whole, Koch reports, law enforcement and forest fires have proved to be a problem with which associations have been unable to cope successfully, also that there is no more important factor in the fire problem than slash disposal. The old slash burns are the giant powder and the new slash the detonator to set them off. He tells us that the more recently cut-over land has been much more burned and carries less young growth than most of the older cuttings. The older cut-over lands are in far better condition than lands cut over in the past ten or twelve years. In the last ten or twelve years under the compulsory slash burning laws of Idaho and Montana, slash is burned broadcast after logging, destroying all young growth, and often spreading to older cuttings.

As a rule, he states, fire breeds fire. The worse a region is burned, the more it will burn again. Slash is difficult to protect from fire and once started is hard to control. In general no slash disposal is preferable to broadcast burning. (A recently enacted Idaho forest fire law may improve the situation.—G. P. A.)

As to duration of supply, he tells us that a life of thirty-one years of state and private timber is estimated for North Idaho, not taking into account overrun of log scale, fire, insects, losses in logging, etc.; that Western Montana is cleaning up its private timber at about the same rate as Idaho; and the state of Washington, which now leads in lumber protection in the United



States, has only about thirty years' cut of private timber, although the rapidity of growth in that region makes the possible cut from second growth stands a good deal more of a factor than it will be in Montana or Idaho.

He also states<sup>46</sup> that the privately owned timber in California and Oregon is but very little greater than the state of Washington has left, and their rate of cut will doubtless very rapidly increase; that new saw mills, new paper mills, and new railroad extensions are being prepared and built at a tremendous rate.

Koch believes, "We may as well accept the probability that most of the remaining timber in Idaho and West Montana will be cut without any very considerable modification in present practice." "At the present time," he states, "I do not believe there is a lumber company in Idaho which has any real serious intention of cutting its timber and handling slash disposal with the purpose of growing another crop of timber."

"If the next generation wants timber at all, people will have to think in terms of second growth."

*Koch's Estimate of the National Forest*<sup>46</sup>—"It is an aggravation that the Forest Service has in general only the tag ends, the upper slopes and the mountain tops to grow timber on, while the foothills and valleys where the real productive timber land is located are in private ownership. Less than one-third of the area of National Forests in District No. 1 is classed as merchantable timber, and less than one-fourth of this is timber which now has a positive value as much as \$1.00 a thousand."

The cut in the Pacific Northwest in 1926 was close to 15½ billion board feet, an increase of almost four billion feet in the past four years. David Mason states<sup>60</sup> that if the three coast states increase their cut fast enough to absorb the declining production of the East they must increase it to 28.5 billion board feet annually for thirty years in the future. The chances are against any such great increase in cut. The facts in the forest situation will be realized with a profound shock long before that cut is reached, and forest conservation, let us hope, will receive more consideration.

## *The Outlook for Second Growth Timber in the South*

For some years the forests of the South have held the center of the stage in lumber production. It reached its peak some years ago, but in 1927 (so the present data indicate) the

first place in production will pass from it to the Pacific Northwest—the last reserve, as the forester in the latter district calls it.

The foresters on the scene, after years of close observation, tell us<sup>61</sup> that steam skidders in the South scarcely leave a tree of first-class seed-bearing condition standing on one acre in five; that fire protection has gone little beyond the educational stage.

The vast majority of operators are making no effort to grow another crop. Some 3½ million acres are cut over annually in the South,<sup>9</sup> involving a net reduction in forested land of 2 1/3 million acres. In 1919, as stated above, the virgin area was estimated at 39 million acres (probably overestimated), which by January, 1927,<sup>9</sup> was reduced to 12,650,000 acres. Fires have swept over more acres in the South than in any other forested region of the country. Out of 91,793 forest fires in 1926, 61,431 occurred in the South; in 1924, out of a total of 91,921 fires, 68,619 occurred in the South. In Alabama alone one million acres of forest were fire-swept in the first six months of 1926. The acreage burned over in the South during these two years averaged annually over 20 million acres, out of a total average of 23¼ million acres for the entire country. These vast uncontrolled fires will often ravage the same area years in succession, completing the devastation. E. M. Bruner states:<sup>65</sup> "Florida Forestry Association in a bulletin states that as much as 75 per cent of the pine forest area of Florida burns each year." In 1919 from Virginia to Texas the cut-over areas not restocking was estimated<sup>61</sup> at nearly 31 million acres.

Foresters report<sup>6</sup> that these cut-over lands are regarded by many of the owners as liabilities, and no effort is made by them at restocking.

John L. Kaul, a prominent lumberman and Chairman of the Forestry Committee of the Southern Pine Association, stated in the *Lumber Trade Journal* in April, 1926: "The states (10 Southern lumber states) are not going to take over the cut-over lands and grow trees on them." \* \* \* "It will be a long time before the public can be induced to do this." Mr. Kaul's statement is borne out by abundant evidence. The average state is so burdened with road bonds and other debts that any suggestion of additional expenditures to protect cut-over lands from fire or aid in growing trees on them will receive scant encouragement.

In the Appalachian region of the South we learn<sup>6</sup> that hardly any of the lands are under administration for continuous forest production. As for the annual destruction by fire:

"With this record it would not take many years for all the forest land in the region to be fire-swept. It is clear that the amount of annual burning in the Appalachian region must be radically reduced if the region is ever to take its proper place as an important continuous source of hardwood timber." \* \* \* "Burning the forest is almost entirely man-made, as fires from lightning are rare."

Fire prevention and fire protection measures are lacking in the South, as the official records indicate. As for private reforestation in the South, the sum total is small, notwithstanding widespread publicity of such efforts by a few lumbermen. (See chapter on Industrial Forestry.)

A chapter could be written on the devastation caused by the small mill in the South. These are to the conservationists what unlimited sheep are to the grazing industry.

In South Carolina, Georgia, Alabama and Mississippi, there were 2,632 mills in 1920; and 4,601 in 1925, cutting 3,905 million feet in 1920 and 7,709 million feet in 1925.<sup>60</sup> These saw mills, or hoppers, as they are called, pick up what the big operators leave. Repeated operations over the same land conduce to devastation. This combined with fire, rot, insects, storms, etc., remove the last hope of natural reforestation. Who, in the face of such widespread and ever recurring fires and other forms of devastation, will have the assurance to estimate with any degree of accuracy the rate of forest growth in the South?

### *Lakes States<sup>4</sup>*

This region was the great leader of lumber production in the eighties, proudly boasting that the white pine was inexhaustible and that it was impossible to estimate the stand, let alone cut it out. The annual cut of all lumber in the region has dropped from nine to approximately two billion board feet. The nation-wide production of white pine, the premier timber of the North, has dropped from 9½ billion feet to less than 1½ billion.

No serious effort to check the steady downward trend of output or replace this most desirable construction timber is evident. Another "Vanishing American." The list is growing as we add: hickory, walnut, chestnut, ash and maple.

Lumber is now imported into this region from the Gulf States and the Pacific Northwest, and as the small remaining area is disposed of, the imports will grow.

The same story of destructive logging practice, slash menace, forest fires, lack of protection of cut-over lands, etc.,

combine to make the prospects of second growth far below what the region is capable of producing.

The report<sup>4</sup> tells us that only a negligible per cent of private forests has yet been consciously and permanently devoted to production of forest crops, and that slash disposal is not commonly used by private operators unless under compulsion. We hear too much of unnecessary destruction of young trees in logging, when with care damage may be reduced to 5 per cent of the trees left on the ground.

As to forest fires, we learn that most of the area of white pine and hardwood which has been cut over in the Lake States (northern part) has been badly burned and now carries only a scrubby growth of aspen and paper birch. If several fires follow at frequent intervals before the Jack pine has reached seedling age, it is eliminated in a very short time and the ground occupied by brush, grass, sedge, lichens, and moss.

For ten years the forest area *under protection* suffered an annual loss by fire of more than 2 per cent; 1 per cent burn is considered only fairly effective protection.

The report<sup>4</sup> urges that some manner of slash disposal is a necessary measure in reducing fire hazards and in making fire fighting easier. It mentions slash as a convenient breeding place for destructive insects, bark beetles, and the germinating ground for fungi and tree diseases. The greatest menace of slash is the hazard to reproduction in case of fire, as fire destroys all young growth and may even burn the soil to such a depth that reproduction is almost impossible for many years. What the foresters urge in their reports is given scant consideration, judging from the ever mounting forest acreage burned.

### *Central Hardwood Region*<sup>5</sup>

This region extends from Ohio to eastern Kansas and Nebraska, and from a southern strip of the Lake States to Missouri, North Arkansas and West Kentucky and Tennessee. The entire forested area of 40 million acres contains a few virgin stands, generally individual pieces of timberland held off the market for personal reasons, or considered relatively inaccessible. Thirty millions of the forty million acres are in farm woodlots. The present stands of timber in this region are largely the culled remnants of former very fine hardwood forests. Continued cutting of the best species and individuals, forest fires, and the heavy pasturage of three-quarters or more of the small fenced-in woodlots, have rendered these stands for the most part badly dilapidated and decadent. The greater portion

of the timber is in a slow but seemingly sure march to extinction and offers little promise for the better unless present practices are materially altered. The selection or culling out of the best trees, continued down to the present day, has resulted in a very little area of farm woods where present mature growth is composed of species of commercial value, together with broken, decayed, limby, and crooked trees of the better species. If this selective type of cutting continues and if the area is also grazed, the farm woods will slowly but surely be eliminated as a source of any great amount of lumber for the general market or even for use on the farm. A part of the region is characterized by lack of fences; livestock runs at large, fires are set to improve grazing; while fires are common they are not devastating.

It seems utterly impracticable to control grazing in small farm woodlots. The practice of grazing them heavily is common. The reports<sup>5</sup> also mention little or no care in logging, tell us of destruction to young growth, high stumps, and of much unnecessary waste.

What we learn here of the decadence of the farm woodlot occurs rather generally, as the farmer is, as a rule, not interested in forestry. He apparently does not realize that what is happening in the woodlot would happen in his vegetable garden if he did not weed intelligently, constantly and vigorously.

### *Northeast*<sup>8</sup>

This region includes nine states from Maine to Pennsylvania. The latest estimate of forest area gives a total of 45½ million acres, 91 per cent of which is in private ownership. Forest development reached its peak in this region in 1820. The report states that the forest resources of the region have been depleted. The great bulk of the wood used is imported from other parts of the country. Maine is the only state in the Northeast which cuts from its own forests as much wood as it consumes. In several other states imports run as high as 90 per cent of wood consumption. Increasing quantities of timber are constantly being brought in from the Southern states and from the Pacific Northwest, with large costs for transportation. New York state's record is striking. The leader in lumber production in 1850; importing 90 per cent of its wood needs in 1927, and this is a state with 40 per cent of its area classed as forest land. Between 1900 and 1925 it lost 630,000 acres of farm wood land and 2,440,000 acres of farm land abandoned. (Dr. H. H. York, Syracuse, N. Y., 1927.)

Here as elsewhere we hear that logging practice has borne little relation to timber growing. The cheapest and most effective logging is practiced without reference to the future of the forest. Careless and continued cutting results in steady deterioration of the forest. A single fire following cutting sometimes converts the area into a barren waste, and a second fire is fairly certain to do so. The report also states that complete prevention of all forest fires is the most effective measure of forest control, which, it states, is a long way in the future. Slash disposal is practiced by a few private owners.

Dr. J. W. Toumey states:<sup>66</sup> "The greater part of New England forest land that formerly bore excellent stands of virgin timber of great value and that supported thriving communities is now more or less covered with second growth of no immediate and but little prospective taxable value" \* \* \* "Only a small per cent of the whole (second growth) is of the better quality and this quality is progressively decreasing.

#### FOREST FIRES

	<i>Year</i>	<i>Number</i>	<i>Acres burned, forested land</i>
	1916	41,003	8,222,617
	1917	38,303	13,029,512
	1918	26,161	7,085,623
	1919	27,005	5,725,290
THE OFFICIAL	1920	28,153	3,564,757
RECORD	1921	38,435	4,737,408
U. S. FOREST SERVICE	1922	51,891	8,194,189
	1923	78,829	21,672,114
	1924	91,921	22,200,004
	1925	85,762	24,018,024
	1926	91,793	24,316,133
	1927	158,338	30,625,460

The damage in dollars noted in reports is but a small fraction of the actual loss. Recurring forest fires wipe out seedlings, seeds and soil fertility, not to mention subsequent erosion and other attendant evils.

The questions arise, why the sudden and tremendous rise in number of fires and forest acreage burned over since 1921, and why no official outcry against this appalling record? They will tell you in Washington, however, that only in recent years have full reports on forest fires been received. The following facts will help the reader to understand the situation.

Five to ten million acres of timber land are cut over annually. As the above mentioned reports prove, careless and destructive logging practice is the rule; also unregulated slash disposal or none, and but slight interest shown in protecting cut-over areas from fire. Under such conditions it is not difficult to understand the great annual increase in number of fires and areas fire swept.

The use of modern machinery and high speed logging operations with the discontinuance of animal logging by the big operators in recent years also accounts for much of the increased forest fire damage noted above.

As the use of animal transportation of logs in the woods passed to transportation by wire cables the devastation in the woods increased. Official reports<sup>2</sup> tell us that forests cut over ten or more years ago give better promise of future timber crops, if fire is kept out, than the average timber land cut over today. Hauling of logs by wire cables has become the rule in practically all large operations. At first the wire cable hauled the logs over the ground at slow speed and caused but little more destruction than under the old, or animal system of transportation. But in recent years ever-increasing speed is noted in the woods, and when high speed and the high lead or transportation of logs by suspended cables is noted, almost complete destruction occurs over a wide area. Recent advices from California<sup>13</sup> tell of the introduction of the caterpillar tractor in logging, a hopeful sign as it means less destruction to young growth.

The forest fire problem has been solved in European countries, and in several of our States, notably Pennsylvania and New Hampshire, at moderate cost, and with a fire damage approximating one-tenth of one per cent. It has been estimated that the cost of efficient forest-fire protection for the entire United States would approximate ten million dollars. It is well worth many times that sum. But we find state and federal governments grudgingly allotting small and inadequate sums for this purpose, an attitude totally different from that of urban governments, where efficient fire protection is the first consideration, cost coming second.

In the woods, however, where public interest seems not to function, widespread and ever increasing destruction reigns.

As seen in the above reports, standing merchantable timber receives first consideration, while seed trees and seedlings on cut-over land receive very scant consideration, being largely sacrificed. What would be thought of a city fire department that

would concentrate its efforts on saving the men, leaving the women and children to the flames?

## *The Last Stand*

Before proceeding to the next chapter it might be well to glance over some very interesting lumber production records for the entire United States. As stated above, we are cutting into our capital forest stock at a very alarming rate, but we could make a worse showing as our mill capacity amounts to about three times the present output. That is, we could clean up faster if we had the market. And still more remarkable, a great Federal department of our Government, the Department of Commerce, is making every effort to increase our export of wood and takes credit for the present annual total export of about three and a half billion board feet.

As stated in the introduction: "A depressed lumber industry seeking cheaper production adopts still higher speed in its operations in its efforts to ward off the threatening hanker." \* \* \* "The lumber industry is almost deliberately destroying its own prosperity by a frenzied rush toward liquidation of the remaining timber holdings."

The trend of lumber production is shown in the following table:

**(Thousand board feet)**  
U. S. Census Reports

	1889	1926 Estimated	Change in cut 1925 to 1926 per cent	1937 Cut Estimated bd. ft.
Pacific N. W. ....	3,222,376	15,515,102*	+ 5	17.5 billion
South (1909) .....	19,972,822	15,604,000†	— 9	8 "
Lake .....	8,749,842	2,046,958	—12	600 million
Central .....	5,643,379	2,001,708	0	600 "
Northeast .....	5,709,224	1,410,000	— 7	200 "
All other states .....	643,355	359,000	—12	100 "
		36,936,000	— 3.7	27 billion

The net annual depletion of our forests amounts to 60 billion board feet.<sup>12</sup>

Annual cut, acres: Pacific Northwest, 526,000;<sup>28</sup> South, 3½ million.<sup>9</sup>

\*Includes cut on public land, less than one billion feet. Cut 1924, 13,297,681,000 B.M.; cut 1925, 14,816,128,000 B.M.  
†Cut 1925, 17,148,479,000.



The former leading centers of production having had their day are on the decline. Production in the Pacific Northwest will continue to increase at least half a billion feet per year for the next five or six years. The decline in cut in all regions except the Pacific Northwest seems certain to continue. By 1937 production on public forests will probably not exceed 2½ billion feet annually. Second growth throughout the country will produce but a fraction of capacity. The total annual production will probably be under 30 billion feet and headed downward.

For the past hundred years we have noted the passing of the center of lumber production from the Northeast to the Lake States region, then to the South, and in 1927 to the Pacific Northwest, "the last stand."

The next chapter will tell you what you may expect when our privately owned virgin timber disappears.

## Chapter II

### INDUSTRIAL FORESTRY

A flood of misleading publicity has been let loose to create in the public mind the false belief that timber operators have turned from "timber mining" to "timber cropping" on a great scale. To this supposed reform the name "industrial forestry" has been given. In this chapter I shall examine and summarize at length all the evidence of what is actually being done in this way that I have been able to find in written and printed reports, in forestry journals, in lumber journals, and in letters and reports in the files of the U. S. Forest Service.

In covering a wide field of discussion of our forest problem, lumbermen and their spokesmen as well as foresters agree that second growth forests must remain largely in private ownership; though public holdings should be located in each state, to serve principally as demonstration forests. This means, as the end of virgin forests privately owned is in sight, that the bulk of our forest products must always come from private holdings. The great total involved thus raises industrial or private forestry to a commercial standing of the highest order.

A brief survey of the field of industrial forestry clears the atmosphere and enables one to grasp the salient points of this very important phase of our forestry problem. Literature covering a wide field of the subject is available, of which some two hundred articles are listed in the Forest Service Library. Seventy of these deal with foreign activities.

Timber cropping is complicated in this country by a flood of production from the last remaining accessible virgin areas, strong competition, uncertain taxation, and inadequate fire protection, further complicated by a variety of substitutes, uncertain in quantity and price, threatening to take advantage of price fluctuations; and still further complicated by a variety of soils and growing conditions, from the most favorable to soils where even a weed has no chance.

A survey of industrial forestry in this country was and is still being conducted by the Society of American Foresters<sup>13</sup> and the National Lumber Mfrs. Association. Data on this subject were also obtained from the U. S. Chamber of Commerce and the Forest Service records.<sup>14</sup>

It is very probable that more than 90 per cent of the area

under tree crop production is accounted for in the following pages.

## *What the Men Most Concerned Have to Say*

All acquainted with the present possibilities of future lumber production on a scale to meet our needs, agree that we must look to the soils of the Pacific Coast and the South for a very large part of our second growth saw timber.

The data on industrial forestry unless otherwise stated is from the report of the Society of American Foresters.<sup>13</sup>

We will begin with the Pacific Coast region, then the South and the other forest regions, and tell you what the lumbermen and their spokesmen have to say on industrial forestry, then we will hear from the foresters and others, and last, a glance over the interesting experiences of foreign countries in trying to solve the problem of industrial forestry. Foresters, public and private, engaged in this survey have been employed long enough in each region to know the operators and their methods. Extracts from their reports, brief as they are, tell the story.

Long Bell Co., Long View, Wash., J. B. Woods, forester, 1927:<sup>27</sup>

"In 1920 the manager of a large Southern company told me his directors had authorized a small expenditure for reforestation, chiefly as an ad. Within three years they were convinced. Originally I was hired to examine and report upon the character and value of southern cut-over lands and to suggest ways of development or liquidation. We have got 200,000 acres of cut-over lands in three states; othre areas not suited for farming or forestry we are selling to stockmen and others. Then we went into logging. Here (Long View) we found two great obstacles, long established practice and lack of definite knowledge about comparative costs and realization. We found that selective logging is impracticable here because of the size and characteristics of the dominant species, Douglas fir. Clean cutting is the proper practice, and slash burning. We do not leave seed trees as they represent considerable value. Artificial planting gives us the spacing and species that we desire; fire protection costs no more upon well stocked land than upon barren or weed covered areas. The extraordinary burden of reforestation here cosists only of money actually spent in planting and forestry supervision. I believe that the market value of well stocked land any time after the trees get up above the stumps will be great enough to retire the investment plus at least savings bank interest, provided one has good forest land, complete stocking

of valuable species, and real protection. President of company announced in 1926 that the policy of his company is that of sustained yield; that there was a thirty years' supply of timber on hand. Three phases of our reforestation work—1st, fire protection, fire lanes and compartments, each 200 acres; 2nd, a test of direct seeding on cut-over lands, using poisoned seed; 3rd, the nursery at Ryderwood has a capacity from one to one and a half million seedlings annually, sufficient to plant 1,500 acres annually."

Geo. H. Rhodes, Secretary, California Forest Protective Association, 1922:<sup>22</sup>

"Forestry by private individuals is not going to start with bad land. It will begin as a rule with a forest property which contains at least some mature timber." (Greeley). "If a forest property at the present time can show as much as 4 per cent interest on the investment, it would certainly appear, with the prospect of increasing timber values, to be a good business to retain. \* \* \* The period of time is so long over which the carrying costs of interest will accumulate that it is very important to have every acre carrying a full stand. Next consideration, rate of growth. We must remember that the first object is to produce saw timber, all other products being incidental and additional. It is estimated that in California 44,000 board feet (pine) per acre may be expected within a period of 100 years."

S. R. Black, Secretary, California Forest Protective Association, 1926:<sup>26</sup>

"Michigan-California Lumber Company of Camino, California, is raising a crop of young trees for its cut-over lands. John W. Blodgett *et al* of this company—own 75,000 acres timber land of which 15,000 cut over. Estimated stand  $2\frac{1}{2}$  to  $2\frac{3}{4}$  billion feet of available merchantable in red dirt region of rapid growth. Stands of 40 to 60 thousand per acre, 60 years old, not unusual. E. T. Allen reported Georgetown Divide area capable of supporting cut 30 million feet annually for all time to come. The second growth stand is the result of the logging methods in use on the operation. Company uses steam donkeys with high lead. All pine under 20 inches left and a sprinkling of fir. The soil is protected and does not dry out. Slash is cleaned up to certain extent, spot burning methods used in regions of particular hazard. Cost per acre, 60 cents for area burned; enables company to prevent spread of fire. The operation is really established on the basis of a permanent operation; at present rate of cut with annual growth 400 feet per acre on 75,000 acres of

company would support cut 30 million feet annually; growth nearer 500 to 600 feet."

Western Forestry and Conservation Association, 1926:<sup>13</sup>

Several large lumber companies in West Washington have commissioned this association to make an examination of some 400,000 acres of logged lands—a first step towards permanent forest management.

The National Lumber Manufacturers' Association, in 1926 published a bulletin—*Progress of Industrial Reforestation*, the gist of which follows:

Private forests yield 97 per cent of our lumber and other forests products, represents an investment of ten billion dollars; employ 1,300,000; and supports ten millions; the fate of these forests is the destiny of forests in America, and the weal or woe of a large sector of our commercial life. All privately owned land is necessarily a commercial problem for its owners. The owner will make only such use of it as pays or promises to pay returns. The history of forestry in Europe indicates that so much forest land is not susceptible of profitable administration that state ownership of as much as 50 per cent is perhaps inevitable in the long run.

The practice of forestry is a purely economic one from the private point of view. The rapidly growing number of timber owners who are embarking on reforestation or policies of conservative cutting that will result in substantial yields indicates that the forest industries are convinced that substitutes can never crowd out wood.

At least two large California pine companies are making a study of managed reforestation. They and forty other pine companies are now avowedly on a sustained yield basis.

The California White and Sugar Pine Association has recently set up a Department of Forest Research with a forest engineer in charge.

Wyerhauser Company has organized a forestry company to look after its cut-over lands, and make them productive.

1925—Crown Willamette Paper Company will by 1930 be planting a tree for every one removed. Nursery at West Linn, Oregon, plants two million spruce seedlings per annum. Owns 125,000 acres timber and cut-over land. Rotation period forty years for pulpwood.\*

\*To arrive at the total acreage planted to seedlings, we may use as a rough approximation 1,000 seedlings as the average number planted per acre.—G. P. A.

C. A. Barton, Pres., Boise-Payette Lumber Co., Boise, Idaho,  
1926:<sup>30</sup>

Production of timber is a business enterprise. A public enterprise may and usually should run, not merely for profit but for maximum public service. The tendency of private owners is to reduce forest capital, shorten the rotation, and improve only the more profitable chances. Private forestry is discouraged by: 1st, competition on the market of the immense store of virgin timber; 2nd, the long period of time necessary to grow a new crop of trees; 3rd, forest fires; 4th, insect depredation; 5th, uncertainties of taxation wholly at variance with the character of the income to be derived from reforested lands. We lumbermen have been too slow to work out these problems ourselves and have left them to theorists and well meaning people. We should have done the thinking and investigating, and we would have been able to arrive at a sound solution. We are now making investigations that will require a number of years, viz., what are sound principles in figuring carrying costs, interest rates, probable utilization, etc. The lumbermen have conflicting counsel, and this must be clarified to meet our needs. Cannot be reduced to any universal principle or formulae. The land investment should be figured at its disposal value and after the virgin timber has been removed, values vary according to localities and conditions possibly from \$1.00 to \$10.00 per acre. 2nd, Taxes, probably five to twenty cents per acre. 3rd, Fire protection, two to forty cents per acre. The above are direct costs. Say we have a 40 year cut, decide to reforest, leave trees as logging goes, it is absolutely necessary to change logging methods and leave trees of certain value, and we must be more careful in slash disposal; this is bound to increase yearly costs if added to present cost of logging; the concern will have less profit; why should not this extra expense be charged to the growing of the new forest; why is not the growing of new forests, if undertaken, a separate and distinct department of such business, as a part of the expense of the year's business and will reduce your income for that year by the amount of that expense? Interest is in no way a part of cost, but must be taken into consideration in arriving at cost value at the end of a certain period of time.

### *Foresters' Survey of Industrial Forestry*<sup>13</sup>

The field of industrial forestry, as stated above, has been covered by foresters in public and private employ. The Society of American Foresters, The American Forestry Association, The U. S. Chamber of Commerce, the U. S. Forest Service,

and the National Lumber Manufacturers' Association have cooperated in collecting data on this subject. Foresters, both public and private, are found in every forested region of the country. They know the local lumbermen intimately and know their methods in the woods. They know the lumbermen who are interested in conservative logging practice, and they know the men who are striving for a quick clean-up and abandonment of the region. They know the men who aim at treating their holdings as a source of perpetual wood supply, whether the crop be wood pulp or other small stuff or saw timber. These matters are constantly discussed in the woods and in the office, so that after a forester has been five, ten, or more years in a region, he can recite without notes just what is happening in the forestry line in his own special territory.

The following comments in abbreviated form, extracted from the foresters' survey,<sup>13</sup> suffice to indicate the character and scope of forestry practiced, if any, on each property mentioned:

*S. Idaho.*—Only one real forest land ownership in this region—other tracts owned run from twenty to forty acres. Boise-Payette Lumber Company (a Weyerhauser concern) (See President Barton's comments above) owns 295,565 acres of which 50,000 acres are cut-over. Very little of their holdings burned over—a virgin stand—purpose to supply two mills, capacity of each 50 million feet annually. Until recently, at least, their idea was to cut out the standing timber that they own and are able to purchase from private owners and the Forest Service, and when that was accomplished to close the plants. *Are now seriously considering the question of operating on a sustained yield basis.* They have an effective fire organization and insect control—the company changed plans and cut out infested stand and is now in control of the insect situation.

The company is starting to pile and burn slash as per recent legislation. *Nothing has yet been done* by this company in adopting methods of cutting for the purpose of securing satisfactory natural reproduction; but this company is *now thinking along this line*—no plans for planting—this company has contracted with the Western Forestry and Conservation Association to have their lands examined to ascertain possibilities of sustained yield for this plant—practicing closest possible utilization—no trained foresters employed. The state has large areas of forest land, school lands, tributary to company and making sales to it.

*Idaho*—Clearwater Land Company has three billion feet, plans to hold for second cut—*mills too large for sustained yield cut.*

C. L. Billings, Assistant General Manager, Clearwater Lumber Co.:<sup>64</sup>

“If the operator does not own land enough, and can not buy it to produce all the logs he needs, and can not assure himself that he can cut some one else’s timber, or get part of his logs there, how can he practice forest management? \* \* \* The deduction is not escapable that forest management is an impossibility for almost all the plants.”

F. Morrell, District Forester, District 1, March, 1925:<sup>65</sup>

“It is only going to be a few years until most of it (Idaho’s private forests) will have been cut over and the evidence of the practice of forestry in the woods, considering the length of time under which the land is going to be cut over, is not, in my judgment, a thing to look at with any degree of enthusiasm.”

*Montana*<sup>13</sup>—No other large timber owner in Montana or North Idaho interested in forest production.

*California*<sup>13</sup>—*Redwood region*:—All long-time operations have reforestation plans by planting. It will take a very long time to thus mature a crop.

Union Land Company employs two foresters—large nursery—aims to increase planting to cover equal area logged.

Caspar Lumber Company—has forester—nursery—same for Albion Lumber Company, Sacramento Lumber Company, Hammond Lumber Company, Little River Redwood Company, North Redwood Company, Dolbeer Carson Company.

The most promising attempts in the United States, at raising crops of saw timber are noted in the redwood region.

*California—Pine region*<sup>13</sup>—Twelve million total acreage.

Maderia Sugar Pine Company<sup>13</sup> has several foresters—*duties not relative to forestry*—cuts its own and Government lumber.

Sugar Pine Company<sup>13</sup> *has forester to study feasibility of forestry.*

Yosemite Lumber Company<sup>13</sup>—has two foresters—*not interested in practice of forestry.*

Pickering Lumber Company<sup>13</sup>—has forester—interested in better fire protection—studying feasibility of forestry.



Michigan-California Lumber Company<sup>13</sup>—has forester—selective logging—cut-over lands in good condition.

Diamond Match Company<sup>13</sup>—has forester—plans nursery.

Weed Lumber Company<sup>13</sup>—subsidiary of Long Bell Company—no forestry practice as yet.

Fruit Growers' Supply Company<sup>13</sup>—has a forester—another as logging superintendent—plans leaving its lands in good silvicultural condition—logging chiefly on Government lands.

Clover Valley Lumber Company<sup>13</sup>—has forest engineer—sought advice from forest service—"probably to better deal with the Forest Service than to introduce forestry."

Hobart Estate Company<sup>14</sup>—two foresters—forestry work *limited to fire protection*.

District Forester Show states:<sup>64</sup> "It seems evident that there remains an apparent disinclination on the part of lumber operators to go ahead in the actual practice of forestry."

Quincy Randles,<sup>13</sup> Secretary Society American Foresters, Southwest Section, New Mexico, 1926:

*Arizona and New Mexico*—Private land owners in Arizona and New Mexico are not practicing forestry. Timber lands are held and in part protected by the Forest Service through cooperative agreements until virgin timber is cut and the land is then sold. A few private tracts (160 acres) have been cut under Forest Service supervision. It is not believed profitable for private capital to engage in forestry in these two states due to slow growth, light yields, etc.

R. H. Chapler,<sup>13</sup> Executive Secretary, Reforestation Commission of State of Oregon, reports:

*Oregon*—There is in this state an area of approximately 2,625,000 acres not valued or assessed for its timber. Tax, almost 10 cents per acre annually; 6/10 of 1 per cent of the total general property tax revenue in the state comes from these lands. No county now depends on the land for more than 5½ per cent of its total tax revenue and the average for all counties is 6/10 of 1 per cent—a certain per cent of these lands is now tax delinquent. Average amount of tax in different counties varies from 2½ cents to 32 cents per acre annually. It is easy to show that the owner who is now paying 32 cents an acre annually on this type of land has a liability rather than an asset.

Forest economists agree that average growth of all reforestation land in the state is around 350 board feet per acre

per year. Future price of stumpage is placed at \$4.50 per M. The average acre will produce \$95.50 in 60 years, allowing owner  $4\frac{1}{2}$  per cent on money invested. Three items—first, land rental, value \$2.35 per acre. Four and one-half per cent or 10 cents per year is allowed for the use of the land. Second, growing costs—fire protection and insurance—fire protection of 5 cents per acre per year; will cost 8 cents per acre to insure the investment against fire loss—a total growing cost of 13 cents per acre per year. Third, Taxes—the proposed law fixes taxes at 5 cents per year per acre. Allowing owner  $4\frac{1}{2}$  per cent on above items, he must get \$82.50 per acre out of his crop in order to reimburse himself. If he pays 13 per cent yield tax he will realize no profit.

Mr. Chapler goes on to state in 1926 report—If the state wants the private owner to hold title to any considerable portion, help support the government through the growing period, and pay cost of growing another crop, it must show the private owner a business proposition which gives fair promise of warranting the necessary investment in land, growing costs, and taxes. On the average the owner will lose less by giving his land to the state now than he will if he finances the growing of a new crop under the general property tax. Experience in other states indicates very clearly that the solution of the problem lies along lines of cooperation among all three agencies. All this has to do with the ownership of stumpage. The community has a far greater interest. When timber is cut the community (a) experiences an increase in taxable valuation, through improvements, railroads, sawmills, homes, etc.; (b) market for labor and equipment; (c) has a market for farm products. Today the total of the above amounts on the average to *about eight times the value of the stumpage*. The community should be far more interested in bringing about conditions wherein there will be a continuous supply of timber than it is in the *ownership of timber*. (See what Forbes states in this connection in the South, p. 61.) He proposes a law similar to the Michigan law which reserves reforestation lands from the general property tax, lists and places them on a separate list subject to special annual tax. The term "forest crop" is meant to cover not only timber but any crop such as bark, cordwood, etc. Owner guaranteed, during period required to grow his crop, against any legislative changes which might affect his property and increase taxes. He proposes also a regular yield tax.

*Oregon*—Mt. Emily Lumber Company<sup>15</sup> cuts annually 45 million feet, operation has 25 years' life—no general policy of reforestation—leaves seed and other trees.

California and Oregon Paper and Lumber Company<sup>15</sup>—twenty-five year timber supply—no plan of reforestation.

Booth Kelly Lumber Company<sup>15</sup>—90,000 acres timber; 30,000 acres cut-over, sixty years' cut available; stockholders to determine long term cut or permanent cut; depends on tax, fire and economic conditions.

Hawley Pulp and Paper Company<sup>15</sup>—uses 60,000 cords a year, twenty years' supply available; company depends on purchases.

*Washington*—Weyerhaeuser Lumber Company,<sup>15</sup> C. S. Chapman, forester. Its holdings are in Washington and Oregon; it has 285,000 acres of cut-over land; is classifying them; no planting program as yet—studying timber tracts in advance of cutting—restocking is slow on account of fire. C. S. Chapman also states in 1928<sup>64</sup> "a few are working toward sustained yield for their operations, and a few are not relying upon natural restocking of cut-over areas but are resorting to planting."

Shevlin Hixon Company<sup>15</sup>—Leaves fully stocked areas; piling and thinning costs \$8.00 for acre; needs some assurance as to taxes on its 200,000 acres before practicing forestry; 8,000 acres cut over annually; 300,000 adjacent acres are available for operations. Should be perpetual cut operation.

West Fork Logging Company<sup>15</sup> owns 30,000 acres of virgin forest; 70,000 acres of state and U. S. forest land adjacent and available for operation.

McGoldrick Lumber Company<sup>15</sup>—Not practicing forestry—its lands are not sufficient in area.

Merrill Ring Lumber Company<sup>15</sup>—We have experimented in a small way in planting; their report goes on to state that the only other companies in northwest taking any steps along lines of reforestation are Meyerhauser, Long Bell, Willamette Paper and Pulp Company and Polsen Logging Company.

Fred Ames, Assistant District Forester, Washington and Oregon, February, 1928<sup>64</sup> has this to say about industrial forestry in Washington and Oregon:

"A few progressive operators have had their properties examined by consulting foresters and two companies that I know of may at least be said to have made a beginning toward continuous cutting. Three companies are employing foresters for technical forestry work.

"Aside from fire protection, I confess that under present conditions I find it a little difficult to be very optimistic over

what can be expected in the way of forest management by the private owner.

“As pointed out by Chapman, a great many companies can see the end of their operations right now.” Forester Ames goes on to say: “Most operators are so heavily oppressed now by interest and taxes that the building up of the timber reserve necessary for a continuous cut is out of the question.”

*Utah*<sup>13</sup>—There is no privately owned forest land in Utah. The National Government owns probably 99 per cent of the forest land in the State. All is in national forest. Small amount forest land owned by grazers, used only for grazing, except for occasional fence posts; the railroad owns some of alternate sections, nothing done on these lands except grazing; a few sections were cut over some ten years ago.

*Wyoming*<sup>13</sup>—West of Continental divide.—Practically no privately owned or state owned forest land; a coal company has about 2,000 acres; has fair stand.

*Colorado*<sup>13</sup>—P. Woodhead, forest supervisor, Routt National Forest. To the average mill man cut-over land regardless of its future forest possibilities is valueless.

Forestry is not being practiced by the very limited number of owners of forest land in this vicinity. The policy seems to be to secure the maximum amount of timber from the land; no seed trees are left.

*Colorado, Steamboat Springs*,<sup>13</sup> P. Woodhead, Forest Supervisor.—There are no extensive timber operations on private lands in the vicinity of Routt National Forest in Northwest Colorado. Very little of the public or private lands outside of the National Forest is timbered. A typical private operation consists of a steam power sawmill, daily capacity 3,000 to 6,000 feet. In general the operators are in bad shape financially. It can be safely said that none of the operators on private lands has any object other than the removal of such timber as the local market will absorb. This means the removal of all the accessible trees from 10 inches to 11 inches up. Operators assist in fire suppression; they make no effort to handle slash so as to reduce fire danger; no cleanings or thinnings are made; no planting is done except ornamental on private lands; nothing is being done toward a sustained yield; no foresters are employed; in general it may be said that forestry is not being practiced on private lands in Northwest Colorado.

*Colorado*.—Rocky Mountain Coal and Iron Company,<sup>13</sup> Ira B. Gale, Superintendent to H. E. French, Forest Supervisor.—

264,990 acres total; tract acquired for coal as well as for timber; no serious fire hazard exists; no methods have been introduced to encourage natural reproduction; no cleanings or thinnings; no planting, none contemplated. No steps have been adopted toward sustained yield; no foresters are employed. A small amount of technical literature has been received from the Forest Products Laboratory from time to time but has been of little value in meeting local problems. Working plans covering future cuts and management of timber are contemplated with the idea of perpetuating forest and increasing yield.

*The South*—The south has a climate favorable to tree growing. It has millions of acres of land indifferent for agriculture but excellent for timber growing, and it is at the door of the world's greatest lumber markets.

*Alabama*—Jackson Lumber Company<sup>13</sup> owns 94,000 acres in S. Alabama, 39,000 in Florida, mostly cut over 1902 to date, with 6 to 7 years of virgin timber burned over often. Hope for second cut in 20 years. Fire protection established 1924—slash disposal 1922, cost 60 cents acre—cut to 18" diameter—no plans sustained yield—may extend operations indefinitely—no forester; advice by U. S. Forest Service.

Tennessee Coal & Iron Company<sup>13</sup>—100,000 acres cut over 1880 to 1905—nearly fully stocked 20 to 40 years old—plan second crop timber—organized fire protection—no plans sustained yield—making survey for formulation working plan.

Kaul Lumber Co.<sup>13</sup> owns 100,000 acres—cut over 1904 to date—4 years' cut virgin timber—hold lands for future operations by small mills—no sustained yield plans—employed a forester in 1909—never since.

T. R. Miller Mill Company<sup>13</sup> owns 120,000 acres of which 50,000 acres virgin, 50,000 in good second growth, 20,000 acres denuded—burned frequently—cut to 18" diameter—leave seed trees—hope for second cut—no plans for sustained yield—cut conservatively.

Allison Lumber Co.<sup>13</sup> owns 75,000 acres of which 25,000 acres virgin—fire protection began 1910—began operations 1900—cut to 12" diameter—good reproduction—advice from State Forester and Forest Service.

W. M. Carney Mill Company<sup>14</sup> owns 60,000 acres—burned frequently—fire protection—has forester—hopes to prolong operations.

Scotch Lumber Co.<sup>13</sup>—Has decided reforestation is practicable.

Georgia.—Sessoms Land & Securities Company<sup>13</sup> owns 80,000 acres cut-over land—burned frequently before 1920—protected since—plan to grow timber for *turpentine* operations—no cutting except for poles and ties—visited by foresters.

Superior Pine Products Company<sup>13</sup> owns 187,000 acres cut-over land—most half-stocked—burned frequently—sufficient seed trees to restock 90%.

*Turpentine operations*—no cutting except for poles and ties—plan perpetual turpentine operations—land purchased 1925—forester as present manager—Technical forester as assistant—will produce 20,000 barrels resin annually—working all trees 10" diameter.

Pfister and Vogel Leather Company<sup>13</sup> owns 65,000 acres hardwood, mostly virgin—protected since 1912—fire protection. Chestnut blight forces selling as fast as market allows—chestnut the only cuttings—forester employed since 1912—no sustained yield plans—plan additional land.

Florida.—Brooks Scanlon Corp.<sup>13</sup> owns 300,000 acres in fee—80,000 acres leased—all virgin except 100,000 acres cut-over—not much fire hazard except where turpentine. The company states, "We have adopted no method of reforestation as we feel under existing laws there is not sufficient inducement or protection for private enterprise to engage in that work." Employs two foresters.

Alger-Sullivan Lumber Co.<sup>14</sup>—Has extensive holdings, Alabama and Florida—has in recent years thinned out 1,000 acres pine to improve the stand.

Louisiana<sup>13</sup>—Brown Paper Mill Co. owns 113,000 acres—burned periodically until 1925—protected since—pulpwood—co-operation with State Forestry Division in fire protection—pay 2 cents per acre into State Fire Protection fund—leave seed trees—cut to 4" diameter—cut over land \$6.00 per acre with 6 to 8 cords—cordwood worth \$5.00 at mill—have talked about employing forester—plan mill capacity 60 to 120 tons Kraft paper daily.

Industrial Lumber Co.—(U. S. Chamber of Commerce report<sup>15</sup>)—Saw milling and paper milling, 10 years' supply; no sustained yield for saw mill. 13,000 acres virgin pine—90,000 acres cutover land—burned over annually or oftener—after cutting virgin timber will operate pulp mill—plan to plant barren areas—advised by U. S. Forest Service, State Forester and Yale Forester—estimated cost \$1 per M more to use team logging than steam skidder; will purchase adjoining areas—plan sustained yield.

Gr. Southern Lumber Co.<sup>13</sup> (La. holdings)—334,000 acres in Louisiana—100,000 in virgin timber—184,000 cut-over

land restocking, 50,000 acres not restocking—50,000 acres fenced—fire protection successful over 250,000 acres—saw logs cut to 6" top diameter—all material over 3" sent to pulp mill—two seed trees per acre since 1920—began reforestation 1921—planted annually—total planted to date 5,000 acres—8,000 acres slash—for 1926-1927 plan to plant 2,400 acres until all barren places planted. Nursery in 1925 grew 7½ million seedlings—planting seedlings more effective than direct seeding. Employ one forester—two graduate foresters in nursery work and making seed trees, preparation and application yield tables—advice by Forest Service. Cost report planting including fencing \$3.92 an acre—10' plowed fire line \$23.25 per mile—50 yard burned line \$8.45 per mile. Cost fire protection 8 cents per acre annually—one-year seedlings at planting site 69 cents per M. Company plans to reduce mill cut and cut only amount grown.

Gr. Southern Lumber Co. (Miss. holdings)<sup>13</sup> owns 90,000 acres—30,000 acres virgin—young timber unmerchantable 10,000 acres—barren 50,000 acres. Propose raise pulp wood and saw logs—leave 6 new seed trees per acre—one forester.

*Louisiana.*<sup>13</sup>—Urania Lumber Company owns 20,000 acres virgin—50,000 cut-over, periodic fires up to 1921—fairly successful protection—4,500 acres under hog-proof fence—cooperating with State Forestry Service—cut 10" diameter and over—8" top diameter. Yale Forestry School has training camp here. Will consolidate holdings and perpetuate operation.

(Ch. Com.<sup>15</sup>)—Southern International Paper Co. (La. & Ark.) 500,000 acres, perpetual supply, general reforestation.

*Mississippi.*—Westar Lumber Co.<sup>13</sup>—Extensive holdings—mostly second growth—propose to grow trees for future operations—fire protection—has service two practically trained foresters—no plans sustained yield.

Tatum Lumber Co.<sup>13</sup>—Considerable holdings virgin and second growth—burned extensively—fire protection—leaving seed trees—cut to 6" top diameter—no plans sustained yield.

Sumter Lumber Co.<sup>13</sup> owns 165,000 acres in Mississippi and Alabama—90% pine, balance hardwood—virgin 650 million feet—second growth 50 million feet—young unmerchantable, 20,000 acres—barren 10,000 acres. Started four years ago to protect young growth against fire—not practiced selective cutting—no forester—no slash disposal—no plans for thinning or planting—12" diameter—7" top diameter—cost 4 cents per acre protection. Quite likely we will adopt some constructive plans in the near future.

*Arkansas.*—Dierks Lumber & Coal Co.<sup>13</sup>—Owns 1,150,000 acres in S. W. Arkansas and S. E. Oklahoma. Of this 575,000 acres virgin—125,000 acres cut-over land not fully restocked—450,000 acres advanced second growth. Reforestation measures taken 1925—before that burned over intermittently—fire protection—several plans slash disposal tried and discarded as not necessary—cut 14" diameter—500' left per acre growing stock and seed trees—cleaning and thinning done carefully—no planting—buying more land to consolidate its holdings—close utilization—2 foresters employed—various visiting foresters—fire protection costs 3 to 4 cents acre annually—taxes about 10 to 12 cents acre—in some cases higher—has 4 good mills and 2 others coming—plan perpetual operation.

Crossett Lumber Co.<sup>14</sup> owns 390,000 acres, of which 90,000 acres virgin—burned periodically—no very successful fire control to date—inaugurating fire protection—1 to 2 seed trees per acre—diameter limit 14"—close utilization. 1923 employed 2 foresters—1924-26, 1 forester—at present, none. Yale Forestry School visited and studied holdings—fire protection costs 2 cents an acre—slash disposal 25 to 50 cents acre—land classification 8 to 9 cents acre—marking seed trees 16 cents acre—plan perpetual operation.

Malvern Lumber Company<sup>13</sup> owns 50,000 acres—operating since 1880—cut-over areas restocking in spite of periodic fires—plan to operate saw mill on a permanent basis—fire protection began 1926—leave about 1,000' standing per acre—cut to 8" diameter in tops—employed consulting forester in 1926—plan to operate on sustained yield basis.

Long Bell Lumber Co.<sup>14</sup> owns 60,000 acres in Arkansas—cut-over 1911-18—burned periodically—good second growth—next operation about 1935—fire lanes—resident non-technical forester in charge fire protection—will purchase adjoining timber lands and consolidate holdings.

Wisconsin and Arkansas Lumber Co.<sup>14</sup> owns 145,000 acres, of which 5,000 acres virgin pine—10,000 virgin hardwood—balance restocking—well-burned periodically—fire protection. Cut 8" diameter top—sustained yield not possible as cut nearly finished—consulting forester since 1925.

*Louisiana.*—Thistlewaite Lumber Co.<sup>13</sup> owns 11,300 acres—second growth hardwoods—plan to cut independently—cooperating with State Division Forestry in fire protection—plan to develop local cordwood market to utilize wood waste—employ consulting forester—taxes 32 cents arce annually—protection 10



cents acre annually—interest on land investment at \$5.00 acre—30 cents annually.

Karuse-Managan Lumber Co.<sup>13</sup> owns 58,000 acres cut-over and greater part denuded—burned annually in past—holding as investment in second growth timber—cooperating with State Forestry Division in fire protection—natural reproduction on portion—employ technical forester, a member of firm—plan to cut second growth with small sawmill after 10 or 15 years.

Union Sawmill Co.—One of Frost Lumber Industries, Inc.<sup>13</sup> owns in Louisiana 135,000 acres virgin; Arkansas 100,000 acres virgin—merchantable second growth 60,000 acres Louisiana and 20,000 acres Arkansas—unmerchantable, 30,000 acres Louisiana, 15,000 acres Arkansas—5,000 acres barren in Louisiana—plan to raise saw logs and *pulp wood*—started fire protection 1923—2 seed trees per acre—14" diameter, 7" top—one forester.

*Texas.*—Carter Kelly Lumber Co.<sup>13</sup>—one-half virgin and one-half cut-over lands—have purchased 200 million feet—fire protection—team logging—no thinning—no planting—no forester.

Jasper County Lumber Co.<sup>13</sup>—(Frost Lumber Industries) owns 175 million feet pine and hardwoods, mostly virgin—fire protection—cut to 12" diameter.

Southern Pine Lumber Co.<sup>13</sup> owns 175,000 acres—on perpetual basis—cut to 12" diameter—some fire protection—not as yet on a bona-fide reforestation basis—working in this direction.

*South Carolina*—Carolina Fibre Company<sup>14</sup> owns 28,000 acres second growth for *pulpwood*—fire protection—have experimental thinnings 25 to 30 acres—have planted one acre to pine—close utilization—advice U. S. Forest Service.

Tilghman Lumber Company<sup>13</sup> owns 60,000 acres—burned for years—fire patrol—2 to 4 seed trees left—14" diameter—advice occasionally by extension forester—will raise crops of saw logs.

J. F. Prettyman Lumber Co.<sup>13</sup> owns 60,000 acres—a little old growth—whole thing has been repeatedly burned—fire protection—16" diameter—advice by extension forester—plans sustained yield.

De La Have Industrial School<sup>13</sup> owns 1,000 acres—fires rare—timber in good shape—plans to supply school with timber—in terms of grant this area to be kept in timber—cutting below annual increment—advice of extension forester—careful cutting plan to be worked out.

E. W. Dabbs<sup>13</sup> owns 5,000 acres—virgin hardwood 1,000 acres—seed trees left—cut to 6" diameter—advice by extension forester—plan to perpetuate operations.

The North State Lumber Company<sup>13</sup> owns 48,900 acres and several small tracts few thousand acres—attempting to raise saw logs—fire protection—fire hazard great on account whiskey stills in woods—cut to 14" diameter—leave seed trees—no forester.

*North Carolina*—The Champion Fiber Company<sup>15</sup>—Employs forester—has nursery—fire protection.

J. B. Woods, Forester, Long-Bell Lumber Co., Feb. 1928:<sup>64</sup>

"Hardwoods are being worked over (in the South) with very little thought being given to aiding nature to produce another of good quality; the trees left usually are crooked and defective.

"So today we find that comparatively few southern lumbermen are in a position to continue permanent operations in pine." \* \* \*

"And although three states have enacted taxation measures intended to promote tree growing, none of them has removed any of the burden from the holders of mature lumber. And only a few hundred thousands of acres of second growth actually have been placed under such contracts in the whole southern area."\* \* \*

"The great weakness in this development (forestry) is one of time; it has come too late. For gentlemen, the number of such operators is ridiculously small in comparison with the number of operators who have saw-milled in the south during the past fifteen years."

The above notes from reports on industrial forestry from the South and the Pacific N. W. cover a large proportion of the areas in the United States under prospect of "cropping." The areas under sustained yield make a small total.

Remember, we need the annual growth of 470 million acres of well stocked and well managed forest.

*The Lake States.*—As in many other sections of the country, interest in reforestation, sustained yield, etc., is found on forest tracts utilized largely for small stuff, paper and pulp material, poles, railroad ties, mining timbers, etc. In Wisconsin we find the paper and pulp industry valued at \$90,000,000 and second in the state to the dairy industry.

A report<sup>14</sup> by the Wisconsin state commission on the industry states that the state has no adequate system of pro-

tection for her forests from fires. The report recommends that the forest owners be represented in an advisory capacity on an Advisory Conservation Council. It goes on to state "It must be recognized that the State has an investment in every acre of land, good and bad, and that the State representing as it does the entire people is under obligation to provide conditions that will allow owners of forest lands and industries dependent upon the forests to operate their plants that they may continue to *contribute their fair share of taxation to the support of the state. The present system of forest taxation is uneconomic and unsound*; it makes for rapid depletion of forest and not for sound conservation. The state in continuing a wrong form of forest taxation has been a party to the rapid cutting of our forests. The committee recommends a forest program, in brief: to restore cut-over lands to productivity that the forest lands of the state may be made continuously productive and that they may become an *insurable risk* for their owners; that an amendment to the constitution is necessary to provide a low land tax, 5 cents per acre, and a yield tax of 10 to 15 per cent. The report goes on to state that the present tax compels the owners to cut stumpage as rapidly as possible and that lands are becoming delinquent.

In the State of Michigan we find that the area of unproductive land has steadily increased; that the state has been forced to take title to nearly 700,000 acres of delinquent (largely cut-over) lands.

We find some interesting comments on industrial forestry in this region in a 1926 letter<sup>14</sup> by the forest service inspector for the district. "In the Lake States there is hardly an instance known to me in which a company can be considered to have attempted forestry. In Minnesota, we have 5 associations of timberland owners formed for the purpose of promoting fire protection in close cooperation with the State Forester. \* \* \* These efforts, valuable as they are, cannot be considered as forestry. With few or no exceptions, the companies will continue their practice of clear cutting. The annual growth and the future of the cut-over lands will play but little part in their calculations. The Cloquet companies may prove to be an exception if a timber tax law is enacted agreeable to them but, thus far, they *have not openly committed themselves* to forestry and *should not be considered as practicing it*.

In Wisconsin, the Cornell Wood Products Company is holding some 35,000 acres of jack pine for future use and is spending money in protecting it. Forestry does not enter into

their calculations although they have purchased some immature jack pine with a view of holding it for increased growth. \* \* \*

The Holt Company, of Oconto, employed the firm of Banzhaf and Watson, consulting foresters of Milwaukee, Wisconsin, to supervise the cutting of 80 acres of over-mature hemlock and hardwood.

The firm of Banzhaf & Watson has been employed, I believe, by the Northern Hemlock and Hardwood Association of Oshkosh, Wisconsin, to assist in certain economic investigations tending to develop the practicability of the practice of forestry, and it has been employed by the lumber companies for special studies tending to show what the possibilities of conservative cutting may be. Thus, some serious thought is being given by the industry and some of its leaders to the question of conservative operations with a view of prolonging the cut but no company seems to have seriously entertained the idea of putting its operations on a continuous basis. Very few, if any of them, have sufficiently large holdings to make that a possibility unless the rate of cut is materially reduced.

The same comment applies to operators in Upper Michigan, many of whom have mills in Wisconsin. It is very doubtful whether any of the large operating companies in the Lake States will see its way clear to adopt forestry on a large scale. There is a great deal of pessimism respecting the tax situation, fire protection and the rate of growth of native species. The opinion of the average operator seems to be that there is no remedy which will prevent the present practice from continuing to its logical conclusion through the exhaustion of the timber, following which the Federal or State Government may have to take hold of the land to render it again productive.

The Cleveland Cliffs Iron Company of Ishpeming, Michigan, has done more experimental planting, dating back 15 years or more, but it is not considered a serious attempt to approach continuous forest production. Elsewhere in Michigan a few attempts at planting have been made, but they were sporadic and have not been followed up. Some of the operators may gradually adopt measures tending toward forestry but very few of them appear to be in such circumstances as would make it possible for them to put their operations on a continuing basis. They are unable or unwilling to curtail their annual cut to a point in keeping with annual growth. *Apparently replacement of the forest must be done by others.*

Rafael Zon, Director of the Lake States Forest Experiment Station in a letter of October 6, 1925, to the U. S. Forest Service states: "Unfortunately most of the hardwood opera-

tors have not enough cut left to inaugurate such a system of cutting, unless they can radically reduce the capacity of their sawmills or temporarily buy logs from the outside.

"In Minnesota the Weyerhaeuser interests are thoroughly converted to fire protection and spend a considerable amount of their own money in protecting their forest lands. In addition, there is the so-called Wales Branch Fire Protective Association, which is doing effective work, of which Weyerhaeuser, Kimberly and Clark, and others are the chief representatives. This, however, is entirely a *pulpwood region*."

Russell Watson, a private forester with much experience in the Lake States, stated in 1926:<sup>45</sup> "In the Lake States the end is now so near that unless the state and the federal government take immediate and well directed steps to rebuild the lands devastated, and to save the forests now standing, there will be very little of forest left in the Lake States within a few years. *If things go well* there may be a matter of 500,000 acres under sustained yield in the Lake States within 20 years (excluding wood lots). These acres will produce perhaps 120 million feet annually, just about enough to run the city of Milwaukee. The solution of the problem must come from private owners, through the private forests. The woods superintendent sees higher logging costs in forestry and is against it. This woodsman sees college boys usurping his place in the woods.

*New England*.—A keen interest in forestry has been manifest in New England for some years. The reports<sup>13</sup> tell us in brief the following:

*Maine*—The Bates College Forest<sup>15</sup> owns 12,000 acres—under management for four years.

The Great Northern Paper Co.<sup>14</sup>—Considering the possibilities of forest management.

The American Thread Co.<sup>15</sup> owns 30,000 acres—manufactures spools—can cut indefinitely—possibility of sustained yield.

Oxford Paper Co.<sup>15</sup> \* \* \* The U. S. Forest Service Inspector for the Northeast stated in a letter September 6, 1927, to the present writer: "I will merely state that my conception of forestry and the practice on the 9,000,000 acres of forest land in Maine are not at all in agreement. The big timberland owners in Maine are not making any definite effort to control cutting operations so as to leave a growing stock of softwoods on their lands. In any logging operation there is of course some softwoods left, but it is not due to any preconceived notion or plans designed to leave it. An exception should perhaps be made of

the Pingree lands amounting in all to about 1,500,000 acres which until quite recently at least have been cut only for saw timber which means timber down to 10 or 12 inches in diameter. \* \* \*

"The Eastern Manufacturing Company, at Brewer, Maine, is planting at the rate of about 1,000 acres a year an old burn of about 20,000 acres extent. This burn is coming up to popple which is being underplanted with spruce. This company maintains its own nursery for the purpose of growing the trees." \* \* \*

*New Hampshire*—The Yale Forest<sup>14</sup> owns 1,000 acres—for demonstration and experimental purposes.

The Brown Paper Co.<sup>15</sup>—Maintains large nursery of 11 million trees—young stock largely sold—sets out two to three million trees annually.

Mr. Colby<sup>15</sup> has a forest tract—sets out white pine seedlings—states that taxes are too high; states that only twenty years' cut left in county.

V. M. Pratt<sup>14</sup> owns 2,000 acres—has practiced partial cutting for twenty years—does much pruning with gratifying financial returns.

*Vermont*—Newton-Thomson Mfg. Co.<sup>14</sup>—in continuous operation for many years—paper birch is the principal species utilized. It counts on securing an adequate and continuous supply of timber.

Parker Plantings<sup>15</sup> owns 100 acres.

*Massachusetts*—Chaffee Brothers Company<sup>15</sup> owns small tract—manufacturing box boards, clothes boards, etc.

Harvard Forest<sup>14</sup> owns 2,000 acres—has been under intensive management sixteen years to secure natural reproduction for sustained yield—a demonstration forest.

E. Murdoch Co.<sup>14</sup> owns 15,000 acres and 25,000 acres of softwood plantations—has large forest tree nursery of 1½ million trees—natural reproduction sought.

Wm. Brown & Son<sup>14</sup>—Another woodenware concern like Murdoch Co.—company owns a few thousand acres managed carefully.

New England Box Co.<sup>14</sup> owns 30,000 acres—accurate timber inventory—rate of growth, etc., is tabulated—little planting done—clean cutting is still the prevailing practice—some silviculture practiced.

George Beale<sup>14</sup> owns 3,000 acres—cut-over white pine land being restored to productivity—cutting for natural reproduction.

Wm. H. Walker<sup>14</sup> owns 2,000 acres—this family has been operating a sawmill and this tract and purchasing other timber for 100 years—cutting carefully for natural reproduction.

*Connecticut*—New Haven Water Co.<sup>14</sup> owns 12,000 acres of watershed—under management since 1900—since 1908 under Prof. Hawley, Yale Forest School—2,000 acres planted—nursery can furnish material to plant 200 acres annually.

Other water companies in New England take interest in reforesting their watersheds.

Dr. J. W. Toumey, in April, 1928, states:<sup>66</sup> \* \* \* “Our existing system of taxation (in New England) which permits the local assessor to tax standing timber at its full market value, thus forcing the cutting long before the timber reaches a size and quality that serves best the general prosperity of the community and the state.” \* \* \* “Under our existing laws in New England, the man who owns and holds valuable second-growth and planted timber to the end of a suitable rotation is almost certain to lose money in the undertaking.”

*New York*—Finch Pruyn & Co.<sup>14</sup>—operating for ten years on a sustained yield basis—employs two foresters—it is one of the few companies in New York state which gives every appearance of being seriously interested in continuous timber production.

The Whitney Preserve<sup>14</sup>—a large estate—being cut over on a plan prepared by the U. S. Forest Service.

The Racquet River Paper Co.<sup>14</sup>—plans sustained yield of 10,000 cords annually.

*New Jersey*—New Jersey Zinc Co.<sup>14</sup> owns 10,000 acres timber—has planted 35,000 acres in four years—aims to get sufficient area to cut only annual growth and secure sustained yield of sound mine props 3 inches to 16 inches diameter and some large timber. Expects to salvage 100 per cent of its chestnut injured by blight. Official of company states: “We need accurate information relative to diameter limits, form, per acre growth under forestry management. We feel that a private concern should not be expected to collect scientific growth data at its own expense.”

*Pennsylvania*<sup>13</sup>—Pennsylvania State College reports that the chief problem is fire protection, then white pine weevil and

grazing; that natural reproduction will stock 95 per cent of our lands as fast as cut over—have planted 140 permanent demonstration areas and plan to have 400 to 450. The report mentions *lack of exact data* and states "*we cannot carry to the farmer that which we do not ourselves possess.*" The Smith-Lever funds can not be devoted to research." In the anthracite section seven or more companies have definite plans of retimbering their boundaries. The *present cut\** of lumber in Pennsylvania is less than the amount used in the city of Pittsburgh.

H. N. Eavenson and Associates<sup>13</sup> own 25,000 acres—has its own forest service—since 1920 is self-supporting—furnishes 1,500 car loads annually—cost of development 30 to 40 cents per acre annually—has planted 918,000 trees.

Clearfield Bituminous Coal Corporation<sup>13</sup> owns 25,000 acres timber land—nursery—fire protection—sawmill—one forester.

Philadelphia & Reading Coal and Iron Co.<sup>13</sup> owns 170,000 acres forest land—protecting and planting—culling less than one-half estimated annual increment—employs three foresters.

The Wilmore Coal Co.<sup>13</sup>—planted 400,000† seedlings.

The Bethlehem Mines Corporation<sup>13</sup> began planting in 1919, planted 300,000 trees, cutting under supervision of a forester.

Rochester and Pittsburgh Coal and Iron Co.<sup>13</sup> set out 500,000 trees in three years.

Armstrong Forest Co.<sup>13</sup> owns 50,000 acres—planting 400,000 to 500,000 trees annually—close utilization, clean cutting of hardwood lands—pulpwood cut to 3 inch diameter except hemlock, oak and chestnut—a small amount of growth and yield studies made—fire protection.

*West Virginia*—Elk River Coal and Lumber Co.<sup>13</sup>—Blight on chestnut—much pitch pine being killed—no reforestation contemplated—cut to 14 inch and 16 inch diameter—pulpwood used from tops and branches—not very profitable venture but cleans up woods and reduces fire damage.

Cherry River Boom and Lumber Co.<sup>13</sup> owns 200,000 acres—fire protection—cooperating with state and federal governments—cut 80,000 feet per day—planted extensively in 1911, no planting since—cut pulpwood to 6 inch diameter—thinnings will not pay cost of transportation. This company reports:

*We need reliable data on yield per acre and cost of raising trees for saw logs, pulp, etc., in different localities.* The Ashe-

\*Note the use of the word "cut" and not "crop."

†On an average of 1,000 seedlings set out per acre, a safe figure to use throughout the country in estimating acreage planted.



ville Station (U. S. Forest Service) says: *Can raise 12,500 feet per acre in fifty years in the Appalachian area without stating how it can be done or the cost for the thinnings, etc.* Land owners and lumbermen in this region are slow to believe such figures when they know that few, if any, tracts of 10,000 acres or more ever had this amount of lumber in their virgin state, where the average growth is 200 to 300 years. Many of these land owners live in a region where the virgin hardwood timber averages only 5,000 feet. Our best hardwood runs 7,000 feet per acre with 2,000 feet of hemlock (making 9,000 to the stand) and this is considered the best in the state of West Virginia. But for the lumberman who has no market or means of transportation for his thinnings above statement by U. S. Forest Service is doing *more harm than good.*

West Virginia Forestry Co. Report<sup>13</sup>—Forest depletion not only has lost an enormous revenue to the state but has also caused the *disintegration of innumerable communities once prosperous and thriving. The state should own sufficient areas to provide demonstration forests.* The tax laws should be amended so as to recognize timber as a crop. *Cooperative selling of logs recommended.*

Elk River Coal and Lumber Co.<sup>13</sup>—Close utilization a problem—question is how to turn waste pieces into profit without sending \$5.00 after \$2.00?

Ohio—Ohio Pulp and Paper Co.<sup>13</sup> owns 500 acres—used for pulpwood and ties—700 acres planted—aims at sustained yield with rotation twenty to forty years—cost of planting \$3.60 to \$9.50 per acre—forester employed.

Carbondale Coal Co.<sup>13</sup> owns 5,000 acres—for mine timbers and ties—100 acres planted—close utilization at \$10.00 acre—permanent production planned.

J. Will and A. Will, Jr.<sup>13</sup> own 350 acres—plan to place area on permanent basis—fifty-year rotation.

Virginia—Churchfield Coal Co. and the Virginia Coal and Iron Co. are engaged in protective work.<sup>13</sup>

Illinois and Indiana<sup>14</sup>—Considerable supply of mine timber. Illinois survey estimates the maximum areas for forest production not over 5,000,000 acres and that it would take the state 100 years or more to reach a condition of self-support in wood production.

Kentucky—St. Bernard Mining Company<sup>14</sup> began reforestation in 1890. In 1920 reforestation on 550 acres; also had in

1920 30 million feet of natural growth on the stump 12 inches and over in diameter.

A few other concerns in Kentucky in this work.

The Stearns Land, Lumber and Coal Co.<sup>14</sup> had its 200,000 acres of lands examined about five years ago by W. W. Ashe who made recommendations for conservative cutting and fire protection.

*Tennessee*—The Babcock Lumber Company<sup>14</sup> has recently had its 40,000 odd acres of land in Tennessee examined by a forester with the idea of placing the tract under management.

Forester Wm. J. O'Neil in discussing industrial forestry<sup>66</sup> states: "I do not feel, and I think the facts speak for themselves, that there is any company today in the United States that is actually practicing forestry from a high motive of enabling a future supply of timber for the coming generations."

As will be noted, the vast majority of operators practicing industrial forestry are raising pulpwood, mining timbers, or other small stuff with a rotation of from thirty to fifty years. Operators raising saw log material have but little to say, probably are not prepared to say anything definite concerning the financial outlook of the project. A rough approximation of the amount of saw timber so raised indicates that it will meet but a negligible part of our needs during the next fifty years.

Widespread and misleading publicity concerning the above surveys tells us that twenty-one million acres of private forests are treated on a crop basis. Take another glance over the above notes in this chapter and endeavor to make even a rough estimate of the amount of saw timber that may be raised from such efforts within, say, fifty years.

Some 174 operators out of the 15,000 annually listed by the U. S. Census Office replied to the questionnaire. The above notes are taken from the most promising of the replies.

## *Foresters Discuss Private Forestry*

*H. S. Graves, 1923.*<sup>35</sup> Public acquisition of forests proceeds slowly at the best. We must work for a large program of public forests, but we must still recognize that we shall have to look to private forests for a large part of the timber production of the future.

It is of the utmost importance that our private forests be well handled. The first service of the public forest in private

forestry is to secure a more efficient protection against fire. Cooperation is difficult except under the guidance and with the material help of the public itself.

The backbone of the system (fire protection) is the National Forests. It is very questionable whether more than a small fraction of these lands (Calif.) would be under protection today if the Forest Service with its trained personnel were not present to do the work.

Where there are no public forests fire protection lags. The public forest also serves as a demonstration ground for the practice of silviculture. The actual demonstration of forestry is more effective than all the advice from experts in literature that can possibly be given. The public forest handled on the principle of cutting and using what is produced by growth is a stabilizing influence in the whole region. As surrounding private forests are brought into the same general system of management, a new industrial strength is created that reacts upon agriculture and the development of the whole locality.

*Mason and Stevens, 1923.*<sup>23</sup> Before 1920 there was some discussion of private reforestation, but this idea was usually considered fantastic in the extreme. It was generally realized that reforestation is necessary, but it was also believed that it must be carried on as a government function; at first only one, the C. A. Smith Co., later the Coos Bay Lumber Co., worked at it awhile and dropped it, then a few companies in the Redwood region. Beginning about 1918, the fundamental situation changed greatly. War demands, use of the canal, and large profits to lumbermen. Then began vigorous discussion of a National Forest Policy, Graves, Greeley, etc. They discussed "Mandatory forestry," "Cooperative forestry," "Minimum silvicultural requirements," the Snell bill and Capper bill; hearings were had on reforestation.

Discussion has turned the attention of many lumbermen to reforestation. Private reforestation had its real beginning in the West in the California Redwood region. The Union Lumber Company was the first to adopt definitely the policy of managing its lands for perpetual production of timber crops, began in 1921. The Pacific Lumber Company, the Hammond Lumber Company, and others joined the Union Lumber Company in undertaking a systematic and thorough investigation of possibilities of reforestation in the redwood region in general.

All these companies have adopted reforestation as a permanent policy. They established nurseries. In the California

pine region the Spanish Peak Lumber Company adopted the policy. The Fruit Growers Supply Company also. In the Douglas fir region, the Merrill & Ring Company is carrying on an intensive study of possibilities, also Puget Sound Mills and Timber Company. Other companies are taking similar steps.

Usually the larger operators have heavy plant investments including sawmills, railways, towns, etc. In a number of cases these investments run to several millions of dollars each. Under the ordinary type of forest exploitation of which so much has been seen in the Lake States and the South, it has been the custom to cut the old growth timber without thought of reforestation and without provision of extension of the life of the dependent plants. Most operators have been deterred from adopting a reforestation policy through lack of definite information as to the feasibility of handling their properties in such a way. When these same operators become "timber farmers" perpetually in the business, locally, they come to be recognized clearly as an important element in the permanent good of the community. As long as there was always another region of virgin timber to which to turn after the Northeast, the Lake States, and the South successively passed the height of their production, second growth received relatively little consideration, but now that we are operating in our last great stand of old growth timber, it is clear that second growth must become the supply of the future.

*C. M. Stevens, 1925.*<sup>43</sup> What can one say of forest management on privately owned lands in this country excepting perhaps that there has been none. One by diligent search finds the exception. Speaking of a shortage of forest products, without doubt there is not even today a sufficiently general knowledge of how serious the situation in this regard is. Cheap wood and the idea of timber growing are directly opposite to each other. The wood crops of the future will then be produced to satisfy the commercial demand for lumber, etc. He who uses wood fiber in the future will pay for its cost.

Our own public projects will upon analysis be seen to bear only the most remote resemblance to the production of wood for commercial uses. Nor are these public projects so eminently successful from a business standpoint.

To the extent that we support any part of this timber growing business by taxation, we interfere with the natural operation of economic laws and distort the effect of the law of supply and demand.

Heretofore the country has had too much wood and too many forests. No tree growing business could have endured in the face of this competition.

In some sections of this country we are cutting the third or fourth crop of trees which have been grown on privately owned lands. Intensive forest management has not been practiced—only casually grown tree crops could be marketed. As demand for wood products in this country intensifies its relation to the supply, there will be a constant pressure towards more wood growing, prices will rise, we will go farther back into the hills for such virgin supplies as may be there found. We need have no fear that any real sound business opportunities will go begging in this country.

Several decades ago in Maine they cut only the larger and better trees because there was no market for any others; it was soon found possible to go back over the areas; the idea soaked in; despite increasing demand the owners refused to cut any but the larger trees; they wanted to be in the business of raising trees. Because of the concentration of water power in the Northeast and its combination with natural supplies of pulp wood species the manufacture of paper and paper products pretty much centered in this region. The conditions which made tree growing possible in the Northeast are spreading and so is the idea of tree growing.

Prospects started in the South. As in New England through force of economic necessity they could market only the larger trees and so left the small ones.

The West is the last region to feel the force of economic pressure pointing to tree growth; it has the experience of the older regions to draw on. In parts of the West are situated the most favorable situations for tree growth in the country. Tree growing has developed in this country to its present situation on privately owned lands only as the business opportunity in tree growing became clear. The habits of generations are not changed over night and the shift from the exploitation of forests already available to the growth of new forests has and will be correspondingly slow.

*D. T. Mason, 1926.*<sup>44</sup> Three periods of private forestry in the U. S.: one before 1905; a few private owners were mildly curious, working plans were made by the Bureau and not put into effect; 1905-19, National Forests received attention; the point of view was that after cutting old growth, lands were to pass into hands of Government—federal or state; private owners began to take more notice and regarded "Forestry as a

public function." In 1919 it was apparent that something must be done with cut-over lands; paved the way for the McNary law providing for cooperation; in 1920 a few private owners adopted a policy of permanent forest management mainly in redwood and southern pine regions. Why? 1st, economic reasons: that under reasonably favorable conditions tree growing could be carried on successfully as private business; 2nd, public relations were found of great importance; 3rd, adoption of reforestation policy in a number of cases resulted from work of forestry missionaries who had gained confidence of owners and convinced them; all agreed that there must be prompt action on a grand scale to prevent serious shortage both on public and private lands, especially the latter; impracticable and undesirable that a large per cent. of land pass into public ownership; future timber supply of U. S. must come mostly from privately owned woodlands. Voluntary action will produce more timber than mandatory procedure. Needed more effective forest protection, sound tax laws, research as to growth, yield, reproduction, and more missionaries: to gain confidence of owners that forestry is sound business; foresters must recognize the sincerity of private owners; we hear too much that 90 per cent is fire protection; that forestry is common sense and it is only necessary to send a few Government bulletins; failure to recognize that each forest property is an intricate problem by itself; must study the technical problems and the financial situation, owners' whims. Forestry must have a sound economic basis; would have more success today if foresters had had greater confidence that forestry is a sound business under proper conditions; the more firmly our profession believes in it, the faster it will come.

C. A. Schenck, 1926.<sup>47</sup> I have yet to see any private venture in forestry the risks of which I should care to share. There is no private forestry in Central Europe (woodlots are never true forest tracts) unless entailed estates or by certain stock companies in Finland and Sweden where forestry is a means to an end, and supply material for smelters, pulp mills; they are never an investment *per se*. Forestry does not pay 6 to 10 per cent dividends, and manufacture does. Trees can not produce a rate of money growth equal to 6 or 10 per cent. There is no sense in forestry producing stumpage at \$30 per M, nobody will buy it; at 6 to 10 per cent interest stumpage is sure to cost that or more. A lumber firm practicing conservative forestry can not compete because its cost of production is too high; in the example given the cost is \$5.00 per M more than the production costs of destructive lumbering.

Is there no help or hope for real timber forestry in the U. S. to be privately produced? No. The case is hopeless. Forestry practiced on 300 million acres of America's private forest land has no chance. Only the states, nation, and cities indirectly benefited by forestry can afford to be satisfied. The dividends are not alluring; privileges with it in Europe not found here. May be A. B. Cones' scheme (Timber Purchase Bonds) is the needed arcanum or money at 3 per cent. We have National banking corporations secured by National bonds and why not forestry corporations, working and controlled under national charters with stocks to be quoted in all exchanges and bought by everybody? All great industries were made possible by similar universal measures; steel, railroads, chemical industry, land settlement, etc. We need less scientific forestry and more knowledge of banking and economics and law making, more common sense and a clear conception of the unusual. No European precedents; must make our own way; best parallel is National banks, chartered, controlled, and encouraged by the nation; cheap taxes, and safety from fires help, but cheap money is the chief essential.

*F. W. Reed.*<sup>48</sup> A problem of finance, secondarily, technical silviculture, a race between annual rings in the woods and compound interest in the bank. If the former will win, it will pay to grow timber and capital will seek such investments. In our leadership in forestry, financial experience is limited to the pay check; compound interest is largely an academic theory; low interest far overshadowing taxes and fire protection; lumbermen know capital must be fed its ration of interest. Some of the tax research funds may be productive of greater results in the perfection of some financial scheme by which the interest burden could be lightened; even our technical investigations, scientific research should be tainted with finance. When we propose seed trees be left and diameter limits raised, thinings, etc., we should learn to translate the results obtained into dollars and cents and balance them against the present profits that are being sacrificed and interest. Investors are interested in dividends. The yellow pine of the west increases far too slowly to compete with 6 per cent interest; same in Rocky Mountains and Lake States.

U. S. recently bought 50,000 acres pine land in Michigan at \$1.00 per acre. It is the most expensive buy from a financial standpoint, and the poorest investment. New planting will cut \$25.00 per acre and take 150 years to mature; at 6 per cent interest on the \$25.00, the above in sixty years will cost \$800.00. Only Government is justified in any such land. A

case of Government contributing to the cost of the enterprise in proportion to the public benefits accruing.

We have a great deal of forest growing on land of much greater productive capacity; much could produce farm crops, not now needed; this timber does grow faster than your compound interest accumulates. The high stumpage, fast growth, and the minimum amount of labor involved all point to worthwhile profits from timber growing. I know where one need pay no more than 50 cents for soil of the best productive capacity. On most tracts there is usually some commercially mature growth; there are agricultural possibilities, etc., that increase dividends. Wood is salable in other forms than logs—telephone poles, ties, pulp, cooperage, tanning wood, alcohol wood, naval stores, etc. We should consider cost to buy it, protect and carry it, what it will grow, how much, and how fast, and what price products will bring. We shall find that private forestry is not an entirely hopeless proposition. (Reed, 1927). I began as a pessimist, but of recent years have come to see that conditions have at last ripened to where it is beginning to be profitable to grow timber. Public conservation of forests is to serve the public need. Private timber growing is to produce cash dividends.

*Schenck, 1927.*<sup>48</sup> Forestry investments go against the grain of human nature, and no where on earth is there today any private forestry comparable to private investment in railroads, liberty bonds, or chemical concerns, and U. S. Steel; there is not one real forestry stock concern anywhere. Swedish iron mines were worthless without fuelwood; Finnish paper mills had control of some of the raw material and of the water courses. Analyze the balance sheets at Bogalusa, Long Bell, Redwood, etc., and you must conclude that forestry of a conservative type is as impossible for them financially as it is for Weyerhaeuser—they are losing money even now at the game. Of such forestry as they practice; nobody will engage in that long run which is needed in any kind of forestry, destructive forestry excepted, who does not obtain certain inducements. The Northern Pacific Railroad got 100 million acres; steel, high tariff, farmers, 160 acres. Inducements are needed for forestry enterprises, cheap money rather than cheap taxes and cheap fire protection. Farm waste land is on the increase; unless we produce lumber cheaply. We must beat brick, steel, aluminum, concrete, etc., with money at 3 per cent. I'll supply lumber at \$30.00 per M and make 8 per cent. We want large forestry enterprises. There is plenty of money



in it. With your petty haphazardous forestry these great United States of America of my admiration have nothing to do.

*D. R. Forbes, 1921.*<sup>21</sup> A lumber company with a chain of mills in the South lost one mill, burned; decided not to rebuild; "the town which it had created forthwith curled up and died. The county in which the firm was situated got to doing a little figuring, and discovered that 85 per cent of its assessed values were derived from the lumber industry. \* \* \* Whatever excuse there may be in excessive taxation, hostile legislation, etc., for the 'get from under' policy of many of the South's foreign owned (regionally speaking) lumber corporations, the fact that these companies are not conducted or financed by men who expect to remain in the South any longer than their timber lasts has operated powerfully against their practice of forestry. \* \* \* To these men a large acreage of cut-over land was no doubt an annoyance rather than an opportunity."

*Wm. L. Hall, 1927.*<sup>50</sup> Arkansas. 1,775,000 acres of private and Government holdings are under systematic reforestation plans, of which 400,000 acres are National Forest. The private holdings are owned by eight companies. Dierks Lumber and Coal Company has largest area, altogether about 1,150,000 acres; has been acquiring land for twenty-six years; of the total, virgin area 575,000; restocking 125,000 acres; other second growth 450,000 acres; growth of 200 to 300 board feet per acre per year in well-stocked stands may be expected. Sixty to seventy per cent restocking, slash disposal arranged for in areas of special importance. Research undertaken to determine exact conditions; second growth and treatment necessary to attain higher production. The seven other companies doing to some extent same thing to keep lands productive. Reason, it pays; Louisiana and Texas operators in considerable numbers have program of fire prevention.

*Commerce Monthly, R. M. N., 1926.*<sup>17</sup> The present decade is seeing the beginning of a transition period during which the lumber and other great wood industries of the U. S. will gradually shift from "a mining" to a "cropping" system of timber utilization. As yet the *movement has not more than made a start*. But from the private or commercial point of view only very recently has "timber cropping" obtained extensive or serious consideration. The aggregate drain estimated by Department of Agriculture, 25 billion cubic feet per year; 22½ billion cubic feet of which represents the timber cut;

fuel wood  $9\frac{1}{2}$  billion cubic feet; sawed lumber  $8\frac{1}{2}$  billion cubic feet; fencing, hewed ties, pulpwood, mine timber, etc.,  $4\frac{3}{4}$  billion cubic feet; loss,  $2\frac{1}{2}$  billion cubic feet due to disease, insects, fire, storm, etc. Total new growth 6 billion cubic feet annually. Ratio of saw timber to annual growth is higher. The use of substitutes growing at rate of several hundred million cubic feet of wood a year accounts for the striking divergence of lumber production from the trends of population growth and industrial expansion in the last two decades. Two hundred and twenty million acres forest (not wood lots) commercially owned. There are three major competitive uses for the surface area of the country, crops, pasturage, and timber. The criterion of use is, what pays best? *At present of around 10 million acres of forest cut each year, only a million acres go into agricultural employments, and this barely offsets the area of farms in the East which, unable to meet the competition of other farming regions, are abandoned annually to revert to forest. There is likely to be no extensive reduction of the total (470 million acres) forest for several decades to come.*

The country seems to have come, as far as can now be seen, to a rough balance between these respective types of land utilization.

The exploitation of timber resources dictated by the economics of commerce has been of the same type, neither better nor worse, than this generation is employing toward its stored nor natural resources of coal, oil and other materials.

Even down to 1870 the forests of New England, New York, and Pennsylvania were the principal sources of supply. The Lake Region by the '80s and '90s had become the dominant source. The lumber industry turned to the southern pine forests, which up to around 1910 supplied a steadily increasing proportion of the rapidly growing consumption of that period. As long as vast supplies of virgin timber were still readily available at nominal cost, the development of forestry, of systems of timber cropping and continuous cutting was economically inseparable on any extensive scale. At all times the lumber enterprises of any given region were confronted with intense competition not only from other interests, in the same region, but from other virgin regions. Under such circumstances intensive and relatively costly methods of utilization could not face the competition of cheap and extensive exploitation. In New England until 1850 white pine stumpage on large tracts was sold at not over 10 cents per M; 1850 to 1875 at 35 cents to \$1.00 per M. In the Lake States

the pine in the '70s cost not more than 25 cents per M. About 1880 long leaf pine in the South was worth 10 cents per M; in the Pacific Northwest about 1900 the merchantable timber 50 cents per M on the average, and great holdings were acquired at prices averaging 10 cents per M.

Stumpage values rose in a series of waves. In the '60s some Maine pine was selling at \$4.00 per M, a level practically unchanged until around 1900; since then the value of second growth timber has tripled. In the Lake States the few remaining stands of virgin pine have sold as high as \$25.00 and probably average \$15.00 per M. North Carolina pine, mostly second growth, has since 1900 risen to \$7.00, while Southern long leaf pine now averages about \$8.00, as compared with 10 cents in 1880.

National forest areas 158 million acres, one-third unsuited to growing new timber, and when the forests (national) have been brought up to their full sustained yield, an annual cut of from 6 to 7 billion feet is anticipated. But more important than the actual yield, is the experimental use of these forests to study logging methods that facilitate reforestation, to determine rates of cutting that will permit a continuous yield and otherwise develop principles of forest management that will be commercially applicable to the private forests as well. Fire is the first major hindrance to natural reforestation that must be overcome. The cost of adequate fire protection is far too large and heavy to be borne by private purses. Estimated that the cost of adequate protection would amount to about ten million dollars.

1922 data of Department of Agriculture, 160 million acres private forests receiving protection, 166 million acres private forests no protection whatever, and over many other areas the protection was very inadequate.

Tax situation: Timber grows slowly and annual taxation compels one crop to pay taxes many times. The heavy increase in state and local taxes in the last decade it is claimed has forced timber cutting. Some states made attempts to remedy situation with but little results; there was as yet no certainty that timber growing would pay. Probably uncertainty as to future taxes has been as much a deterrent to private forestry as the burdens of existing levies. Over a hundred lumber companies, according to the National Lumber Manufacturers' Association, have adopted conservative systems of cutting, and of these at least fifty are on a perpetual logging basis. Redwoods, 70 per cent of production definitely committed to reforestation.

The Western Forestry and Conservation Association has

undertaken an investigation of reforestation possibilities in the Pacific States. The largest timber owning interest in the country has organized a subsidiary to handle its cut-over lands in Washington and Oregon with a view to promoting their natural restocking and another large operator in the Northwest has announced a policy of reforestation. In 1925 the Forest Service reports nearly a score of companies have definitely committed themselves to a sustained yield policy. The pulp and paper industry in New England will, rather than the lumber industry, probably develop extensive reforestation. In the Lake States a number of timber owners' associations are active in fire protection with rather slight prospect for early adoption of other forestry practices; most of the industry will probably continue clear cutting with annual growth on the future cut-over lands playing but little part in their calculations; few of the companies have sufficiently large holdings in proportion to their mill equipment to make the adoption of sustained yield a possibility unless the rate of mill operation were to be materially reduced; second deterrent is the relatively slow growth of native species.

### *Private Forestry in Foreign Countries*

Interesting and instructive lessons may be learned from the history and experiences of foreign countries in their care of private forests. This history takes in a very long period, covering changing forms of government, economic crises, floods, fires and other disasters. In England private forest control dates back to the time of the early Norman kings and was deemed necessary at that time to prevent wholesale forest destruction. During the feudal period the forests fell into the hands of kings and nobles, and it was not until after the Napoleonic wars that forests began to pass into private hands.

During the last century governments began to assume control of private forests for protection against floods, erosion, wind, etc. Private forests are usually divided as far as this control is concerned into protection forests and ordinary forests.

The long and varied experience above mentioned has contributed much to our knowledge concerning official control in private forest management and brings out a few fundamental factors that apply generally. All regard private forest holdings as of national concern especially where protection of soil or stabilization of water flow is concerned. The present laws seem specially concerned towards the maintenance of existing woodland areas. Almost all countries recognize the fact that

more or less governmental aid is necessary to make the exploitation of such forests profitable. This aid may take the form of tax exemption, subsidies, cooperation in protection from forest fires, technical advice, free seeds, plants, etc. Protection forests receive first consideration, and usually are treated on a non-commercial basis. In Russia all protection forests are free from taxes for all time. France endeavors not to interfere with proprietors' rights but encourages sound management. Under the French law of 1859 no private owner can clear all his forest without notifying the local authorities at least four months in advance. This refers only to ordinary forests; protection forests come under a very strict law strengthened by the amended law of 1922. Practically all countries forbid new rights such as grazing, gathering litter, fuel, etc., and provide for cancelling existing rights that may reduce the protective value of forests.

Wherever the state assumes control of private forests, whether protective or ordinary, an effort is made to lighten the owners' burdens. Tax exemptions run from thirty to sixty years, and as stated above aid is given in fire protection, free advice as well as free seeds, plants, etc. Certain other privileges and perquisites are also mentioned. Devastation or deforestation without a permit outside of protection zones is forbidden in a number of German states, Spain and Italy. The 1924 law of Spain forbids the clear cutting of any high forest or more than one-fifth of the stand of timber in any ten-year period unless under an approved plan. In Scandinavia where the best showing in European forestry is made, strict control of private forests is maintained by law through local boards composed of representatives of owners and foresters. The annual growth marks the limit of cutting in Scandinavia. The 1913 French law permits owners to turn over their land to the government for management under contract. In England bonuses are given, but remittances of taxes spread over a number of years are more popular than the bonus. The law of Entail in England prevents the land owner from cutting down his woods without an effort to replace them without the sanction of the heir at law.

The tendency in Europe is for a private owner to manage his forest on a short rotation and to leave to the government the growing of the more valuable grades of timber. When you hear of profitable timber growing in Europe you will learn on inquiry that it is either a government enterprise or if by private owners, that it is connected with another allied enterprise such as smelting, paper making, etc. Cooperative enter-

prises, however, may be undertaken where low interest rates are available. In Sweden the cut on forty million acres amounts annually to sixteen billion board feet. Trees are cut from 10 inches to 30 inches in diameter. In addition to lumber, match and pulpwood and charcoal are taken. These latter quick growing products probably pay a good part, if not all, of the annual expense and interest, leaving a good part of the stumpage value of the lumber clear profit.

All through Europe we find cuttings limited to an amount equal to the annual growth. Requirements in excess of this amount (approximately 3,000 million cubic feet) are imported annually from other countries.<sup>63</sup>

Great Britain's experience in forest administration in India extending over a period of more than 120 years is worthy of consideration at this time.

England, ever deeply concerned over the efficiency of her navy and seeking a permanent supply of teak timber, undertook forest administration on the Malabar Coast of India in 1805. A leasing system was adopted but the lumbermen wasted and ruined the forests for over fifty years. Great Britain, in 1856, secured the services of a German, Dietrich Brandis, who organized and administered with great success the forests of India, was knighted later for his distinguished service. These great forest areas improved by wise use, administered by an efficient forest service, producing an ever increasing and substantial net revenue, combine to give the United States Government a sorely needed object lesson. The public interest in this case was given due consideration as the following paragraphs indicate.

The Governor General of India on November 1, 1862, wrote\* to the Secretary of State: "In the first place we may express our belief that under no conceivable circumstances is it possible that personal interests can be made compatible with public interests in the working of forests, otherwise than under a system of such stringent supervision as would in fact reduce those working under it to the position of mere agents of the administration."

E. P. Stebbing, a leading forester of long experience in India, in his book "The Forests of India," 1920, writes: "Areas of forest of enormous value were cut out by timber traders, who cared nothing for the future of the forests, while the government did not receive adequate value for the produce extracted. Instances of this nature had been plentiful in the history of many forests in Europe, but India failed to profit

\*Roy Nash; Brayhan Forest Policy, "Pan-American Bulletin," July, 1924.

by these examples and for many years government authorities pinned their faith to the ruinous method of leasing forests to capitalists, in the hope that the latter would so work the areas as to insure a future crop of young trees taking the place of the mature, and often the immature ones felled. The hope proved as elusive in India as it has elsewhere in the world. The method meant and will always mean, reckless waste and inevitable ruin."

Cooperative cutting and marketing of timber by holders of small forest tracts is being carried on quite successfully at present in Finland. Cooperative agriculture and other enterprises in Europe are enabled to secure loans at rates far below those quoted by our Federal Farm Loan Boards or Land Banks. The average timber growing enterprise in the United States at present stumpage prices cannot afford to operate on loans at six per cent interest. It may be possible in certain favored regions on the Pacific Coast, and in a few Gulf States, but to make such enterprises attractive in other parts of our country, loans should be made available at a rate much nearer three per cent, or the difference made up in some other way.

## Chapter III

### GENERAL SUMMARY

What do we learn from these facts? That:

For many years the bulk of our saw timber came and continues to come from privately owned virgin stands, and the end of that source of supply is in sight.

The publicly owned forests produce at present but three per cent of our needs. Six per cent is expected within ten years and a possible twenty per cent within fifty to seventy-five years.

Present requirements: we need the annual growth on four hundred and seventy million acres of well stocked and well managed forest. Only the forester appreciates the significance of the terms "well stocked and well managed forests." By 1937 it will be difficult to find in the entire United States twenty per cent of our forests meeting this standard.

The National Forests, although comparatively well managed, average well below this standard. They are the remnants not taken when private enterprise sought possession of all worth-while and accessible public forest land. The greatest value of the National Forests will continue, for some time, to be as demonstration forests, showing what skilled forest management can do in perfecting the production of a continuous succession of forest crops.

As the privately owned virgin forests, furnishing the bulk of our lumber needs, are bound to disappear, we must look to second growth, the principal remaining source of supply. Reproduction is menaced by destructive logging practice, and by ever increasing and widespread forest fires. Totally devastated areas are increasing, accompanied by erosion and waterflow problems.

From the facts stated above we can find little hope that even one-half of our minimum lumber requirements can be expected from second growth if cutting is confined to an amount not exceeding the annual growth.

The farmer's woodlot is in decadence and approaching extinction. It can be saved by a more liberal policy in supporting the Government forest extension work and by closer cooperation with county agents. The crop of the farmer's woodlot rarely reaches the dignity of being termed a forest



crop. That term is reserved for sustained yield operations on the larger holdings. The few timber trees available annually on the woodlot as well as the small amount of fencing, mine props, and other small stuff should be handled on a co-operative basis, so successfully worked out in Scandinavia. A vigorous and liberal policy towards the woodlot, aggregating one hundred and fifty million acres, would mean much to the six and one-half million farmers and to the lumber industry in general. The thirty foresters assigned to this work will be facing a hopeless task until this number is considerably increased.

Industrial forestry—Raising of forest crops by private owners. Of some 15,000 operators reported on as engaged in forest work, but 174 were deemed worthy of notice in the industrial forestry survey conducted by the Society of American Foresters; a survey that endeavored to cover the entire country. The preceding pages tell of the very small number reported on as engaged in raising pulpwood and other small stuff as a crop; a total crop exceedingly small as far as total requirements are concerned. And as for saw timber raised as a crop, the total amount matured during the next fifty years, as indicated in the report, will be negligible as far as the market is concerned.

A widespread and misleading publicity concerning industrial forestry, is broadcast in such a way as to leave the impression that forest crops will meet all requirements, in fact, it goes so far as to state that: "Timber will soon take its place with cotton, corn and wheat as one of the crops of the United States."\*

Why go on? The lumber interests, in the present depressed condition of the industry, and so far as more than ninety per cent of the operators are concerned, will not expend one extra cent for improving logging practice, slash disposal, fire prevention of cut-over lands, or for reforestation. The states are too heavily burdened with debts to look with favor on additional expense, and the Federal Government has other more pressing interests. T. T. Munger,<sup>57</sup> the Forest Research Officer in the Pacific Northwest and long familiar with forest conditions in the region of "The Last Stand," has this to say: "The industry has been following the same road for generations, the road of least resistance; perhaps they are going so fast down the smooth straight road under the pressure to liquidate bonded indebtedness that they cannot make the radical turn into the new road to timber farming. The road to timber farming turns off sharply from the well-tracked conventional

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\*Chicago Press note, Nov. 16, 1927.

route. Few have travelled it in Oregon. Timber mining looks like a better paying business than timber farming."

Lumbermen, foresters and bankers agree that the lumber industry is in a bad way. As Forester Ames, of Washington and Oregon, puts it:<sup>64</sup> "You can't talk very convincingly of the perpetuation of a regional industry when perhaps sixty per cent of it is losing money." Forester Granger of the same region tell us:<sup>64</sup> "At present the bulk of the products of the choicest virgin stumpage of this region are being dumped on eastern markets at distress prices, which in the main cause year-end entries in the red on the producer's ledgers. As is well known, this is due chiefly to two things—over-production under increasing interest and tax burdens, and much poor merchandising."

Here we have the views of experts long on the ground, men best qualified to speak. They paint a gloomy picture and not a ray of hope flickers through the gloom. Foresters and lumbermen offer nothing worthwhile to stem the tide of forest devastation. The rapidly increasing forest devastation so disturbed the Forest Service that some four years ago it quietly banned the use of the word "devastated," and substituted therefor the milder word "denuded." That was some contribution to the cause.

Usually in a time of great national need a leader appears, but this national calamity seems to be the exception. Indeed, a miracle worker will be needed to save us from the evils of a timber shortage, one who can grow a crop of saw timber in twenty-odd years, that usually requires a hundred years to mature.

What hope is there for a leader from among the foresters? Judge for yourself.

This manuscript was submitted to Dr. A. F. Woods, Director of Scientific Work for the U. S. Department of Agriculture. Dr. Woods has been long familiar with the forest situation, especially in the state of Minnesota. After reading this manuscript he wrote two letters, one to Forester Greeley, in which he stated: "I think the time has come to hit hard and keep on hitting hard, until the lumbermen see that it is to their permanent interest as well as to the interest of the nation to use conservative methods, and if they do not learn it soon they should be made to do so." In Dr. Woods' letter forwarding a copy of the manuscript to Associate Forester Sherman, we find the following: "I am sending herewith a very interesting and instructive survey of the forest problem in the United States. \* \* \* A policy which does not provide for

reproduction and reforestation on lands adapted better to forestry than otherwise is suicidal from the standpoint of the community, the state, and the nation. \* \* \* Some way must be found to put our lumber producing areas on a permanent productive basis. Then communities can build upon a permanent basis, and the industry itself in the long run will be far better off."

The manuscript was retained by Foresters Greeley and Sherman for some six weeks, and a letter to Dr. Woods, signed by Associate Forester Sherman, included the following: "Major Ahern's statement of the situation is thorough and concise. \* \* \* The situation as developed by Major Ahern does not differ from what the Forest Service for many years has understood it to be. \* \* \* Major Ahern's assembled data leads one to the conclusion that the present trend of economic and political forces is heading the lumber industry into ruin both for itself and the natural resources upon which it is based. \* \* \* With your permission I would like to retain Major Ahern's report for indexing and inclusion as a reference manuscript in the Forest Service library."

From this we learn that the facts in this appalling forest situation have been known to the Forest Service for many years. In addition Colonel Greeley in 1925 stated:\* that we will need overnight sixty or seventy million tons of forest products, and that the change is coming with the suddenness of an economic crisis.

The forest situation as indicated above, so menacing to our national prosperity, even involving our national defense, calls for aggressive leadership by the men our country holds responsible for the conservation of this great natural resource. The foresters, for more than twenty years familiar with forest conditions from Maine to California, have duly reported the facts to headquarters at Washington, but there they lie. The foresters at headquarters should be held responsible. They have fallen down on the job in failing to get the real facts to the people, not through the medium of dry Government bulletins, but on the front page of metropolitan dailies.

The following comments in the *Journal of Forestry* (1928), are significant:

C. L. Billings, Asst. Gen'l Mgr., Clearwater Lumber Co.,  
Idaho.<sup>64</sup>

"But it is quite probable that forestry in Northern Idaho would be much farther along today if there had been *aggressive*

\*Economic Geography, March, 1925.

*leadership* from outside the industry in the research field among these and other lines. That the Forest Service has been prevented from assuming this leadership is simply too bad."

F. G. Miller, Dean, School of Forestry, Univ. of Idaho:<sup>64</sup>

"And I may add that it is not foresters who have furnished all of the leadership in forest progress in Idaho."

Wm. J. O'Neil:<sup>66</sup>

"The present trend of the foresters today is to conciliate and to arbitrate—in other words, to admit to the operator that he is doing a great deal toward the progress of forestry, and overlooking the fact that in his methods of logging, and in his methods of operating, he is destroying the future crop because he is employing the wrong methods. \* \* \* Candid facts must make us admit that our leadership has been poor."

The following statement by a prominent forester<sup>64</sup> in the great state of California, it is hoped, is not typical of the attitude of the average forester:

"For a forester in public employ it is much the safest course to say little regarding the large volume of public statements of one kind and another made regarding the status of industrial forestry in the region. The outsider in reading these would certainly receive the impression that the practice of forestry was the rule rather than the exception—a conclusion not exactly warranted by the facts of the situation." \* \* \*

The present writer has been in close touch with the U. S. foresters for more than thirty-five years, and has the greatest respect for the many able men in the ranks, but they, unfortunately, are hampered by lack of unity and lack of an aggressive forest policy. We also find that the Forest Service has, apparently, in its endeavor to cooperate with the lumbermen, been led into playing a minor role, following the lead of a few able, aggressive, and influential leaders of the National Lumbermen's Association.

We also find that Forest Service and Congressional reports, general forestry literature, etc., carry invariably an optimistic tone, even during the recital of distressing facts, and in the face of years of ever increasing devastation, with no real basis for hope, make constant use of the word "if." If destructive logging practices are modified, if slash is regulated, if fires are controlled, if undesirable species are eliminated, if tax methods are readjusted, if timber insurance is provided,

if research is expanded, if we learn something of silvicultural requirements, etc., etc. The great mass of forestry literature fails to get the real picture before the people. The people are entitled to the facts. Government bulletins, voluminous and very dry, fail in this respect. The foresters of the country, as stated above, have fallen down on the job in not getting the facts to the people, and in not pushing vigorously and unitedly a forward looking policy.

Dr. Woods hit the nail on the head in his letter, quoted above, in which he states, "a policy which does not provide for reproduction and reforestation of lands better adapted to forestry than other use, is suicidal from the standpoint of the community, the state, and the nation." \* \* \* Dr. Woods is right. The present policy is suicidal.

Suggestions looking to a solution :

We have sufficient data to visualize the problem and frame a program of action. Throughout these pages we find convincing proofs that the chief trouble lies in destructive logging practice, unregulated slash disposal and lack of adequate protection from forest fires.

Further forest devastation must stop. The Capper Report of 1919, and the Pinchot Committee report of 1920, made this same demand after reciting very distressing facts concerning destructive logging, uncontrolled fires, etc. Evidently the appeals made no impression on the lumbermen or on the Forest Service. As Dr. Woods states above, "If they (lumbermen) do not learn it (conservative methods) now, they should be made to do so." It looks as if the offending lumbermen may soon learn something of the police powers of government, and that the basis of government is the greatest good for the greatest number. Forest conservation has never succeeded in any country until the strong arm of the government was used.

Police powers, public interest, etc., receive scant consideration in this country once the domains of certain lumber barons are entered. The lumber baron will permit the health officer to enter his town premises and meekly submit to orders to clean up, but in the woods he is lord and master. The rights of private property out in the "sticks" seem to take on something sacred, especially where it concerns methods of operation. Vast quantities of earth and debris from devastated timber land may ruin adjoining farm land and the farmer affected, ignorant of the cause of his loss, apparently has no recourse. He meekly abandons his land and goes elsewhere. This is but one of many examples that may be cited of the evils attending

lack of governmental control in the woods. This attitude is voiced by a representative of the greatest timber company in the world today. C. S. Chapman, Forester, Meyerhauser Timber Co.,<sup>64</sup> informs us: "Land owners cannot be compelled to follow good forest practice, neither can the public be compelled to accord such owners fair treatment in matters of taxation, fire protection, and things of this kind." No other country permits its forests to be so ruthlessly destroyed and attendant evils go unchecked. A screen of misleading propaganda keeps our people ignorant of the seriousness of the situation.

A very different story is told in European countries. There, as related above, the private forest holdings are regarded as of national concern. Protection forests are governed by drastic rules, which emphasize the need for conservation of soil, and stabilization of waterflow, and they also provide that these protection forests be treated on a non-commercial basis. Deforestation without a permit even outside of protection zones is forbidden in a number of German states, Spain and Italy. In Scandinavia strict control of all private forests is maintained by law through local boards.

By this time, we, in the United States, should be convinced that E. P. Stebbing, quoted above, is absolutely right when he tells us: "The hope (for forest conservation) proved as elusive in India, as it has elsewhere in the world. The method (leasing forests to capitalists) meant and will always mean, reckless waste and inevitable ruin."

We in the United States not only use our capital stock but use the facilities of the Department of Commerce to urge the export of almost three and a half billion feet of lumber annually. What could be more stupid? The shortage of wood supplies is coming, as Colonel Greeley stated, with the suddenness of an economic crisis, imperilling our every day vital needs, even menacing our national defense. Our next great emergency will call for immediate supply of billions of feet of special woods, such as oak, hickory, ash, walnut, etc. The general staff had better check up information now furnished concerning the availability of indispensable woods. It is no simple matter to adequately equip, house, transport, and maneuver three to four million armed men.

Saving the forests and the lumber industry is even more important, more complicated and every bit as urgent as Mississippi Flood control.

Our national forests, some 20 per cent of our total forest area, have been improving in stand and value by good manage-

ment for over twenty years. The 80 per cent privately owned forests (with a possible exception of not to exceed 5 per cent) are being rapidly destroyed. If nothing better is proposed, why not benefit by the Government's successful experience in forest management?

The private owners have been warned time and again, but in vain, to improve their methods, but they figure, as a rule, on a quick clean-up and after them, the deluge. Thirty years of unheeded warnings to lumbermen warrant some loss of patience on the part of our people. A real crisis is here which demands an aggressive attitude on the part of the Forest Service, and such legislation as may be necessary to compel certain operators to do what good sense and public interest on their part should have brought about long ago. Other countries have solved similar problems, and their experience should at least serve to point the way. In any event we can do no less than make an effort, and if the lumberman continues to have his way we may as well close up shop and, like the vanishing empires of past ages, move on. Let us hope that final step will not be necessary. Once again we dare make use and a final use of the word "if," citing T. T. Mungèr,<sup>57</sup> "If the public does its part in holding public timber as a reserve, in reconciling forest taxation with timber farming, in sharing forest protection costs, and furthering more scientific knowledge about timber growing, it will pave the road to timber farming with plenty of inducements. There will be no excuse then for the lumber industry not to forsake its reckless course of timber mining and to direct its way to timber farming. Should it not take the road to timber farming—then the Commonwealth in order to save to the state its great industry, and to avoid the idleness of millions of acres, has but one recourse. It must put a barricade across the road of timber mining and force the lumberman into the route of forest perpetuation by penalizing those who practice forest devastation or by compelling forest renewal."

G. H. Cecil, Supt., Angeles Nat'l Forest, tells us:<sup>64</sup>

"There is only one way in which the public can be insured of such action (timber perpetuation) and that is by public regulation, and I am convinced that the public will be satisfied with nothing less."

H. S. Graves, former head of the U. S. Forest Service, has this to say:<sup>65</sup>

"I believe that private owners will find it impossible to

meet the situation without public cooperation. If a large and far-reaching plan of national cooperation in securing a stabilization of the present unstable conditions of production were proposed, with the benefits to the public in forest perpetuation and other matters in mind, I believe that national support would follow."

Judging from our experience of the past thirty years it will be necessary to erect the barricade mentioned above and compel forest renewal. The administration of such a policy will not be as difficult as it may seem. In the first place, but a few hundred operators out of a total of some 15,000 produce two-thirds of the entire lumber output, and this same small number is responsible for much of the devastation mentioned. The additional supervision necessary could for a time be managed by the U. S. Forest Service personnel. There is also a large number of state and private foresters whose services might be made available during the first year or two. The lumber industry will suffer some financial loss, and other inconveniences in adjusting itself to the new conditions, but all of this is of minor consequence compared to the great, in fact incalculable, losses suffered by the nation under present conditions. Public interest of such magnitude, including vital factors in our national defense plan, is of far greater moment than the selfish interest of a few individuals.

The staggering financial sums, the time and labor involved in bringing back to agricultural and forest use the vast totally devastated forest areas, the thousands of square miles of usable land lost by erosion annually, and other attendant evils, are really too much, apparently, for our legislators. If that is a fact, let us try to interest them in staying the present ghastly forest devastation, and save the rapidly decreasing remnants of our once vast forests.

The procedure for a government genuinely interested in the national welfare would be to call together the persons most concerned, from the tax assessor, the forester and the lumbermen and the legislator, to the Budget Director or their representatives, around the council table, tell them to lay the facts on the table and work out a solution.

When we see how smoothly a national forest program works out in other countries, like Sweden, one wonders what impelling force is behind it all, for the operators, the forester, the tax collector, etc., have similar problems to contend with as are now presented to our own people.

This paper was prepared in the hope that it would start



fruitful discussion, well organized, strongly financed, and strenuous opposition to the above proposals may develop into a real challenge to our Government.

The history of timber devastation is the history of the fall of a number of great empires.

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