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## AMERICA AND THE WORLD'S WOODPILE <sup>1</sup>

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A proposal that the United States abandon one-sixth of her territory to foreign powers would be met with instant and general disapproval. The American people would not hesitate to sacrifice millions of lives and countless treasure, if necessary, to prevent such a surrender. Yet practically as great a loss in national wealth and income would be suffered if all the privately owned forest land of the country were allowed gradually to lapse into an idle, unproductive condition—the actual condition on many thousand square miles to-day—and if the forests of other countries were called upon to furnish the wood that American forests have hitherto produced.

The forest land of the United States amounts altogether to about 730,000 square miles. About 150,000 square miles is managed for permanent timber production under public ownership, Federal, State, and local. The other 580,000 square miles, an area larger than France, Belgium, the Netherlands, Denmark, Germany, and the British Isles, is privately owned. This privately owned forest land supports industries giving employment to more than a million people and turning out each year primary products valued at \$2,000,000,000. Besides supplying domestic needs it annually furnishes foreign countries with lumber and other wood products valued at close to \$200,000,000.

These figures indicate great productive values, but they do not tell the whole story. Should present conditions persist, the great contribution to our national wealth and welfare made by privately owned forest land would be largely temporary, soon to be drained away. The reason is that only a small part of this land is now being handled so as to produce timber continuously. The greater part is gradually drifting into idleness, producing so little that it is a burden to its owners and to the communities within whose territory it lies. Some 125,000 square miles has already ceased to be productive, and a much larger area is only partially productive.

The unproductive land is being abandoned not because of any serious difficulty in keeping it productive, nor because the way to keep it productive is not known, but primarily because its owners doubt whether timber growing will pay. Hitherto, as the virgin timber in one region was cut, there was always another virgin supply

<sup>1</sup> Based on *Forest Resources of the World*, by Raphael Zon and William N. Sparhawk, 2 vols., 997 p. New York. 1923.

a little farther on. In spite of gradually increasing costs of transportation as the principal source of supply receded from the centers of consumption, the competition of this free timber kept prices in most parts of the United States below the cost of growing new forests. It has generally been assumed that this condition would continue and that when our virgin timber was gone other countries would supply us. It has also been pointed out that many substitutes for wood are coming into use, and that wood is being used more sparingly as prices rise. The fear has been expressed that there would be no market for timber after it was grown and that reforestation of denuded acres consequently would not pay.

Is such a fear well founded? If we are going to consider the situation only in terms of America's woodpile, ignoring the possible effect of conditions in other countries upon our future supplies and assuming that the world's woodpile will always be ample to replenish our own, then we may well fear the possibility of an overproduction of timber. But such a view constitutes a misapprehension of the facts. A survey of the world's forest situation will place our own

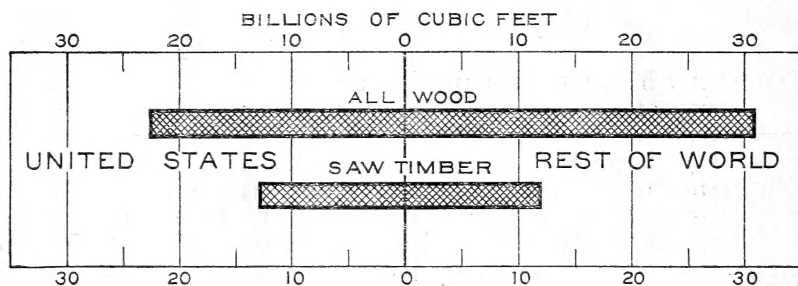


FIG. 1.—Wood consumption of United States and rest of world

prospects in a very different light and should suffice to dispel any doubt that there will be a ready market for all the wood that can be grown in the United States.

#### THE UNITED STATES IS LIKELY TO REMAIN THE WORLD'S CHAMPION WOOD USER

More wood is used in the United States than in any other country. We consume as much timber from trees large enough to saw out lumber as all the other countries combined—13,000,000,000 cubic feet in all. Of the world's total wood requirements, including firewood and similar small material, the United States takes two-fifths or 22,000,000,000 cubic feet.

The United States leads the world in the manufacture of many products made wholly or partly of wood. With only 6 per cent of the world's population, this country has 35 per cent of the railway mileage, and for transportation industries alone, including railroads and automobiles and other vehicles, we use nearly as much saw timber per capita as is required for all purposes in Great Britain, Germany, or France. For the extensive long-distance shipments of food and manufactured products that are so characteristic of America, enormous quantities of wooden (or wood-fiber) boxes, crates, and barrels are utilized. The United States consumes more paper,

most of it made from wood pulp, than the rest of the world combined. Also, as a consequence of wood being until recently very cheap as compared with the costs of labor, transportation, and equipment required for more intensive utilization, a great deal more has been cut from our forests than could actually be utilized and much has been wasted.

In 1906, approximately 280 cubic feet of wood was cut from our forests for every man, woman, and child in the United States, or about eight times the rate of consumption in western Europe. The rise in the cost of wood during the past 20 years has, however, led to greater care in its utilization and now only 200 cubic feet per capita is cut in a year. While still further reduction will doubtless be made, there is no reason to suppose that timber consumption in the United States will ever fall as low as it is in western Europe. To a considerable extent our high rate of timber use is a natural result of geographic conditions and of our social and economic organization. It can not be reduced to the present European level without serious disruption of many of our important industries and a lowering of our standards of living.

#### THE WORLD'S APPETITE FOR TIMBER IS GROWING

The widely held idea that wood is more or less out of date—used now because of its cheapness and abundance but to be replaced eventually by other and better materials—has no basis in fact. On the contrary, as populations grow and as living standards rise and human wants become more complex, timber consumption increases in spite of the extensive and growing use of substitute materials, and in spite of the tendency to utilize wood more economically. No sooner do substitutes take the place of wood for some particular use than new uses are found. A century ago, railroad ties, railroad cars, and telegraph poles had not been thought of. Now American railroads use more lumber in a year than was required to meet all the needs of the 30,000,000 people living in the United States in 1860. Newsprint and other products of wood pulp, automobiles, phonographs, radio cabinets, and many other articles requiring large quantities of wood, all have come into extensive use within a generation.

In Great Britain timber consumption has increased much more rapidly than has the population. In 1915, with the total national consumption nearly six times as great as in 1851, the requirements per capita were almost four times as great. Even in France, with a practically stationary population, timber consumption was slowly increasing up to 1914. That of Germany more than doubled within the century. In the United States, at least seven times as much lumber is now used in a year as in 1850, and even the per capita rate of consumption is considerably larger. Judging from the rates of increase in these and other important consuming countries, the world's timber needs may be expected to double within approximately 50 years.

#### THE PREFERENCE FOR SOFTWOODS

With more than 11,000,000 square miles of forest in the world, much of it bearing heavy stands of virgin timber and with a pos-

sible annual growth many times the world's present timber requirements, it would seem that there is enough timber to last for centuries. This would be true if all kinds of wood were equally capable of satisfying our wants and if, like metals, wood could be molded into any form or size desired, regardless of the form in which it occurs in the forest. But such is not the case; wood is not a homogeneous substance; because of characteristics of growth, form, structure, and mechanical properties, certain kinds of wood are better adapted than others to meet the world's need. Except locally, there is likely to be no shortage of fuel wood for several generations, because the size, form, and kind of tree are seldom of special importance. Timber used in construction and the industries, however, must not only be of sizes that take 50 to 150 years to grow (depending on kinds, locality, and size required), but it must fulfill certain mechanical requirements, and it must generally possess physical properties that make it fairly easy to work and handle.

Of the 26,000,000,000 cubic feet of timber (not including firewood) consumed by the world, three-fourths comes from softwood or conifer forests, comprising such species as the pines, spruces, firs, hemlocks, larches, cedars, sequoias, and cypresses. These forests are commonly rather uniform in composition over wide areas, with only a few species in mixture, and the costs of logging and milling are generally less than for the more complex hardwood forests. The wood is mostly light, soft, straight-grained, easy to work and nail, but strong and durable, and hence convenient to use. The principal timber-consuming peoples and industries are accustomed to using the softwoods, and could not readily adapt themselves to the use of other kinds, such as the timbers of the Tropics, many of which require quite different tools and methods of utilization.

#### THE QUEST FOR SOFTWOODS IS WORLD-WIDE

With a few exceptions, the softwood forests are confined to the cooler regions of the Northern Hemisphere. The Parana pine of Brazil, the alerce, pino, and cipres of Chile, the cedar and yellowwood of Africa, the pines of the East and West Indies, and the kauri and other softwoods of New Zealand do not occur in sufficient abundance ever to become important beyond their own regions. The principal softwood or conifer forest regions are (1) North America, including Canada, Alaska, western, northeastern, and southeastern United States, and the Sierras of Mexico; (2) northern Europe; (3) central Europe; (4) Asiatic Russia, Manchuria, and part of Japan.

Taken as a whole, the conifer forests are already being cut faster than they are being replaced, and the supply of softwood timber is consequently diminishing. The potential growth is much greater than the actual growth. Theoretically it is possible to grow as much timber as is cut each year; actually, however, many of the forests are so situated geographically or economically that intensive management is not feasible. Some of the forests that might be most productive are being denuded and left in a condition from which recovery will be exceedingly slow. Other forests where new crops of softwoods are growing are so situated that the trees are cut before their maximum rate of growth is attained, or before they reach a size and

quality suitable for the principal timber needs. These needs have to be met chiefly by the large timber from virgin stands.

The fact that the old-growth timber is seldom replaced by new growth of a corresponding size and quality serves to speed up the cutting of the remaining virgin forests. Besides the inroads of the lumberman, heavy losses are caused by fires, wind, insects, and various diseases. In the United States, less than one-third of the original stand of nearly 875,000,000,000 cubic feet of softwoods remains. In Canada, fires, cutting, and other agencies have probably made almost as great a reduction in the original stand of large-sized timber. In

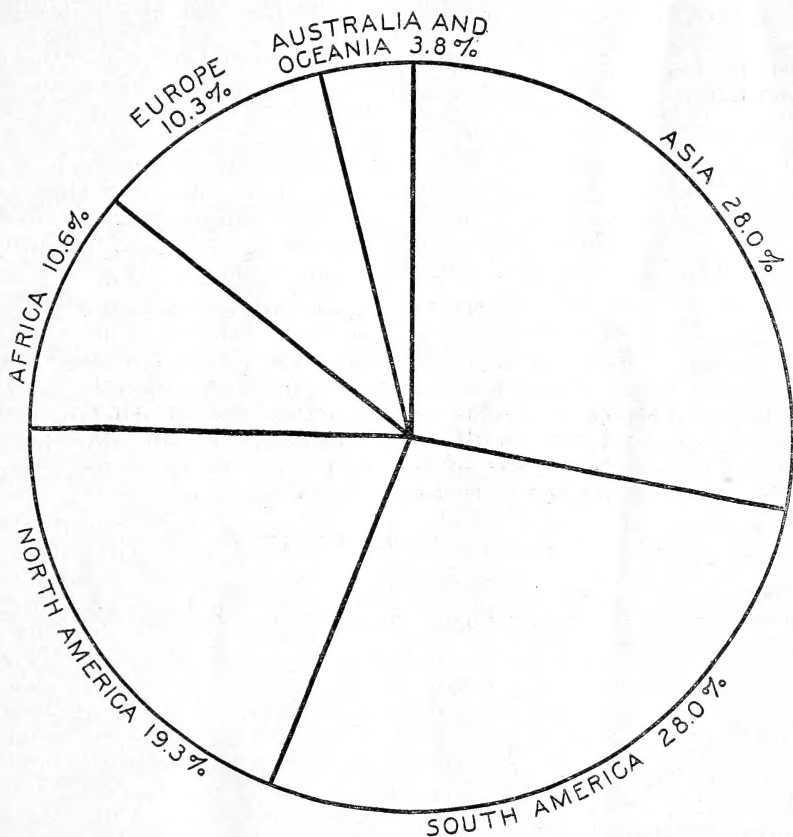


FIG. 2.—Distribution of forest lands by continents

Europe the bulk of the virgin softwoods was cut long ago, except in Finland and northern Russia and comparatively small areas in the Carpathians and Balkans. The most extensive remaining supplies of softwoods are in Siberia and especially in the Russian Far East.

Throughout the world, there is a growing realization of the impending shortage of conifer timber. The industrial countries are becoming concerned regarding future supplies of softwoods, and nearly all are seeking means not only to increase their own production, but also to gain control of undeveloped supplies or surpluses in other countries.

## EUROPE

The principal wood-consuming countries of western Europe depend upon imports to meet a large part of their present needs. Just before the World War, Great Britain imported 97 per cent of the timber she consumed (not counting firewood). France, Germany, Italy, Belgium, and the Netherlands imported approximately 30, 47, 65, 77, and 82 per cent, respectively. The only European countries that have any prospect of increasing their output of timber for any considerable period, or even of continuing to export at the present rate, are Sweden, Finland, Russia, and possibly Czechoslovakia, Rumania, and Yugoslavia. Taking Europe as a whole, there is a small surplus of timber production over consumption, amounting to possibly 360,000,000 cubic feet annually. As imports of hardwoods somewhat exceed exports, the net surplus of softwoods may be as much as 450,000,000 to 500,000,000 cubic feet. This is only about 5 per cent of the amount of softwood required by Europe each year. Considering that the requirements tend to increase, and that any enlargement of output from the northern forests is likely to be gradual, it is obvious that outside countries can not look to Europe for any considerable quantity of timber in the future.

## ASIA

Asia, considering its enormous population, consumes very little wood, and most of that is for fuel. With practically half of the world's population, the entire continent uses only one-seventh of the wood consumed by the world, and one-sixteenth of the saw timber. Yet most of the Asiatic countries now depend partly upon imports for their softwoods, and only Siberia has a large surplus.

The forests of western Siberia are more accessible to Europe than to the Pacific Ocean, and any surplus over local needs will naturally go to European consumers. Eastern Siberia has vast areas of forest and is reputed to have enormous stores of virgin timber, but the forests are largely unexplored and little is known about their actual condition. Though eastern Asia and Australia still depend on North America and Europe for most of their imported softwoods, it is likely that Siberia will eventually supply a large part of their needs and will also send to more distant markets some of the high-grade timber that can stand heavy transportation costs. Expansion of the lumber industry is likely to take place rather slowly, however, and meanwhile the timber needs of Siberia itself and of the rest of Asia are almost certain to increase rapidly as the countries develop industrially. It is highly improbable that there will ever be a large surplus available for the United States. Even if there should be, the handicap of distance would tend to prevent Siberian competition from destroying the market for home-grown timber.

## AFRICA

While the equatorial forests of Africa are extensive, they do not contain enough softwood timber to furnish even the small amounts required locally for construction purposes. African countries import nearly all of their softwoods from Europe and North America.



## AUSTRALIA, NEW ZEALAND, AND OCEANIA

In Australia, also, the softwood supply is inadequate for local needs, and attempts are being made to supplement the native forests by extensive planting of pine. Much pine, fir, and spruce lumber is imported from North America, Europe, and northeastern Asia. For many years New Zealand supplied Australia with softwoods. Now her forests are so depleted that New Zealand is restricting the exportation of certain woods and is extending the area of conifers by planting in order to meet her own future needs. The small areas of softwood forest in New Guinea and the other islands of the Pacific are insignificant from the standpoint of the world's supply.

## SOUTH AMERICA

Of the 3,270,000 square miles of forest in South America, only 5 per cent is composed of conifers. The bulk of the supply is in the Parana pine region of southern Brazil and adjacent portions of Argentina and Paraguay. Southern Brazil, Uruguay, and northern Argentina, the heaviest wood-consuming districts of South America, may be expected to take practically the entire output of Parana pine. At present the entire region produces only one-third to one-half as much softwood timber as Argentina alone buys from the United States and Canada. The other South American countries depend on the Northern Hemisphere for a considerable portion of their construction timber, although most of them have extensive forests of hardwoods.

## NORTH AMERICA

In North America are approximately 1,600,000 square miles of conifer forests. This includes some of the world's most productive forest land, such as the Douglas fir and redwood regions of the Pacific coast, the eastern white pine region, and portions of the southeastern yellow pine belt. Vast areas, however, are not so productive. Although Canada has nearly 850,000 square miles of conifers, only one-third to one-half of the area is capable of producing saw timber in commercial quantity. The rest has such unfavorable conditions of soil or climate that trees grow very slowly there and do not reach large size. Alaska has dense forests of good timber along the southeast coast, but the bulk of her forest area—that in the interior—can never furnish much large material to outside consumers. The Rocky Mountain region of the United States can not produce any considerable surplus over its own needs, which are growing. The same will be true of the southward extension of the mountain pine region in Mexico and the Central American republics. These countries are now importing a large proportion of their softwood lumber from the United States.

The total remaining stand of conifer saw timber in Canada is estimated to be only one-third of the amount in the United States. If it were all available for consumption in this country it would meet our needs, at the present rate, for only 15 years. At the present time, however, Canada uses three-fifths of the lumber she produces, and as her population grows her lumber requirements may be expected to increase also. The Canadian supply of pulp wood, while

large, and at present a heavy contributor to the needs of the United States paper industry, is already giving so much concern that the exportation of unmanufactured wood is subject to restrictions in several Provinces.

In the United States softwoods comprise two-thirds of the 13,000,000,000 cubic feet of large timber used annually, and more than three-fourths of the sawed lumber. Nine-tenths of the paper consumed in this country is made from softwoods. It is evident that the United States, more than most countries, has reason for concern regarding future softwood supplies. We now export about 2,000,000,000 board feet of softwood lumber annually, or about 7 per cent of the amount cut. Almost as much is imported, however, so that the net export is only about 1 per cent of the production. To meet the present requirements the United States is cutting four times as much conifer timber as grows each year.

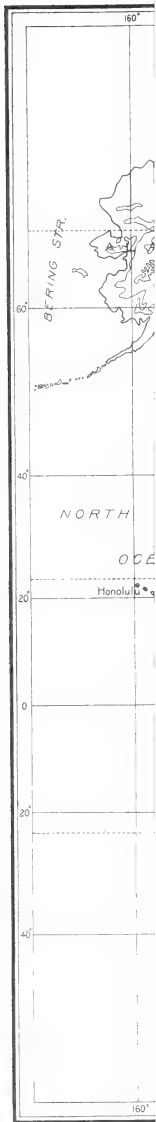
#### TEMPERATE ZONE HARDWOODS ARE ALSO DWINDLING

Broad-leaved forests cover a little more than one-third of the total forest area of the Temperate Zones, or nearly 1,900,000 square miles. Like the conifers, the Temperate Zone hardwoods are confined chiefly to the Northern Hemisphere, and to an even greater extent than the softwoods they are located fairly close to consumers. In general, the Temperate Zone hardwood forests have occupied and still occupy in many cases the better soils or the more favorably situated lands at comparatively low elevations and latitudes. As these lands support the densest populations, not only have the forests been progressively destroyed to make room for cultivation, but also from the earliest times they have been important sources of fuel and timber for a large part of the world's peoples.

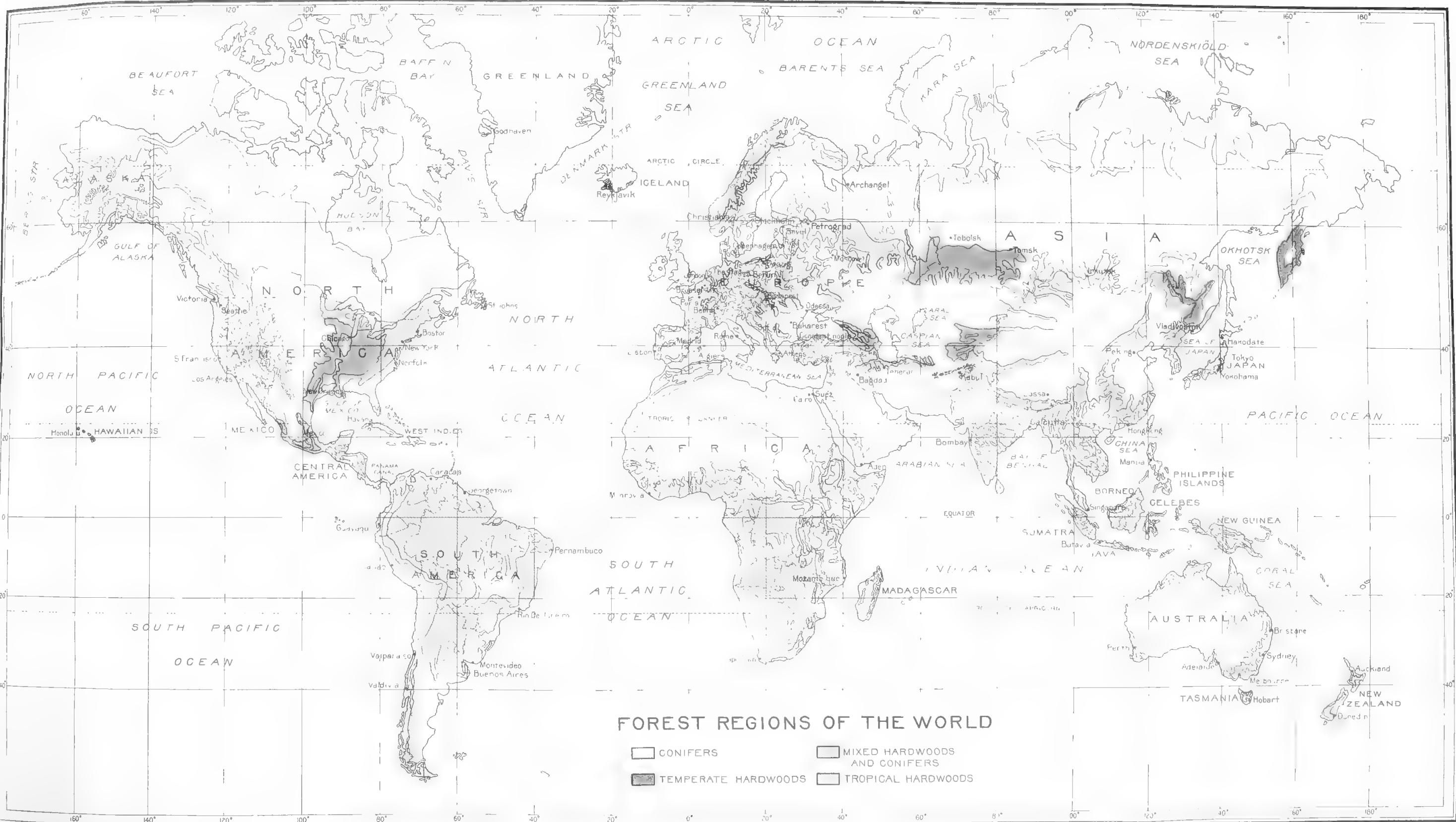
The Temperate Zone hardwoods now supply slightly more than two-fifths of the world's wood. They supply three-fifths of all the firewood, and approximately one-fifth of the larger timber. Though these woods are not so essential for many purposes, nor so widely used for construction and common lumber as the softwoods, they have many special uses for which softwoods are less satisfactory. Their hardness, strength, elasticity, toughness, weight, color, grain, texture, finishing qualities, or other properties make various hardwoods especially desirable for furniture, vehicles, interior trim, handles, staves, woodenware and turned goods, and a multitude of other products.

The better class of timber comes chiefly from large old trees, the supply of which has been depleted to an even greater extent than that of softwoods. Moreover, the demand for firewood and other small timber in the more accessible forests has generally kept ahead of the growth of new timber. Most second-growth stands, therefore, are cut before the trees reach large size or contain much high-grade material.

Europe has extensive areas of hardwood forest, and even exports special kinds, such as the oak of Poland and Slavonia. On the whole, however, the consumption of hardwoods in Europe greatly exceeds the production, so that there is a net annual importation of something like 90,000,000 to 100,000,000 cubic feet.







### FOREST REGIONS OF THE WORLD

- CONIFERS
- MIXED HARDWOODS AND CONIFERS
- TEMPERATE HARDWOODS
- TROPICAL HARDWOODS



In Asia, Japan exports small quantities of oak. Walnut and other hardwoods are exported from Asiatic Turkey and the Caspian region. Siberia has about 30 per cent, by area, of the Temperate Zone broad-leaved forests of the world. Except in the Far East, however, they consist of fairly light stands of aspen and birch, much of it valuable chiefly for firewood or pulp and not to be compared with the oak, ash, maple, chestnut, beech, and other hardwoods of the United States and Europe.

In the temperate region of the Southern Hemisphere, including southern Chile and Argentina, portions of New Zealand and Tasmania, and the high mountains of South America and Africa, are only relatively small quantities of valuable hardwood timber, little or none of it available for export.

The United States now has the largest supply of hardwoods in the Temperate Zone; the other North American countries have no surplus over their own needs. For many years the United States has been the largest exporter of high-grade hardwoods, and the exportation of products made in whole or in part from such woods, aggregating in value many millions of dollars, has been possible because of the abundant and accessible supplies within the country. Now the original stand of approximately 250,000,000,000 cubic feet of merchantable hardwoods has dwindled to about one-fourth of that amount, and is being further depleted at the rate of over 2,000,000,000 cubic feet a year. The United States uses almost two-thirds of the entire world consumption of Temperate Zone hardwood timber, exclusive of firewood, or nearly 4,000,000,000 cubic feet a year. There is no prospect of getting large supplies from other countries when our own hardwoods are gone. Nevertheless, the outlook for future supplies of hardwoods is probably better than for softwoods, because woods adapted to the same uses can be got from the Tropics, though they may cost considerably more.

#### TROPICAL FORESTS WILL NOT SATISFY NORTHERN TIMBER NEEDS

The tropical hardwood forests occupy nearly 5,700,000 square miles, or close to one-half of the entire forest area of the world. Not all of this area, however, bears timber of commercial value. In many regions the forests have been depleted by centuries of misuse, by burning and cutting in order to carry on the shifting agriculture that is so prevalent in tropical countries, or by cutting to supply the wood needs of the local population. In such places the original stand is represented by scattered remnants, or the new stand is composed mostly of inferior, comparatively worthless trees and scrub. Yet there are still vast areas of virgin forest, unutilized and even unexplored. The amount of standing timber is far greater than the amount remaining in the temperate regions, and the estimated growth that might result if the whole area were devoted to systematic timber production is at least four times the world's present timber consumption.

The peoples of the Tropics use very little timber, in comparison with those of cooler regions; and the northern wood-consuming countries have always had access to forests nearer at hand than are those of the Tropics. Hence the tropical forests have played a minor part

in supplying the world's timber. Even now they furnish only about 15 per cent of the firewood, and less than 3 per cent of the larger timber. Besides the local consumption, chiefly for firewood and framing for houses and huts, woods possessing special qualities have been exported to the northern countries. These include special woods such as *lignum-vitae*, teak, and greenheart; fine cabinet woods such as mahogany, boxwood, ebony, and satinwood; dyewoods such as logwood and brazilwood; and quebracho and other woods rich in tannin.

In consequence, the idea has become widespread in the Northern Hemisphere that the tropical forests are chiefly composed of these and other kinds of hard, heavy, deeply colored woods, suitable for furniture and a few special uses, but not for general construction. During recent years, however, explorations have begun to dispel this belief. It is known now that there are many excellent construction woods, some of which are claimed to be superior to the woods of conifers for use in the Tropics, because more resistant to decay and to termites. As the tropical-forest regions are penetrated by railroads and otherwise opened up and as primitive methods of logging gradually give way to modern machine methods the output of timber may be expected to increase greatly.

There are many difficulties, however, to be overcome before the tropical forests become important sources of timber for the varied needs of the industrial countries. They must be opened up by adequate systems of cheap transportation. There must be adequate supplies of efficient labor, both to construct the transportation facilities and to exploit the forests. (This is not the case in most tropical-forest regions now.) These regions must be made more healthful living and working places for white men and others accustomed to or capable of carrying on woods work on a large scale by modern methods. A profitable outlet must be found for the many different kinds of timber that occur in the stands, in order to keep logging costs reasonably low and to leave the forests in a productive condition. Only a few of the numerous species have yet entered the world markets, and little or nothing is known of the properties and possible utilization of the others. A long period of study will be required to learn those properties and uses, and the best methods of manufacture and utilization—in many cases quite different from the methods employed with the woods now in use. It will also be necessary to educate the wood-consuming peoples to change their established tastes and habits, so that they will accept the new woods. These things will all take time. Meanwhile the timber requirements of the tropical countries themselves will doubtless grow as their industries develop, while their most accessible forests will probably be destroyed or rendered less productive, just as has happened in other regions passing through a corresponding stage of economic development.

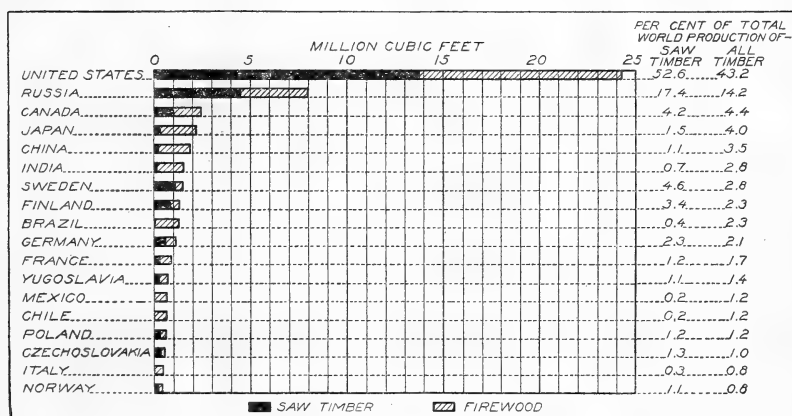
The United States, as well as other northern countries, will probably get more and more timber from the tropical forests. We may even depend on the Tropics for a large proportion of the high-grade hardwoods and other special timbers, when our own virgin supplies are exhausted. But for the bulk of our requirements, particularly ordinary construction timber and other comparatively low-grade material, no reliance can be placed on the Tropics. The problem



will have to be solved and the shortage met long before those forests are in a position to meet it. Moreover, the solution will have to be much more practicable than attempting to supply our enormous hunger for wood from the distant equatorial forests.

**THE UNITED STATES MUST DECLARE FOREST INDEPENDENCE**

This brief outline of the forest situation in all countries shows plainly that America can not reasonably depend upon the world's woodpile for adequate supplies of timber. Competition for softwoods will naturally become more intense as the needs of the consuming countries grow and as the reserves diminish. And by the time our virgin hardwoods are gone, there will be no appreciable surplus of similar material in the Temperate Zones. Although we may get much of our higher-grade woods from tropical forests, to depend on them for the bulk of our hardwoods would involve extensive changes in our wood-using habits and largely increased



THE CUT OF TIMBER IN PRINCIPAL PRODUCING COUNTRIES

FIG. 3.—The cut of timber in principal producing countries

expenditures for hardwood products. Nor would it be desirable, even if it were possible, to depend upon other countries for essential raw materials that can be produced at home as cheaply as they can be obtained abroad.

There are in the continental United States (exclusive of Alaska) approximately 460,000 square miles of softwood and 275,000 square miles of hardwood forest land. A recent careful study of land utilization and agricultural trends leads to the conclusion that there need be no reduction in our forest area to meet agricultural requirements, at least during the next 50 years. Much of this forest land is capable of producing timber at a rate hardly surpassed by the forests of any other part of the Temperate Zone. There are very few regions of equivalent extent where the growth of hardwoods exceeds that in portions of the southeastern United States, or where the growth of softwood equals that of our Pacific coast Douglas fir and redwood and much of our southern pine and white pine.

The greater part of our forest, however, has been and still is treated as a mine rather than as a continuously productive resource. About 125,000 square miles of it now lies idle and nonproductive as a result of destructive lumbering and repeated fires. To restock this land with valuable timber species will be a slow and costly process, and even then it can not produce timber crops for several decades, nor saw timber in less than half a century. More than 390,000 square miles additional, which has been cut or burned over, is partially restocked with timber varying in age from seedlings to mature trees. Although some of this land is fairly productive, a greater proportion bears for the most part inferior trees, or stands too open to give high yields or to grow good timber. Such forests can not be brought to full productivity within less than 50 years. The rest of our forest area is occupied by old-growth timber, the growth of which is approximately balanced by decay; it can not add appreciably to our

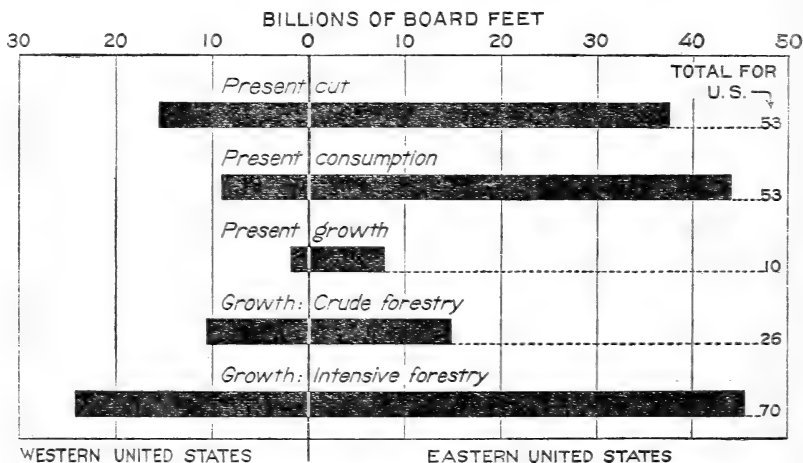


FIG. 4.—Saw-timber cut, consumption, and growth

stock of timber until the old trees are cut and replaced by young growth.

It has been estimated that the forest land we now have, if it were all stocked with trees and managed carefully with the object of continuous timber production, could yield annually about 27,000,000,000 cubic feet of wood, or about one-sixth more than our present consumption of all kinds of woods. Something over half of this amount would consist of 70,000,000,000 board feet of saw timber or one-third more than we now require. It is more than four times the present total growth and seven times the present annual increment of saw timber.

By the time our forests are brought to such a high state of productivity, which can not come about in less than several decades, and probably not within a half century, there can be little doubt that all of the wood will be needed. With the increase in population that is likely to take place our needs will grow, even though the rate of consumption per capita should fall almost as low as the present Euro-

pean rate. Moreover, the other timber-consuming countries will demand even more wood from us than they get now, provided it is available. Europe can not increase her timber production sufficiently to keep pace with her increasing needs, for the growth on much of her forest area is already approximately as much as the land is capable of producing.

The only forest regions of the United States that can possibly grow more timber than is needed locally are the Pacific coast region and the southeastern pine and hardwood belts. The kinds of timber produced in these regions are well and favorably known to consumers all over the world. Being close to the ocean, both regions will have the advantage of relatively low transportation costs. They will be able, therefore, to get fairly high stumpage prices and still compete with less accessible exporting regions, such as the interior of Russia and Siberia. In most of northern and western Europe and in some parts of the United States stumpage values are already high enough to cover the cost of growing timber. Elsewhere they have been kept down by the competition of natural-grown timber, which the owners acquired cheaply and which, in order to liquidate their investments, they are willing to sell far below the cost of replacement. By the time new timber crops can be grown, this virgin timber will be so far depleted that it will cease to be a factor in the situation.

It is clear that the United States can be entirely independent of other regions for her ordinary timber needs. She has vast forest-producing areas that are not required for agriculture. She has climate, soil, and a great variety of fast-growing and valuable timber trees, probably unequaled by any other country in either Temperate Zone. She has the largest market for forest products right at home. It would be folly to throw away these wonderful natural opportunities and economic advantages. It would be worse than folly to rely upon distant and possibly illusory timber supplies, and to make future generations of Americans depend upon foreign countries for essential materials that can be produced to advantage at home.

#### SOME IMPORTANT FACTS ABOUT THE FORESTS OF THE WORLD

TABLE 1.—*Comparison of forests in grand divisions of the earth*

Continent	Distribution of the world's forest lands		Land area in forest	Forest area per 100 inhabitants
	<i>Square miles</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Acres</i>
Asia.....	3, 275, 023	28. 0	21. 6	240
South America.....	3, 269, 828	28. 0	44. 0	3, 245
North America.....	2, 256, 483	19. 3	26. 8	998
Africa.....	1, 246, 028	10. 6	10. 7	560
Europe.....	1, 209, 559	10. 3	31. 1	1, 170
Australia, New Zealand, and Oceania.....	442, 905	3. 8	15. 1	3, 470
Total.....	11, 699, 826	100. 0	22. 5	435

TABLE 2.—Character of forests by continents

Continent	Area of conifer forests		Area of Temperate Zone hardwoods		Area of tropical hardwoods	
	Square miles	Percentage	Square miles	Percentage	Square miles	Percentage
Europe.....	904, 770	21. 9	304, 789	16. 2	.....	0. 0
Asia.....	1, 388, 799	33. 6	893, 483	47. 5	992, 741	17. 5
Africa.....	11, 514	. 3	27, 297	1. 4	1, 207, 217	21. 2
Australia, New Zealand, and Oceania.....	23, 766	. 6	24, 006	1. 2	395, 133	7. 0
North America.....	1, 634, 113	39. 5	453, 750	24. 1	168, 320	3. 0
South America.....	169, 531	4. 1	179, 688	9. 6	2, 920, 609	51. 3
Total.....	4, 132, 493	100. 0	1, 883, 013	100. 0	5, 684, 020	100. 0

TABLE 3.—Annual production of wood

Continent	Saw timber		Firewood		All wood	
	Total	Per acre	Total	Per acre	Total	Per acre
	<i>Million cu. ft.</i>	<i>Cu. ft.</i>	<i>Million cu. ft.</i>	<i>Cu. ft.</i>	<i>Million cu. ft.</i>	<i>Cu. ft.</i>
North America.....	14, 986	10. 4	12, 821	8. 9	27, 806	19. 3
Europe.....	9, 160	11. 9	7, 843	10. 1	17, 003	22. 0
Asia.....	1, 556	. 8	6, 372	3. 0	7, 929	3. 8
South America.....	259	. 12	2, 233	1. 07	2, 492	1. 2
Africa.....	62	. 08	655	. 82	717	. 9
Australia, New Zealand, and Oceania.....	93	. 33	182	. 64	275	. 97
Total.....	26, 116	3. 49	30, 106	4. 02	56, 222	7. 51

TABLE 4.—Present cut and growth of the three principal kinds of forest

Kind of forest	Cut		Growth	
	Total	Per acre	Total	Per acre
	<i>Million cu. ft.</i>	<i>Cu. ft.</i>	<i>Million cu. ft.</i>	<i>Cu. ft.</i>
Conifers.....	27, 500	19. 4	23, 500	8. 9
Temperate Zone hardwoods.....	23, 500	19. 6	9, 500	8. 0
Tropical hardwoods.....	5, 000	1. 4	5, 000	1. 4

TABLE 5.—Annual consumption of wood

Continent	All wood		Saw timber		Firewood
	Total <sup>1</sup>	Per capita	Million cu. ft.	Per cent	
	<i>Million cu. ft.</i>	<i>Cu. ft.</i>	<i>Million cu. ft.</i>		<i>Million cu. ft.</i>
North America.....	27, 192	188. 0	14, 372	52. 8	12, 820
Europe.....	16, 641	35. 8	8, 844	53. 1	7, 797
Asia.....	7, 917	9. 1	1, 539	19. 4	6, 378
South America.....	2, 527	39. 2	294	11. 6	2, 233
Africa.....	774	5. 7	114	14. 7	660
Australia, New Zealand, and Oceania.....	297	36. 1	114	38. 6	183
Total.....	55, 348	32. 2	25, 277	45. 6	30, 071

<sup>1</sup> The figures for total cut and those for total consumption for the world as a whole do not exactly correspond, although as a matter of fact they must be approximately equal. The differences are due to various discrepancies in the data, such as differences in the years for which figures on individual countries are based, different converting factors used in different countries, and differences in completeness of customs statistics.

TABLE 6.—*The world trade in wood*

Continent	Exports	Imports
	<i>Million cu. ft.</i>	<i>Million cu. ft.</i>
Europe.....	2,326	1,965
North America.....	1,317	703
Asia.....	50	38
South America.....	32	67
Australia, New Zealand, and Oceania.....	22	43
Africa.....	11	64
Total.....	3,758	12,880

<sup>1</sup> The total exports and imports should be the same. The discrepancy is due to differences in completeness and accuracy of trade statistics for the different countries, to differences in the years for which figures were available, and probably also to differences in units of measurement and converting factors.

## ORGANIZATION OF THE UNITED STATES DEPARTMENT OF AGRICULTURE

December 1, 1927

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