

Forestry Lecture -- 10.

Two men can plant about 1,000 a day, most of which should grow if planted under the right conditions.

Slide 46. These men are planting pine seeds in the Angeles National Forest, by the "seed spot" method.

Slide 47. Nature herself will grow trees again where fire is kept out. This is a forest in West Virginia, where the young trees, - spruce, hemlock, and firs, are coming up.

Slide 48. The last slide shows little trees that have been put in all over mountainous area in Southern California. Perhaps 50 or 60 years from now mighty forests will be here.

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The proper management of the forests -- that is, a care of them based on scientific principles, is called forestry, and we can easily understand, then, that the future welfare and prosperity, and progress of this country depend, in a large measure, on scientific forestry, or the management of our forests in such a way that we may be always assured of an abundant supply of wood.

You are going to be citizens of the United States before long, and should be as well informed as you possibly can be about the things that contribute to the well-being of our country. One of the great values of our country is that everyone has an equal voice in the government; your vote is just as effective as mine, or just as good as the vote of another citizen: and since this is so, we, as citizens, ought all to have a feeling of responsibility for the government of our country. Each one of us ought to make it his duty to be well posted on those things that are going to influence the development of our country in the future.

Forestry is one of these things because it deals primarily with our supply of wood. Forestry is the management of the land so that it will always bear a crop of timber: it is so handling an area of land that it will always produce trees. One of the best ways to illustrate the main principle of forestry is to compare the forest to a sum of money.

Let us suppose that some one gives you a large amount of money. In the use of that money there are two general ways or courses open to you. In the first place, you could spend every cent of it as fast as possible, and in so doing, you would probably lose your health, your friends, and your self-respect. The other way would be to

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deposit it in the bank, or invest it wisely and use the interest each year. In this case the interest would accrue regularly every year, and the result would be that the original amount would always be intact, if not increased.

It is the same with the forest land in the United States. Lumbermen and people in general, until recently, felt that our timber supply was practically inexhaustible -- that they could cut it and use it as freely as possible. The lumberman cannot be blamed for this attitude: he naturally wishes to make as much profit as he can. He cuts off all the trees of any value, without thought of the future, so that the forest may be totally destroyed. This is like spending all your money and having nothing left; and if our country should do this, it would become a very poor country indeed.

The other way is the employment of the principles of forestry. The forester is always thinking of the future. He is careful not to destroy his principal, but to improve or increase it if possible. He determines by his special methods what is the annual increase in the amount of wood in the particular forest of which he has charge. This increase represents the amount of wood that can be cut from that forest and is called the "yield." The yield may be removed every year in the form of a certain number of mature trees or it may be removed at intervals of several years. By this method a future supply of wood is always provided for. There are other ways or "silvicultural systems" by which this can be done, but the fundamental idea in forestry is the maintenance and perpetuation of a crop of timber on the land.

Well-managed forests are made to yield their present "interest" without endangering the future interest or yield, and usually to the

great advantage of the future yield. Like the plant of a successful manufacturer or like a wisely invested sum of money, a forest should increase in productiveness and value year by year. Unfortunately we are cutting our timber now in the United States at least four times as fast as it is growing.

Not all of our country is forested, nor was it so originally.

Slide 1. At present, the natural forests in the United States extend mainly along the Appalachian Mountain system in the east, from Maine to Alabama, from north to south in the Rocky Mountains, and on the Coast Ranges. There are also large forest areas in Michigan and Minnesota; and in the lower Mississippi Valley - for example, in Louisiana and Arkansas. The best forest area in the country is in the extreme northwest in Oregon and Washington.

This slide shows the location of some of the national forest reserves in the United States in 1920. At present (1947) the area is much greater.

About 1891 the first forest reserves were set aside by the national government to form a timber supply for the future. This was in Harrison's administration. Later, Cleveland set aside further acreage. In McKinley's term this was continued, and in the term of Roosevelt, who was so heartily in sympathy with the public welfare of the country, a great amount of land was withdrawn for national forests. These national forests in 1922 amounted to 136,000,000 acres. With the acreage in Alaska, which is 20,000,000, and a small area in Porto Rico, the total is about 280,000,000 acres of national forests, which number 160 in all. This does not include several million acres which have been set aside by the states as State Forests. The national forests are all administered on forestry principles by the Federal Government at Washington through an organization known as the Forest Service, which sends out inspectors and other forest officers to manage these areas.

Types of Forests

Slide 2. There are different kinds of forests. The first is the commercial type of forest, where timber is to be used for lumber, cut up into planks or boards. Here is a view in a splendid commercial forest in the State of Washington. It is a "stand" of red fir. These trees grow from 10 to 12 feet in diameter, and sometimes 250 feet high. There is no tree here in the east that grows so high. Red fir makes a splendid lumber.

Slide 3. Then we go down to Alabama where we have a forest of long-leaf pine, also a commercial forest. You will notice white patches on the lower part of the trunks; these are where the resin is being extracted from the tree. Turpentine is manufactured from this resin.

Slide 4. Here is an example of a forest in New York State, with

Mount Marcy, 5,344 feet, the highest point in New York State, in the background. The trees do not look large, but they are of fairly good size, as you can see in front. This is an example of another type of forest called the recreational forest or luxury forest, which is managed primarily with a view to its appearance and aesthetic value rather than for the timber it produces.

Slide 5. Another example of a forest is one where the main object is to protect the watershed. If it were not for forests we would be likely to have great floods, and this is what actually happens where they have been cut off. This is Reservoir No. 2 at Colorado Springs, a view looking down the valley and showing a dam where the brook has been backed up to form the reservoir.

Slide 6. This is a brook in a forest in Tennessee. The streams are well watered. If it were not for the forests, they would be torrents at one time of the year and dried up during drought. People then could not depend upon them for water power to run factories, manufacture electricity, etc., and the results would be disastrous.

Slide 7. This slide shows an example of erosion, the wearing away of the soil, done here by the water after heavy rains. At least an acre of sterile soil has been exposed here by the water. This soil will not grow good crops. Such devastation will occur where the forests have been cut off, especially on steep slopes.

Slide 8. In this slide we see inundation which happens as a result of the careless cutting off of the forests at the stream sources, ruining the land for agricultural purposes. If you have ever gone through deep woods, you have noticed a layer of leaves on the ground. At any time of the year there is a thick, spongy cover on the ground composed of the leaves which become more and more decayed as time goes on. When the rain falls, much of it is absorbed by this "forest floor," which can sometimes hold a rainfall of 5 inches. From this sponge-like layer, the water seeps away very slowly into the streams, or sinks into the ground to come out at lower levels in springs. But think how differently it acts on a bare slope where there is no forest! The rain falls down and runs off the dry hard soil in much the same way that it would run down a sloping roof - a tremendous flood occurs and then a drought. This is the way we get washing away of the soil (erosion) and subsequent drying up of streams. In this slide the whole course of the stream has been changed because of a disastrous flood. Houses have been washed away, perhaps lives lost, and good farm land covered up with sand and pebbles because of a sudden rise of water due to a lack of forest cover around the sources of the streams, or headwaters.

UTILIZATION OF THE FOREST.

I. Lumbering.

Slide 9. One part of forestry is lumbering. Some people think that forestry is cutting down trees, and others that it is saving trees or keeping them from being cut down, but the cutting of the tree is just as important a part of forestry as harvesting the crop is a part

of farming. Here we find them cutting down a tree. This is a large red fir. The first thing the woodsmen do is to put in these spring-boards on each side; then they make an uppercut so that the tree will fall in the right direction. This is an old-fashioned way of doing and a wasteful method of cutting trees. They wish to cut through where the trunk is smaller, since it flares out below; but nowadays lumbermen cannot afford to waste such a large stump by this method.

Slide 10. The next thing they do is to cut the trunk into logs. These are usually 16 feet long.

Slide 11. The next problem is to get them down to the mill. This is done in several ways; such as by wagon, as here; by railroad, by floating them down a stream or through a flume; or floating them in rafts on the ocean. A scene in a national forest in New Mexico showing the wagon in which they are to be carried down to the mill, and one of the methods of pulling up the logs on an inclined plane is shown. The wire rope leads to an engine not shown in the slide.

Slide 12. One of the best times to do lumbering is in the winter when the snow is on the ground, especially in the north. This is a scene in Minnesota with a fine stand of jack pine. Winter is best, not only because of the snow for the sleds but because the ground is frozen, and there is no danger of the team sinking into the mud. The lumberman also does not have so much work in felling the tree, since the wood is usually frozen and easily cut.

Slide 13. Another way of getting logs to the mill is by means of this contrivance called a "flume", where the logs float down to the mill. This is an expensive method because these flumes cost a great deal to build. They are almost sure to leak, so that often additional water is led into them, as is being done here by this branch flume called a "feeder."

Slide 14. If there is a river nearby, the logs may be floated down in that way, but often form what is known as a "jam". In these jams there is sometimes a single log which can be extricated and which releases the whole jam. It is very difficult and dangerous to extricate the key log because the whole mass of logs moves downstream at once.

Slide 15. Here are logs brought down and waiting to be "yarded out".

Slide 16. You see here log rafts of White Pine after having floated further down into more level land below the mountainous area. As a matter of fact, this is in Michigan and evidently pretty near the level of the lakes.

Slide 17. The logs are often "ponded" nearby to wait the convenience of the mill force. Note the splash as the great logs strike the water, also the mill in the distance.

Slide 18. This shows one of the methods of pulling the logs from the pond up the slide or incline to the sawmill.

Slide 19. Once in the mill it is the duty of the sawyer (and he is the highest paid operator in the mill) to so manipulate the logs that they are moved over and shoved against the saw. This then cuts away the rough sides and successively cuts out planks or boards which are shipped to the lumber yards.

Slide 20. Finally we have the lumber yard where the boards are piled up carefully with air spaces between, so that they may properly dry out or "season." This takes from four months to a year.

Slide 21. Here is a scene in Tacoma, Washington, where the ships are ready to start on their journey. They are being loaded with lumber which is very evidently red fir.

Slide 22. You would probably not realize that this is the Pacific Ocean and that these things which look like toothpicks are really logs. These are all bound together and have come down from Vancouver to San Diego, a distance of about 1,300 miles. It took this whole flotilla a month to make the trip. The little barge which resembles a bug is a powerful little tug-boat which furnishes the power for the trip.

FOREST PRODUCTS

Slide 23. The main use of the forest is for lumber, as we have seen. But there are many other products such as resin. Resin is the natural gum of a coniferous tree; for example, of a hemlock, pine, or a spruce. All the pines, especially the long-leaf pine, yield resin which is used commercially. This is a forest of long-leaf pine. The method now in use to get the resin is to make a V-shaped cut in the lower part of the tree about 6 or 8 inches high, and as a result the resin drips out of the bark and outer wood, collects in the trough and runs down into the receptacle below. As a result of exposure to the air, the ducts fill up and new cuts must be made further up so that a new supply of resin can be given off. It is then collected in large barrels and taken to the mill where it is distilled. The distillate of this resin is turpentine, which is tremendously valuable, and the "rosin" which is left is used for many things; for example, as an ingredient of varnish, glue, sealing wax, soap, and also for the glazed surface of paper which otherwise will not take ink or color.

Slide 24. Another thing the forest yields is paper pulp. This slide shows one-half the amount delivered to a New York newspaper daily.

Slide 25. Forests are used also for food. They yield nuts and furnish fodder for one-sixth of the meat supply of the United States. In this connection we have a slide showing a large flock of sheep crossing a bridge in one of the national forest reserves in Utah.

Slide 26. Here we have in one of the national forests in Idaho, a little open space called a "park." Owners get permission for their cattle and sheep to graze during certain months of the year.

Slide 27. If, however, the animals do not graze on these areas at the right time, they create irreparable havoc, as is shown in this slide where the young growth and seedlings have been killed.

ENEMIES OF THE FORESTS AND FOREST PROTECTION.

So much for a brief outline of the uses of the forest. We shall now consider the enemies of the forest. Of course the greatest of these is fire. Millions of acres of forests are destroyed every year by fire. Some of the worst forest fires are caused by sparks from locomotives. Some railroads are now required by law to use spark arresters to prevent starting such fires. In some cases fire lanes are being constructed along the railroads at some distance from the tracks.

Slide 28. There are two kinds of fires, ground and crown. Ground fires, of course, simply run along the ground.

Slide 29. This man is putting out a ground fire. These can often be put out by beating with a wet gunnysack or brush, or by throwing earth on them.

Slide 30. We can also use axes or shovels when the burning is close to the earth.

Slide 31. When we have a crown fire it is almost impossible to stop it and backfiring is necessary. When a crown fire reaches a ridge, it usually becomes a surface fire. Backfiring is burning a little lane some distance ahead of the fire so that the fire stops on reaching it. But it is most important to be sure that the backfire does not go further than intended. This man is making sure.

Slide 32. After the fire has gone through, what a sad spectacle remains. Everything is burned out and worthless.

Slide 33. The slope of Mt. Mitchell in North Carolina, the highest mountain in the Eastern United States, 6,711 feet, which shows the results of an old forest fire. A beautiful forest once grew there.

Slide 34. Here is an area in the Adirondacks which has been burned over time and again. The valuable soil cover is burned out and it is difficult for new trees to start.

Slide 35. Again we have a spot where there has been a forest fire and you can see how the soil has been eroded and washed away from the roots.

Slide 36. We have in our national forests these lookouts who are constantly watching and trying to detect the fires. Nowadays in some states, aeroplanes assist in this work.

Slide 37. This is another view of the lookout at the top of the observation tower. Nowadays much of this scouting is done by airplane.

Slide 38. Here we have fire lanes to check the spread of the fire, as shown in the foreground and also in the inverted V on the face of the mountain.

Slide 39. You see that a road such as this may be very effective as a fire lane. This scene is in Florida. The fire came up to the road and then stopped, leaving the rest of the forest entirely green.

Slide 40. Another method of checking fire is to plow the land and keep it freshly plowed. The fire will stop when it reaches this area as it has done here.

Slide 41. In managing the forest reserves, not only for the purpose of going from one fire to the other, but for any kind of communication, it is necessary to build trails. This shows the operation in a national forest in Southern California.

Slide 42. Here we have a trail entirely built in a national forest in New Mexico.

So much for the fire, but there are a great many other enemies of the forest. One of these is insects which do a tremendous damage, eating the leaves and bark and causing great losses.

Still another enemy is fungi, a very low order of plants which grow in the bark and leaves and wood. For example, the chestnut blight fungus has killed off millions of dollars worth of timber.

PROVISION FOR A NEW FOREST: REGENERATION

Slide 43. When lumbering is carried on in the forest reserves, these large trees are left as seed trees for future young growth or reproduction as we see here. In forestry there are a great many methods of insuring a future crop of trees and this is one.

Slide 44. In planting a new forest, of course the first thing to do is to raise the seedlings. Here is a seed bed in the Angeles National Forest in California. In this part of the country the sun is so hot that they have to use the lath to modify the burning rays. These are little spruces only six weeks old.

Slide 45. Here we have a boy with a bundle of pines ready to plant out. They are evidently about two-year old pines. All that is necessary to plant these trees is to make a hole with one stroke of a mattock, put in the roots of the seedling and tamp down the soil.