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New York (State) University
 Division of Visual Instruction

List 23

SLIDES AND PHOTOGRAPHS

FORESTRY AND LUMBERING

The slides and photographs listed below illustrate most of the more important aspects of forestry and lumbering in which the general public is interested, particularly those features found in New York State. The collection as a whole should satisfy the wishes of those who for several years have been inquiring for carefully selected illustrations of this subject.

The list has been made up with reference to no one class of borrowers. It is not offered as a "set" to be used entire. The subject of the forests and forest conservation is one of popular interest and can be satisfactorily presented through an illustrated lecture. But selections from the list can be made for use in classes in botany, descriptive geography and commercial studies.

There are numerous available publications on this subject, to some of the most important of which reference is herein made. The specific titles of the illustrations and the brief notes appended should be sufficient to guide the studies of those not already familiar with the subject.

Acknowledgment is here made of the assistance rendered us in the preparation of this list by Mr C. R. Pettis, superintendent of New York State Forests of the State Conservation Commission, and by Professor Walter Mulford, director of the department of forestry in the New York State College of Agriculture at Cornell University, who have passed upon the pictures and made helpful suggestions concerning them.

A. W. ABRAMS

Chief, Division of Visual Instruction

Albany, N. Y., December 1, 1913

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LIST OF SLIDES AND PHOTOGRAPHS

The forests

The purpose of this group as a whole is to show some of the general aspects of the forests and forest areas, chiefly of New York. Each picture also illustrates one or more special features of forestry.

Call no.

Dn Gg94.....Panorama Northwest from Prospect Mountain Showing Foothills of the Adirondacks Covered with Forest. Near head of Lake George, N. Y. (1911)

Characterized by patches of land cleared for cultivation, but for the most part suitable only for forestry purposes. Cutting here at present should be selective.

Dn AE6.....Panorama West over Elizabethtown (Essex co.), Pitchoff Pass (right distance); Forest Covered Mountains. The Adirondacks, N. Y. (1912)

These woods are second growth. Note the evergreens in middle distance, showing that natural reseeding is taking place. In most parts of the Adirondacks, as shown here, the solid rock is very close to the surface — unfavorable for agriculture.

Dn OIZ.....Panorama North from Rock City: a Wooded Section of the Eroded Allegheny Plateau. Near Olean, Cattaraugus co., N. Y. (1911)

The forests of this section are chiefly sprout hardwoods.

Dn Se5.....Panorama of Rounded Hilltops, with Wooded Summits, and Fertile Valleys. Seward, Schoharie co., N. Y. (1912)

Dn Bd7.....Berlin and the Taconic Valley; Wooded Hilltops. Rensselaer co., N. Y. (1913)

The last two pictures illustrate very well the proper use of the valleys and lower slopes for agriculture and the hilltops for lumber and wood.

Th A2.....Virgin Forest in Winter: Mature Hemlocks with Young Growth Underneath, with Mixture of Hardwoods. Near Lake Pleasant Village, Hamilton co., N. Y. From negative (about 1905) of N. Y. State Conservation Commission

The mature hemlocks should be cut for lumber, giving the young trees a chance to grow.

Th A24.....Virgin Forest in Winter: Mixture of Spruce, Hemlock and Hardwoods. Woods lake, Herkimer co., N. Y. (1912)

This is a typical mixture. Note that the trees vary in size: a forest for selective cutting. Observe the wasted wood on the ground and compare views of German forests, p. 15-16.

Th A3.....Dense Growth of Softwoods, Chiefly Hemlocks, with Long, Straight Trunks; Natural Pruning. Bear Mountain, near Cranberry lake, St Lawrence co., N. Y. (1913)

The lower branches, for lack of sunlight, died when very small, thus allowing the long trunks to form comparatively free from knots.

Call no.

- Th A34. Virgin Forest on State Land along Little Salmon Lake, Spruce and Hardwoods. Herkimer co., N. Y. (Oct. 1913)
- Dn AH4. Western End of Honnedaga Lake, Surrounded by Virgin Forest, Summer Camps on Shore. Herkimer co., N. Y. (1913)
- Th A4. View within a Virgin Forest of Spruce, Numerous Tall, Straight Trees of Various Sizes, Free from Branches to the Top. On State land, northern part of Herkimer co., N. Y. (1913)

Some of these trees are from 75 to 100 feet in height and at least 100 years old.

Note the different sizes, regularly found in an un lumbered forest. The forest floor is comparatively free from underbrush, due to abundant shade.

- Th A44. Comparatively Young Spruce within an Unlumbered Area; Natural Pruning in Progress; Undisturbed Forest Floor. Northern part of Herkimer co., N. Y. (1913)

This forest is less mature and there is more undergrowth and broken down parts of trees than in Th A4. Note how tall and straight the spruce trees are.

- Nn SpR4. Detail of Trunk of Red Spruce Tree (*Picea rubens*), 18 Inches in Diameter; Appearance of the Bark. (1913)
- Th A5. Patch of Small, Thickly Growing White Pine Being Removed; Logs and Tops in Foreground; Standing Trees Show Effects of Crowding; High Oak Stump Illustrating Wasteful Cutting. Albany co., N. Y. (1913)

These trees have developed height, but not thickness. They should have been thinned some years ago.

- Th A55. Small Grove of Large White Pine with Two Large Chestnut Trees (on the left). Near Slingerland, Albany co., N. Y. (1913)

These trees are a remnant of an earlier forest. Pine trees would not develop like these in the open.

- Nn PiW4. Detail of Trunk of Large White Pine (*Pinus strobus*), Deeply Furrowed Bark; Ground Strewn with Needles. Near Slingerland, Albany co., N. Y. (1913)
- Th A6. Timber Land, the Kind That Is Cleared for Rice Plantations. Brinkley, Ark. (1912)

This picture and the three following ones illustrate well the economic fact that some land should be used for agricultural purposes rather than for lumbering.

- Th A62. Clearing Forest Preparatory to Planting Rice. Brinkley, Ark. (1912)
- Th A63. Breaking Ground That a Month Before Was Covered with Forest. Brinkley, Ark. (1912)
- Td Ri7. Harvesting Rice on Land in Forest Eight Months Before. Brinkley, Ark. (1912)

Yield 120 bushels an acre, worth \$1 a bushel. Land of this sort cost from \$6 to \$10 an acre. The cost of clearing and putting in the first crop was from \$15 to \$25.

- Nn PiL2. Forest of Long-leaved, or Yellow, Pine. Duval, Fla. (1911)

See also List 5 for turpentine industry.

The lumber camp

In beginning lumbering operations on a large tract a temporary camp is constructed suitable for accommodating the lumbermen until the job is finished.

Call no.

Th C2.....General View of Lumber Camp in Summer. Near Cranberry lake, St Lawrence co., N. Y. (1913)

In every lumber camp buildings for particular purposes are constructed. There is the "men's room" (the building on the left), the "cook shack" (the building just beyond), the "stables" (the larger buildings on the right), the "blacksmith shop," the "store" and the "office." Such a camp is not often used more than two or three years unless it happens to be near a main drive.

The following views of a lumber camp were made in the winter of 1911-12 near Woodhull lake, Herkimer co., N. Y.

Th C24.....General View of Lumber Camp in Winter; a Sheltered Place in the Woods

Th C4.....A Tote Load Just Arrived at Lumber Camp with Provisions

Two or three teams are kept constantly busy toting in supplies to the camp. This is often a long trip, from 10 to 20 miles, and everything has to be brought into the camp in this way, feed for the horses, provisions and supplies, mail etc. Such a tote road is very poor, practically no work being done on it except to clear away the trees enough to get through.

Th C45.....A Camp Blacksmith Shop; Making Bunkers

The blacksmith is absolutely essential to a lumber camp as the horses are constantly in need of shoeing, the sleighs are breaking and tools and chains are always in demand. The blacksmith usually has to work when the other men are idle. A bunker is a kind of bolster on which the logs rest.

Th C6.....Camp Kitchen and Eating Room, Preparing Supper

Th C63.....Lumbermen at Supper

Meals are served earlier in winter than in summer, and the men plan to be at their work by daylight in winter. The food of the camp is an important factor in making and keeping the men satisfied. It is usually abundant and wholesome.

Th C7.....Sleeping Quarters at a Lumber Camp

These quarters are very comfortable and clean compared with many.

Felling, sawing, peeling and skidding

Th D2.....Felling a Large Spruce Tree. The Adirondacks, N. Y. (1901)

Note the notch on the side opposite the saw, made to prevent the splitting of the tree when it falls. The cutting point here is relatively high on account of the swelling at the bottom of the trunk. The best practice is to cut as low as possible and thus avoid waste.

Th D24.....Felling a Large Hardwood Tree: Skidways of Peeled Softwood Beyond. Woods lake, Herkimer co., N. Y. (Nov. 1912)

The softwood was cut and peeled during the summer, the season best adapted for such wood. Now the lumbermen are going over

the track again and taking out the hardwood. If hardwood is cut in the summer the sap sours and stains the wood, thus injuring it for some purposes.

Call no. j

Th D3.....Wasteful Lumbering, Dangerous Slash; Small Red Oak (on left).
Near Voorheesville, Albany co., N. Y. (1913)

Note hardwood broken by falling tree. Much firewood could be secured out of the tops. There is a demand for firewood in this locality. This slash is one in which fire would spread rapidly.

Th D6.....Sawing into Logs the Hardwood Tree Shown in Th D24. Woods lake, Herkimer co., N. Y. (1912)

Th D8.....Many Peeled Spruce in Forest Where Felled; Remaining Hardwoods, Stumps, Bark, Forest Floor. Near Cranberry lake, St Lawrence co., N. Y. (July, 1913)

Note that these trees had not attained very large size, that practically all the softwood has been cut, that the cut has been made low, that the bark is not saved, that peeling is done before sawing into logs.

Peeling in the woods has been coming into practice in recent years. Only softwoods are peeled. The bark of these trees peels readily in early summer, hence softwoods are cut early in the season if they are to be peeled.

Th E2.....Drawing a Trail of Logs on a Slide to a Skidway. Near Cranberry lake, St Lawrence co., N. Y. (1913)

Th E3.....Skidding Softwood Logs in Summer. Near Cranberry lake, St Lawrence co., N. Y. (1913)

Th E4.....Skidding Hardwood Logs in Early Winter. Woods lake, Herkimer co., N. Y. (1912)

Th E7.....Scaling Unpeeled Spruce on Skidway. Forked lake, Hamilton co., N. Y. (About 1901)

Th E8.....Skidway of Peeled Pulp Wood. On border of Cranberry lake, St Lawrence co., N. Y. (1913)

The last two views illustrate the change in practice as to peeling.

Road building

Preparation for hauling is made largely in the summer. At that time roads are built and the logs are placed on skidways beside them.

Th F2.....Corduroy Road through the Forest; Skidways. Near Cranberry lake, St Lawrence co., N. Y. (1913)

The bed of the road is made even by means of skids. Some loose brush may be placed between and over the small logs or poles to help hold the snow and ice with which the road is covered in winter. The grade is carefully considered so the maximum load can be drawn.

Th F3.....Building a Temporary Wide Gauge Railroad through the Forest for Hauling Logs. Near Cranberry lake, St Lawrence co., N. Y. (1913)

Transportation of logs by rails is largely displacing river driving wherever it is practicable. Hardwood logs can not be floated down

stream, hence little hardwood cutting has been done except where the railroad reaches.

Call no.

Th F6.....Ground Graded for Railroad through the Forest; Peeled Spruce and Standing Trees along the Way. Near Cranberry lake, St Lawrence co., N. Y. (1913)

Winter hauling

The following views of hauling were made at or near Woodhull lake, Herkimer county in the winter of 1911-12. In northern sections hauling is done in winter as conditions are then more favorable.

Th H2.....Skidways beside a Main Logging Road

The logs are skidded in this way during the summer. Compare Th F2. The skidways are always in or near the cuttings as it does not pay to skid the logs very far from the stump.

Th H24.....Logging Road across Woodhull Lake; Snow Plow in Foreground

Although one might think a lake an ideal place for a log road, it is a location that is always shunned if possible as the deep snow breaks the ice, thus letting the water through and making slush and forming additional layers of poor ice. More jobbers fall down on such lake roads than anywhere else.

Th H3.....Chain and Pulley Arrangement for Assisting Team in Drawing Load of Logs up a Steep Hill

This arrangement is used also to hold back a load going downhill. Such a place as this increases the cost of the operation. Bad grades not only make slower time but the amount which can be carried on each load is much diminished. It is necessary to keep a man at such a place in order to pull back the block and chain after each load. In locating a road the aim should be to secure a good grade; distance is of secondary importance.

On this job logs were hauled from the skidways for three miles, up grade most of the way to the "double headers" where they were made up into much larger loads and hauled four miles farther, down grade to the landing.

Th H4.....Unloading Logs at a Double Header Skidway

This picture shows well how logs from the skidways are unloaded at a double header to be made up into larger loads on other sleighs.

Th H44.....Topping Off a Load of Logs at a Double Header Skidway

The haul from the double header is the "main haul" and the loads are made as large as the roads will stand, for the larger the load the cheaper the jobber is getting his logs to the "landing." Sometimes these loads contain from 10 to 15 cords.

The most highly paid men on the job are usually employed "topping off." In this picture the two men rolling the log on the load were paid \$65 a month, which is very high for woods work.

Th H5.....The Ice Cart, or Water Box, Icing a Logging Road

Used during freezing weather, chiefly at night. With a good ice road much larger loads can be hauled. Note barrels and skids for loading the water.

Call no.

Th H56.....The Main Haul, a Good Example of a Logging, or Hauling, Road

The success or failure of a logging operation depends more on the roads than on any other factor. As soon as the snow is of sufficient depth the road over which all the logs will have to pass, or the "main haul," is broken in and sprinkled except where the down grades are steep. On the steep down grades the road is carefully sanded. (See Th H7)

Th H6.....A Good Load of Pulp Wood, Spruce and Hemlock; 95 Pieces,
12 Cords, 19 Tons

This shows well the manner in which the logs are held in place by the "toggle chains" and the whole held on by the "binder."

It is every driver's ambition to haul the largest loads, and yet they become very much attached to their teams and see to it that they are well cared for.

Th H7.....Load of Logs Coming down a Sand Hill

All bad down grades are called "sand hills" because it is necessary to sand the road in order that the load does not get the best of the horses. The load shown in this picture weighed nineteen tons and the hill was much steeper than it appears in the picture. Men were employed on this one hill all the time to keep it in the proper condition. The friction of the runners on the sand is so great that no matter how cold the day the snow and ice under the runners are melted to water. Many sand hills cause a serious expense by wearing on the runners of the sleigh. Notice how the load in this picture has shifted. Men are sometimes killed by a load shifting or getting beyond control.

Th H72.....Sand Hole and "Road Monkey"

Such places as this are kept on all hills which must be sanded. A good road man is a valuable acquisition as on him depends the success of getting the loads through. If one load gets stuck there is no possible way for the other loads to get by and the loss of a day's work means several hundred dollars.

Th H8.....Lumbermen's Lean-to, for Temporary Use

Men waiting at "double header" for the loads to come from the skidways. These men make up from twelve to fourteen loads a day. This does not take many hours, but the work is very hard and exacting while it lasts.

Th H9.....The Landing; Log Bridge in Distance. South Branch of the
Moose River

Here the logs lie on the ice in the river to wait until the spring freshets. As seven or eight thousand may be unloaded at such a landing place it is necessary to arrange the logs in a uniform position else all the available space would soon be used.

Log driving and rafting

Before railroads had penetrated the forest areas it was necessary to "drive" the logs down streams to get them to the mill. The

practice is still followed to some extent, but whenever practicable the logs are now transported by rail.

Call no.

Dn Hui6. . . . View up the Hudson; a Few Logs Floating down the River, Others Lodged on the Shore. Thurman, Warren co., N. Y. (Aug. 1912)

Logs thus stranded along a stream are usually placed in the water again the following year. But at best, driving involves a loss of time and often depreciation on value of the wood.

Th I6. Log Jam above the D. & H. R. R. Bridge. Fort Edward, Washington co., N. Y. (Mar. 28, 1913)

When logs get entangled in this way much labor is required to "break the jam."

Th I7. Great Log Rafts, Containing Millions of Feet of Lumber. Columbia river, Washington

Copyright, 1905, H. C. White Co.

The sawmill

Th L15. Interior of Sawmill of Old Type; Up-and-down Saw. Woodland Valley, near Phoenicia, Ulster co., N. Y. From negative (1904) of N. Y. State Conservation Commission

Th L2. A Small Sawmill in Farming Section. Seward, Schoharie co., N. Y. (1913)

The farmers for several miles around draw to this mill during the winter enough logs to supply their ordinary needs for lumber.

Th L24. Large Sawmill: Band Saw, Carriage with Levers, Logs on Logway. Tupper Lake, N. Y. From negative (1904) of N. Y. State Conservation Commission

By means of the levers on the movable carriage the logs are easily and quickly placed in any position desired.

Th L25. Several Large Band Saws in Storage; Machines for Setting and Filing Below. Tupper Lake, N. Y. From negative (1904) of N. Y. State Conservation Commission

Th L28. Interior of Large Sawmill: Gang Saw. Tupper Lake, N. Y. From negative (1904) of N. Y. State Conservation Commission

Note that eight logs pass the saws together. Beyond the saws are the boards of a previous run of the carriage.

Th L3. Marble Cove, Looking West: Sawmills and Boom of Logs. St John river, St John, N. B. (1913)

Th L33. Marble Cove, Looking Northwest: Sawmills and Booms of Logs, High Limestone Cliffs. St John river, St John, N. B. (1913)

The last two views were photographed from the same point but cover different parts of the cove.

The St John river flows for hundreds of miles through a forest area. Shipments of lumber from St John have value of one and a half millions dollars annually.

Th L6. Portable Sawmill in Operation. Albany co., N. Y. (1913)

Th L8. Pit Sawing. Old Cairo, Egypt

Copyright, 1901, H. C. White Co.

Pit sawing is done by two men, one (the top sawyer) standing on top of the timber to be sawed, the other (the pit man), below it. This primitive method of sawing was not entirely abandoned when sawmills were introduced, a pit saw having been seen in operation in Steuben county, N. Y., as late as 1860.

Lumber

Call no.

Th M2.....General View of Piles of Lumber along Water Front; Lake Boats and Canal Boats. North Tonawanda, N. Y. (1911)

Th M23.....Sorting and Piling Lumber, North Tonawanda, N. Y. (1911)

Th M25.....Lumber on Trucks before Mill, Ready for Dressing. North Tonawanda, N. Y. (1911)

Tonawanda, North Tonawanda and Buffalo form the most important lumber district in the State. The lumber comes from the West and Canada.

Th M7.....Lumber District, Old Erie Canal and Hudson River. Albany, N. Y. (1913)

Albany was formerly one of the leading lumber districts in the country and is still an important distributing center.

Woodlots

Th N2.....Bad Company — Woods and Pasture; Woodlot Heavily Culled, Leaving Scrubby, Limby Trees; Pasture Poor. (1913)

Such a piece of land should either be cleared of trees and turned into good pasture or planted with desirable trees and devoted solely to woods. When a woodlot is pastured, there is no new growth from the ground. The four sprouts on the right should have been reduced to one or two thus turning into fewer trees the growth supported by the given supply of roots.

Th N3.....Slash and Cull. (1913)

Best trees all removed regardless of further use of the land. Poor species, like white birch, and worthless individuals left. The next crop likely to be of these kinds. Slash left to litter the ground and be a dangerous source of fire.

Th N4.....Chances for Investment: Natural Seeding of White Pine under Poor Species. (1913)

When young the white pine can stand the shade of these trees, but at the age shown in the picture they begin to suffer severely from over shading and from whipping of the branches. Work at odd times through the year slashing down some of the worthless trees would greatly increase the growth of white pine and prove a very profitable investment for the owner.

Th N44.....Unscientific Management of Land. (1913)

All the area shown is used for pasture. If the farmer would fence off his woods, including the young pines which seeded naturally, planting the few openings in the pine growth already started, and would clear the worthless brush and scrub from the open land, seeding it with good grass, he would have a valuable forest growth and increase his forage. The aim should be to assist nature in reforesting.

Call no.

Th N47.....A Clean Sweep; a Bad Practice for the Ordinary Woodlot. (1913)

This method of procedure leaves no small trees to grow to larger size, overlooks the need of a constant supply, destroys the normal conditions for starting new trees. The new crop will consist of weak sprouts, weeds will spring up, and soil conditions are rendered poorer. Compare Th N5

Th N5.....The Way to Improve the Woodlot. (1913)

The worthless and poorer species and individuals are marked for cutting. Their removal will improve the stand and furnish all the wood needed. This selective method of cutting would build up the farmer's woodlot and make it more profitable, whereas by the method shown in Th N47 his woodlot is destroyed.

Th N52.....Improvement Cutting; Further Work Needed. (1913)

Notice reproduction both by sprouts and from seed, keeping the ground shaded and covered with a good crop of trees at all times. Further work is necessary now to remove some of the dead and dying trees and to clear up some wind-thrown trees. The number of sprouts from one stump should be reduced to two or, if there is plenty of young growth around, to one, thus increasing vigor of growth. Such cleaning up will furnish the farmer wood and improve his property. The work can be done in winter.

Th N54.....Woodlot Marked for Improvement Cutting. (1913)

A few popple, here worthless and mature, and some dying chestnut are marked for cutting, leaving a well-spaced, vigorous growing stand. These cuttings will make room for the young seedlings already started and thus encourage a succession of growth.

Th N6.....A Well Managed Woodlot. From negative of N. Y. State Conservation Commission

Under this management the farmer obtains a supply of wood and constantly improves his woodlot.

Some other forest products

Very much of softwood from the forests of New York, as well as of New England, Michigan and Canada, is used for pulp wood the annual production of which in New York alone is more than half a million cords annually. Much pulp wood is also imported by this State.

Th Op2.....Huge Pile of Pulpwood; Conveyor and Railroad Cars. International Paper Co., Glens Falls, N. Y. (1912)

Th Op3.....A Pulp Mill on the Black River. Carthage, Jefferson co., N. Y. (1913)

The upper Hudson and the Black river sections of New York are noted for their pulp and paper mills.

Th Of.....Unloading Waste of Sawmill from Boat, Used for Fuel at Lime Kilns. Glens Falls, N. Y. (1912)

Formerly such material was not used at all.

Th Oe2.....Sawing Logs into Blocks for Excelsior Machines. Phoenicia, Ulster co., N. Y. (1913)

The wood used in making excelsior is poplar and basswood.

Call no.

Th Oe3. View in an Excelsior Factory; Machines, Blocks of Wood, Bales of Excelsior. Phoenicia, Ulster co., N. Y. (1913)

The output of this factory is about four tons a day.

Ti Sx4. Maple Sugar Bush: Gathering Sap, Absence of New Growth. Near Lowville, N. Y. (1911)

The hard maple of New York and New England is the source of a considerable quantity of maple sugar and syrup and also supplies wood for many manufactured articles.

Forest destruction

Besides the work of man there are several natural agencies, chiefly fire, water and plant pests.

Th Pf2. Forest Fire; Trenching to Prevent Spread of Fire. Black Bear mountain, Hamilton co., N. Y. (1901)

Th Pf3. Surface of Ground after a Severe Fire. Long Lake West, Hamilton co., N. Y. (1908)

By this fire every living thing was destroyed over a large area.

Th Pf4. Forest Area Recently Burned Over, Showing Tendency for Worthless Vegetation to Spring Up. Near Wanakena, St Lawrence co., N. Y. (1913)

Inferior species are usually the first to spring up. Where, as in this case, no seed trees of better species are left, replanting is the only means of insuring the establishment of a valuable forest.

Dn AE8. Big Raven Hill and Little Raven Hill from the Southwest, Deforested by Fire. Northwest of Elizabethtown, Essex co., N. Y. (1912)

Ground fire, working on elevations where the soil is shallow, usually so far destroys the soil as to make reforesting the work of many generations. Forest soil, "duff," composed largely of humus, burns quite readily.

Th Pf6. Charcoal Burning: Kilns, Piles of Wood, Deforested Area. Essex co., N. Y. (About 1890)

Charcoal burning was once carried on quite extensively west of Lake Champlain in connection with the iron industry. Wood was cut with no regard for the future and forest fires were often started from the kilns.

Th Pf5. A Fire Warden's Tower. Cat Head Mountain, Hamilton co., N. Y. From negative of Department of Forestry, Cornell University. (1912)

New York State employs a field force of 70 rangers who patrol lakes and streams, 50 observers on mountain stations and 300 fire wardens with power to act in case of fire. Simple towers like the one in the picture are built to give the warden an unobstructed view over an extensive area.

Th Pw. Drowned Forest; Dead Stumps and Trunks—the Result of Raising the Water Level. Cranberry lake, St Lawrence co., N. Y. (1913)

Th Pg2. Red Oaks Defoliated by Gipsy Moth. Weston, Mass. (June 29, 1911)

Call no.

- Th Pg3.....Hardwood Trees Defoliated by Gipsy Moth. Cohasset, Mass.
(June 29, 1911)
- Th Pg8.....Clean Stand of Pine and Maple Protected from Gipsy Moth by
the Cutting Out of Its Favorite Food Plants. Metheun, Mass.
(June 30, 1911)

The gipsy moth feeds especially upon oak, birch and willow. The last three pictures represent present New England conditions. The gipsy moth has not yet made headway in New York. Some pests attack trees through the bark rather than through the leaves. Fungi of various kinds attack individual trees to harm them.

Effects of forest on flow of water

- Dn CdK.....Kaaterskill Clove, East from Santa Cruz Park to the Hudson
Valley: Heavily Wooded. The Catskill mountains, N. Y.
(1913)

Bring out the value of such a forest area as this to regulate the flow of water from rain and snow.

- Dn Hur8.....Hudson River at Glens Falls at Time of Spring High Water.
Glens Falls, N. Y. (March 29, 1913)
- Dn Hur84.....Hudson River at Glens Falls in Summer. Glens Falls, N. Y.
(August, 1912)

Forest restoration

a Natural seeding

- Nn Sp6.....Spruce Cones on the Ground in the Forest. State land along
Little Salmon lake, Herkimer co., N. Y. (1913)

Softwood trees do not begin to produce cones until they have attained considerable size.

- Th R3.....A Natural Seeding of Spruce; Young Growth under Large Trees.
On border of Little Salmon lake, Herkimer co., N. Y. (1913)

These young spruce grew from seeds shed by the neighboring trees. Seeds may be carried some distance by the wind and other agencies. In lumbering a softwood tract enough fully developed trees should be left to reseed the area.

The young spruce are here too close together. Some are already out-stripping others in the struggle to exist. The weaker ones will die.

- Th R4.....Growth of Self-sown Pines. York co., Va. (1912)
- Th R45.....More Advanced Growth of Self-sown Pines; Thinning Needed.
York co., Va. (1912)
- Th R5.....Road through Advanced Growth of Self-sown Pines. York co.,
Va. (1912)

The trees shown in the last three pictures are growing on land under cultivation prior to the Civil War — but since allowed to return to a state of nature. They are known locally as "old field pine."

b The nursery

The forest nurseries of the State are at Saranac Inn, Lake Clear Junction, Saratoga Springs, Comstock and Salamanca.

- Call no.
- Th S2.....Preparation of Forest Nursery Seed Beds: (1) Ground Ready for Seed; (2) Seed Sown; (3) Seed Covered with Soil; (4) Entire Bed Sown; (5) One-year Beds. State forest nursery, Saratoga Springs, N. Y. (May 18, 1912)
- Th S3.....Covering Forest Nursery Seed Beds: One Bed Covered with Canvas; Another, with Canvas and Wire Netting; a Third, with Canvas, Netting and Slats. State forest nursery, Saratoga Springs, N. Y. (May 18, 1912)
- Th S34.....Forest Seedling Beds in August, Still Covered with Netting. State forest nursery, Lake Clear Junction, Franklin co., N. Y. (1912)

This tract contains 6,000,000 trees.

- Th S4.....Numerous One Year Old Seedling Beds; Area of Two and Three-year Transplant Beds (beyond the frames). State forest nursery, Saratoga Springs, N. Y. (May 18, 1912)

A seed bed 4 feet by 12 feet contains 10,000 plants. Transplants are set 250,000 to the acre.

- Th S5.....Making Chisel-Shaped Trench in Transplant Bed for Receiving Row of Pine Seedlings. State forest nursery, Saratoga Springs, N. Y. (May 18, 1912)
- Th S52.....Threading the Planting Board with Pine Seedlings Preparatory to Setting a Row. State forest nursery, Saratoga Springs, N. Y. (May 18, 1912)
- Th S56.....Removing Planting Board after a Row of Pine Seedlings Has Been Set. State forest nursery, Saratoga Springs, N. Y. (May 18, 1912)
- Th S6.....Numerous Beds of Second Year Spruce. State forest nursery, Lake Clear Junction, Franklin co., N. Y. (Aug., 1912)
- Th S64.....Beds of Third Year Scotch Pine; Spruce in Foreground. State forest nursery, Saranac Inn, Franklin co., N. Y. (Aug., 1912)
- Th S7.....About a Million Three-year Old Transplants in "Heeling In" Trenches. State forest nursery, Saratoga Springs, N. Y. (May 18, 1912)

The roots of transplants must not be allowed to dry out. "Heeling in" is a means of protecting them, while waiting for shipment or for transplanting.

- Th S9.....Baskets and Moss Used for Shipping Transplants. State forest nursery, Saratoga Springs, N. Y. (May 18, 1912)

The cost of three-year old transplants is from \$3 to \$3.50 a thousand.

c Tree planting

- Th T2.....Crew of Men Transferring Three-year Old Pines to Field. State Reservation, Saratoga Springs, N. Y. (May 18, 1912)
- Th T5.....Eleven-year Old Scotch Pines on Reforested State Land. State forest plantation, Lake Clear Junction, Franklin co., N. Y. (1912)

Forestry in Europe

Reference: A. Knechtel. The Cultivated Forests of Europe. Eighth and Ninth Reports of the Forest, Fish and Game Commission, 1902-3, p. 179-200.

† The pictures of this group on the forests of Germany and of Switzerland are particularly useful for comparison with those illustrating American forests. Centuries ago density of population and other conditions in Europe stimulated efforts to grow forests.

There a forest is a crop, which is expected to yield an annual income. The vocation of the forester is of much importance.

These illustrations on forestry in Europe are from negatives of the New York State Conservation Commission made in 1904 by A. Knechtel then a member of that department but now chief forester of Dominion parks, Canada. Assistance has been rendered by Mr Knechtel in the preparation of this section of the list.

Call no.

Thg A2.....A Forest Plantation of Spruce with Roads Radiating from a Common Center. Near Eisenach in the Thuringian forest, Germany

Note how clean the ground is and that the trees are uniform in size. This forest, like most of those in Europe, was planted. No tree is allowed to die and fall to the ground to decay. The Thuringian forest is noted for its beauty and is a tourist resort. Signs on the trees indicate the road to take to reach certain places.

Thg A3.....Fine Spruce Trees on Nonagricultural Land; an Excellent Road. Near Bastei, Saxony, Germany

One-fourth of Germany, practically all nonagricultural land, is under forest cover. Good roads are maintained through these forests.

Thg A4.....A Spruce Forest with Road; on Left Once Thinned, on Right Ready for Thinning. In the Erzgebirge, Germany

The first thinning gives from 8 to 20 festmeters of poles per hectare (a festmeter = a cubic meter of solid wood; a hectare = about $2\frac{1}{2}$ acres). The second thinning yields from 15 to 30 fm., chiefly pulp wood. When the trees are from 70 to 80 years old a thinning gives 100 fm., worth from 10 to 12 marks per fm. After this about 400 trees per hectare are left standing for the final cutting which gives from 450 to 800 fm., not counting branches. All trimmings are used for firewood.

Thg A5.....Spruce Forest after the Second Thinning; Piles of Peeled Pulpwood. In the Erzgebirge, Germany

The Erzgebirge is a mountain range on southern boundary of Saxony, densely wooded with coniferous trees.

Thg A6.....Oaks (350-400 years old) and Beeches (180-200 years old). Rothenbuch, in the Spessart, Germany

The Spessart is one of the largest and finest forest-districts in Germany, noted for its gigantic oaks and beeches. It is situated on both sides of the Main east of Frankfurt. The beeches shown are the second generation grown among the oaks.

Ths A4.....Mixed Species; Ground Covered with Young Beech, Wind-sown. In the Sihlwald, Canton of Zurich, Switzerland

Thg O3.....Annual Cut of Scotch Pine Firewood from a Forest Owned by a City. Grabow, Mecklenburg, Germany

The picture shows 1000 fm., one-third the annual yield from a city forest of 2500 hectare. This is the equivalent of only a small part of a cord per acre for the entire forest. But it must be considered that wood is scarce in Germany, that it is taken out not alone for fuel but also to improve the remaining forest, that under the compartment system in use wood probably is not collected from the entire forest each year.



Call no.
Thg O6. A Wood Harvest in a *Staat Forst*. Lohmen, near Dresden, Germany

Note the clean cutting, the common practice in Germany. In the foreground is a new plantation.

Ths F3. Permanent Gravity Railway for Removing Wood from the Forest. In the Sihlwald, Canton of Zurich, Switzerland

In most European countries it is expected that a forest will yield an annual revenue, hence such tracks are maintained during the life of the forest, or until it ceases to supply wood. Sometimes only a single rail is laid.

Thg O7. Needles and Moss Collected in a Spruce Forest for Bedding. Tharandt, near Dresden, Germany

Nothing is allowed to go to waste. Leaves are also removed from these forests.

Thg O8. Man Carrying Brush from Forest for Firewood. Near Gerardmer, Vosges mountains, Germany

Within the forests of Europe there are many small settlements. There are no large uninhabited areas as in the Adirondacks. Peasants regularly gather a supply of fuel as shown in this and the next picture.

Ths O6. Part of Winter's Wood Supply; Load of Tree Tops Drawn by Cow. Zurich, Switzerland

Thg H3. Hauling Balsam Logs (full length of tree trunks); Three Oxen and a Horse. Tilisee, Black forest, Germany

Thg L4. A Sawmill; Long Straight Logs on the Logway. Hartz mountains, Germany

In Germany, tree trunks are not sawed up into short logs as in America. A 16 meter log has a maximum diameter of 16 cm and minimum diameter of 10 cm at 16 meters from the base. This is a good sized log in Germany. Compared with American logs it is small. About 80 per cent of a tree goes into lumber. Most German sawmills are small, but unlike American mills they are operated almost continuously for many years. Although all of her available land is in forests, Germany does not produce all the lumber she needs. The price of lumber and wood is high. What will be the condition in America when her population has become as dense as that of Germany?

Thg R3. Four Areas of Pine Woods, Ages Respectively 3, 15, 30 and 45 Years. Grabow, Mecklenburg, Germany

Thg R4. Three Areas of Pine Woods, Ages Respectively 3, 11 and 60 Years. Grabow, Mecklenburg, Germany

The last two pictures illustrate the prevailing European practice of successive clean cutting and replanting.

A forestry leader

Th YpD. Portrait of Gifford Pinchot (1865—). From negative (1907) from life by Harris & Ewing, Washington. (1913)