Pennsylvania State Forest School Forest.

By

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State Forest Policy.

Pennsylvania once contained one of the richest forests of eastern America. Her 29 million acres of land were covered with magnificent stands of white pine, hemlock, maple, beech, birch, and further south chestnut and the various oaks. Only 29 years ago (1899) Pennsylvania reached her maximum lumber output of two billion three hundred and thirty three million board feet. The larger part of the state had already been swept of its forest however, and fire was completing the ruin of her forest land. To-day only a few pitiful remnants of the great forest remain, and the lumber cut has dropped to 300 million feet - about thirteen percent of the peak and thirteen percent of what its thirteen million acres of forest land can continuously produce when reforested. The state to-day imports seven-eighths of its needs in forest products and pays out 100 million dollars that its own mountainlands should keep within its borders.

Pennsylvania's forest policy may be said to have developed simultaneously with, but more or less independently of, the forest policy of the nation. The early national policy may be said to have centered about a few men, among which Dr. B.E. Fernow's name stands out most prominently. This policy became aggressive after the National Forest Reserve Act of 1891 enabled President Harrison to begin the organization of the great string of National Forests that now form the backbone of the government forestry development south of the Canada line. In the same way the early forest policy of the State of Pennsylvania is developed about Dr. Joseph T. Rothrock. As State Commissioner of Forestry, he secured the adoption of a forest land buying policy by the State Legislature in 1897 and the purchase of the first cut-over lands followed the next year - 1898.

Land Purchase.

From 1898 to 1902 the state under Rothrock acquired about a half million acres and to the present has acquired 1,132,444 acres, costing \$2,561,572 or \$2.26 per acre. Added expenditures since purchase have increased this cost to \$7.00 per acre

with all improvements. The acquisition policy stagnated after 1921 and is just now being revitalized. An appropriation of \$500,000 for this biennium has been made which will add in the neighbourhood of 125,000 acres to the state holdings. The Game Commission will expend from its annual hunting license receipts of about \$900,000 about \$300,000 for the biennium for the purchase of forest land for state game refuges and open hunting lands, adding another 75,000 acres to the state domain. Written offers for the sale of 720,000 acres are in hand and 50,000 have been purchased already this year for less than \$4.00 average per acre. There is a state bond issue of twenty-five million dollars to be voted on this fall to complete the purchase of the denuded forest lands. Much credit belongs to the Secretary of the Department of Forests and Waters, Mr. Charles E. Dorworth, and to the State Forester, Dr. J.S. Illick, for the speeding up of this policy.

It may be noted that the State purchases land under a price limit. The first million acres were acquired at an average price of \$2.26 per acre with a price limit of \$5.00. This limit has now been raised to \$10.00 per acre but the policy is to have the State buy only the lands that private capital will not handle. A price limit is deemed valuable to prevent inflation of values. The first purchases this year were made at around \$2.00 per acre and widely advertised. If the bond issue passes, the completion of the purchase programme is in sight. About five million acres of the thirteen million should be in the care of the State.

The land already acquired has been protected and developed. Forty-seven hundred miles of road and trails have been built; one hundred and twelve fire towers cover the state and private forest lands within its boundaries; the state is districted into 24 districts in charge of graduate foresters from the State School; fifty-six rangers are employed on the State forests; thirty-one hundred and seventy-two local and five hundred and sixteen special fire wardens complete the fire extinction force. These men are paid only for actual time on fires, or special duty.

The two year appropriation embraces

Administration,	\$1,591,000
Tax appropriation,	115,970
Fire extinction,	200,000
Land purchase,	500,000
Fire deficiency,	100,000 (almost all unused)
Cook Forest Park,	450,000

The purchase cost of the 1,132,444 acres was \$2,561,572. Total tax appropriation to date \$838,000, and purchase

price plus expenses of development in the 25 years, total about nine million dollars. The cash sale value of these lands would be far above this to-day (conservatively placed at 14 million dollars at wrecking value). Receipts have totalled about \$735,000 to date. The gross income is now growing rapidly - being \$96,000 in 1927. Over \$427,000 of the receipts have gone into the State School Fund.

Recreational Value.

Timber income develops rather slowly as 60 to 100 years are necessary to develop heavy stands of good saw timber. The recreational use of these lands is growing by leaps and bounds and furnishes early returns. The State is leasing already over 1800 permanent camp sites (average rental about \$9.00 per year) bringing in an annual revenue of about \$16,000. The income from forest camps alone will ultimately pay the interest on a sizeable part of the purchase price of the lands. On one state forest camp site rentals already pay interest on the cost of the forest, and the value of the camp buildings exceeds the cost of the entire forest. The buildings are taxable by the local government.

Game is more abundant than in any state in the Union and the forests support the large independent Game and Fish Commission programs financed by hunting and fishing licenses bringing in annually over a million dollars.

At least seven large water and power projects have either been completed or are definitely begun on the Susquehanna, upper Delaware and Ohio River watersheds, for which the headwater state forests will have a large significance.

The large state nurseries should not be neglected. They furnish 16 million trees each year for reforestation purposes.

Tax Policy.

To prevent undue hardship on the local government units through loss of taxes on state lands, the legislature appropriates annually 5¢ per acre to the local units.

If local taxation becomes too heavy the private forest owner may have his forest land declared "Auxiliary State Forest" when he is assessed at not over \$1.00 per acre and pays a 10 percent final yield tax. A small area only has found it desirable to enter this class.

The State Forest School.

This thorough-going state forest policy had hardly begun to gain impetus in 1902 when the need for trained foresters to protect, organize, reforest and develop these lands became acute. The few early schools did not have available graduates. It seemed of doubtful wisdom to import European foresters with a totally different economic background. The refusal of one or two colleges that might have qualified for developing a course in forestry, caused a critical survey of the educational situation. It appeared that often no great consideration was given to the equipment or location of a forest school with respect to a practice forest and forest nursery. It might be observed that the newer pedagogy for professional schools was demanding closer and closer co-ordination between theoretical instruction and its practical application. Thus every medical college in the land must have its hospital at hand and medical practice is only permitted after an additional hospital internship after graduation. Teachers colleges were requiring the addition of practice "model" schools. Engineering schools were requiring and giving credit for shop work - often in commercial plants. Agricultural colleges must have their experimental and demonstration farms. Could the forest school ignore this movement in the new professional school pedagogy? Could occasional trips and inspections and forest camps take the place of a school forest and nursery in situ or should they be regarded only as collateral aids to the school forest? West Point and Annapolis as government service schools suggested the establishment of a state forest-service school. The present law establishing this school contains this significant statement of duty of the present Department of Forests and Waters, "to continue at the school professional education in forestry and maintain a close association of theory and practice". (Italics mine).

Accordingly in 1903 the State Forest School was opened by Dr. Rothrock under the direction of Mr. George H. Wirt, under the first name "State Forest Academy" on the Mont Alto State Forest in the Blue Ridge or South Mountains. With the Biltmore School discontinued and the first Cornell School also discontinued, this is the second oldest forest school in America. The school is thus directly under the State Forest Administration and is a state school in the fullest sense of the term. From the beginning it has supplied the foresters for the State Forest Service. As the list of applicants for entrance grew, the School raised its limit of attendance from 30 to 80 students, but even now only one-half the applicants filing credentials from within the State are accepted, and, for the present, applicants from outside the State are refused. This should be only temporary.

The School Forest.

This idea of a State Service school with emphasis on the closer co-ordination of the theoretical instruction with the practical, led Doctor Rothrock and Mr. George H. Wirt, the first Director, to locate it on the Mont Alto State Forest. The nucleus of the state forest holdings (embracing the contiguous Michaux and Mont Alto State Forests), totalling almost 70,000 acres in the South Mtns. between the Susquehanna and Potomac watersheds, were the lands of three old charcoal iron furnaces. The land was cut over from one to three times and burned over frequently. Parts were reduced to scrub oak barrens, but other large areas had a most promising cover of chestnut and oak coppice. White pine, hemlock, birch and (soft maple), and tulip poplar occupied the coves. Chestnut, white, red, scarlet and black oaks occupied the slopes with rock or chestnut oak and chestnut and some pitch pine on the ridges.

Fire Protection.

The School immediately, on establishment, organized for fire protection. Wooden fire towers (since replaced with steel) were erected; telephone lines installed; roads opened and rebuilt. In places the scrub oak (*Quercus ilicifolia* or *pumila*) was so dense after the fires that the engineering class had to hack their way through when laying out road grades. The natives were not in sympathy with the work. Incendiarism was rampant. But fire organization, lectures, employment, tree planting and resulting public interest slowly developed sympathy with the forestry viewpoint. The students here are able to learn to know the forest population and to deal with it fairly and intelligently - one of the most valuable parts of a forester's training. There are at hand accurate figures for the progress of the protection work from 1910 to 1925. The figures apply to the protection of the 23,000 acres of school forest and 17,000 acres of private forest adjoining.

Fire Data by 7-Year Periods.

	1910-1917	1918-1925	Decrease percent.
Av. fires per year	28	18	37
Av. area burned	1150	239	79
Av. size per fire (acres)	40.6	13.3	67
Money loss (dollars)	2500	575	79
Part of fires incendiary (percent)	21.4	8.6	60

Fire protection costs 1911 - '21 were 5.2 cents --

including overhead and one half the road maintenance cost. They are now falling on the fire extinction side.

Each of the four classes at the Forest School has a fully organized and equipped fire crew of 15 to 25 men. They are an important factor in forest fire extinction within a radius of 30 miles of the School. Fire crews occasionally assist Maryland in large fires. This training is of utmost value to the future forester.

Forest Stock.

A 10% strip survey showed trees four inches and over in diameter on the 23,000 acres of school forest --

Chestnut	10 million cu. ft.
Oaks and others	15 " " "
Of this 70.5% was 4" to 10" in diameter	
22.5% " 11" to 17" "	
7.0% " 18" and over "	

This showed (including the chestnut) around 1100 cu. ft. per acre 4" and up. The average age of the forest was about 35 years or the increment was about 32 cu. ft. per annum. This was only about 80% of expectancy with fires eliminated, as the average stand at 50 years should be about 2,000 cu. ft. (thinnings not included).

Utilization.

The loss of the chestnut (40% of the stock) by the chestnut blight started the first large scale utilization work. From 1920 to '27 there were marketed about 35,000 cords of dead chestnut, mostly as tanning extract wood, stave wood and fuel wood. Some of the larger material made poles and ties and a little lumber. In these seven years \$200,000 worth (gross - wood at mill and railway siding) of dead undersized chestnut was salvaged from the 23,000 acre forest costing originally \$80,000. To date the 23,000 acre school forest has had a gross income (excluding nursery stock) of over \$260,000 which is 36% of the total income from the 1,132,000 acres of state forests; viz \$735,000. This is only a sample of what re-established forests can be made to do in wage production.

The decrease in fires has somewhat offset the loss in increment through the loss of the chestnut. The increment is again approaching 30 cu. ft. with the prospect of further increase to probably 60 cu. ft. ultimately, (thinnings included). An approximate mean rate of growth shows 1 inch in diameter in 6 years.

Chestnut poles netted \$9.00 per cord stumpage, while the mass of the small sized material netted about 50¢ per cord only.

This shows a rather unusual price increment with size - a factor always to be calculated on, however, in forestry. Mixed hardwood fuel sawed stove length sells for \$5.50 per cord on the forest road. Mill run lumber brings \$35.00 per M ft. at the railroad on the forest.

The working plan soon to be published will call for a 100-year rotation for timber, with a 30-year return for thinning and cleaning.

Local fuel markets can not absorb all the thinnings. A re-adjustment of freight rates will be necessary when the coal mines east and west should become a satisfactory market for all small sized material. This will in time require marketing 4,000 to 5,000 cords of thinnings annually. The present thinning cut is set at 3,000 cords. In the next 35 years the annual saw timber cut should rise to 3 million feet and finally to 6 million feet.

Other Forest Uses.

The school forest contains numerous leased camp sites; two borough water supplies; one state sanatorium; one park; a most plentiful game supply and some trout streams.

Hardwood Conversion.

Where the chestnut approached a 60% stand, underplanting the hardwood remnant with conifers is being tried. The old fields have all been reforested with conifers. Hundreds of acres of white pine, with some norway spruce, scotch pine and pitch pine are succeeding. Some of the earlier plantings are being thinned for the first time. It is hoped to increase the percentage of conifers on the forest materially.

Nursery.

A 10 acre nursery with overhead water system has an annual output of 4 million trees.

This school forest has an ideal location for exemplifying all forest uses - timber, water, health, and recreation.