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THE FUTURE OF FORESTRY IN KENTUCKY AND THE SOUTH

By J. E. BARTON,
STATE FORESTER OF KENTUCKY
FRANKFORT

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INTRODUCTION

In the publication of this article as a bulletin for distribution throughout the State, the State Board of Forestry desires to put into the hands of as many individuals as possible a statement in popular form of the scope of the work proposed along forestry lines by the Board and the reasons for and necessity of this work. It is realized that there is a desire on the part of a large number of people for information in this direction and it is hoped that this publication will in some degree meet this demand.

Thanks are due the Southern Lumberman for permission to reprint the article and for the loan of the cuts used in its illustration. The United States Forest Service kindly furnished the photographs used in illuminating the text.

The Future of Forestry in Kentucky and the South

By J. E. BARTON,

STATE FORESTER OF KENTUCKY, FRANKFORT, KY.

The greatest single step forward in the South for the cause of the conservation of our national resources as a whole and forestry in particular was undoubtedly the Act of Congress approved March 1, 1911, which is usually termed the "Weeks Law." This act provided in general for the "maintenance of a perpetual growth of forest on the water sheds of navigable streams where such growth will materially aid in preventing floods, improving low waters, in preventing erosion of steep slopes and the silting up of the river channels, and thereby improve the flow of water for navigation," and the bill further provided that the Secretary of Agriculture may "stipulate and agree with any state or group of states to co-operate in the organization and maintenance of a system of fire protection on any private or state forest lands within such state or states and situated upon the water shed of a navigable river."

The passage of this bill marked the success of a struggle which has been carried on before Congress for years, for the passage of bills of like character had been previously vigorously opposed by certain interests. Now, while it is not to be supposed that the work looking toward the conservation of forests and stream flow had not been heretofore vigorously pushed in the various Southern States, nevertheless, the passage of the "Weeks Law" indicated a positive and definite stand by the Federal Government and, undoubtedly, did much to strengthen the work of the advocates of conservation throughout the South, since it offered a point to tie in to and furnished a concrete argument for like legislation in each of the Southern States.

The effort in Kentucky to formulate into law a forest policy stretches back almost a decade, during which a continually growing body of earnest men and women

have seen with dismay the wide-spread depletion and waste of the forests of the state and have endeavored each year to secure the passage of a bill establishing a State Board of Forestry and creating the office of State Forester. Finally, March 19, 1912, an act of the General

Fifty-two Year Old Upland Forest, Original Growth
Cut and Used in Iron Furnaces.

Assembly was approved, establishing "a State Board of Forestry, prescribing its duties, and for conserving the forests and waters of the state and appropriating money therefor." The law was unusually well drawn up, and too much credit cannot be given to the men and women of

Kentucky who labored so untiringly for the passage of the law. This act, together with acts creating a "Good Road Commission," a "Tuberculosis Commission," a "Fish and Game Commission," "Insurance Commission," "Banking Commission," and others, reflect the greatest credit on the administration of Governor James B. McCreary and indicates him as one of the foremost men of the South in the advocacy of progressive legislation.

TIME FOR REAL WORK AT HAND.

Upon the passage of this act the real work in forestry in Kentucky was ready to begin, and on September 1, I was appointed State Forester and assumed the duties of the office. In view of the fact that the last seven years had been spent by men in the Federal Forest Service in the Northwest, I found it hard at first to realize the changes that had taken place even in so short a period in the hardwood producing region of which Kentucky is the center, since within that brief span of years the production of hardwood by Kentucky and the South had climbed to its zenith and was passing to its decline. The condition then is surely alarming since it means not only the depletion and destruction of the state's forests and a great source of wealth, but it also means a serious disturbance in the industrial and economic conditions which are the outgrowth of the timber and lumber business.

KENTUCKY'S POSITION IN HARDWOOD INDUSTRY.

Let us take a survey of the situation as it applies specifically to Kentucky, since in view of the fact that, as I have heretofore said, Kentucky is the "hub of the greatest hardwood producing region in the world," the same reasoning can be extended to the balance of the South in general except the pineries which present many problems. There are several factors which make for Kentucky's supremacy in the hardwood producing industry, and of these the chief are: 1. Geographical situation with relation to the hardwood timber supply; 2. Large variety in supply; 3. Cheap fuel supply; 4. Abundance of cheap transportation facilities; 5. Large and accessible markets. These will be discussed in their order. Up to the present time the supply of hardwood has

seemed inexhaustible; for Kentucky, situated in the center of the Southern hardwood producing belt, has had not only her own magnificent forests to draw from, but has made large drafts on the supplies in the neighboring states. But of late, plain indications are not wanting, even to the most casual observer, that the supply of timber within the borders of the State is diminishing. River points which formerly supported several saw mills are

Western Kentucky Hardwood Forest
Where Fire Has Not Entered

now practically deserted, or are completely abandoned. Where it was once no uncommon sight to see large rafts of logs go floating down the rivers to the manufacturing points, this has now become an unusual and occasional sight. Also timber which is now being cut indicates that the best has been culled from the forests and that it is now a question of taking whatever can be used. The forests of Kentucky and the Southern hardwood region furnished an almost indefinite variety of species,

and this exceeding richness of variety has added to the value and diversity of the manufactured products, since almost any demand could be fulfilled which might exist. The oaks, walnut, gums and others furnished the finest character of timber for finishing lumber and furniture; the tulip poplar, basswood, magnolias furnished a soft, clear, easily worked lumber for a large range of uses; the oaks and hickories have furnished unexcelled material for the vehicle industry; the varieties are as innumerable as the uses to which they are put. The beauty, diversity, and usefulness of the Kentucky timber supply is practically unexcelled. The third factor in building up the hardwood manufacturing industries in Kentucky has been the abundance of cheap fuel, for both the eastern and the western ends of the state are underlaid with large coal deposits of the best grades of bituminous coal, so situated that it is readily mined and easily accessible. The extent of the coal in Kentucky, coupled with the ease of working it, has rendered a cheap fuel supply indefinitely available. Again the facilities for cheap transportation have been on hand throughout Kentucky and the neighboring states, with the result that it has been an easy matter to get the raw material and fuel to the manufacturing centers and to ship the manufactured products to the markets. The rivers of Kentucky form a network of arteries within and circumscribing her borders down which the timber and lumber has been floated and driven or transported in barges and rafts to the mills, and the fuel has come through the same channels. The Cumberland, Tennessee, Ohio, Kentucky, Green, Big Sandy, Tradewater Rivers and others have all played their part in this moving drama. Then the numerous railroads of the state as they have developed have continually opened up new fields, continually added their quota to the flow of fuel and raw materials to the centers of manufacturing. Also in like manner these agencies have entered just as much into the distribution of the manufactured products throughout the Commonwealth and the country in general. Always there has been the two streams, the flow of fuel and raw material to the manufacturing centers and the flow of finished products to the markets of the world. It was not far to go for market either, since large distributing points

Waste in Logging—In First Picture a 20-inch Poplar was felled to Dislodge an Oak Tree and left Unused. In other Picture note amount of Sound Oak Timber left in Unused Top.

were within a comparatively small radius, and the demand for the character of manufactures involved was stable and reliable.

LUMBER AND WOODWORKING INDUSTRIES OF THE STATE.

Attention has been called to these factors in detail because they have served to build up the lumber and woodworking industries within the state to their now commanding proportions and consequently have served to deplete to their present condition the forests of the state; but again they are the very factors which make possible the initiation of a forest policy within the state which shall have a sound economic and industrial basis, without which any forest policy is vain, indeed. Lumbering within Kentucky, as everywhere, has up to the present time been conducted with the lavish prodigality typical of the American people, and this prodigality was largely the result of conditions which the lumberman had to meet. A waste naturally resulted, and this was largely unavoidable under the then existing conditions; but the face of conditions has changed and the time is ripe economically for the practice of forestry, which largely, so far as the lumberman and timber owner is concerned, means conservative logging and manufacture and the closest character of timber utilization, together with the most adequate protection to the existing forest.

KENTUCKY'S CONSUMPTION OF HARDWOODS.

Kentucky today consumes in round numbers over 400,000,000 feet of timber annually, about one-half of which comes from her own forests and one-half of which is imported from the neighboring states. Approximately \$10,000,000 is paid annually for this raw material. When one figures how much is spent in the manufacture of this raw material and the transportation of the manufactured product, he will have a fair idea of how much the timber industry means to Kentucky from an industrial and commercial standpoint. Yet from 1909 to 1910 the production of lumber cut within the state fell off 12½ per cent. The result of this depletion will ultimately be that the wood using industries will have to move to

View Showing Effect of Deforestation an

osion on Hill Slope in Western North Carolina.

new fields or ship their raw material from increasing distances, either proposition involving financial loss to the state and increased cost to the consumer. Further, the coal mining industry within the state is growing each year as new fields are opened up and this industry alone consumes about an average of $3\frac{1}{2}$ feet board measure for every ton of coal mined. The forest problem for Kentucky then is to create as nearly a balance as may be between the amount of timber consumed annually and that produced each year. Surely a herculean task!

FOREST FIRES A SOURCE OF GREAT LOSS.

In tackling this problem, as in dealing with any business, the first thing to do is to look for leaks and waste, and we find leakage and waste on every hand. One of the greatest sources of these is forest fires, which occur annually throughout the state. No steps are taken to prevent these fires, yet the damage they do to standing timber and young growth is incalculable. Leaving out of the consideration young growth, fires damage mature timber by actual destruction, by lowering the grades, by offering points of attack for insects and subsequent fungus decay. Fires also destroy the soil fertility and greatly lower the productive capacity of the forest area. Here then is a big leak in our business and an actual waste. It is a waste, however, that can be mitigated in a large degree, for forest fires are largely preventable, as has been adequately shown in the various sections of the country, particularly the Northwest, where the close co-operation of the timberland owners, the railroads, the state and the Federal Forest Service has resulted in a notable diminution of serious fires. The proposition of dealing with forest fires presents the same features as dealing with fires in a city. The first aim in a municipality is so to build and manage the city that there will be a minimum of fire hazard, the second is to suppress what fires occur in their incipiency, and the third and last aim is to deal adequately with large fires which may get underway in spite of the greatest care. In a state such as Kentucky, with valuable wooded and forested areas, exactly the same thing must be done. The timberlands must be managed so that there will occur a mini-

munum of fires. This we propose to accomplish by a campaign of education wherein the economic losses to the community from forest fires are made clear; by securing the co-operation and support of all the interests adversely affected by forest fires and of all good citizens of the state; and lastly by organizing a system for patrol of forested areas during the danger seasons and the adequate suppression of such fires as occur in their earlier stages.

INCOMPLETE UTILIZATION IS ANOTHER WASTE.

Another source of waste is incomplete utilization, and this usually occurs in the actual logging operations. It is a remarkable fact, but one capable of ample demonstration, that whereas the manufacture of timber at the mill and the disposal of the manufactured product has been so completely systemized and organized that the least leakage or waste can be detected by the manufacturer, yet the woods end of the lumbering business is the most haphazard kind of an operation for the most part, and very few operators can give you any accurate idea of how much the various steps of their woods operations are costing. Here then it is probable that a big waste occurs. It does as a usual thing, and in these ways. Very rarely is the attention given to laying out woods roads that they deserve. Since a logging operation makes or loses, ordinarily, by the cost of the transportation of the material, too great care cannot be used in the laying out of the main haul roads. In one operation, which came under my observation, the cost per thousand feet of placing the logs at the mill was reduced one-half by the expenditure of a few extra dollars at the start in laying out the main haul road. With the cost of transportation reduced to a minimum a large amount of timber can be cut and taken to the mill which ordinarily it would not pay to handle. Again, all material should be cut and taken out which is available. This is the simplest economy, since the cost per mile per thousand feet of roads and transportation is reduced in proportion as the amount of material removed is increased. This can only be accomplished by the most careful wood supervision, which ordinarily is not given or considered necessary. The contract system, so universally in vogue in woods

Kentucky Hardwood Forest, From Which White Oak Has Been Cut.

operations in Kentucky and the South, is vicious beyond expression. The next source of waste is one which is not plain to the casual observer, and that is lack of foresight for the rapid regeneration of cutover areas. In the ordinary woods operation no thought is directed to the future of the forest, with the result that large quantities of healthy young growth is needlessly destroyed, the timber is not cut at a time of year when regeneration from sprouts may be secured, and the brush and debris is left on the ground in such a condition as to be a serious menace to the remaining stand. Again, no seed trees are left, where natural seeding is to be depended upon for restocking the area, and lastly live stock are allowed to graze over the area so that quantities of nuts, seeds and young growth are destroyed. The chief sources of waste, as I have said, are in the logging operations, but some waste undoubtedly occurs in the mill operation by failure to use certain classes of apparently useless material in the manufacture of by-products.

It has been pointed out that the very features which have been paramount in hastening the alarming exploitation of Kentucky's timber supply are also the features which will make for the building up of the forests of the state, since with cheap fuel and transportation and good markets, it is a practical business proposition to insist upon complete utilization of our supply on hand and raise thereby the productive capacity of our forests. For instance, in harvesting the timber on coal lands, it is not industrial economy to cut up into mine timbers trees which can be utilized for more valuable products and leave on the ground as culls timber which will make satisfactory mining props, stulls, etc., just because it is slightly easier for the woods laborer to work up the first-class material. But in addition to this, we have got to have an active constructive forest policy throughout the state, and the basis of this is protection, as has been previously outlined, protection from fire and from live stock. Even a casual survey of the forests of Kentucky shows that they are depleted in two ways, in quantity and second in quality and kind. The ordinary forested area is not fully stocked, which means that certain ground is merely dead capital. All our forests areas should be stocked to their full capacity, which is usually about a

Burned Over Area Largely Given Up to Weed and Pasture. Sprout Growth Here Is Eaten By Cattle.

hundred per cent increase over the material on the ground. In regard to the method of securing a full-stocked area, I shall not be able to enter into details in this article, since this is largely a question of the silvicultural methods applicable to individual tracts and can only be determined after an examination of the area. Again, our forests have deteriorated most perceptibly in the kind and quality of timber produced. Where are the magnificent forests of white oak, tulip poplar, walnut and other valuable species. Gone, absolutely gone! The quality and kind of the material plays a very decided part in any scheme of reforestation, for we must continually bear this in mind, that we are raising our trees with the expectation of marketing them eventually, and we want to raise what we can sell most readily, and we want to do this in the shortest space of time. We have first, then, to study the varieties of trees indigenous to the state to find out what varieties grow most rapidly and lend themselves most readily to cultivation on the soils available, and next we must scrutinize carefully the present markets and forecast as sagely as we can the future markets. So far as my observation goes, it will be wise in Kentucky to confine our future forest crops to a few varieties which have well defined qualities of commercial importance. Among this list I may include several varieties of ash, oaks and hickories, one or two gums, basswood or linn, tulip poplar, chestnut (if the course of the chestnut blight is checked), black locust, and, among the conifers, white pine and short-leaf pine.

The very latest movement in agriculture has been to bring the most approved scientific methods of agriculture to the very door of the farmer by demonstration farms in his county and expert demonstrators who will be available to minister to his individual needs. It is axiomatic with children, and the same thing applies to adults, that they learn more easily from concrete examples than from any abstract line of reasoning. This is particularly true as regards the progress of forestry in Kentucky and in the South. We want state forest reserves upon which we can demonstrate ocularly the material benefits of scientific forestry, since in no other way can this be done as quickly and convincingly. We want to establish nurseries in which good trees of stand-

ard varieties can be raised and furnished to the people of the state at cost. We expect to do this by obtaining, either by purchase or gift, suitable areas within the state. One area which will be utilized as a small demonstration nursery and forest is twenty acres at the State Fair Grounds at Louisville, which will be accessible as a practical demonstration each year to thousands of visitors. Earlier in this article I mentioned the consumption of wood in the coal industry (approximately $3\frac{1}{2}$ feet board measure for every ton of coal mined). It seems to me that on the timbered coal lands of Kentucky is one of the best chances for demonstrating the practical utility of scientific forestry and we cannot afford to lose sight of the fact that to the vast bulk of the people it is still a matter for demonstration. The coal lands are a long-time investment, and the mine operator desires a sustained annual yield of timber for his mine, both of which premises are fundamental in scientific forest management. It will then be the object of the development of forestry in Kentucky to get coal land owners interested in practical forestry and secure co-operation between them and the office of the State Forester and among themselves in attaining this end.

WELFARE OF STREAMS AND FORESTS.

Thus far in this article attention has been directed entirely to the forests of the state and the lines which their proposed development should take, but there is another feature of the matter which has equal weight and significance, and that is the water of the state. In a recent address before the Rivers and Harbors Congress in Washington, D. C., President Taft lays stress on the fact that in the regulation and conservation of stream flow the part played by the forests at the head of the streams is a vital one, and surely not to be overlooked. The welfare of waters and streams of the state, both from the mechanical and sanitary point of view, is ultimately linked with the welfare of the forests, and the office of the State Forester in Kentucky is charged with the oversight of both. Everywhere are evidences of the interrelation of the forests and waters of the Commonwealth, the denudation of the hills and mountains, the conse-

quent erosion of slopes and the subsequent floods and silting up of the streams speak eloquently of the need of regulation and conservation. In Kentucky—in practically every state—there are certain areas and, ofttime regions, which are primarily what may be termed absolute forest land; that is, land upon which, taking into consideration all economic questions involved, should be perpetually maintained a forest cover. These lands are, as a rule, in the mountain region at the headwaters of the streams and rivers. It is a mistake to maintain in forest cover land which is more valuable for agriculture, all things considered. It is just as much an economical blunder to try to cultivate land when the result of such cultivation is an actual loss far outbalancing the money value of the agricultural crops obtained from the land. The problem, so far as Kentucky and the Southern States generally are concerned, is not more land to cultivate, but the scientific cultivation of the land which is obviously agricultural land and the restoration to forest cover of land which is obviously non-agricultural land.

SOME THINGS WHICH NEED EMPHASIS.

Now, as to the practice of forestry in the state, there are some things which unquestionably need emphasis. Pure forestry is a business and must stand or fall on our ability to reduce its practice to a question of dollars and cents. That forestry is a good investment from this point of view, not only in the matter of direct returns, but also in the matter of indirect returns, is beyond question. It must be borne in mind, however, that this is a long-time investment and is not ordinarily a proposition for the private individual. It is a matter for the Federal Government, the states, municipalities and long-time corporations (such as railroads, coal land companies, etc.). Only in certain phases does it recommend itself as an investment for private individuals, as in the raising of fence posts, wind breaks, or a maple sugar grove on the farm, or where it is desired to increase the ultimate value of the property by the presence of a healthy young grove of trees on the place. The positive and direct benefits of a concrete forest policy in Kentucky then will be an increase in the forest area of the

state and pronounced increased productivity of the present suitable forested areas as a whole, with a consequent tangible revenue from the forest crops. The more important indirect benefits will be the resultant regulation and purification of stream flow and the increased healthfulness of the people of the state as a whole.

To recapitulate, Kentucky is the center of the Southern hardwood region; her forests have been rapidly exploited because of certain favorable industrial conditions, with a consequent diminution of the supply; the result will be a great economic loss to the state unless steps are taken to restore a balance between supply and demand; the waters of the state are in need of regulation and purification. The application of scientific forestry to the large wooded areas will increase the productivity of the wooded areas enormously, with a consequent benefit to the streams of the state; the time is now ripe for the vigorous prosecution of this work; the practice of forestry is a business proposition and a paying investment, but is not under ordinary conditions a proposition for small individual owners.

APPLIED TO OTHER SOUTHERN STATES.

What has been said in this article relates to the future of forestry in Kentucky in particular, but there is nothing in it which cannot be applied with equal force to the Southern states as a whole. A large share of the Appalachian region is within the borders of the South and the Southern hardwood region stretches from the Atlantic seaboard through Missouri and Arkansas, and from Maryland and Virginia, Southern Indiana and Illinois south to the Gulf. The conditions do not differ materially throughout this region and its importance from an individual and commercial standpoint cannot be overestimated because of the vast timber supplies which do now and will hereafter come from this region, and because of the close interrelation between the forested areas and the great rivers of the region, the Ohio, Cumberland, Tennessee, Red and others. The indirect benefits of a forest policy in the South are as far-reaching as the direct benefits. In a few of the Southern states the movement for the conservation of the forests and waters

is either well organized or has assumed the form of a concrete forest policy, but since the region embraces the states as a whole and the conservation problem applies equally to all the states, and will eventually involve co-operation among the states, there should be an earnest endeavor in those states which have not already done so to crystallize into law a definite forest policy. This is essential if we are to have an adequate control of our floods and rivers and a solution of the annually recurring Mississippi flood problem.

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