

## FORESTRY IN MICHIGAN.

The following paper by V. M. Spalding, Ann Arbor, Mich., was read at the meeting of the American Forestry Congress, at Montreal:

It is not necessary to go into an argument to show that Michigan ought to be interested in forestry. Everyone knows what an element the forests have been in our prosperity. According to a late report of the Commissioner of Immigration "the aggregate value of the forest products of this State already mentioned is largely in excess of \$8,000,000," and the timber product of a single year, 1879, amounted to \$60,000,000, or about thirty-five per cent of the total value of the natural productions of the State for that year. Michigan produces more salt than any other State in the Union, and the brine is evaporated by means of the refuse from the great saw mills in the vicinity of Saginaw and other lumbering towns. Ours is the second State in the production of iron, and the blast furnaces of Ironton, Elk Rapids, and a number of other places are drawing the supply of charcoal for its reduction from the great hardwood forests in their vicinity. The products of these forests are sent to the ends of the earth. Much of the first lumber of the Atlantic cities and of the Old World comes from Michigan pineries. Threshing-implements, furniture and a long list of articles requiring wood in their manufacture are made in the State and exported from it, their manufacture being a source of support to fifty thousand of our people and their sale a steady source of wealth to the State.

Nor is it necessary to repeat the well-known fact that our forests are rapidly disappearing. The bulletins of the last census, accessible to everyone, show that the estimated amount of merchantable pine timber standing in Michigan May 31st, 1881, was thirty-five billions of feet. At our present rate of consumption, five billions of feet annually, it will take seven years to use up our pine forests. Suppose, however, that the estimates of the amount remaining, although made with great care, are too low; suppose for safety the pine will last twice as long as has been estimated, the fact still thrusts itself upon us that in a few years this great source of our wealth will be gone.

What are we doing in view of these facts? We are going on with astonishing energy and improved machinery to hasten the end. Every man who can do so is trying to get a piece of pine land, or a quantity of logs before they are gone, and our own people, in company with eastern capitalists, are planning the speedy destruction of the hardwood forests as soon as the pine lands have been stripped. The newspaper articles that charge this thing upon us are not sensational. They do not tell all the truth.

We have squandered with reckless haste the abundant forest wealth with which the State was endowed, and, besides all this, time and again, forest fires, that might have been prevented, have swept over fair portions of the commonwealth, carrying swift destruction with them and completing the work that the axe had begun.

In the study of this subject then we may as well turn our attention at once to the forests of the future, for it is evident that those of the present will be gone in a few years. Our own legitimate wants and the great profits of lumber trade have already settled the question for Michigan. If we want forests we must make them.

Without repeating the arguments that have been given so fully by others, I shall assume, what is admitted by everyone who has bestowed serious thought upon the subject, that the highest welfare of the State requires the establishment and continued maintenance of a suitable proportion of wood-land. It may be assumed, too, that, in due time, both Government and people, moved by necessity, if by no higher influence, will unite in a settled purpose to secure this. As soon as this attitude is taken by the people of the State, and we are ready to enter upon the work of reforesting, we shall find ourselves face to face with various difficult problems. Some of us, perhaps, may render a service by studying these problems now, viz.:-

(1) What parts of the State and what proportion of its area should be covered with forests?

Economists estimate about twenty-five per

cent, as a suitable proportion, but this varies with the position, physical character, and commercial interests of the State or country under consideration. The State of Michigan contains large areas that are worthless for any other purpose than raising timber, and still more extended regions that, if not absolutely valueless for agricultural purposes, can be used to far better advantage in growing trees than in raising any other crop whatever. Undoubtedly, the great question with us is, how, in the most direct practical way, can we rehabilitate the extensive regions in the central and northern parts of the lower peninsula that have been stripped of their pine forests, and the remaining portions of this region that will so soon be bare? Anyone that has been through this part of the State will remember its desolate and ruined aspect. "The valuable trees were all felled years ago, and the lumberman moved on to fresh spoils, leaving behind an inextricably confused mass of tree tops, broken logs, and uprooted trunks. Blackberry canes spring up everywhere, forming a tangled thicket, and a few scattering poplar, birch, and cherry trees serve for arboreal life, above which tower the dead pines, bleached in the weather and blackened by fire, destitute of limbs, and looking at a distance not unlike the masts of some great harbor. Thousands of such acres, repellant alike to botanists and settler, can be seen in any of our northern countries." [Erwin F. Smith, "Flora of Michigan."] While there is good soil to be found in this region, much of it is light and sandy, altogether unfit for farming purposes, but it has raised one of the finest forests that ever clothed the surface of the earth, and if it can again be covered with such a forest it will become in the future, as it has been already, a source of almost unlimited wealth.

Another portion of the State will soon force itself upon our attention, unless it is cared for. All along the eastern coast of Lake Michigan sand-dunes extend, precisely similar in their nature, though of less extent than those of the Old World. While these dunes are covered with vegetation they keep, for the most part, within their limits, but indications of what they may do, when free from such control, may be seen at Grand Haven, Michigan City, and other places along the shore, where piles of fine drifting sand are covering railroad tracks, and fences, and some trees, and, in some localities are encroaching upon cultivated fields, to the dismay of their proprietors. The experience of Western Europe is conclusive upon this point, and it is the manifest duty of the State, and of the people, to absolutely prohibit and prevent the clearing away of trees, or even excessive pasturage of such lands, and to encourage by every suitable means, their reforesting.

The farming lands in the southern portion of the lower peninsula all need a fair proportion of woodland for fuel and shelter, and the great majority of these farms would be rendered much more valuable in a few years by judicious plantations of trees; so, also, the northern peninsula, though still heavily wooded over large areas, already has extensive regions that have been stripped of their forests, and that can be turned to better account for this than for any other purpose. We may safely conclude, therefore, that the State of Michigan requires fully as great, and probably a greater proportion of its area to be kept in wood-land than has been estimated as necessary for other countries; in other words, more than twenty-five per cent. in this State, rather than less, may properly be covered with timber.

(2) What kinds of trees shall we plant?

To answer this question we must know something about the different species of trees, the soil and climate to which they are adapted or to which they can be induced to adapt the selves, what kinds will endure unfavorable conditions best, what trees will grow rapidly, and what sorts are most valuable for timber or other products.

Without attempting to decide all of these questions in detail—many of them requiring not only careful study but long experiment, for which the State makes no adequate provision, as yet—there is one very important question suggested at the outset, and that must be met, whether it can be settled at once or not. The question is, how much significance must be

attached to the principle of rotation? It has been commonly noticed that forests of oak succeed those of pine, and vice versa. Oak and hemlock forest have been succeeded by those of elm, beech and maple. When the pine woods in the northern part of Michigan and Wisconsin are cut off, poplars, birches, and the red-cherry spring up, and so, as in many cases, this succession seems to be pretty uniform and constant. There has grown up a half popular, half scientific notion that it must be so, and that, if we are to succeed in reforesting our denuded pine lands, we must follow the order of nature. We have no right, however, to follow nature blindly, and sometimes we can take a short cut while nature is going around a corner. No one has ever formulated an order that governs the succession of forest trees, nor has it ever been shown that there is any such unvarying order of succession. On the contrary, it is one of the most variable things with which we are acquainted, and there is every reason for believing that it depends more upon what the ground is seeded with than anything else. The reason why birches, poplars, and red cherry spring up on our wasted pine lands is that the seeds of these species are carried there by the wind and by the birds, and there is no doubt whatever that other and better trees may, with suitable pains, be made to take their place. When we plant trees about our houses, or along the highway even, if it happen to be now land, we do not stop to make a critical inquiry into the laws governing the succession of forest trees; we find out what trees are hardy, and having settled this point, set out whatever kinds we fancy with the expectation of having them do well if they are cared for.

(3) Shall we plant the white pine in Michigan?

The answer may be given without hesitation. Yes; plant it first, and last, and all the time. Give it a fair chance and it will cover the State again. It may be wisdom to substitute some other species on those tracts that have just been covered with a heavy growth of pine, but it is, to say the least, doubtful whether any such distinction need be made. If the white pine were planted in Michigan universally and everywhere where the land could be spared, it would find congenial soil enough even in those counties that have been most heavily covered with it.

Without discussing the value of other well-known species a few may be mentioned as specially worthy of planting in Michigan. The European larch, famous for the durability of its timber, and perfectly adapted to our northern climate; the *Atlantus*, the only tree that has successfully controlled the drifting sand plains of southern Russia, and will perhaps be more valuable than any other on our own sand dunes; the *Catalpa speciosa*, of which specimens a foot and a half in diameter may be seen in Ann Arbor, and which, probably, may be depended upon for hardiness throughout the southern portion of the lower peninsula; the white ash and a long list of indigenous trees, any of which may be planted with every reason to expect a good return. The consideration of the large number of species, both indigenous and introduced, that may be successfully cultivated in Michigan is of great importance, but requires too much space for this article, and will have to be taken up in a separate paper, together with the consideration of the species best adapted to our sand-dunes, and the methods to be employed in planting them.

(4) Admitting that it is desirable that the planting of trees in Michigan should be undertaken at once and in earnest, what are the means of securing this and of ensuring the best results?

(1) The Legislature of the State may promote the work by offering encouragement to tree planting in the way of exemption of property from taxation. As to the form of legislation and its practical details, a careful study of the action of other States will furnish valuable suggestions. Of all State laws on the subject of tree planting that have come to my notice, that of Iowa has seemed prominently adapted to the purpose. The law provides that "for every acre of forest trees planted and cultivated for timber within the State, the trees thereon not being more than twelve feet apart, and kept in a healthy condition, the sum of one hundred

dollars shall be exempted from taxation \* \* for ten years after each acre is so planted, provided, etc." Possibly other forms of legislative action on this subject may be found better, but that of Iowa has this very excellent feature, that it has very largely accomplished the object aimed at. We can profitably follow the example of Iowa, too, in securing the preparation and distribution of something corresponding to their "Forestry Manual," an unpretentious pamphlet of about thirty pages, filled with valuable information and practical hints on the subject of tree planting, and distributed gratuitously among the farmers of the State.

(2) The State ought also to be establishing facts upon which to base the future management of the great work of reforesting its waste lands. Two or three experimental stations, located in as many parts of the State, where trees of all sorts, both native and foreign, can be cultivated and the results recorded, would enable us in a few years to demonstrate the usefulness of some kinds and the unsuitability of others for general cultivation. Meteorological observations carried on at these stations would give data for the solution of the difficult but important question relating to the climatic effects of forests.

(3) Very much depends upon the railroad companies, owning as they do, in the State of Michigan, lines aggregating over four thousand miles in length, with large grants of valuable land, they control, in a very great measure, the agricultural and commercial interests of large areas of the State. The Detroit, Mackinac & Marquette Railroad alone owns over 1,300,000 acres of land, and the Flint & Pere Marquette, the Grand Rapids & Indiana, and other lines are possessed of large tracts of both farming and timber lands. An abundant supply of wood for ties and manufacturing purposes is a prime necessity of all these lines, and may be secured by the prompt adoption of a liberal and enlightened policy in maintaining or restoring a suitable amount of forests on their lands. A number of western railroads, though obliged to contend with great natural disadvantages, have taken hold of this work with great enthusiasm, and several of them are now employing paid foresters to direct the work of raising and caring for forests along their lines.

(4) The farmers of the State have very much to do with the future of our forests, and, unfortunately, they have not yet, as a rule, taken a practical interest in maintaining or restoring them. There is, however, no class more ready to enter into undertakings that promise to be productive of good, and none more accustomed to meet and overcome difficulties. When the farmers of Michigan are once possessed with the conviction, that trees are often far more valuable than any other crop, and that they render the farm more productive and worth more per acre, trees will be planted.

(5) A few at least of the educational institutions of the state can do an important work by giving forestry an honorable place among the subjects of their respective course of study. Whether there is as yet a science of forestry in the United States or not, there will be before long, and intelligent and interested action on the part of such institutions will aid greatly in establishing the science, and in gaining for it the confidence and encouragement of both government and people. A beginning of this kind has been made at the University of Michigan, in connection with the School of Political Science recently established there, and the lectures on forestry are attended by a class of about fifty.

(6) The general Government still owns something over a million acres of land in Michigan, and the State Government has yet large tracts of land under its control. If, instead of throwing this away, or selling it at the rate of \$18 per 160 acres, any considerable portion might by any means still be kept in permanent forests under Government control, and this control be exercised wisely and for the public good, as is done in the State forests of the Old World, forestry in Michigan would become an established fact. In some or all of these ways it is to be hoped that the great work of restoring the forests of the State may be accomplished.

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