

THE MOUNTAIN FORESTS AND WATER SUPPLY OF THE CONTINENT.

BY DR. JOHN A. WARDER.

The mountains were intended to be perpetually clothed with forest growths, at least to the timber line, at a varying elevation depending upon latitude, where arboreal vegetation is restricted by the low temperature that approaches the conditions of congelation. The traveller, to be of any use to himself or to others, should keep his eyes open and observe every phenomenon as he passes through the country.

Limited observations, when among the Rocky Mountains a few years since in Colorado, and more recently in a journey on the Medicine-Bow Mountains of Wyoming Territory, have given the writer still firmer convictions of the truth of the first proposition, which had already been accepted, as truly set forth by forest writers of Europe, and read in the open book of nature, as it was unfolded before his eyes in the Alpine regions of that continent. But these journeys among the Cordilleras of our country, exposed as they are and have been to the ruthless and wanton destructiveness of ignorant and thoughtless men, have filled him with serious apprehensions respecting the future water supply of our western rivers.

The destruction of these mountain forests by fire is indeed a most fearful and melancholy subject to contemplate. An inspection of portions of the public domain by one who has studied the subject, and who has either read or witnessed the disastrous effects of the spoliation of the forests in elevated mountain heights, cannot fail to fill the mind with the most serious apprehensions.

The efforts of the Secretary of the Interior on behalf of the forests are highly appreciated by those who have made a study of the influence of the woods upon the country's water supply. The mountains (up to a certain elevation, close to the limit of perpetual congelation) were designed for the forests, nor should they ever be stripped of their arboreal covering, for, as the Secretary has well said in his annual report of 1877, if the forests in such regions be once destroyed, they will never be restored. The rationale of the action of the forests as receivers, reservoirs and fountains of waters, is perfectly simple and familiar to all students of forest science, and may be understood by any one of common powers of observation, who may have had his attention directed to the conditions of earth's surface in a wood that is in a state of nature. The fallen trees and branches, the undergrowth, the masses and other herbage, among the decaying leaves, the accumulations of years—all these, and the leafy canopy above—break the force of the falling rains, which come quietly to the earth and are there arrested, and instead of rushing tumultuously down to lower levels, they are absorbed as by a sponge, until, although gradually percolating into the soil, they reach internal cavities or porous strata, from which they are gradually distilled through perennial springs that keep up a constant and regular supply for the streams and rivers.

But to return to Wyoming, to scenes so recently visited—while traversing a broad plateau of the range, and passing through a glorious forest primeval, the traveller closely scrutinized the trees. These were chiefly pines, and almost exclusively of our species (*pinus contorta*), but among them, in the lower and damper spots, the most lovely firs and spruces reared their tall shafts, clothed with a mystic drapery of depending boughs, bearing the silvery green foliage of the *Menzies*, *Douglas* and *Englemann's* spruces, and of the *Grandis* firs.

While contemplating these noble trees, we suddenly came upon a scene of appalling desolation. Upon a tract of many square miles in extent, as far as the eye could reach in every direction, over many thousands of acres, there was not a living tree to be seen. All, all, were standing bare, stark and stiff in death: their tall dead trunks blackened by fire, except where time had kindly come to their relief and stripped off the bark, leaving the bare poles that stood by the way like shivering ghosts, waiting in purgatory until storms of years should prostrate them to the earth that bore them, when they would at length gradually crumble into mould to renovate the soil, which had been deprived of all

vegetable humus by the fierce flames of the conflagration.

The forest is destroyed, the noble trees are dead and gone, too often never in our time to return, to be a kindly covering and a befitting garniture to the sad wastes, and to clothe these mountain sides with verdure. Continued and continuous desolation is their sad doom.

Practically speaking, this is and must be so. Whence can come the seed germs for the future afforesting of such extensive tracts? Man, the improvident destructive, will not do it. The kindly winds can transport the winged seeds but a short distance from the parent trees. The cunning and provident rodents have a still more limited range within which to carry the seeds they may gather, and with wise instinct store up for their hyemal repasts, from which a few might escape, to germinate and form nuclei, producing at length seeds for further distribution in the future.

Ages must be required to restore these forests in the slow course of nature, and meanwhile the degrading agencies of every storm will be carrying away the soil, and scarring the mountain sides with frightful gullies and chasms, occupied at times with violent torrents, for there is no longer any herbage, no moss or lichen, nor any debris to cover the surface, and, spongelike, to absorb and retain the precipitated moisture.

Yes, our worthy Secretary was perfectly right in his assertion that in these bared mountains the forests would never be restored, when thus ruthlessly destroyed. In certain situations and over such vast areas, practically speaking, in reference to any period of time that it is worth our while to calculate upon, any time that we or our progeny for many generations need take any account of, this is sadly true.

But, it may be asked, cannot these terribly destructive fires be prevented? Cannot these calamitous results that must inevitably follow be avoided? Yes! yes! they may, and they must be prevented, and that at once, lest our fair continent become a desert, unfitted for the many millions it is capable of happily sustaining upon the broad territory of its beautiful bosom.

This is indeed a great question, and only requiring the exercise of a high order of statesmanship. It is truly a difficult question, but the interests at stake are enormous, and are of infinitely greater importance to this nation than deciding who of all the great army of office-seekers shall be gratified by an appointment to this or that petty office under Government; and yet there are those who were sent to guard the great concerns of the State who cannot spare time from the scramble after office to listen, to study, nor to advocate matters of such great import as this. Oh, that we could be blessed with a race of statesmen something better than politicians, and capable of grasping and of solving such questions as this!

Yes! the interests at stake are truly enormous; they involve the welfare of the country, since they concern the permanence and the very existence of our rivers. If their consideration be neglected, will not some future explorer of the vast Sahara, that may extend eastward from the base of these mountains, find, amid the shifting sands of that wide desert, only depressions of the surface to mark the ancient beds of our great rivers and their tributaries in that American Sahara, as Champollion has observed them in the wastes of Northern Africa, of which he said: "And so the astonishing truth dawns upon us that this desert may once have been a region of groves and fountains, and the abode of happy millions. Is there any crime against Nature which draws down a more terrible curse than that of stripping mother earth of her sylvan covering? The hand of man has produced this desert, and, I verily believe, every other desert on the face of the earth. Earth was Eden once, and our misery is the punishment of our sins against the world of plants. The burning sun of the desert is the angel with the flaming sword, who stands between us and Paradise."

But how shall this great work, the preservation of the mountain forests, be accomplished? How shall we preserve these treasure-houses of the snow and rain that they shall steadily distil the streams which are to fill our rivers?

It may be effected by wise legislation after we have enlightened the public upon the subject

of an advanced forest science, and educated them up to a proper and just appreciation of the importance and of the especial functions of the forests on these mountain heights, as condensers of moisture, as receivers and as reservoirs of the water supplies of a large portion of the continent.

When so educated, and fully informed upon these important truths, with an enlightened public sentiment, the people will become more careful in the use of this dangerous agent; they will be more watchful of their camp fires, they will compel others to be more careful, and they will stamp out the first beginning of a conflagration.

In addition to this enlightened sentiment, and complimentary to it, legislation will be needed to operate on those who may wickedly or ignorantly transgress. Some of the excellent suggestions of Mr. Schurz were incorporated in the bill of Senator Plumb, of Kansas, last winter (S. 609). They might prove valuable as preventive measures, especially the appointment of forest guards, as proposed in the 3rd section. Section 13 is intended to prevent fires on the public domain, whether in prairie or timber. Such a provision has never existed in the case of Government lands, though provided for by some of the states.

The losses by fires are enormous, and should be prevented.

Some of us know by sad and painful experience how difficult it is for the philanthropist, who presents a simple proposition for the public good, however great its importance, to arrest the attention of the public. We have also learned how almost impossible it is to reach the ear of the law-making powers, and to excite in their minds an active interest in such questions as are here presented; in a word, how herculean an undertaking is presented, when we attempt to educate the people, and those who represent them in the Halls of Congress, up to a proper and full appreciation of such a subject as this *Forestry*, which so deeply concerns the public weal.

More especially unpromising does such an effort appear, when an attempt is made to impress upon their minds the absolute necessity of keeping these extensive ranges of mountain heights in a condition best adapted to attract and condense the atmospheric moisture, to receive the precipitation, to retain it for a time, and then gradually and quietly to give it off through perennial springs, as limpid fluid, to supply the fertilizing streams that shall fill the rivers which are so happily and extensively distributed over our great continent.

You who are engaged in forest studies, you who are engaged in planting trees, will unite in presenting our thanks to Secretary Schurz for the noble stand he has taken in defence of the forests on the public domain, and for the part he has taken to call public attention to the vast and wide spreading influence exerted by them on the present and future welfare of the country. Long may he be permitted to prosecute these noble efforts in behalf of the protection, preservation, and extension of our woodland heritage!

Mr. President, the above paper is but a repetition of an open letter addressed to the secretary of the Interior, which may never have fallen under the notice of any of your members. No apology will be offered, however, for presenting it to men like yourselves, even thus at second-hand, because you are known to be interested, as western-tree planters ever are and should be, in everything that relates to this great question of trees. Situated as you are, on the great open plains, this is to you especially a vital question, and this aspect of the infinite value to you of the mountain forests cannot be devoid of interest, even in the imperfect manner of its presentation by such a tyro in forest science as your friend W.

Wicked for Clergymen.

Rev.—, Washington, D. C., writes: I believe it to be all wrong and even wicked for clergymen or other public men to be led into giving testimonials to quack doctors or vile stuffs called medicines, but when a really meritorious article made of valuable remedies known to all, that all physicians use and trust in daily, we should freely commend it. I therefore cheerfully and heartily commend Hop Bitters for the good they have done me and my friends, firmly believing that they have no equal for family use. I will not be without them."—*New York Baptist Weekly*.

A NEW LUMBER DISTRICT.

A correspondent of the *Toronto, Ont., Globe*, who is (writing) for that paper (from British Columbia, includes in a recent letter some interesting information in regard to the lumber and logging business of the Province. The point from which he writes is New Westminster, located at the mouth of the Fraser river, and very near the boundary line between that Province and Washington Territory. It is the largest manufacturing point for lumber in British Columbia, and will, no doubt, become the center of one of the most important producing districts on the Pacific before many years. The country adjacent to it is rapidly settling up, and we are informed that the business of turning the timber wealth of the country into cash already occupies a large proportion of the people. The forests are the continuation of those immense timber tracts that have made Oregon and Washington Territory famous, and the trees contained in them are similar in size and other respects to those found there. Speaking of the remarkable size that the timber attains, the *Globe* correspondent says:—As the trees in the woods through which we passed, on the Hastings road, were such monsters, I was curious to know how they could be cut down and hauled about. Miles upon miles of timber exists on the inlet of the Douglas fir species, as well as cedar. Unless one saw these trees he would scarcely credit the fact that such did exist anywhere. In numerous instances they rise a perfectly limbless trunk for 200 feet, and then over another 100 feet above that, with small limbs.

About three miles from Granville I saw trees felled that were 320 feet in length, and eight feet in diameter. There were hundreds like these all round. The woodman cuts a hole in the tree, about four feet from the ground, into which he inserts a board having sharp iron prongs. This resembles a spring-board. On this he stands while swinging his axe. The axe is the same as is used in the east, but much longer in the handle, generally four feet; occasionally a shorter one is used for the outside cuts. As he enters the tree the resin runs like water, and every blow spatters it in every direction. So soon as the tree is down the woodman attacks another. His business is to lay it on the ground. Following him comes the sawyers, who cut it into the required lengths; then the "barkers." Every inch of bark is peeled off before leaving the spot where it fell, to enable it to be moved round conveniently by the teams. In this camp an ox team of twelve oxen is employed to bring the logs to the road on which the traction engine runs. Strong pulkys, with endless chains, are used to get the log so the team can get a haul on it. Come away it must. Scarcely a word is uttered to these dumb brutes. The driver is morose on the score of shouting, and uses a goad. He stands in the middle of the team, has a long pole, in the end of which is inserted short spikes. A few dabs of this into the hide of the bullock has the desired effect, and off they go, pulling all together for dear life as it were. They take to the "station ground," on an average, logs that will manufacture into 8,000 feet of lumber. The road on which the traction engine runs is constructed of split cedar, and hewed down perfectly level. In the center of this road bed, at distances of seven feet apart, are placed concave blocks of maple, on which the logs can ride. As they move along, the "greaser" applies dog-fish oil to each one. The log being free of its bark, the oil takes effect, and along it glides, apparently with perfect ease. The engine makes four trips a day to and from the water, into which the logs are rolled, and thence are towed to the mill by a tug. Following the logs to the mill we saw them hauled up the gang way and placed upon the carriage, two circular saws in very short order take off the slab, one saw being suspended and revolving over the other. The lumber cut is taken on board a vessel lying at the wharf, loading for Hong Kong.

Having heard that the mill across the inlet was a very complete one, we decided on visiting the Moodyville mill, in which Senator Nelson is largely interested. Here we found matters very similar to those at Granville, except that a gang of thirty-six saws is used for cutting the log after it is slabbed. The machinery here is of the very best description, and all of the latest design. The power is obtained from a turbine