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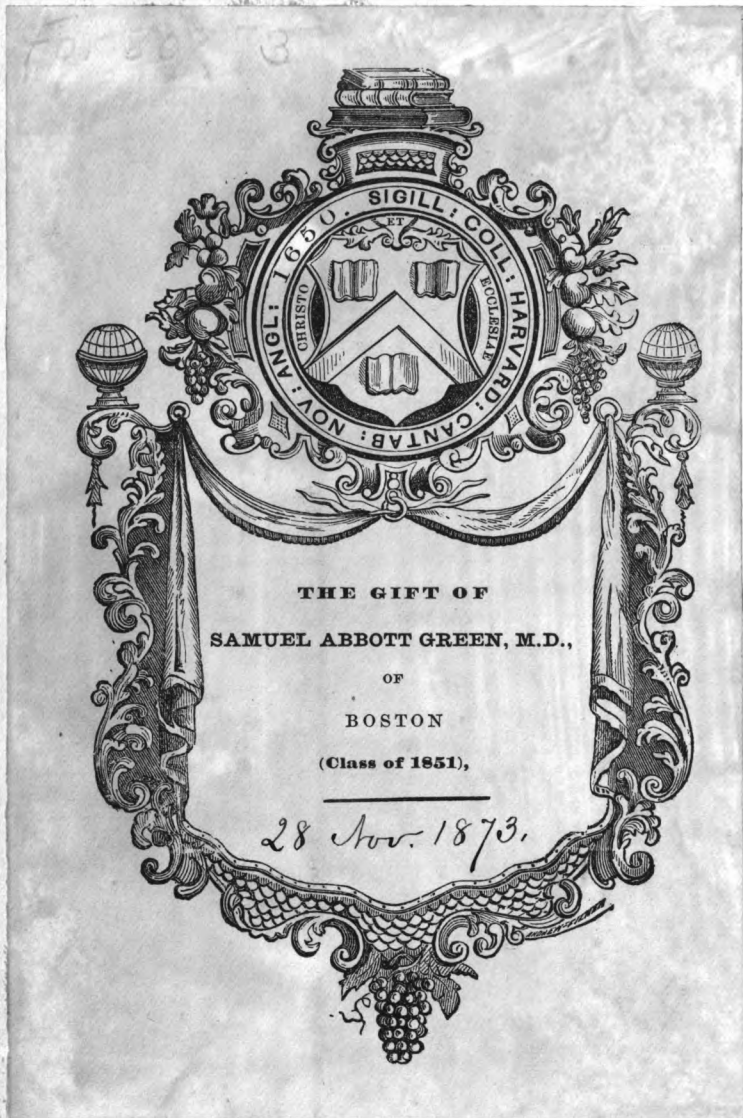
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ON THE DUTY OF GOVERNMENTS IN THE  
PRESERVATION OF FORESTS

FRANKLIN B. HOUGH

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ON THE WAY TO CHINA

BY HENRY J. WATSON

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Samuel A. Houghton  
of Lowell, Mass.  
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### ON THE DUTY OF GOVERNMENTS IN THE PRESERVATION OF FORESTS.

BY FRANKLIN B. HOUGH, of Lowville, N. Y.

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The presence of stately ruins in solitary deserts, is conclusive proof that great climatic changes have taken place within the period of human history in many eastern countries, once highly cultivated and densely peopled, but now arid wastes.

Although the records of geology teach that great vicissitudes of climate, from the torrid and humid conditions of the coal period, to those of extreme cold which produced the glaciers of the drift, may have in turn occurred in the same region, we have no reason to believe that any material changes have been brought about, by astronomical or other natural causes, within the historic period. We cannot account for the changes that have occurred since these sunburnt and sterile plains, where these traces of man's first civilization are found, were clothed with a luxuriant vegetation, except by ascribing them to the improvident acts of man, in destroying the trees and plants which once clothed the surface, and sheltered it from the sun and the winds. As this shelter was removed the desert approached, gaining new power as its area increased, until it crept over vast regions once populous and fertile, and left only the ruins of former magnificence.

In more temperate climates the effect is less striking, yet it is sufficiently apparent everywhere and throughout our whole country, but especially in the hilly and once wooded regions of the eastern and northern states. In these portions of our union the failure of springs and wells, the drying up of brooks which once supplied ample hydraulic power through the summer, and the increasing difficulties of procuring water to supply canals for navigation, and wholesome water for cities, are becoming every day something more than a subject of casual remark. It is destined to become a theme of careful scientific and practical inquiry, to ascertain how these growing evils may be checked, and whether the lost

advantages may be regained. We regard the ocean itself as the source whence the moisture, precipitated in rains, is mainly derived. Its area changes not; the exposure to solar heat is uniform (unless, as some suppose, the spots on the sun's disk may have an appreciable influence); and, except as varied within fixed limits by the inclination of the earth's axis in its revolution around the sun, there are no astronomical or other causes that should sensibly change the annual amount of general evaporation from the surface of the ocean from year to year or from age to age. The vapors raised from the sea are distributed by the winds over the land, and descend as rains where mountain ranges, forests and other causes favor condensation. It is probable that the Gulf of Mexico furnishes more vapor for rain within the United States than the Atlantic Ocean, its influence being felt throughout and beyond the great basin of the Mississippi and its tributaries.

In a work which I recently prepared for the Regents of the University of the state of New York, I was able to collect, from all sources and for various periods, in some stations for almost half a century, about two thousand years of rainfall records within the state of New York; and in a volume published within the last year by the Smithsonian Institution, there is a much more extended series for the whole country. These extensive series are not enough to determine, with any claim to accuracy, the secular changes; if any, that may be going on, in the amount of precipitation of rain and snow. Although they reveal great irregularities in a series of years at any given locality, they do not justify us in supposing that, in the general average of periods, the amount is sensibly increasing or diminishing, although they do show, in some cases, greater tendencies to drought for a series of years together, and often a more unequal distribution of rain throughout the year.

This growing tendency to floods and droughts, can be directly ascribed to the clearing up of woodlands, by which the rains quickly find their way into the streams, often swelling them into destructive floods, instead of sinking into the earth to reappear as springs. Aside from the direct effects of shelter and shade afforded by trees, the evaporation of raindrops that fall upon the leaves, and the chemical action of the leaves themselves, have a marked influence upon the humidity and temperature of the air beneath and around them. The contrast in a very dry season,

between an open and sunburnt pasture, and one interspersed with clumps of trees, must have been noticed by every careful observer, and the actual relative profits of farms entirely without trees, and those liberally shaded (everything else being equal), will show, at least in grazing districts, the advantage of the latter in the value of their annual products. The fact that furniture, in houses too much shaded, will mould, is a familiar and suggestive instance of the humid influence of trees, and the aggregate results of woodland shade may well explain the fulness of streams and springs in the forest, which dry up and disappear when it is removed.

The economical value of timber, and our absolute dependence upon it for innumerable uses in manufactures and the arts, the rapidly increasing demand for it in railroad construction and the positive necessity for its use in the affairs of common life, even were its use as fuel largely supplanted by the introduction of mineral coal, are too obvious for suggestion. It is this necessity, rather than considerations of climate or of water supply, that has led in several countries of Europe to systems of management and regulation of national forests, as a measure of governmental policy and public economy. Such systems have been devised to a greater or less extent, in Russia, Turkey, Austria, Germany, Italy, France, Denmark and Sweden; and more recently in British India. The extent of state forests in France, is about 3,130,000 acres; to which may be added 5,335,000 acres belonging to communes, corporations, hospitals, and other public establishments, making the whole extent of forest under the management of the forest administration, 8,465,000 acres, or about 13,226 square miles. They are distributed widely over the country, a large proportion being in the departments of the east. Legislation in France having in view the preservation of forests, chiefly dates from the ordinance of 1669, which fixed a certain time for the cutting of forests belonging to the state. A clause was inserted by the statesman Colbert, "that in all the forests of the state, oaks should not be felled unless ripe, that is, unable to prosper another thirty years." The present French Forest Code was established in 1827. It intrusts the care of public forests to the Ministry of Finance, under a Director General, assisted by two administrations; one charged with the management of forests, and the sale of their products, and the other with the police of the forests, and the enforcement of forest laws. In the departments there are



thirty-two Conservators, each in charge of one or more departments, according to the extent of forests in each. The immediate supervision is intrusted to Inspectors, who are assisted by sub-inspectors and *Gardes Généraux*, who live near, and personally superintend the work of the forest guards. The latter live in the forests, and act as police over a certain range. They personally observe the operations, and report all infractions of the laws. No timber is cut till marked, and most of the saw-mills are owned by the government, and rented to the wood-merchants. The system has been extended to Algeria, where several rainy days have been added to July and August, by forest culture.]

These details might be extended, but they would not have practical application with us, because our states, as a general rule, own no large forests, and we have no strong central organizations or means of enforcing the stringent regulations which make their system a success. The title to the lands in our older states (where the evils resulting from the loss of forests are liable to be first and most severely felt) has already passed into the hands of individuals, and from the theory of our system of government, the power that must regulate and remedy these evils must begin with the people, and not emanate from a central source. With us, there are no great estates, entailed upon future generations, to keep together, and promising a reasonable hope of reward to the family for a heavy investment in their improvement. Nor is there even a reasonable prospect that the landed estate of a wealthy citizen will pass unimpaired and undivided beyond one generation of his descendants. It should also be remembered that, from the peculiar nature of forest culture, one generation must plant for another to "reap," as the age of a full-grown tree in some species much exceeds that of a human life. The investment for land, planting and protection, must be carried with interest into another century, and for the benefit of a generation unborn.

These considerations present a problem difficult, it may be, of solution, but I have confidence in the ability of our American people to work out a practical system, adapted to our social organization, and our general theory of laws. We must begin at the centre of power, and that centre is the circumference. We must make the people themselves familiar with the facts and the necessities of the case. It must come to be understood that a tree or a forest, planted, is an investment of capital, increasing annually

in value as it grows, like money at interest, and worth at any time what it has cost—including the expense of planting, and the interest which this money would have earned at the given date. The great masses of our rural population and land owners, should be inspired with correct ideas as to the importance of planting and preserving trees, and taught the profits that may be derived from planting waste spots with timber, where nothing else would grow to advantage. They should learn the increased value of farms which have the roadsides lined with avenues of trees, and should understand the worth of the shelter which belts of timber afford to fields, and the general increase of wealth and beauty which the country would realize from the united and well-directed efforts of the owners of land in thus enriching and beautifying their estates.

In this great work of popular education, agricultural societies and kindred associations may do much, by promoting a spirit of emulation, and offering premiums for the most effectual results. In a recent premium list of the Highland and Agricultural Society of Scotland, I notice *fourteen* prizes offered, amounting to one hundred sovereigns, in medals and coin, for approved reports upon the subject of tree culture in its various relations. They have also established a system of examinations, by competent professors of their universities, at which young men may appear and receive certificates of attainment, according to degree, which can scarcely fail to find for them profitable employment by the owners of forest estates. They afford a strong incentive to high ambition, and a conspicuous opportunity for those who seek distinction in a lucrative and honorable employment.

The necessities of European governments have led to the establishment of Schools of Forestry for instruction in the sciences that find application in the growth, preservation and removal of timber, in which an eminently practical system of education is adopted, and the precepts of the class-room directly applied in the operations of the forest. About a dozen such schools exist in Belgium, Denmark, France, Germany and Switzerland. The necessity for special education in this department is sure to arise in our own country, in which perhaps fewer persons will find a special profession in forestry, but a greater number will feel the want of practical instruction in the principles upon which success depends.

Our educators would act wisely in taking this into consideration, in devising plans for new institutions, or revising plans of existing ones, and perhaps some far seeing and enlightened benefactor, of sufficient means, may find in this direction the opportunity of rendering his name familiar in the annals of fame, by establishing a school of forestry, in its most comprehensive sense, for the systematic training of educators and practical engineers, in this inviting field of enterprise, and fully adapted to our American wants and ideas upon this subject.

However much the public may favor, there will still arise the need of laws to regulate, promote and protect the growth of wood; as we find laws necessary in the management of roads and bridges, or of any other great object of public utility. Let us consider some of the measures which a State might adopt for the promotion of this end, without interfering with personal rights, or stepping beyond the line which limits its duty in protecting the rights of its citizens.

1. By withholding from sale such wild and broken lands as might be returned from time to time for non-payment of taxes, when found chiefly or only valuable from the growth of timber, and by establishing laws for its protection, and for realizing to the state or to the county, whatever profits there might arise from the thinning out of timber, so as to preserve the tract as a forest. In this connection I would remark, that a more effectual vigilance would probably be secured, if the benefits belonged to the local administration of the place, as party jealousies and private interests would tend to keep officials under close surveillance, where a state officer, residing at a distance, and not personally known in the locality, would often find his authority ignored, and the public interests in his charge invaded. There should, however, be required an annual report to a state officer, clothed with ample power to enforce a rigid compliance with the laws upon the subject of forests.

2. By exempting from taxation for a limited time, and by offering bounties, for lands planted and enclosed for the growth of forest trees.

3. By offering bounties to counties, towns and individuals, for the greatest number of trees planted in a year, and made to live through the second season.

4. By requiring railroad, turnpike and other road companies,

where valid reasons to the contrary do not exist, to plant the sides of their roads with trees, or empowering town authorities, in case of neglect, to do this at their expense.

5. By imposing a tree-tax, payable in the planting of trees, or a fixed sum for each tree, to be expended only in planting trees. In cities and villages this commutation might be applied under local officers to the improvement of parks or other objects of public utility and ornament.

6. By protecting trees on the way-side, and in public places, as well as on private grounds, from wanton destruction, by adequate penalties, sufficient to restore the loss and pay the injury.

7. By requiring the elements of science applicable to forest culture to be taught in the public schools, and by encouraging it in academies and colleges. This, in the higher grades of schools, would embrace the most approved methods of cultivation, the influences of soil and climate, and the various mathematical, mechanical, physiological and chemical principles involved in the subject. Special schools under national or state patronage might ultimately be founded.

Congress has recently taken action tending to encourage the planting of forests in the territories, where most needed, but might do much more in promoting this great measure of public utility. A few of the states have also done something intended to advance the same object, but without uniformity, and as yet with but very limited result.

With respect to the failure of water supply for hydraulic power, navigation, or city use, until woodland shade can be restored to the sources, we must depend upon *reservoirs*, to retain the surplus floods of winter for summer wants. There are few streams or rivers in the country, where these might not be made to advantage, and in some cases greatly to the improvement of the natural capacity of these streams as they were first known. In the construction and maintenance of these reservoirs for navigable canals or for cities, they should obviously be under the same control as these works themselves, of which they are the essential part. But where needed for hydraulic power only, they could best be intrusted to the management of those who have an interest in them, and government should only provide, by general laws, for the organization and regulation of companies with the corporate powers necessary for their object. As in other cases where pecuniary



values are involved, the vote or power of each owner should be in just proportion to his interest, with the right of appointing a proxy to represent it when desired. Under suitable regulations of law, such associations could scarcely be perverted from their proper object.

There may be cases in which a state would be justified in making reservoirs to improve the hydraulic power of rivers, thus securing solidity of construction, and amplitude of size; and often such improvements might be made before any capital had been invested along the line, or where its amount was too feeble to warrant the expenditure; but the expense should ultimately be taxed upon the interests concerned, and the management should be given up to these interests, as soon as it can safely be done.

In the state of New York, measures have been begun for the preservation of forests, which I may briefly notice. An extensive region north of the Mohawk river and west of Lake Champlain, embracing over two million of acres of land, the Adirondack Mountains, and the sources of the Hudson and other rivers, lies an unbroken wilderness. More than a hundred years have passed since settlements were formed on its southern and eastern border, and more than seventy since it has been entirely surrounded by a belt of improvement embracing some of the best farming lands of the state. Although a scheme of speculation was far advanced before the close of the colonial period, for the settlement of this region, and great sums have since been wasted by capitalists in attempting to develop its agricultural resources, these efforts have uniformly resulted in failure; and, excepting in a few favored spots, the region is still as wild and picturesque as when it was known only as the hunting ground of the native Indian. This uniform failure may be justly ascribed to the scanty sterile soil which covers the surface where the surface is not the naked rock, and to the cold and forbidding character of the climate, due to great elevation and the influences of mountain ranges. Corn and the cultivated fruits would seldom ripen, from the frosts that may happen at any time in the summer, and only hay, oats and potatoes can be grown to advantage where the soil and exposure favors. Yet it is for the most part covered with timber, often of the finest quality, and it is supposed to abound in magnetic iron ores, of which mines are wrought with great profit near the eastern border.

Some twenty years ago, some railroad speculators secured from the state a grant of a quarter of a million of acres, at five cents an acre, yet failed to build the road, or to confer the advantages promised; and since this period almost the whole of the lands in this region have passed into the hands of lumbermen and tanners, leaving at present only about forty thousand acres in the seven counties wholly or partly included in the wilderness. Most of these lands have been repeatedly returned and sold for the non-payment of taxes, and if no more tax sales are held, a large portion will doubtless in a very few years again revert to the state. Through this wilderness lines of navigation extend through lakes and along rivers with slight portages, entirely across, from the Moose and Beaver rivers on the west, to the Saranac and Racket rivers of the northeast. For many years it has been the favorite haunt of parties of sportsmen and those seeking relaxation from the cares of business, by a few weeks' residence in summer, among the wild picturesque scenery and healthful climate of this region. Hotels for summer residence have been built upon the banks of lakes in various places in the interior, and many guides find employment in conducting parties along these rivers and lakes. and in furnishing the supplies and assistance they may need, Roads and telegraphs have been constructed to navigable points in the interior, and every year adds to the number of visitors to this great solitude of woods and waters.

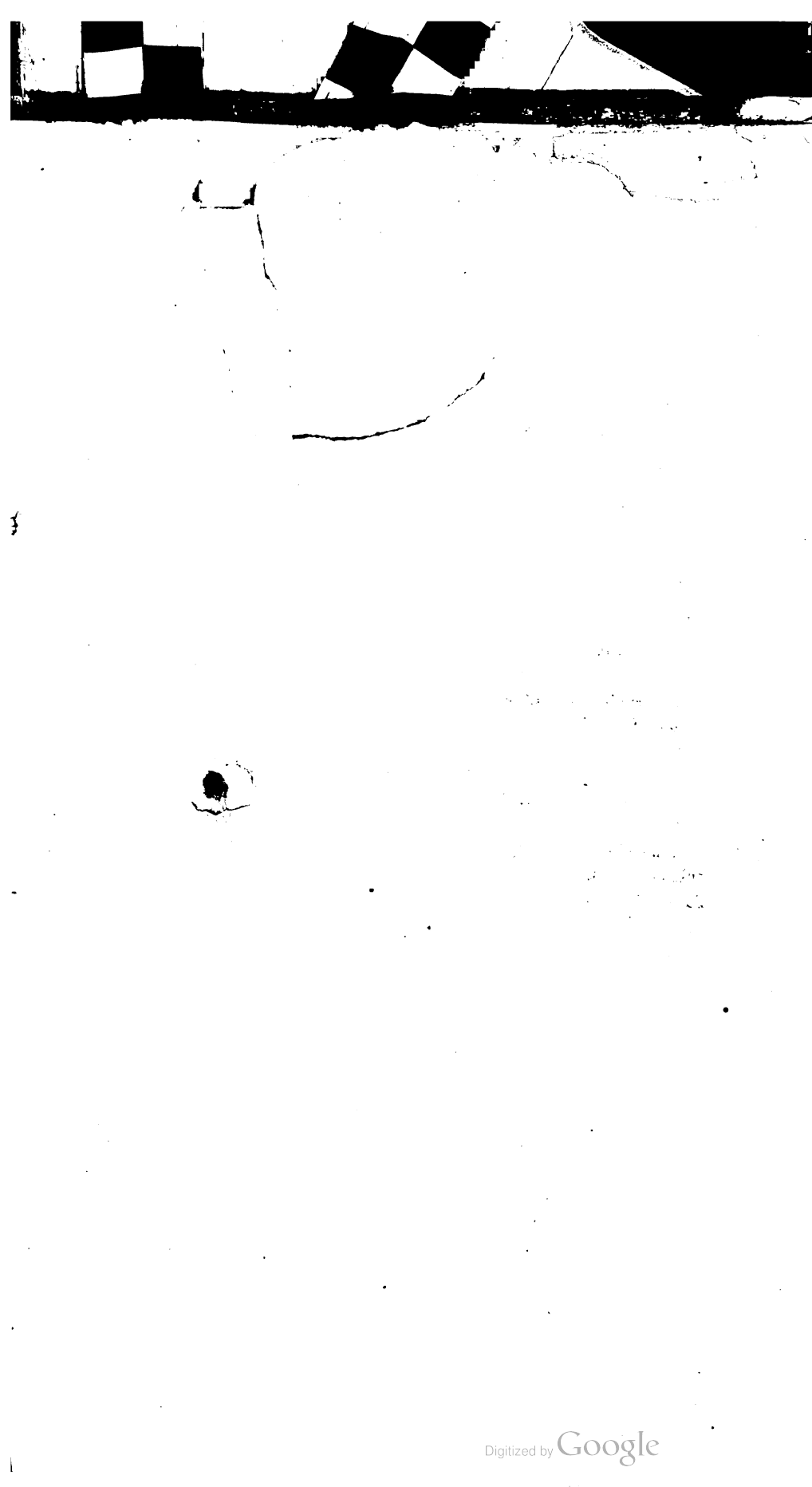
In 1872, the Legislature of New York passed an act creating a Commission of State Parks, and appointing certain persons therein named to examine and report upon the expediency of vesting in the state, the title to the wild and timbered regions lying within Lewis, Essex, Clinton, Franklin, St. Lawrence, Herkimer and Hamilton counties, and to recommend such measures as might be deemed proper, relative thereto. The Commission was to continue two years, and there is a probability that it will be made permanent. Already, at its suggestion, the sale of lands for non-payment of taxes has been ordered to be discontinued, and thus the first step taken towards the accomplishment of its object. The commission will recommend no enclosed grounds, no salaried keepers, and no attempt whatever at ornamentation. There should be stringent laws and adequate penalties against spoliation of timber, or destruction from careless fires; and means of access from various places on lines of thoroughfare should be provided

and maintained. In some cases short canals, with locks for passing boats, might save the labor of a difficult portage, but beyond these there is scarcely more needed for the present.

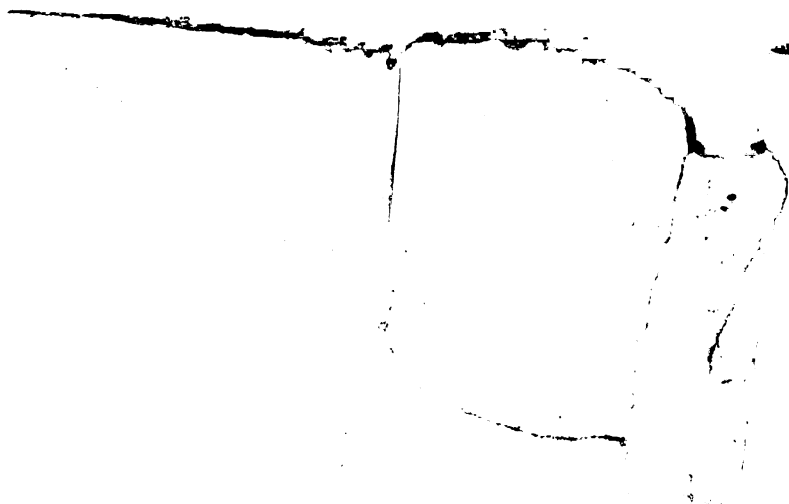
There are, however, important questions involving the supply of water for the state canals; the preservation or restoration of hydraulic power on the rivers; and possibly the future supply of New York City, and the cities and towns along the Hudson with pure water, by an ample aqueduct, from the crystal fountains of the Hudson, which may be properly considered; and a fit opportunity is given for presenting in its strongest light, the importance of protecting forests, and of promoting the growth of trees, on account of their influence upon climate, and upon the general welfare of the state.

These questions are not limited to a particular state, but interest the Nation generally; and I would venture to suggest that this Association might properly take measures for bringing to the notice of our several State Governments, and Congress with respect to the territories, the subject of protection to forests, and their cultivation, regulation and encouragement; and that it appoint a special committee to memorialize these several legislative bodies upon this subject, and to urge its importance.

A measure of public utility thus commended to their notice by this Association, would doubtless receive respectful attention. Its reasons would be brought up for discussion, and the probabilities of the future, drawn from the history of the past, might be presented before the public in their true light. Such a memorial should embrace the draft of a bill, as the form of a law, which should be carefully considered in its various aspects of public interests and private rights, and as best adapted to secure the benefits desired.







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