

facing right

Oil Portrait on Canvas of Dr. Franklin B. Hough of Lowville, New York (1822-1885)

First Forestry Agent, U.S. Dept. of Agriculture, 1876-1881

Firest Chief, Division of Forestry, U.S. Dept. of Agriculture, 1881-1883

Member, First New York State Commission on Adirondack Forest Preserve, 1872

Graduate, Class of 1843, Union College, Schenectady, New York

This portrait is a mirror image of a photograph of Dr. Hough in his later years, which explains why the pen seems to be in his left hand.

The portrait was painted by M. R. DeSantis of New York City.

It was presented on May 29, 1935 to Union College, Schenectady, New York, by the Schenectady County Celebration Committee appointed by Governor Herbert H. Lehman to celebrate 50 years of forest conservation in New York State. (The Adirondack Forest Preserve was first established in May 11, 1885, largely through the influence of Dr. Hough.) (This was just one month before he died.)

A sketch of Dr. Hough's life, written by Dr. Dixon Ryan Fox, President of Union College, was read at the Lewis County celebration of the 50th year of forest conservation in New York State, at Lowville Academy, June 28, 1935.

This photograph of the painting was presented to the Lowville Public Library at that time by Clarence L. Fisher, chairman of the Lewis County Celebration Committee. The negative and other copies of the painting are now in the hands of the Lewis County Historical Society, Lyons Falls, New York (Box 306; 13368). Arthur Einhorn, historian and anthropologist, an instructor at Lowville Academy, is director of the Society.

April 28, 19

Portrait of Franklin B. Hough

facing left

A photographic copy of a large gilt-framed portrait of Franklin B. Hough of Lowville, Lewis County, New York, the first forestry agent hired by the United States Government (August 30, 1876) was made by the U.S. Forest Service in October 1957, at ^{about} the time that the portrait was presented to the Forest Service by a descendant of Dr. Hough. (Dr. Hough was originally a physician by profession.) The portrait was kept in the attic of the South Agriculture Building for quite a few years. Charles E. Randall, of the Information and Education Division staff of the Forest Service, finally gave the portrait to the Library of Congress. (He so informed the History Unit of the Forest Service on April 28, 1976.) The portrait was made when he was in his late 50s or early 60s. He died at 63 in 1885. (On May 6, Mr. Randall recalled that the Library of Congress refused the portrait and it was returned to the South Bldg. att

When the Forest Service History Unit asked the Forest Service photo library for a print of Dr. Hough, one of the two prints was the copy of his portrait. Frank J. Harmon, Acting in Charge of the History Unit, made inquiries about the present location of the portrait but was unable to trace it, between late January and early March of 1976. The Forest Service property office had no record or recollection of the portrait. Neither did the Department of Agriculture property office, and they reported it is not stored anywhere in the Department. The Natural Resources Branch of the National Archives reported that it is not there (phone call Jan. 27 to Douglas Helms). The National Gallery of Art reported it is not there (phone call Feb. 4). The retired Forest Service photo librarian, Leland Prater, reported that he does not recall the portrait, although he said he may have made the copy.

The National Portrait Gallery does not have the portrait, and their catalog 381-5 of American portraits does not list it, according to Mona Dearborn, ext 5861. There is no record that it was ever received by the National Portrait Gallery. If it is found the Gallery would like to know and add it to the national catalog. She suggested calling the Frick Art Reference Library in New York City to see if they have any record of it, but it seemed a remote chance and no call was made. (Call to NPG Feb. 4, 1976). (281-5861). (Curator, 381-5169).

A call Feb. 4 to the Library of Congress was referred to the Division of Prints and Photographs (426-6394). They had two prints of other earlier photographs, of Hough in his late 30s or early 40s, an oval lithograph in a white rectangle, and another photo as an older man which the Forest Service has also, which is apparently the basis for the portrait. Jerry Kearns. 20540. copy of Wendell portraits. If the portrait is found, we should send a copy of the portrait to Linda Neumaier, Catalog of American Portraits, National Portrait Gallery, 8th and F Streets, N.W., Washington, D.C. 20560. The portrait is not in the Hough Collection in Albany, N.Y. The portrait is not at the Cosmos Club, Washington, D.C. Arthur Ringland, long-time member who was first regional forester in the Southwest for the Forest Service, does not remember ever seeing it.

The Smithsonian Institution's Archives of American Art (which is located in the National Portrait Gallery) has only the papers of American artists, and has no paintings. (Call April 28 to 381-6174).

Charles Randall, retired I&E, USFS, does not know present location of portrait. Bluford Muir, retired USFS photo librarian, does not recall seeing the portrait. The portrait was probably given to the Forest Service after the death of Philip R. Hough, a grandson, in 1953. He was a 1917 graduate of the New York State College of Forestry at Syracuse, and was Superintendent of Geo. Washington Birthplace National Monument, Wakefield, Va., 1932-53.

His daughter, Mrs. Barbara Ann Miller of Midlothian, Va., doesn't recall ever seeing (Phone call to her May 6, 1976).

called
F.B.H.
union
college
portrait

facing right

Oil Portrait on Canvas of Dr. Franklin B. Hough of Ioville, New York (1822-1885)

First Forestry Agent, U.S. Dept. of Agriculture, 1876-1881

Eldest Chief, Division of Forestry, U.S. Dept. of Agriculture, 1881-1883

Member, First New York State Commission on Adirondack Forest Preserve, 1872

Graduate, Class of 1843, Union College, Schenectady, New York

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The portrait was painted by M. R. DeSantis of New York City.

It was presented on May 29, 1935 to Union College, Schenectady, New York, by the Schenectady County Celebration Committee appointed by Governor Herbert H. Lehman to celebrate 50 years of forest conservation in New York State. (The Adirondack Forest Preserve was first established in May 11, 1835, largely through the influence of Dr. Hough.) (This was just one month before he died.)

A sketch of Dr. Hough's life, written by Dr. Dixon Ryan Fox, President of Union College, was read at the Lewis County celebration of the 50th year of forest conservation in New York State, at Ioville Academy, June 28, 1935.

This photograph of the painting was presented to the Iovilla Public Library at that time by Clarence L. Fisher, chairman of the Lewis County Celebration Committee. The negative and other copies of the painting are now in the hands of the Lewis County Historical Society, Iyons Falls, New York (Box 306; 13360). Arthur Hammon, historian and anthropologist, an instructor at Ioville Academy, is director of the Society.

From "Forests & Forestry in the American States" by Ralph
Natl Assn. of State Foresters. 1967. Widne

Forestry Pioneers



g up after 1910 fire, Idaho

cut for mine props, Colorado



23. Franklin B. Hough



24. Charles S. Sargent



25. Bernard Fernow



26. John Ashton Warder



27. Joseph T. Rothrock

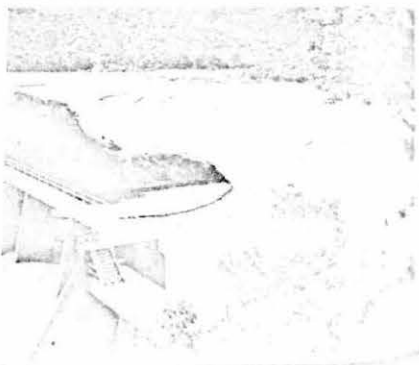


28. J. Sterling Morton



enlock mill destroyed by flood

ilted reservoir after forest fire



ROBERT H. SOMERS

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63 OAKVALE AVE. □ BERKELEY, CA 94705 □ (415) [REDACTED] □ (OFFICE) 848-4253

(1977)

6-12

Dear Frank -

Thanks for
the reprints which
arrived the other
day (of the Hough article).
I'm delighted you have
written this.

Bob Somers

(Great-Grandson of
J B Hough)

Brass Plaque suggested by Bill Hauser.

Legend for Portrait of Dr. Franklin B. Hough drawn by Rudy Wendelin:

(sent to Hauser Aug. 25)

Dr. Franklin B. Hough (1822-1885)

First Federal Forestry Agent, 1876-1881

First Chief, Division of Forestry, 1881-1883

U.S. Department of Agriculture

Photo of Benjamin F. Hough

Portrait by Rudy Wendelin
showing the frame.

F-524990

Item from A.D. Rodgers' biography of B.E. Fernow concerning Franklin B. Hough

In 1874, Hough delivered a series of lectures at Lowville Academy, Lowville, N.Y., and to the New York State Agricultural Society at Albany, N.Y.

Subjects covered included: Tree growth and the physiology of timber; Distribution of forest species; Qualities, chemical properties and special products of various species; Forestry and schools of forestry in Europe; Planting and management, irrigation; climate and its relation to forestry; Timbers in commerce and their supply and demand; Destructive agencies and preservative processes; Ages of timber and time of cutting; Transportation of timber; Forest restoration; Protection afforded by woodlands; Investments and profits, and duties to the present.

Hough planned to deliver these lectures at several agricultural colleges.

(Dr. Harold K. Steen's Chapter I ("Forestry in Agriculture, an Accident of History") of his "A History of the United States Forest Service" (1976, Univ. of Washington Press, Seattle), reports that:

"At home, Hough continued to study forestry during the remainder of 1874 and through 1875, writing papers and presenting a series of lectures at the Lowell Institute of Boston. (Prof. George B.) Emerson (Harvard botanist) attended and gave Hough high praise for his efforts."

Hough also lectured on forestry at the Peabody Institute in Baltimore.

Hough's diaries show that he travelled extensively by railroad throughout the United States during the spring and summer of 1877 to help gather data for his Reports Upon Forestry. As a Government official he was able to ride free.

In December 1878 he travelled through the Great Lakes States and the provinces of eastern Canada to meet officials and gather data.

Dr. John Miller, Hough Mansion, Collins St.,
Lowville, N.Y. 13367

Goodspeeds Book Shop, Inc., 18 Beacon St.,
Boston, Mass. 02108

Lewis County Historical Society, Gould Mansion,
Box 306, Lyons Falls, N.Y. 13368

New York State Library, State Education Dept.,
Albany, N.Y. 12234. James Corsaro, Senior
Librarian, Manuscripts and History Library

History Section, Forest Service, U.S. Dept. of
Agriculture, Washington, D.C. 20250

National Agricultural Library, Beltsville, Md.

From Arthur Einhorn, Director
Gould-Hough Museum & Library
Lewis County Historical Society
Box 266, Little Falls, N.Y.

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PART 1 - WORK ORDER

we had planted on the survey lines, within a more limited range, 53 68-100 miles of Willow-hedging, and one mile of Osage-Orange. The latter utterly died out at the end of the second year."—*J. W. Fell.*

Recent correspondence with the proprietors of Larch-wood represent these plantations as being very thrifty, and that they are extending them annually.

THE FORESTRY OF THE FUTURE.

A Paper Read at the American Forestry Congress, held at Cincinnati, April 27, 1882, by FRANKLIN B. HOUGH, Ph. D., Chief of Forestry Division, Department of Agriculture, Washington, D. C.

WE learn the probabilities of the future from what we know of the past, and reasoning from this experience, let us, on this occasion, look ahead, and strive to learn what the future promises in the way of resources and opportunities, and what are our duties in respect to the waste of forest supplies that we see going on around us.

A century ago, our settlements then scarcely released from colonial dependence, hardly extended a day's journey beyond tide water upon the Atlantic coast, and, if we except the beginnings that had been made within these limits, and the prairies on our western and still almost unknown border—and places here and there made void by fires or other causes—the whole of our territory as then claimed, was one vast forest.

Admitting that this amount was relatively too large for the occupation of civilized man, we must justify its partial clearing, in order to prepare the land for cultivation. But there is a limit beyond which this can not be safely done. If we pass it, we incur dangers not easily restored—for it takes centuries to reproduce what may be destroyed in an hour, and the history of older countries teaches us, that injuries may be done that are utterly beyond the power of man to overcome.

In Europe they have long since learned the importance of this subject, by realizing the dangers that result from going too near the verge of ruin, and in almost every country they adopted systems of management, tending to conservation and supply.

Part I.

They have learned that it is necessary to maintain a certain proportion of woodlands, not only for the growth of trees, for the uses to which they may be applied, but also to secure the incidental benefits resulting from their presence, in their effect upon the climate, and the growth of grains and fruits, and in equalizing the flow of waters for purposes of navigation, hydraulic power, and the supply of cities and towns.

In all Europe, the percentage of woodland area is a little less than 30. In Russia and Finland it is 40, in Sweden and Norway 34.1, in Austria 29.4, in Germany 26.1, in Turkey and Roumania 22.2, in Italy 22, in Switzerland 18, in France 17.3, in Greece 14.3, in Spain 7.3, in Holland and Belgium 7, in Portugal 5.1, in Great Britain 4.1, and in Denmark 3.4.

In most of the countries where the percentage is small dependence is chiefly had upon importation from countries more favored with supplies, and principally from Northern Europe, Canada, and the United States. How long these supplies of Northern Europe will hold out is becoming a matter of anxious inquiry in countries depending upon them to meet their own necessities, and even in these countries themselves, the people are beginning to ask one another—"what shall we do next?"

1881
In a journey made last year in Sweden and Norway, Finland and Russia, I had some opportunity for seeing what these forests are, and are likely to be, if the operations of the past go on for a few years longer. For a hundred miles along the Glommen—and it is doubtless the same in other rivers in Norway—one can see in summer the rapid waters and the eddies of the stream, alive with floating timber, all of which had been peeled, and much of it scarcely larger on an average than our telegraph poles. It is rare that a piece is seen more than a foot in diameter, at the smaller end, and many of them we would scarcely think of using, except for the poles of scaffolding. It has of late years been found more profitable to cut this timber up into narrow floor-boards, and other small lumber before it leaves the country, and heavy timber of large dimensions is now less commonly seen in the markets, or quoted in the trade. The governments have established systems of forest-management in all these countries, for the care of woodlands belonging to the public domain or to municipalities or public institutions, but beyond this, they do not

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generally attempt to dictate in the affairs of individuals, or to restrain them from clearing as they please. In Sweden they have an excellent School of Forestry at Stockholm, and in both Sweden and Norway they have several elementary schools of recent origin, for teaching the rudiments of forest-science. They have recently begun to establish nurseries for selling young forest trees at cost. The timber of this region (chiefly the *Pinus sylvestris*, or Scotch pine, and *Picea excelsa*, or spruce) is of very slow growth, and a tree 70 years old, in poor soil may scarcely measure six inches across the stump. Indeed, in passing through a crown forest in Finland, I could not but remark the smallness of the trees, at an age that with us would have been of twice the diameter, or four times the sectional area.

How long these supplies will satisfy the demands of trade is a question for the future. As they decline, the deficiency will be made up, so far as can be, from North America—certainly not from other countries of Europe, for there is not one of them, excepting on the Baltic, and perhaps Austria, but that imports more than it sells, and some of them, like England, are almost wholly dependent upon commerce for the supply of their timber wants. But with our 50,000,000 of people, our immense system of railways, our vast and growing industries and increasing wants, what can foreign countries depend upon from us? From whence shall we import, as our supplies become short?

The late census, as analyzed in a recent speech in congress by the Honorable Mark H. Dunnell, of Minnesota,* shows that from the estimates of standing timber and the returns of manufactures the supplies of pine in the states of Michigan, Wisconsin, and Minnesota, at present rates of use, will last but about seven years.

These three states constitute the whole of what we are accustomed to call "the great timber region of the Northwest." They deliver to the markets a sufficient amount of lumber to lay an inch floor fifty feet wide around the earth at the equa-

*Delivered March 9. Printed in "Congressional Record" of April 15, 1882. Vol. I—No. 1—2

tor, in a single year, and the amount received at Chicago alone would lay such a floor, fourteen feet wide, in a year.

These estimates, applied to the states of Alabama, Florida, Mississippi, and Texas, shows that the pine might be exhausted in them, at present rates of use in the northwest, in about seventeen years.

But the consumption, instead of being uniform, is going on at a gaining rate, and with this rate the prices must inevitably increase. By the construction of railroads in recent years, the lumbering operations which could formerly be only carried on along floatable streams, are now extended into the interior, and the delivery once dependent upon a favorable winter, and seasonable floods, is now going on at all seasons of the year, and sometimes by night as well as by day.

In speaking of the influence of railroads upon our timber-supply, Mr. Dunnell in the speech already noticed, says:

"The vast and rapidly increasing extent of our railroad system, which at the present moment can scarcely be less than 100,000 miles,* has a most important bearing upon the question of our forest supplies. This effect is not limited to the vast consumption that they occasion, in supplying ties and other timber materials for the new construction and renewals that are constantly going on. These roads are every-where penetrating the timber regions of the country, many of them being built for the express purpose of getting out the timber that was before inaccessible by the old methods of floating upon rivers, or hauling in winter by teams. It is but a comparatively recent period since this feature in lumbering was introduced, and its direct and speedy effect is, to hasten the exhaustion of these supplies that were already going off too fast for the needs of the present and future. The obvious effect of this will be to keep up the supply at the mills, so long as there are forests from whence it can be obtained. They will distribute the manufactured lumber over a wide area and to greater distances, to meet the wants of regions that have already used up their own forest resources, and they will doubtless extend for a little while, the time of apparent 'abundance' and of 'inexhaustible supply.'

"But while they are doing this, they will be every day equalizing the ruin that must inevitably follow this vast and rapidly increasing destruction, that will happen to the country in the near future, unless seasonable and adequate measures are taken to meet

* Actually over 105,000 miles at the beginning of 1882.

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these future wants by extensive and judicious planting, and by effectual measures for economizing our remaining supplies. We shall be soon enough admonished of this necessity, by the rapidly gaining prices of our timber; but it is not wise to wait for this extremity until it is upon us; we should anticipate these wants—for it takes many years for a seeding sprout to become a tree fit for timber and boards!"

I regard this as sound advice based upon valid premises, and acting upon this suggestion, let us attempt to consider what these "seasonable and adequate measures" may be, in order to avoid the injurious consequences that seem to be threatened. They are foreshadowed in the words—"by extensive and judicious planting, and by effectual measures for economizing our remaining supplies."

We will take these as the words of our text, and endeavor to examine them, and understand what they mean. As to *planting*, whether on an "extensive scale" or but a single tree, it is fairly reasonable to assert, that it will never be done excepting by the owner of the land, or by his procuring and for his benefit. It will not be by a tenant, unless he is paid for the service, or is assured of a share of the profit. But in timber-culture, the returns are many years distant, and no planter can expect to cut the full-grown oak that he plants and nurses, nor in his own lifetime expect any other profit from it, than what it gives to the land on which it grows.

Now the whole of our lands, from one end of the country to the other, so far as settlements extend, belonging absolutely to private owners, or will belong to those in occupation, upon the fulfillment of certain conditions promised, and that can not now be changed.

The title is granted or assured to them without any conditions whatever, as to the cultivation or reservation of timber or other crop. In no country in the world, does the government attempt to control private owners in this respect, with the exception of a few cases where public interest is involved, and in these, where a sacrifice of interest is required, the owners are generally paid for it by those who are benefited.

It is among the plainest of probabilities, that neither the National, State, or Local Governments will ever spend money in planting upon private lands, and it is almost as certain that

But they did!

* they will never attempt to re-purchase these lands for purposes of timber-culture. The States might, and sometimes should, retain in their possessions such broken lands as have been abandoned by their owners as not worth the taxes upon them, and adopt measures for their reservation for timber-growth; but we will not here further consider this point.

If, then, the planting so much needed, must be done by the owners of the land, they must be first convinced that there is profit in it, and the present tendencies of the markets appear to indicate, that this conviction will only be brought too soon. But here we would impress a point, as an effectual answer to the remark we so often have made—"that a man can never himself derive any profit from planting trees,—because he may not live till they are grown,—and that a future generation can alone be benefited by this labor."

So far as the actual use of the material goes, this may be true,—but let us consider it in another point of view. "We hold this truth to be self-evident," that a piece of land—perhaps too broken for cultivation, or exhausted from tillage,—or better still, a liberal part of a good sized prairie-farm, as rich in soil as the best around, if carefully and judiciously planted with forest trees, best suited to the conditions, will be worth to the owner after planting, as much more than it was before, as the plantation has cost him. If it could be sold for the former price *plus* this investment, he is so much richer than before. He has added this amount to his capital, and put it at interest. If, from necessity or choice, the property is sold at any time afterwards, it should, and I think very generally would, bring as much more from year to year, as the gain acquired by growth. The holding of this property, implies that the owner has other means to live on, while this portion of his estate is growing, just as in case of other invested capital. No man can hold stocks or bonds bearing interest, or paying dividends, unless he has other means of subsistence, or enough to enable him to wait till the next payment.

Now, to show how this possession will increase in value, I will use a mathematical illustration that I have used before. A tree consists of concentric circles of growth, in some years wider than in others, but for the sake of argument we may fairly assume that they are true circles of equally increasing

width, and, till then, from the exact truth. After that, however, we have to take into account the age of the tree from the time of its planting.

Now circles are easy to draw, and the areas of them (as you know, it) are 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, from the one before, increasing at a constant rate, the first number. The increase is three times as much as the first number.

Now what particular rates?—or what particular rates increase the value of the land? It begins in a small way, and increases in money-value, and is used for stakes, and is large enough for the first number.

In the calculation of a tree thus gains in height, and the value on account of its growth to which it may be added.

It is further true that the value of the land increases as they become more valuable in order to make the land more valuable. It is sold in most cases for more than its value, leaving the value of the estate.

The rate of increase of the soil in which the trees are planted is the kinds of trees under the given conditions.

We will now see how the value will bear more

width, and, till the tree approaches maturity, this is not far from the exact truth. If we count these circles from the center out, we have the series 1, 2, 3, 4, 5, 6, etc., representing the age of the tree from year to year.

Now circles are to each other, as the squares of their radii, and the areas of these circles (each including what is within it), are 1, 4, 9, 16, 25, 36, etc. By subtracting each of these from the one before it, we have the actual gain in sectional areas from year to year, in the series 3, 5, 7, 9, 11, 13, 15, etc., increasing at a common interval of 2, or at double the rate of the first number. In other words—in the fifth year the increase is three times as much as the second, the seventh three times as much as the third, and so on.

Now what particular farm crop gains from year to year at these rates?—or what railroad, mining, or other stock companies increase their capital in this way? It is true that it begins in a small quantity, but it is not long before it has a money-value, and produces in succession a growth that can be used for stakes, poles, rafters, posts, and so along up to timber large enough for framing, and sawing into boards.

In the calculation just made, we have not noticed that while a tree thus gains in sectional area and volume, it is growing in height, and the wood is increasing in value per cubic foot, on account of its better quality, and the more important uses to which it may be applied.

It is further true, that the trees must become fewer in number as they become larger, by the thinning out of a part, in order to make room for the rest. But these thinnings themselves have value almost from the first, and as wood is now sold in most countries in Europe, they have a market price that more than pays for all the cost of planting and management, leaving the growing crop to represent the clear growing value of the estate.

The rate of this gain, depends upon the goodness of the soil in which the trees grow, and we take the words "judicious planting" in our text to mean, the intelligent selection of the kinds of trees that will bring the most profit to the owner under the given conditions.

We will not try to prove the self-evident fact, that rich land will bear more timber than poor land, nor deny that land may

be so poor, or the climate so dry, that it will bear nothing. But we should not grudge the use of good, rich prairie soil to trees, and the rings of growth, and the rates of gain, will be so much the greater for it.

In a soil once fertile, but exhausted by improvident tillage, the loss of fertility applies chiefly to the surface, and if we go below the distance that the roots of the grain extended, we may generally find a sub-soil still rich in the elements that give rigor to the growth of plants. In the approved modes of agriculture, we seek to reach and bring up this sub-soil by deep plowing. The roots of trees can do it better, because they can go deeper. In ledgy and broken ground, they can insinuate themselves into crevices that have been filled with rich soil washed in from the surface, and that we could never use by any other means.

Again, there may be a surface-soil that never has been cultivated, and never could be, underlaid by a sub-soil that is of itself still more worthless, and yet there may be conditions that render this a splendid opportunity for the growth of trees. I will ask a few moments indulgence to illustrate this apparent absurdity:

In the course of a journey made last summer in Europe, for the purpose of gaining information on the subject of Forestry, there was nothing in the whole ten thousand miles of travel upon the continent that interested me more than the Dunes and the Landes of Southwestern France.

The "Dunes" are sand hills that stretch for a hundred miles along the coast, between the Gironde and the Adour, from one to six miles wide, and from one hundred to two hundred and fifty feet high. They were sands cast up from the sea—utterly naked—shifting with every gale of wind, always changing in form, and creeping inland more and more. By closing the mouths of streams, they formed a series of ponds behind them. Between the rivers above named lay the "Landes"—a vast region almost level—the first twenty inches or two feet of the soil almost pure sand, and below this an indurated stratum of about equal thickness of hard-pan, and still below, pure sand to a great depth. This hard layer was wholly impervious to water, and in the heavy winter rains, this entire region was half inundated. As the natural drainage was ob-

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structed, the waters slowly evaporated in the heats of summer, breeding malarial fevers every year. The few wretched inhabitants became accustomed from childhood to walk upon stilts, by which means alone they could lead their hungry flocks to pick the scanty herbage that grew here and there on that desolate waste.

In 1785, *Nicholas Brémontier*, an Engineer, undertook to plant the Dunes with the Maritime Pine, and now the whole of these shifting sands along the shore (about 148,200 acres in amount), are planted with forest-trees. I can not here describe the ingenious methods by which this was done, and is maintained; a monument erected many years ago at La Teste, in the midst of the pines that Brémontier planted, tells what is thought of *him* in that region.

But the desolate Landes still remained a wretched waste, alternately inundated in winter, parched with summer heat, and haunted every year with fevers. There were difficulties other than what we have mentioned, in its soil of sterile sand and solid bed of hard-pan. It was chiefly owned by the Communes, and the inhabitants had common property and rights of usage. They might wade from place to place where they pleased, and pasture their sheep wherever they could find a little herbage, all having equal rights within these local public lands.

They were extremely ignorant, wholly illiterate, superstitious, jealous of innovations, and knew of no better ways than those of their fathers. There were plans of various kinds devised from time to time for improvement, but nothing could be done without the consent of the local authorities. There could not be found perhaps a stronger combination of circumstances against improvements of any kind, either in the condition of the soil, the title, or the prejudices of an ignorant people.

About a third of a century ago, a Government Engineer, still living, named CHAMBRELENT, was sent into this region to lay out the work of some canals, for connecting the ponds behind the Dunes. An accident suggested to him the study of this subject of improving the Landes, by planting the Maritime Pine. This tree was a native of that region, but

had not seeded itself upon the half-drowned portion, because the seed could not get sprouted until midsummer, and then they perished. If they could get started in the spring, the trees would "grow like weeds."

So in June, 1849, he bought 500 hectares (1,235 acres) in the midst of the poorest part, and caused it to be drained by broad shallow ditches—a work easily done in the sand—and it was not difficult to lay them out so that they slightly descended toward the sea. The heavy winter rains almost immediately drained into these ditches, and the surface remained dry. The water slowly flowed away, in a limpid stream, without erosion or obstruction, and he could now sow his seed, so as to catch the first warmth of spring. Success attended his first efforts, and the very first season, saw the whole surface waving in the wind, a stout growth of very small forest-trees.

He persuaded an Insurance Company to make a large investment in land, and in its drainage and planting. In 1855, five years after his first seed were planted, over 50,000 acres had been drained, and his first plantation was twelve feet high, and well developed. Specimens were sent to the Universal Exhibition at Paris the next year, and this led to the appointment of a committee of the Institute to go down and see for themselves. Their report led to the passage of a law in 1857, allowing the Communes to sell a part of their lands, and to expend the money in draining and planting the remainder.

It was at once found by speculators that there was "money in it," and the price of land went up several hundred per cent. A general plan of drainage was laid out, with very large main and smaller secondary canals, and the lands that were sold, as well as those retained by the Communes, were put under the new improvement as fast as the drainage progressed. The very superstitions of the people hastened the operation, because they thought that whenever Chambrelent advised, there was *luck in it*. And now mark the result:—There are at the present time a million and a half of acres of Maritime Pine on the Landes. It has already grown so large as to furnish abundantly fire wood, charcoal, staves, telegraph poles, posts,

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railway ties, mining props, hewn timber and sawn lumber.* Along the railroad between Bordeaux and Bayonne we see at every station the evidences of this in great piles of pine

*A publication of the Forest Administration, issued in 1878, entitled "*Notice sur le débit et les emplois des principales Espèces de Pins*," gives the following summary of the work of planting the Landes:

"It is shown from official reports, that on the vast triangle formed by the shore, the Gironde and Adour, the surface actually wooded, amounts to 711,525 hectares (1,757,467 acres), viz:

"Of the Landes sown since 1857, 616,526 hectares (1,522,817 acres).

"Of the Landes sown before 1857, 35,000 hectares (86,750 acres).

"The Dunes, 60,000 hectares (148,200 acres).

"The sowing done since 1857, now averages 18 years old, and the product in wood is already very great. Perhaps some might fear that the large amount already sown would reduce the price; but by a phenomenon in trade that is easily explained, the outlet has increased with the production. Not only this, the price has increased, since that which sold ten years ago, at the rate of 35 francs, now brings 55 francs. This partly comes from using up the small pieces taken out in the trimmings, which a few years ago were left on the ground. Many roads now traverse the Landes in all directions; they are making railways, and the means of communication are increasing still more rapidly the production of wood. Thanks to these facilities for freight, and the nearness to a great commercial center like Bordeaux, where capital is abundant, and can never lie unproductive, the wood of the Landes, when worked, is being sent not only to ports of France, but to England, Belgium, Switzerland and even America. Firewood is sent in great quantities from Bordeaux to Paris. Stakes, poles, etc. are supplied for the vineyards, which cover 190,000 hectares (469,300 acres in Gironde, and 200,000 hectares (494,000 acres) in Charantes. Since 1870, mine-props have been in growing demand in England and Belgium. Telegraph poles are sent to various parts of Europe, and so of other articles to a great extent.

"These facts are proved in a very evident manner from the business done by the 'Compagnie du Midi,' which shows that this railroad took off from its stations upon the Landes—

"In 1875, 357,719 tons of wood.

"In 1876, 453,880 " "

"Besides this, there should be added the amount going to Bordeaux by land, and that sent out by the Adour. The actual production is 600,000 tons a year, for the various uses noticed, and it may be safely estimated, that when the 60,000 hectares on the Dunes become fully productive, the yield will be increased at least four fold, a market still opening as it increases, for all of these products."

This report presents in detail the prices and dimensions of the various articles produced. One of these is broom-handles, of which about 15,000,000 are made every year at Bordeaux, from the young pines that are

wood and lumber of every kind, awaiting its chance of delivery, and every day they send off long trains heavily loaded with these forest products that have grown since 1850, and some within less time. There are saw-mills, wood-working establishments, works for reducing wood to paper-pulp, charcoal kilns and turpentine distilleries, and all along the way for more than seventy miles, we see among the thrifty young woodlands, the trees now from six inches to a foot in diameter, in full course of working for the production of turpentine. For this, long shallow incisions are made, but little wider than a hand, but extending up some twelve or fifteen feet high, and when the tree is to be cut soon, several to a tree, with as much of bark between them.

They are not such wounds as we see in our southern forests, that will kill the trees in four or five years. Instead of cutting a great hole into the wood to receive the turpentine, it flows down into earthen jars suspended to the tree, and which are emptied from time to time. These strips, after a time, are allowed to grow over, and then are cut again, so that they go on producing for thirty or forty years, and then when cut for timber the wood will be better for some uses than before.

(To be completed in the next number.)

thinned out, and were formerly thrown away. They are sent in large quantities to various countries in Europe, to both Americas and Australia. The railway ties are of no value without being injected, by the Boucherie process (sulphate of copper), and, to some extent, by other methods. They are used throughout Western France, and in Algeria and Spain. Their cost and durability, when compared with oak and beech, are as follows:

Oak (not prepared), 5 francs each, will last 15 years.
Beech (prepared), 4 francs, 80 cents each, will last 12 to 15 years.
Pine (prepared), 3 francs, 25 cents each, will last 10 years.

A process of preparation by the vapor of water and creosote, and another by external carbonization had been more recently introduced. The telegraph poles prepared by the Boucherie process, either in close vessels or by pressure, were sent to all parts of France, England, Belgium, Switzerland, Spain and Algeria. They should be at least 25-year-old timber, and varied from 1 to 6 francs in price, and from 6.5 to 12 meters in length.

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we had planted on the survey lines, within a more limited range, 53 68-100 miles of Willow-hedging, and one mile of Osage-Orange. The latter utterly died out at the end of the second year."—*J. W. Fell.*

Recent correspondence with the proprietors of Larch-wood represent these plantations as being very thrifty, and that they are extending them annually.

THE FORESTRY OF THE FUTURE.

A Paper Read at the American Forestry Congress, held at Cincinnati, April 27, 1882, by FRANKLIN B. HOUGH, Ph. D., Chief of Forestry Division, Department of Agriculture, Washington, D. C.

WE learn the probabilities of the future from what we know of the past, and reasoning from this experience, let us, on this occasion, look ahead, and strive to learn what the future promises in the way of resources and opportunities, and what are our duties in respect to the waste of forest supplies that we see going on around us.

A century ago, our settlements then scarcely released from colonial dependence, hardly extended a day's journey beyond tide water upon the Atlantic coast, and, if we except the beginnings that had been made within these limits, and the prairies on our western and still almost unknown border—and places here and there made void by fires or other causes—the whole of our territory as then claimed, was one vast forest.

Admitting that this amount was relatively too large for the occupation of civilized man, we must justify its partial clearing, in order to prepare the land for cultivation. But there is a limit beyond which this can not be safely done. If we pass it, we incur dangers not easily restored—for it takes centuries to reproduce what may be destroyed in an hour, and the history of older countries teaches us, that injuries may be done that are utterly beyond the power of man to overcome.

In Europe they have long since learned the importance of this subject, by realizing the dangers that result from going too near the verge of ruin, and in almost every country they adopted systems of management, tending to conservation and supply.

Part I.

They have learned that it is necessary to maintain a certain proportion of woodlands, not only for the growth of trees, for the uses to which they may be applied, but also to secure the incidental benefits resulting from their presence, in their effect upon the climate, and the growth of grains and fruits, and in equalizing the flow of waters for purposes of navigation, hydraulic power, and the supply of cities and towns.

In all Europe, the percentage of woodland area is a little less than 30. In Russia and Finland it is 40, in Sweden and Norway 34.1, in Austria 29.4, in Germany 26.1, in Turkey and Roumania 22.2, in Italy 22, in Switzerland 18, in France 17.3, in Greece 14.3, in Spain 7.3, in Holland and Belgium 7, in Portugal 5.1, in Great Britain 4.1, and in Denmark 3.4.

In most of the countries where the percentage is small dependence is chiefly had upon importation from countries more favored with supplies, and principally from Northern Europe, Canada, and the United States. How long these supplies of Northern Europe will hold out is becoming a matter of anxious inquiry in countries depending upon them to meet their own necessities, and even in these countries themselves, the people are beginning to ask one another—"what shall we do next?"

In a journey made last year in Sweden and Norway, Finland and Russia, I had some opportunity for seeing what these forests are, and are likely to be, if the operations of the past go on for a few years longer. For a hundred miles along the Glommen—and it is doubtless the same in other rivers in Norway—one can see in summer the rapid waters and the eddies of the stream, alive with floating timber, all of which had been peeled, and much of it scarcely larger on an average than our telegraph poles. It is rare that a piece is seen more than a foot in diameter, at the smaller end, and many of them we would scarcely think of using, except for the poles of scaffolding. It has of late years been found more profitable to cut this timber up into narrow floor-boards, and other small lumber before it leaves the country, and heavy timber of large dimensions is now less commonly seen in the markets, or quoted in the trade. The governments have established systems of forest-management in all these countries, for the care of woodlands belonging to the public domain or to municipalities or public institutions, but beyond this, they do not

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generally attempt to dictate in the affairs of individuals, or to restrain them from clearing as they please. In Sweden they have an excellent School of Forestry at Stockholm, and in both Sweden and Norway they have several elementary schools of recent origin, for teaching the rudiments of forest-science. They have recently begun to establish nurseries for selling young forest trees at cost. The timber of this region (chiefly the *Pinus sylvestris*, or Scotch pine, and *Picea excelsa*, or spruce) is of very slow growth, and a tree 70 years old, in poor soil may scarcely measure six inches across the stump. Indeed, in passing through a crown forest in Finland, I could not but remark the smallness of the trees, at an age that with us would have been of twice the diameter, or four times the sectional area.

How long these supplies will satisfy the demands of trade is a question for the future. As they decline, the deficiency will be made up, so far as can be, from North America—certainly not from other countries of Europe, for there is not one of them, excepting on the Baltic, and perhaps Austria, but that imports more than it sells, and some of them, like England, are almost wholly dependent upon commerce for the supply of their timber wants. But with our 50,000,000 of people, our immense system of railways, our vast and growing industries and increasing wants, what can foreign countries depend upon from us? From whence shall we import, as our supplies become short?

The late census, as analyzed in a recent speech in congress by the Honorable Mark H. Dunnell, of Minnesota,* shows that from the estimates of standing timber and the returns of manufactures the supplies of pine in the states of Michigan, Wisconsin, and Minnesota, at present rates of use, will last but about seven years.

These three states constitute the whole of what we are accustomed to call "the great timber region of the Northwest." They deliver to the markets a sufficient amount of lumber to lay an inch floor fifty feet wide around the earth at the equa-

* Delivered March 9. Printed in "Congressional Record" of April 15, 1882.

tor, in a single year, and the amount received at Chicago alone would lay such a floor, fourteen feet wide, in a year.

These estimates, applied to the states of Alabama, Florida, Mississippi, and Texas, shows that the pine might be exhausted in them, at present rates of use in the northwest, in about seventeen years.

But the consumption, instead of being uniform, is going on at a gaining rate, and with this rate the prices must inevitably increase. By the construction of railroads in recent years, the lumbering operations which could formerly be only carried on along floatable streams, are now extended into the interior, and the delivery once dependent upon a favorable winter, and seasonable floods, is now going on at all seasons of the year, and sometimes by night as well as by day.

In speaking of the influence of railroads upon our timber-supply, Mr. Dunnell in the speech already noticed, says:

"The vast and rapidly increasing extent of our railroad system, which at the present moment can scarcely be less than 100,000 miles,* has a most important bearing upon the question of our forest supplies. This effect is not limited to the vast consumption that they occasion, in supplying ties and other timber materials for the new construction and renewals that are constantly going on. These roads are every-where penetrating the timber regions of the country, many of them being built for the express purpose of getting out the timber that was before inaccessible by the old methods of floating upon rivers, or hauling in winter by teams. It is but a comparatively recent period since this feature in lumbering was introduced, and its direct and speedy effect is, to hasten the exhaustion of these supplies that were already going off too fast for the needs of the present and future. The obvious effect of this will be to keep up the supply at the mills, so long as there are forests from whence it can be obtained. They will distribute the manufactured lumber over a wide area and to greater distances, to meet the wants of regions that have already used up their own forest resources, and they will doubtless extend for a little while, the time of apparent 'abundance' and of 'inexhaustible supply.'

"But while they are doing this, they will be every day equalizing the ruin that must inevitably follow this vast and rapidly increasing destruction, that will happen to the country in the near future, unless seasonable and adequate measures are taken to meet

* Actually over 105,000 miles at the beginning of 1882.

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these future wants by extensive and judicious planting, and by
effectual measures for economizing our remaining supplies. We
shall be soon enough admonished of this necessity, by the rapidly
gaining prices of our timber; but it is not wise to wait for this ex-
tremity until it is upon us; we should anticipate these wants—for it
takes many years for a seeding sprout to become a tree fit for tim-
ber and boards!"

I regard this as sound advice based upon valid premises,
and acting upon this suggestion, let us attempt to consider
what these "seasonable and adequate measures" may be, in
order to avoid the injurious consequences that seem to be
threatened. They are foreshadowed in the words—"by ex-
tensive and judicious planting, and by effectual measures for
economizing our remaining supplies."

We will take these as the words of our text, and endeavor
to examine them, and understand what they mean. As to
planting, whether on an "extensive scale" or but a single tree,
it is fairly reasonable to assert, that it will never be done ex-
cepting by the owner of the land, or by his procuring and for
his benefit. It will not be by a tenant, unless he is paid for
the service, or is assured of a share of the profit. But in tim-
ber-culture, the returns are many years distant, and no planter
can expect to cut the full-grown oak that he plants and nurses,
nor in his own lifetime expect any other profit from it, than
what it gives to the land on which it grows.

Now the whole of our lands, from one end of the country
to the other, so far as settlements extend, belonging absolutely
to private owners, or will belong to those in occupation, upon
the fulfillment of certain conditions promised, and that can
not now be changed.

The title is granted or assured to them without any condi-
tions whatever, as to the cultivation or reservation of timber
or other crop. In no country in the world, does the govern-
ment attempt to control private owners in this respect, with
the exception of a few cases where public interest is involved,
and in these, where a sacrifice of interest is required, the
owners are generally paid for it by those who are benefited.

It is among the plainest of probabilities, that neither the
National, State, or Local Governments will ever spend money
in planting upon private lands, and it is almost as certain that

they will never attempt to re-purchase these lands for purposes of timber-culture. The States might, and sometimes should, retain in their possessions such broken lands as have been abandoned by their owners as not worth the taxes upon them, and adopt measures for their reservation for timber-growth; but we will not here further consider this point.

If, then, the planting so much needed, must be done by the owners of the land, they must be first convinced that there is profit in it, and the present tendencies of the markets appear to indicate, that this conviction will only be brought too soon. But here we would impress a point, as an effectual answer to the remark we so often have made—"that a man can never himself derive any profit from planting trees,—because he may not live till they are grown,—and that a future generation can alone be benefited by this labor."

So far as the actual use of the material goes, this may be true,—but let us consider it in another point of view. "We hold this truth to be self-evident," that a piece of land—perhaps too broken for cultivation, or exhausted from tillage,—or better still, a liberal part of a good sized prairie-farm, as rich in soil as the best around, if carefully and judiciously planted with forest trees, best suited to the conditions, will be worth to the owner after planting, as much more than it was before, as the plantation has cost him. If it could be sold for the former price *plus* this investment, he is so much richer than before. He has added this amount to his capital, and put it at interest. If, from necessity or choice, the property is sold at any time afterwards, it should, and I think very generally would, bring as much more from year to year, as the gain acquired by growth. The holding of this property, implies that the owner has other means to live on, while this portion of his estate is growing, just as in case of other invested capital. No man can hold stocks or bonds bearing interest, or paying dividends, unless he has other means of subsistence, or enough to enable him to wait till the next payment.

Now, to show how this possession will increase in value, I will use a mathematical illustration that I have used before. A tree consists of concentric circles of growth, in some years wider than in others, but for the sake of argument we may fairly assume that they are true circles of equally increasing

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width, and, till the tree approaches maturity, this is not far from the exact truth. If we count these circles from the center out, we have the series 1, 2, 3, 4, 5, 6, etc., representing the age of the tree from year to year.

Now circles are to each other, as the squares of their radii, and the areas of these circles (each including what is within it), are 1, 4, 9, 16, 25, 36, etc. By subtracting each of these from the one before it, we have the actual gain in sectional areas from year to year, in the series 3, 5, 7, 9, 11, 13, 15, etc., increasing at a common interval of 2, or at double the rate of the first number. In other words—in the fifth year the increase is three times as much as the second, the seventh three times as much as the third, and so on.

Now what particular farm crop gains from year to year at these rates?—or what railroad, mining, or other stock companies increase their capital in this way? It is true that it begins in a small quantity, but it is not long before it has a money-value, and produces in succession a growth that can be used for stakes, poles, rafters, posts, and so along up to timber large enough for framing, and sawing into boards.

In the calculation just made, we have not noticed that while a tree thus gains in sectional area and volume, it is growing in height, and the wood is increasing in value per cubic foot, on account of its better quality, and the more important uses to which it may be applied.

It is further true, that the trees must become fewer in number as they become larger, by the thinning out of a part, in order to make room for the rest. But these thinnings themselves have value almost from the first, and as wood is now sold in most countries in Europe, they have a market price that more than pays for all the cost of planting and management, leaving the growing crop to represent the clear growing value of the estate.

The rate of this gain, depends upon the goodness of the soil in which the trees grow, and we take the words "judicious planting" in our text to mean, the intelligent selection of the kinds of trees that will bring the most profit to the owner under the given conditions.

We will not try to prove the self-evident fact, that rich land will bear more timber than poor land, nor deny that land may

be so poor, or the climate so dry, that it will bear nothing. But we should not grudge the use of good, rich prairie soil to trees, and the rings of growth, and the rates of gain, will be so much the greater for it.

In a soil once fertile, but exhausted by improvident tillage, the loss of fertility applies chiefly to the surface, and if we go below the distance that the roots of the grain extended, we may generally find a sub-soil still rich in the elements that give vigor to the growth of plants. In the approved modes of agriculture, we seek to reach and bring up this sub-soil by deep plowing. The roots of trees can do it better, because they can go deeper. In ledgy and broken ground, they can insinuate themselves into crevices that have been filled with rich soil washed in from the surface, and that we could never use by any other means.

Again, there may be a surface-soil that never has been cultivated, and never could be, underlaid by a sub-soil that is of itself still more worthless, and yet there may be conditions that render this a splendid opportunity for the growth of trees. I will ask a few moments indulgence to illustrate this apparent absurdity:

In the course of a journey made last summer in Europe, for the purpose of gaining information on the subject of Forestry, there was nothing in the whole ten thousand miles of travel upon the continent that interested me more than the Dunes and the Landes of Southwestern France.

The "Dunes" are sand hills that stretch for a hundred miles along the coast, between the Gironde and the Adour, from one to six miles wide, and from one hundred to two hundred and fifty feet high. They were sands cast up from the sea—utterly naked—shifting with every gale of wind, always changing in form, and creeping inland more and more. By closing the mouths of streams, they formed a series of ponds behind them. Between the rivers above named lay the "Landes"—a vast region almost level—the first twenty inches or two feet of the soil almost pure sand, and below this an indurated stratum of about equal thickness of hard-pan, and still below, pure sand to a great depth. This hard layer was wholly impervious to water, and in the heavy winter rains, this entire region was half inundated. As the natural drainage was ob-

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alternately inundated in winter, parched with summer heat,
and haunted every year with fevers. There were difficulties
other than what we have mentioned, in its soil of sterile sand
and solid bed of hard-pan. It was chiefly owned by the Com-
munes, and the inhabitants had common property and rights
of usage. They might wade from place to place where they
pleased, and pasture their sheep wherever they could find a
little herbage, all having equal rights within these local public
lands.

They were extremely ignorant, wholly illiterate, supersti-
tious, jealous of innovations, and knew of no better ways
than those of their fathers. There were plans of various kinds
devised from time to time for improvement, but nothing could
be done without the consent of the local authorities. There
could not be found perhaps a stronger combination of cir-
cumstances against improvements of any kind, either in the
condition of the soil, the title, or the prejudices of an igno-
rant people.

About a third of a century ago, a Government Engineer,
still living, named CHAMBRELENT, was sent into this region to
lay out the work of some canals, for connecting the ponds
behind the Dunes. An accident suggested to him the study
of this subject of improving the Landes, by planting the
Maritime Pine. This tree was a native of that region, but

had not seeded itself upon the half-drowned portion, because the seed could not get sprouted until midsummer, and then they perished. If they could get started in the spring, the trees would "grow like weeds."

So in June, 1849, he bought 500 hectares (1,235 acres) in the midst of the poorest part, and caused it to be drained by broad shallow ditches—a work easily done in the sand—and it was not difficult to lay them out so that they slightly descended toward the sea. The heavy winter rains almost immediately drained into these ditches, and the surface remained dry. The water slowly flowed away, in a limpid stream, without erosion or obstruction, and he could now sow his seed, so as to catch the first warmth of spring. Success attended his first efforts, and the very first season, saw the whole surface waving in the wind, a stout growth of very small forest-trees.

He persuaded an Insurance Company to make a large investment in land, and in its drainage and planting. In 1855, five years after his first seed were planted, over 50,000 acres had been drained, and his first plantation was twelve feet high, and well developed. Specimens were sent to the Universal Exhibition at Paris the next year, and this led to the appointment of a committee of the Institute to go down and see for themselves. Their report led to the passage of a law in 1857, allowing the Communes to sell a part of their lands, and to expend the money in draining and planting the remainder.

It was at once found by speculators that there was "money in it," and the price of land went up several hundred per cent. A general plan of drainage was laid out, with very large main and smaller secondary canals, and the lands that were sold, as well as those retained by the Communes, were put under the new improvement as fast as the drainage progressed. The very superstitions of the people hastened the operation, because they thought that whenever Chambrelent advised, there was *luck in it*. And now mark the result:—There are at the present time a million and a half of acres of Maritime Pine on the Landes. It has already grown so large as to furnish abundantly fire wood, charcoal, staves, telegraph poles, posts,

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railway ties, mining props, hewn timber and sawn lumber.*
Along the railroad between Bordeaux and Bayonne we see
at every station the evidences of this in great piles of pine

*A publication of the Forest Administration, issued in 1878, entitled
"Notice sur le débit et les emplois des principales Espèces de Pins," gives the
following summary of the work of planting the Landes:

"It is shown from official reports, that on the vast triangle formed by
the shore, the Gironde and Adour, the surface actually wooded, amounts
to 711,525 hectares (1,757,467 acres), viz:

"Of the Landes sown since 1857, 616,526 hectares (1,522,817 acres).

"Of the Landes sown before 1857, 35,000 hectares (86,750 acres):

"The Dunes, 60,000 hectares (148,200 acres).

"The sowing done since 1857, now averages 18 years old, and the pro-
duct in wood is already very great. Perhaps some might fear that the
large amount already sown would reduce the price; but by a phenome-
non in trade that is easily explained, the outlet has increased with the
production. Not only this, the price has increased, since that which sold
ten years ago, at the rate of 35 francs, now brings 55 francs. This partly
comes from using up the small pieces taken out in the trimmings, which
a few years ago were left on the ground. Many roads now traverse the
Landes in all directions; they are making railways, and the means of
communication are increasing still more rapidly the production of wood.
Thanks to these facilities for freight, and the nearness to a great com-
mercial center like Bordeaux, where capital is abundant, and can never
lie unproductive, the wood of the Landes, when worked, is being sent not
only to ports of France, but to England, Belgium, Switzerland and even
America. Firewood is sent in great quantities from Bordeaux to Paris.
Stakes, poles, etc. are supplied for the vineyards, which cover 190,000 hec-
tares (469,300 acres in Gironde, and 200,000 hectares (494,000 acres) in
Charantes. Since 1870, mine-props have been in growing demand in Eng-
land and Belgium. Telegraph poles are sent to various parts of Europe,
and so of other articles to a great extent.

"These facts are proved in a very evident manner from the business done
by the 'Compagnie du Midi,' which shows that this railroad took off
from its stations, upon the Landes—

"In 1875, 357,719 tons of wood.

"In 1876, 453,880 " "

"Besides this, there should be added the amount going to Bordeaux by
land, and that sent out by the Adour. The actual production is 600,000
tons a year, for the various uses noticed, and it may be safely estimated,
that when the 60,000 hectares on the Dunes become fully productive, the
yield will be increased at least four fold, a market still opening as it in-
creases, for all of these products."

This report presents in detail the prices and dimensions of the various
articles produced. One of these is broom-handles, of which about 15,
000,000 are made every year at Bordeaux, from the young pines that are

wood and lumber of every kind, awaiting its chance of delivery, and every day they send off long trains heavily loaded with these forest products that have grown since 1850, and some within less time. There are saw-mills, wood-working establishments, works for reducing wood to paper-pulp, charcoal kilns and turpentine distilleries, and all along the way for more than seventy miles, we see among the thrifty young woodlands, the trees now from six inches to a foot in diameter, in full course of working for the production of turpentine. For this, long shallow incisions are made, but little wider than a hand, but extending up some twelve or fifteen feet high, and when the tree is to be cut soon, several to a tree, with as much of bark between them.

They are not such wounds as we see in our southern forests, that will kill the trees in four or five years. Instead of cutting a great hole into the wood to receive the turpentine, it flows down into earthen jars suspended to the tree, and which are emptied from time to time. These strips, after a time, are allowed to grow over, and then are cut again, so that they go on producing for thirty or forty years, and then when cut for timber the wood will be better for some uses than before.

(To be completed in the next number.)

thinned out, and were formerly thrown away. They are sent in large quantities to various countries in Europe, to both Americas and Australia.

The railway ties are of no value without being injected, by the Boucherie process (sulphate of copper), and, to some extent, by other methods. They are used throughout Western France, and in Algeria and Spain. Their cost and durability, when compared with oak and beech, are as follows:

Oak (not prepared), 5 francs each, will last 15 years.

Beech (prepared), 4 francs, 80 cents each, will last 12 to 15 years.

Pine (prepared), 3 francs, 25 cents each, will last 10 years.

A process of preparation by the vapor of water and creosote, and another by external carbonization had been more recently introduced. The telegraph poles prepared by the Boucherie process, either in close vessels or by pressure, were sent to all parts of France, England, Belgium, Switzerland, Spain and Algeria. They should be at least 25-year-old timber, and varied from 1 to 6 francs in price, and from 6.5 to 12 meters in length.

THE FORESTRY OF THE FUTURE.

By FRANKLIN B. HOUGH., PH. D.

(Continued from page 26).

THIS rapidly-grown wood, when cut before it has been hardened by age, would not last more than two or three years on the ground, as railway ties, or in the soil as posts and stakes; but when injected with the sulphate of copper in solution, they become not only very durable, but harder, stronger and less inflammable, the open pores receiving the solution perfectly throughout.

At several stations there are extensive establishments for preparing the wood by this process, and they can turn out 1,000,000 of ties a year.

Although France imports many grades of woods largely beyond her exports, still in 1880, she sent to foreign countries 25,000,000 of francs worth of wood-products, of which about half went to England, and much the largest part went out from the Gironde and was the growth of the Landes. In fact, hundreds of cargoes of these products are sent out yearly from Bordeaux, and for certain grades of coarse lumber, that city has become in recent years, the great commercial center of Southwestern France.

In 1857, a committee predicted that these plantations would add more than 1,000,000,000 of francs to the wealth of France, in a region the most sterile and forsaken. This seemed at the time the declaration of some wild enthusiast, or a scheme to advance the interest of some speculation. But this prophecy has been more than realized! In presenting this sketch, I speak of what I have seen. I have ridden for more than twenty miles among the Dunes which Brémontier and his successors planted, in company with an intelligent resident, who knew all about these forests, their history, and the economies that they serve. I have visited the establishments of which I have spoken, and examined their methods. I have passed and re-passed through the whole length of this forest which Chambrelent—still living and active—began, and which he and others who got their impulse from him, planted.

Need I repeat, that in a long journey made for the express purpose of studying the forest-question, and which extended

through almost every country in Europe, and embraced every subject in any way affecting the forest-interests of these countries, there was nothing that interested me more than this?

But I have not entirely finished what I wanted to say about the Dunes and the Landes. A turpentine-forest, like those on the Landes, is by no means a solitude. It requires a considerable local population for its attendance, and these laborers must have homes near their work. They must have gardens and lands for cultivation, and to get fertility, they must keep cattle to get fertilizers from stables. These forests are dotted all through with little plantations, that serve an actual benefit, by interrupting the continuity, and preventing sweeping fires, which have in former years proved disastrous, but are now quite uncommon. They still afford pasturage for stock, and quantities of herbage, bushes, and undergrowth are pulled up, pressed into small bales by powerful machines, and sent to Paris for oven-wood and other uses.

In all these operations, care is taken to maintain a growth of young timber to take the place of that which is cut, and the production, as we have described, may be indefinitely continued. The fevers that once infested these regions have disappeared with their cause.

I can not, however, pass this subject without noticing one other result, by quoting from an official report of the General Council of Gironde, which was drawn up from exact data. They say:

"It was interesting to see how the spirit of improvement went forward, when once under way. In some of the Communes there were no conveniences for public business; they hired some mean apartment in a tavern for their occasional use. They had no schools, and the few old churches had fallen into ruin, so as to be wholly unworthy of use. But now, with the increased value of their lands from drainage and planting, the local Councils, under the advice of the Administration, having sold some of their land to secure these improvements, consented to part with still more to get the means for building public offices and buildings for schools and worship."

Without giving the exact details of all these, it may be stated, that they amount to almost two and a half millions of francs for churches, three-quarters of a million for priests'

dwellings, a million and three-fourths for public offices and school houses, almost two millions for country roads, and another million for other improvements, such as filtering-wells for public use, the removal of village cemeteries to rural sites, and other matters of obvious utility, besides having nearly four and a half millions in their treasuries. The Council might well sum up this statement by saying:

"This is one of the most beautiful pages in the history of civilization and progress—in a region that twenty years ago was one of the poorest and most miserable in France, but which may now be ranked as among the most wealthy and prosperous."

But I have wandered from my text, and must recall myself. It is embodied in the words, "extensive and judicious planting" and "effectual measure for economizing our remaining supplies."

Now, I understand that "extensive" planting means "a good deal of it." We have already seen that in the countries of Europe, where the subject is best understood, this is something more than a quarter of the whole area, devoted to the growth of wood.

Now, how many old-settled farms are there in the country that have this proportion of reserved or planted woodlands? How many are there that have cut off their last acre? How many the last tree? I would not inquire—how many farms could be found in the country, in which, under present management, the profit is now much below what it would be, if judiciously planted with trees?

It is a natural and noble instinct in man, to seek to promote the welfare of his family, and it is no mean motive in him to toil through life, in order that he may leave an estate for their inheritance. Now, if by careful management, a man can so improve his farm that it will be worth several times as much when he leaves it, as it would have been without this "judicious planting" that we are considering, is he not securing the very object of this laudable ambition?

But passing to a further notice of the precept of our text, there can be no other meaning in the term "judicious planting," than that founded upon a correct knowledge of the conditions and wants of the location. What is the capacity and quality of the soil? What are opportunities afforded by cli-

mate, altitude, aspect, the demands of available markets and other circumstances—and what species will best meet these requirements?

With respect to the kinds of trees that will grow to best advantage, in a region once timbered, there should be no difficulty in selecting from those that we know once flourished upon the soil, such as will be probably the most valuable when grown. There are doubtless other kinds that will flourish, and probably some that would be more profitable.

But when we find ourselves without this indication from past knowledge or present observation, the case becomes very different, and this brings me to a most important point for consideration: It applies to the settlement of the pioneer upon the prairies, and the plains, where there is no trace of what has been,—if ever, in the way of timber,—certainly nothing at present, and a matter of uncertainty as to what can be grown, if any thing, as forest trees. These pioneers are very often poor, or they may be young and inexperienced; or, what is still worse, they may have an experience gained under other conditions which they can not apply here, and which they must unlearn and begin anew. The latter class may have failed in attempting to apply their knowledge, and from this may settle down with the conclusion that nothing can be done, thus discouraging others in their own disappointment.

It is for these conditions that we may properly invoke the aid of Government in the establishment of Experimental Forest Stations for determining what can be done, and what can not; and as to the possible and the most profitable, and by what methods can we best avoid failure and insure success. These facts, when known, should be published for the information of the country.

In these researches, a negative may prove almost as valuable as a positive result, for when once known, there will be no losses or disappointments by repeating a trial that has uniformly proved a failure. Now, some of this information may be gained accidentally or experimentally by an individual, but it may not become known to others. There must be a centralized agency, for collecting, summarizing and dif-

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fusing the information. This is a most important question in Forestry, and one upon which I have given much thought, but as this is embodied in my Third Report upon Forestry; I will not further consider it on this occasion.

Time will not permit me to follow the subject implied in the term "effectual means for economizing our remaining supplies," with that detail that it deserves. So far as relates to the remaining supplies upon our public lands, after carefully studying the systems now in use, or in course of introduction in the English colonies of India and Australia, where the circumstances closely resemble our own, and the system of timber management in Canada, as very fully described in my Second Report, I have presented the conclusions with as much detail as was found practicable in the Third Report, and will not anticipate them here. As for remaining supplies upon lands held by individuals, they will in all cases be managed, or wasted, as the intelligence or the ignorance of the owners may lead them, or as their interest may guide. There are economies to be studied at every point, perhaps in nothing more notably than in those relating to fences, and the needless waste that they occasion. There are wastes in the working of timber and lumber that might be avoided—uses for parts now wasted—wants that are not real—and methods that need improvement.

Some of these may hereafter be forced upon our notice, as the prairie farmer learns to cultivate his land without fences; but it is better to anticipate and avoid these inconveniences by seasonably providing against them. *Do not hesitate to plant a part of the farm in timber trees.* If they are not needed on the place, they will always find a market. There will always be a growing demand for timber so long as the industries thrive; and should ever a time arrive when this demand can not be met, the effect must be felt through every phase of our civilization.

AMERICAN ANTHROPOLOGY

The Early Years

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3

Franklin B. Hough:
An Incipient
Anthropologist of the
Early Nineteenth Century*

ARTHUR EINHORN

Lewis County Historian, Lowville, New York

The late nineteenth and early twentieth centuries saw numerous personalities emerge from totally unrelated disciplines and interests into qualified scholars of anthropology. Their influence and theories

*Mr. Einhorn also chairs the Social Science Department at Lowville Academy and is Associate Professor of Anthropology at Jefferson Community College, Watertown, New York.

have become part of the profession's intellectual bag and baggage, as well as subjects of the discipline's folklore. Several years ago Claude Lévi-Strauss (1969:61-63) published a convincing case for ranking Rousseau as a "father" of anthropology. Those who argue against the anthropological legitimacy of some historical personalities might be applying criteria to the past that only recently became viable professional taxonomy.

As it functions today, anthropology could only have grown out of the work of interested nonprofessionals who engaged in anthropological behavior and whose "marginal" work reinforced the contributions and eventual emergence of major personalities. Early anthropology was not a discipline, nor would it have developed into one had it not been for the men on the sidelines, some long forgotten. Their significance is revealed when we examine it in the light of anthropology's roots in the natural sciences and museums (Fenton 1968:4-5). Western man may have been dealt with in the context of history but preliterate societies were lumped with botany; primitive technology and folklore were collected as most biological and geological specimens.

In the early nineteenth century there were few specialists in the slowly emerging study of anthropology; a real need existed for the generalist, the dilettante, whose mind was stimulated by a wide range of topics and whose awareness responded to the relationships between widely separated artifacts and man.

This paper addresses itself to the life and works of one of those marginal men of early anthropology, although he was better known as a historian, forester, conservationist, and medical doctor. His anthropological contributions seem minor amidst the other work he produced, yet a lack of quantity cannot alter that they were written with quality when anthropology was still ill defined and such anthropological behavior was the exception rather than the rule. The subject was a contemporary of Lewis Henry Morgan and graduated from Union College within a few years of him. Their paths probably crossed many times in Albany at the New York State Legislature, as well as at the Albany Institute and the Smithsonian Institution in Washington, D.C. He was familiar with Morgan's work on the Iroquois, as is shown by the many footnotes and references to Mor-

gan in his publications. This, however, is only a superficial claim to a link with the anthropology of Morgan's time, and before presenting the evidence, it will be necessary to outline briefly some highlights of the man's extremely active career.

FRANKLIN HOUGH'S LIFE

Franklin B. Hough was born in Martinsburg, Lewis County, New York in 1822, the son of Dr. Horatio Gates Hough. Horatio Hough was the first physician in Lewis County and a man whose accomplishments included a short published tract entitled *Diving, or An Attempt to Describe Upon Hydraulic and Hydrostatic Principles a Method of Supplying the Diver with Air Under Water*, (Hartford, Conn., 1813). With Franklin growing up in the household of such a father, he developed many intellectual interests, despite the fact that he resided in a remote and sparsely settled region of New York far from intellectual centers or academia. Lewis Henry Morgan's life was similar in many respects, before and after his college training.

Hough received his primary education at Lowville Academy (located in Lowville, Lewis County) and later attended Union College (Schenectady) where he acquired his A.B. degree in 1843 and his A.M. several years later. For a short while he taught school in Champion, New York, then decided upon medicine as a career. In 1848, Cleveland Medical College (now Case Western Reserve) awarded him the M.D. and many decades later his accomplishments caused the Regents of the State of New York to confer on him the Ph.D. Between his graduation from Union College in 1843 and his death in 1885, Hough wrote, edited, and published over eighty books, pamphlets, and articles on subjects ranging from colonial and American history through physical science, linguistics, archaeology, American Indians, botany, forestry, constitutional law, statistics, biography, genealogy, and miscellaneous other topics. Such prolific eclecticism, ranging all over the academic land-

scape, suggests the general lack of others specializing in those areas; a characteristic typical of Franz Boas even years later.

When the professional associations most scholars affiliate with today are matched against Hough's activities, he appears almost gargantuan. He belonged to thirty-six professional and nonprofessional organizations in many states of the United States, as well as Canada and Europe. These included a wide range of interests covering forestry, medicine, genealogy, anthropology, and biology. He was also a fellow of the American Association for the Advancement of Science and active in the American Philosophical Society, the Academy of Natural Sciences, the Anthropological Society of Washington, and the New York Forestry Association (this last named organization being closely tied to his role as the intellectual progenitor of the New York State Conservation Department). Hough also had close ties with the Smithsonian Institution and was several times engaged by congressional commissions and state governments to conduct various studies in population census, medical and vital statistics, and botany.

During the Civil War he had served as a regimental surgeon with the New York Volunteers, and as a result of this experience translated Lucien Bandens's *Guerre de Crimée* under the title *On Military and Camp Hospitals* in 1862 (Graves 1932:250-252).

Over the middle decades of Hough's life he recognized the growing problem of forest resource depletion. In 1873 he presented a paper to the American Association for the Advancement of Science entitled "On the Duty of Governments in the Preservation of Forests" (Graves 1932:251). This paper resulted in a memorial to Congress recommending enactment of conservation laws. President Grant subsequently endorsed the recommendations to Congress, and in 1876 Hough was appointed by Grant as the first federal forestry agent in the Department of Agriculture. Hough's familiarity with forestry had an early foundation, seen in his publication *A Catalogue of Indigenous, Naturalized and Filicoid Plants of Lewis County, New York* (1846). Hough was also interested in geology and is reputed to have discovered the mineral "houghite" (Graves 1932:251). He also donated many geological specimens to the natural history cabinet in the state capitol in Albany.¹

HOUGH'S WORK AND PUBLICATIONS

Hough's writing career began while practicing medicine in rural St. Lawrence and Jefferson counties in upstate New York. During this time he took up a serious interest in the local history of the region and began researching it. His published county histories are quite long and generally begin with voluminous material focused on the aboriginal and colonial occupation. For this he drew from previously published colonial documents, the works of his contemporaries (e.g. O'Callaghan, Clark, Morgan, and Squier), and his own observations and fieldwork (principally among the Mohawks of the St. Regis reservation in New York and the Caugnawaga reservation near Montreal). Much of the material is broken down into systematic categories and reads well as a regional synthesis representing the state of the art for the mid-nineteenth century.

ARCHAEOLOGY

One of Hough's archaeological county histories (1853) quotes liberally from Squier's (1849) previous work describing earthworks and mounds. But Hough then goes on to enumerate outstanding sites and their locations, adding new sites and interpretations not covered by Squier. He further describes petroglyphs and their locations in the above publication as well as in another county history (1854). There are no clear-cut indications that Hough ever excavated a site, but he certainly conducted a survey of sites and roamed the countryside with open eyes, as is evident when he states, "Nothing is more common than to find along the lands that skirt the fertile meadow bottoms . . . the broken remains of crude pottery . . ." (Hough 1854:18).

Very little of Hough's records of archaeological remains lacks some reasonable inference and interpretation. In referring to several sites with high earthen works, Hough noted, "It may be well to remark, that the observation made by DeWitt Clinton, that none of

these remains occur below the level of the lake ridges, fails to be sustained in the instances which occur in St. Lawrence and several which occur in Jefferson counties" (Hough 1853:15), and for astute observation, Franklin Hough must take honors as one of the first to publish a description of post molds left by ancient stockades: "In a few of the trench enclosures of Western New York, the evidences of this (stockades) are not wanting, for the holes which were left by the decaying of the pickets may still be traced" (Hough 1853:19).

It is fortunate that articulate observers like Hough and Squier recorded what they did, for as Hough observed on one site, "Every trace of the work has been long since erased by cultivation . . . [and] . . . great numbers of these [artifacts] . . . have been picked up and carried off by the curious" (Hough 1853:19). Quite appropriately Hough's archaeological references have been a useful resource for mid-twentieth-century archaeologists,² particularly at the University of Buffalo, where a special archaeological project has been under way for several years writing the prehistory of Jefferson County. As one Ph.D. candidate noted, "Hough's site location references are usually more accurate than Squier's."³

ETHNOGRAPHY AND ETHNOHISTORY

Hough found much in the French and English colonial literature whereby some Native American history might be reconstructed. In 1866 he translated and republished the original 1787 French edition of *Captain Pouchot's Memoirs of the War of 1755-60*. In this account of one man's view of the French and Indian War, there are several examples of Iroquois oral tradition which Pouchot had written down. In subsequent publications, Hough quoted this material when discussing native tradition; as he also used the works of LaHontan, DelaPotherie, Colden, and Charlevoix.

By 1880, when Hough published *The Thousand Islands of the St. Lawrence*, he was in a position to sort out the confusion of who first set down the "Legend of Hiawatha"—Clark, Schoolcraft, or Longfellow—and concluded it was Clark who had first recorded it from

two Onondaga chiefs. Schoolcraft later published it without acknowledging Clark's *Notes on the Iroquois*; Longfellow acknowledged Schoolcraft in what Hough kindly described as a "highly imaginative versification" (Hough 1880:13-14) of the tradition. Hough points out that Longfellow changed the locale of the tradition as well as the essence of it, and finally gives Clark much credit for having recorded it in the first place.⁴

In his earlier *History of St. Lawrence and Franklin Counties*, Hough put together, from many published and unpublished sources and his own investigations, a fairly concise picture of the history of the St. Regis and Caugnawaga Mohawks. He apparently interviewed many Mohawk residents of both reserves, pieced together life histories, and effectively described the lifestyle, pastimes, government, numbers, and condition of those people for the early and middle decades of the nineteenth century, a boon to any student of acculturation and ethnohistory. This material is widely scattered throughout the book, but it is a virtual gold mine of data for the ethnohistorian today.⁵

Among other Hough publications relating to ethnohistory are the following: *Pemaquid in Its Relations to Our Colonial History* (1874), *Easton's Phillip's Indian War* (from original MS with Hough notes and analysis—1858), and numerous other items such as the *Journal of Major Robert Rogers* (1883), *Capt. Leonard Bleeker's Order book* (1865) from the Sullivan Campaign against the Iroquois, and *Sir John Johnson's Invasion of the Schoharie and Mohawk Valley* (1861) from the unpublished originals.

In 1970 a doctoral dissertation was written which relied as much on Hough as on any other source, particularly on the ethnographic material on the St. Regis Mohawks (Frisch 1970). Because of the 1911 fire in the State Capitol in Albany, Hough's material is the only extant data available on the subject for certain periods.⁶

LIFE HISTORIES AND BIOGRAPHIES

Apart from five biographies of white Americans which Hough wrote and published, he fell heir to and edited a life history manu-

script sent to him by one of his informants at the St. Regis Reservation. This was published under the title, *Life of Te-Ho-Ra-Gwa-Ne-Gen, Alias Thomas Williams, A Chief of the Caughnawaga Tribe of Indians in Canada*, by the Rev. Eleazer Williams (Albany: J. Munsell, 1859). It is a good document of the colonial period and the French and Indian War. While imparting the highlights of Thomas Williams's life (the descendent of a white captive from New England), the narrative gives many insights into Mohawk and Abenaki culture during the late eighteenth and early nineteenth centuries. Unfortunately, only 200 copies of this work were printed. Eleazer Williams was the object of much controversy when Hough knew him (over his claim to being the Lost Dauphin), and in the introduction Hough Describes Eleazer and the controversy in terms which could only be defined as objectively fair.

Scattered throughout the St. Lawrence County History, noted earlier, are pages on the life of At-I-Aton-Ha-Ron-Kwen, or Col. Louis Cook. One section of sixteen pages is a solid biography of Cook, which, as Hough states, "we have derived from his daughter, Mary Ka-Wen-Ni-Ta-Ke, at St. Regis, through the kindness of the Rev. F. Marcoux, as interpreter, and from a biographical notice written by Eleazer. . . ." "The author has also availed himself of whatever else came his way, among the public archives in Albany."

In Hough's charming book *American Biographical Notes* (1875), he lists not only white U.S. citizens, but also both famous and obscure native Americans, American blacks, visiting Japanese students, Latin American Presidents and prime ministers, native Hawaiians, Hungarians, and Dutchmen in Surinam among others. His coverage, hardly Anglophile, was surely Pan-American in scope, and implies a definite recognition of the family of man. Most of the personalities included in Hough's work were *not* included in other biographical dictionaries of the day, such as Drake's or Allen's.

LINGUISTICS

Although Hough was not conversant in Mohawk, he knew simple greetings and utilized several qualified bilingual informants who

worked closely with him in producing a sizable list of Iroquois (Mohawk) place names for a three-county area in northern New York and adjacent Canada. These Mohawk names are accompanied by English translations, as well as common names. In several instances he notes Morgan's and Squier's terms for the same locations in a comparison between Seneca and Mohawk. It is interesting that he coded each of the native terms and translations to indicate which informant provided the information (Hough 1853:178-181). Such meticulous care for data quality was rare in that era.

Entirely in keeping with Hough's humanism, apparent throughout his writings, he believed Indian place names were beautiful both in sound and meaning, and advocated using them instead of the recently superimposed Anglo-Saxon names.

MINORITY ADVOCATE

Not uncharacteristic for the period and region, Hough was an abolitionist in the pre-Civil War era, although his role in the movement is an obscure story. His older brother, Horatio Hough, was a conductor in the Underground Railroad.

In Franklin Hough's edited edition of the *Proceedings of the Commissioners of Indian Affairs for Extinguishment of Indian Title in New York State* (1861) he expresses his empathy and remorse, rather than the usually cold and implicit rightness presumed by many others of the period in the national pastime of manifest destiny. Hough further emphasized his position on dubious land titles by twice noting that the Oneidas were forced into ceding their salmon fisheries in 1802, due to clumsy and indifferent procedures by the state (Hough 1860:21, 23; 1854:38-42). Had Hough been alive in that period he may well have championed the Oneida cause as Morgan so ably served the Tonawanda Seneca.

PHYSICAL ANTHROPOLOGY

As a medical doctor Hough was conversant in osteological terminology. Occasionally when describing Indian burial sites or ossuaries he used technical terms for parts and conditions of skeletal remains. In other instances, as when interviewing informants at St. Regis, he noted human variation in facial traits and hair type. These aspects, though not forming a significant feature of his writings, indicate he was familiar with and aware of them.

CONCLUSIONS

Franklin Hough's interests and writings are really not so unusual when it is considered that in his day the percentage of highly educated individuals in America was relatively small. Men like Hough and Morgan returned to their rural hamlets with college degrees in hand barely forty years after the frontier had moved westward. Amidst the majority of their fellow citizens they were educationally unique and probably intellectually frustrated. Such professional men naturally turned to intellectual endeavors and interests which filled their leisure time and in some instances became contributors to literature, history, or some branch of science.

It is apparent that Hough touched in varying degrees on many aspects of what we today define as anthropology. With his historical orientation he ably used library archives, did fieldwork, asked the right questions, gathered data, and presented a diachronic picture of a region. While he exhibited incipient anthropological behavior, his general interests were too varied for him to concentrate in one area. One wonders what he might have progressed into had he lived closer to Morgan in western New York, or if the Mohawks at St. Regis had been traditional Indians rather than Catholic converts. Would he have delved deeper and further than he did, given the opportunity? Indications suggest that he probably would have. In one passage he stated that he often

collected material because it might be useful to others, apart from his own research target. Hough never expounded any theories, although he occasionally attempted light interpretations, a trait Boas would have admired in him.

A special case need not be made for Hough any more than for the many others whose contributions were minor, but perhaps significant to someone in the future. Franklin Hough is not a difficult man to assess in the broad picture of nineteenth-century intellectual activity. He and others like him filled a need by functioning in various social, governmental, and academic vacuums. As science and academia grew, these men grew with the trend and reinforced it with their contributions; in some cases perhaps they even created trends. The intellectual climate of America in the period was certainly a curious and searching enthusiasm, a creative influence on many educated men.

Not to recognize the importance of such individuals to the emergence of specific disciplines, including anthropology, is to ignore the intellectual milieu and process of peer interaction for a given period of history. In a day when only a few professions could claim a specific training harness within academia, there were many unharnessed in the race to understand man and record his past. That only a few would finish the race with a broad recognition of accomplishment is typical statistical prediction. Yet the "also-ran" group should not be forgotten; to them is owed the validity, if not the intensity of the race.

NOTES

¹Charles Gillette, senior curator, New York State Museum (personal communication).

²Marian E. White, "Current Work on Iroquois Archaeology in Northern New York State," paper read at the 1969 meeting of New York State Archaeological Association.

³Earl Sidler (personal communication).

⁴Subsequently collected versions of the Hiawatha epic would prove to be superior to the Clark version, but it is important to know who recorded the one he did.

⁵The citations are too numerous to quote here; the original index to the *History of St. Lawrence and Franklin Counties* is inadequate. See new comprehensive index compiled by the St. Lawrence County Historical Association, Canton, N.Y., 1971.

⁶Jack A. Frisch (personal communication).

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- 1970 Revitalization, Nativism and Tribalism Among the St. Regis Mohawks. Ph.D. dissertation, Indiana University. Ann Arbor, Mich.: University Microfilms.

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1854 History of Jefferson County. Albany, N.Y.: Joel Munsell.
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1875 American Biographical Notes. Albany, N.Y.: Joel Munsell.
1880 Thousand Islands of the St. Lawrence. Syracuse, N.Y.: Dains, Bardeen and Co.

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- 1859 Life of Thomas Williams. Albany, N.Y.: Joel Munsell.

- 1861 Proceedings of the Commissioners of Indian Affairs for Extinction of Indian Title in New York State. Albany, N.Y.: Joel Munsell.

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- 1969 Rosseau, Father of Anthropology. *In* The Unesco Courier. New York.

St. Lawrence County Historical Society

- 1971 Index to Hough's History of St. Lawrence and Franklin Counties. Canton, N.Y.

Squier, E. George

- 1849 Aboriginal Monuments of New York. Smithsonian Contributions to Knowledge. Washington, D.C.

White, Marian E.

- 1969 Current Work on Iroquois Archaeology in Northern New York. Draft of paper presented at the 1969 annual New York State Archaeological Association meeting.

A Notable Anniversary

One hundred years ago this week—on 22 August 1873, to be exact—the American Association for the Advancement of Science took an historic action that led to the establishment of forestry policy as a function of the federal government.

At the 22nd AAAS annual meeting, held that year in Portland, Maine, Franklin Benjamin Hough of Lowville, New York, delivered an address titled "On the duty of governments in the preservation of forests."* A doctor of medicine, Hough was also an historian, a naturalist, and a statistician. While director of the United States census of 1870, he was impressed and concerned by widespread forest devastation caused by logging and fires throughout the East, the Great Lake states, and then starting in the South.

After the Civil War, a few observant citizens, alarmed at the rapid destruction of the virgin timber and fearing an eventual wood shortage, warned state legislatures and Congress of the need for forest protection, but without effect. Most government officials ignored the threat of timber scarcity and discounted the possible depletion of this valuable natural resource, which, indeed, many people believed to be inexhaustible. Thus, when Hough submitted the problem of forest preservation to the AAAS meeting, he was appealing to the scientists as the only organized citizens' group having sufficient influence to inspire public attention. Hough decided that the scientific community would have to initiate action for forest conservation, if it was to be done at all. In his paper, he emphasized the relationship of woodland to soil stabilization, to maintenance of streamflow, and, of course, to wood production for domestic and industrial use. He urged the AAAS to alert federal and state governments to the need for forest protection.

At his suggestion, the AAAS appointed a committee "to memorialize Congress and the several State Legislatures upon the importance of promoting the cultivation of timber and the preservation of forests, and to recommend proper legislation for securing these objects."† Nine scientists served on this committee; Hough was chairman. The others were William Henry Brewer of Yale; George B. Emerson of Boston, educator and author of a book on trees; Asa Gray, the nation's leading botanist; Eugene W. Hilgard, soil scientist, of the University of Michigan; Lewis Henry Morgan, anthropologist, of New York, later to become president of the AAAS; John Strong Newberry, botanist and geologist, and Charles Whittlesly, a horticulturist, both of Ohio; and Josiah Dwight Whitney, a geologist of California.

The committee's memorial was delivered to President U. S. Grant, who, on 19 February 1874, transmitted it to Congress with a special message of approval. There the proposition languished for 2 years. Finally, on 15 August 1876, Congress enacted legislation appropriating \$2000 for the appointment to the Department of Agriculture of a man to investigate forest conditions. Hough was selected on 30 August and thus became the federal government's first forestry agent. From his appointment evolved the present Forest Service, with its nationwide network of forest and range experiment stations and forestry and wood science laboratories, its thousands of professional and scientific personnel, and its 187 million acres of national forests managed in the public interest.

On this centennial anniversary, it is appropriate to recall the extraordinary influence of Hough's paper, presented as a private citizen before a small assemblage of scientists. Historically, it is appropriate also to acknowledge the energizing role of the AAAS in starting forestry work on a national scale in the United States government.—HENRY CLEPPER, American Forestry Association, 1319 18th Street, NW, Washington, D.C. 20036.

* *Proceedings of the AAAS Twenty-Second Meeting, held at Portland, Maine, August 1873* (AAAS, Salem, Mass., 1874), part II, section B, "Natural History," p. 1. † *Ibid.*, p. 429.

(Frank J. Harmon, History Section, AM, FS, WO, Oct. 23, 1978)

At the 489th regular meeting of the Service Committee of the Washington Office of the Forest Service on October 16, 1912 (Page 6):

" . . . Mr. Sudworth. . . stated. . . that he had this morning met a son of the late Franklin B. Hough, who told him that 35 years ago today his father had delivered the first address which led to the first Congressional appropriation for forest protection and probably was the beginning of the present Forest Service work. . ."

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

P.O. Box 2417
Washington, DC 20013

1680



Mr. Harry W. Dengler
Maryland State Extension Forester (Retired)
3108 Lancer Drive
Hyattsville, MD 20782

Dear Harry:

As you requested on the phone Monday, I am enclosing a copy of a bibliography of the writings of Dr. Franklin B. Hough compiled in Warren V. Benedict's History of White Pine Blister Rust Control-- A Personnel Account which was sponsored by the History Section. I am sure you will find Benedict's history of much interest especially since you worked in this program. Since you were also an instructor in the CCC program of the 1930's, you should find Perry H. Merrill's new book, Roosevelt's Forest Army: A History of the Civilian Conservation Corps, 1933-1942. Merrill served for many years as Vermont State Forester and Director of the Department of Parks and Forests. We provided much material to him for this book. It is available at \$8.00 a copy postpaid from him at 200 Elm Street, Montpelier, Vermont 05602. A photographic history of the CCC, The Tree Army, by Stanley Cohen, was published a year ago by Pictorial Histories Publishing Company, Missoula, Montana. The Forest Service is now sponsoring a history of the CCC, is publicizing the 50th anniversary of the CCC, and is furnishing the site and participating in the plans and program for the CCC Alumni Association convention in June 1983, at the headquarters of the Nicolet National Forest in Rhinelander, Wisconsin. We are grateful to you for supplying us with a copy of your article on Romeyn B. Hough, noted conservationist and son of Franklin B. Hough, first Federal forestry agent.

1886 shortly after his death and copy of
much of value

Sincerely,

FRANK J. HARMON
Writer/Editor
History Section

Enclosures

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Sincerely,

15/ *Frank J. Harmon*
FRANK J. HARMON
Writer/Editor
History Section

Enclosure

WARMON:ac: 3/10/82

1886. pp. 321-347.

(from Library of Congress)
May 1977

By JOHN H. HICKCOX, Washington, D. C.

1846.

A catalogue of the indigenous, naturalized and filicoid plants of Lewis county, N. Y. Arranged according to the natural method adopted by Professor Torrey in the State catalogue. By Franklin B. Hough, A. B. Half-title. Albany, *Van Benthuysen*, 1846. 8°, 35 pages.

One hundred copies separately printed from N. Y. Sen. Doc. No. 71, 1846; being the fifty-ninth annual report of the Regents of the University.

1847.

Observations on the geology of Lewis county, N. Y.
In ——— May and June 1847.

In ———, May and June, 1847; pages 267-274, 314-327.

Electro-magnetic telegraph.

In Northern Journal, Lowville, N. Y., April 29, 1847, five columns.

Properties of water, and cause and prevention of steam boiler explosions.

In Northern Journal, Lowville, N. Y., August 26, 1847, three columns.

Address delivered before the Educational Society of Lewis county, at Martinsburg, N. Y., June 27, 1848.
Not printed

Not printed.

1847-1848.

Communications numbered one to twelve, inclusive, on various topics, in the "Lewis County Democrat," Turin, N. Y., signed "Viator."

- No. 1, written at Cleveland, Ohio, January 14, 1847, one column.
- No. 2, written at Hudson, Ohio, July 21, 1847, one and three-fourths columns.
- No. 3, written at Cuyahoga Falls, Ohio, August 2, 1847, two columns.
- No. 4, written at Akron, Ohio, August 9, 1847.
- No. 5, written at Warren, Ohio, August 13, 1847, two and one-half columns.
- No. 6, written at Pittsburg, Pa., August 18, 1847, one and one-half columns.
- No. 7, written at Pittsburg, Pa., September 17, 1847, two and two-thirds columns.
- No. 8, written at Bedford, Pa., September 28, 1847, two and one-fourth columns.
- No. 9, written at Lancaster, Pa., October 9, 1847, one column.
- No. 10, written at Lancaster, Pa., October 13, 1847, two columns.
- No. 11, written at Philadelphia, Pa., January 26, 1848, two columns.
- No. 12, written at Philadelphia, Pa., January 31, 1848, one and one half columns.

1848.

Communication to the "Lewis County Democrat," Turin, N. Y.
Written at Cleveland, Ohio; dated January 1, 1848, one column.

Importance of local history.

In Northern Journal, Lowville, N. Y., April 4, 1848.

Historical incident of Jefferson county, N. Y.

In Lewis County Democrat, Turin, N. Y., June 27, 1848, one column.

Society for the acquisition of useful knowledge.

In Northern Journal, Lowville, N. Y., August 25, 1848, page 2.

Original essays, numbers 1-4, Scientific Associations.

In Northern Journal, Lowville, N. Y., September 1, 15, 22, 1848.

1849.

Fire.

In Northern Journal, Lowville, N. Y., February 10, 1849, one-sixth column.

Arson.

In Lewis County Democrat, Turin, N. Y., February 27, 1849, one-quarter column.

The free school system.

In The New Yorker, Gouverneur, N. Y., May 10, 1849, two articles, one column and half column.

The free school system.

In Lewis County Democrat, Turin, N. Y., ———, 1849, one column.

Thoughts on primary education.

In Northern Journal, Lowville, N. Y., May 22, 30, June 6, 13, 20, 27, 1849; six communications numbered one to six inclusive.

Letter from Dr. F. B. Hough to E. Meriam, Meteorologist, of Brooklyn, N. Y., dated Somerville, June 25, 1849.

In ———, one-sixth column.

Holbrook's school apparatus, dated Lowville, N. Y., November 23, 1849.

In ———, one-sixth column.

1850.

Catalogue of mineral and geological specimens received from Franklin B. Hough, A. M., M. D., of Somerville, St. Lawrence county, N. Y. Half-title, 8°, 3 pages.

In N. Y. Senate Doc. No. 75, 1850, pages 31-33, being the Third Annual Report of the Regents of the University on the State Cabinet of Natural History.

Notice of several ancient remains of art in Jefferson and St. Lawrence counties. By Franklin B. Hough, M. D. Half-title, 8°, 5 pages, 5 plates.

In N. Y. Senate Doc. No. 75, 1850, pages 101-105, being the Third Annual Report of the Regents of the University on the State Cabinet of Natural History.

Meteorological notes kept at Somerville, St. Lawrence county, N. Y., from March 25, 1849, till the end of the year. Half-title, 8°, 8 pages.

In N. Y. Senate Doc. No. 113, 1850, pages 334-342, being the Sixty-third Annual Report of the Regents of the University.

Figure and description of a remarkable solar halo and perihelia seen at Richland, Oswego county, N. Y., March 6, 1847. Half-title, 8°, 1 page.

In N. Y. Senate Doc. No. 113, 1850, page 143, being the Sixty-third Annual Report of the Regents of the University.

Floral record kept at Somerville, St. Lawrence county, N. Y., during the years 1848-9. Half-title, 8°, 10 pages.

In N. Y. Senate Doc. No. 113, 1850, pages 344-353, being the Sixty-third Annual Report of the Regents of the University.

On the discovery of sulphuret of nickel in northern New York, with additional observations by S. W. Johnson.

In American Journal of Science and Arts, March, 1850, pages 287-288.

New mineral localities in New York.

In American Journal of Science and Arts, March, 1850, pages 288-289.

On the existing mineral localities of Lewis, Jefferson and St. Lawrence counties, New York.

In American Journal of Science and Arts, May, 1850, pages 424-429.

On the cylindrical structure observed in Potsdam sandstone.

In American Association for the Advancement of Science; proceedings, August, 1850, pages 352-354.

The injustice of the free school law.

In The Equalizer, Utica, N. Y., October 26, 1850, three columns.

Suggestions on agricultural education.

In Northern Journal, Lowville, N. Y., November 20, 1850, one and two-third columns.

1851.

List of mineralogical and geological specimens received from Franklin B. Hough, A. M., M. D., Somerville, St. Lawrence county, N. Y., with descriptions and drawings. Half-title, 8°, 9 pages.

In N. Y. Senate Doc. No. 30, 1851, pages 82-90, being the Fourth Annual Report of the Regents of the University on the State Cabinet of Natural History.

Notices of ancient remains of art in Jefferson and St. Lawrence counties, by Franklin B. Hough, M. D., of Somerville, St. Lawrence county. Half-title, 8°, 7 pages, 5 plates.

In N. Y. Senate Doc. No. 30, 1851, pages 103-109, being the Fourth Annual Report of the Regents of the University on the State Cabinet of Natural History.

The peculiar way in which a horse was struck by lightning, July 16, 1851.

In Lewis County Republican, Martinsburg, N. Y., July 22, 1851, one-third column.

On the meteorological observations of New York, from 1825 to 1850.

In American Association for the Advancement of Science; proceedings, 1851, pages 168-9.

On the existence of diluvial agencies during the earlier geological periods.

In American Association for the Advancement of Science; proceedings, August, 1851, pages 262-4.

Removal of the reefs in Hurlgate channel, New York.

In Daily Observer, Utica, N. Y., August 29, 1851, one-half column.

Hurlgate channel and the operations now going on for the removal of obstacles to its navigation.

In Oneida Morning Herald, September 2, 1851, one-half column.

Hurlgate channel. Account of the operations now going on for the removal of Pot Rock and Way's Reef.

In St. Lawrence Republican, Canton, N. Y., September 9, 1851, one column. Copied from the Albany Argus.

Lightning and lightning rods.

In St. Lawrence Republican, Canton, N. Y., September 23, 1851, one-half column.

A habit of observation essential to success with the farmer.

In Pennsylvania Farm Journal, November, 1851, pages 285-7.

The application of science to the common purposes of life.

In St. Lawrence Republican, Canton, N. Y., December 2, 1851, one column.

The lead mines of the St. Lawrence Mining company in Macomb, N. Y.

In St. Lawrence Republican, Canton, N. Y., December, 1851, three-fourths column.

On the association of certain minerals in Northern New York.

In American Association for the Advancement of Science; proceedings, May, 1851, pages 205-6.

1852.

A report on the mines and lands of the St. Lawrence Mining Company. New York, Arthur & Burnet, 1852, 8°, 9 pages.

Catalogue of reptiles and fishes from St. Lawrence county, N. Y., procured for the State Cabinet of Natural History, by Franklin B. Hough, A. M., M. D. Half-title, 8°, 6 pages.

In N. Y. Assem. Doc. No. 122, 1852, pages 23-28; being the Fifth Annual Report of the Regents of the University on the State Cabinet of Natural History.

List of minerals furnished for the State Cabinet of Natural History by Franklin B. Hough, M. D., of Somerville, St. Lawrence county, N. Y. Half-title, 8°, 6 pages.

In N. Y. Assem. Doc. No. 122, 1852, pages 40-43; being the Fifth Annual Report of the Regents of the University on the State Cabinet of Natural History.

Two communications on the result of a visit to St. Regis in May and June, 1852.

In St. Lawrence Republican, Ogdensburg, N. Y., May 25, 1852, three-fourths column, and The Courier, Potsdam, N. Y., June 25, 1852, two columns.

Early history of St. Lawrence county. Address delivered at Ogdensburg, N. Y., December 27, 1851.

In The Sentinel, Ogdensburg, N. Y., January 20, 1852, six columns.

First settlement of Gouverneur.

In The Laborer, Gouverneur, N. Y., July 20, 1852, three-fourths column.

1853.

A history of St. Lawrence and Franklin counties, New York, from the earliest period to the present time. By Franklin B.

Hough, A. M., M. D. Albany; Little & Co., 1853, 8°, xvi, 17-719 pages, 1 leaf, 5 maps, 9 plates.

Edition 1,500 copies, of which twenty-five copies were printed on heavy paper, uncut. Published by subscription, and printed by Munsell.

The siege and surrender of Fort Levi.

In Ogdensburg (N. Y.) Sentinel, February 22, 1853, three-fourths of a column.

1854.

An act providing for the publication of the results of meteorological observations made under the direction of the Regents of the University, from the year 1825 to 1859, inclusive.

N. Y. Assembly bill, No. 255, February 27, 1854. Bill drafted by Dr. Hough.

An act for the preservation and arrangement of the legislative manuscripts of the State of New York.

N. Y. Senate bill, No. 92, February 7, 1854. Bill drafted by Dr. Hough.

A history of Jefferson county in the State of New York, from the earliest period to the present time. By Franklin B. Hough, A. M., M. D. Albany; J. Munsell, Watertown, N. Y. Sterling & Riddell, 1854, 8°, 601 pages, 7 plates.

Edition 1,500 copies. Published by subscription by Dr. Hough and Hon. F. Lawrence, as equal partners.

An act to assist Franklin B. Hough in the continuance of certain historical researches.

N. Y. Assembly bill, No. 399, March 15, 1854.

Life boats. [Letters to L. Ingalls, dated Albany, January 5, 1854.]

In —, one and one-sixth columns.

On the importance of preserving our State Papers. Paper read at the meeting of the New York Historical Society, February 7, 1854.

In Tribune, February 8, 1854; and Northern Journal, Lowville, N. Y., March 8, 1854, one column each.

1855.

Plan for seizing and carrying to New York, Col. Wm. Goffe, the Regicide, as set forth in the affidavit of John London, April 20, 1678. Published from the original in the office of the Secretary of State of New York, by Franklin B. Hough, M. A. With other documents on the same subject among the State papers of Connecticut. Albany; Weed, Parsons & Co., 1855. 12°, 17 pages.

Edition fifty copies.

The Regicide in Hartford.

In Hartford Courant, September 15, 1855, three-fourths of a column.

Results of a series of meteorological observations made in obedience to instructions from the Regents of the University at sundry academies in the State of New York, from 1826 to 1850, inclusive, compiled from the original returns and Annual Reports of the Regents of the University, by Franklin B. Hough, A. M., M. D. Albany: Weed, Parsons & Co., 1855. 4°, xvi, 502 pages, 4 pages diagrams, 1 map.

Edition 1,000 copies.

The New York Civil List; containing the names and origin of the civil divisions and the names and dates of election or appointment of the principal State and county officers, from the Revolution to the present time. Compiled from the public records in the office of Secretary of State, and other authentic sources, by Franklin B. Hough, A. M., M. D. Albany: Weed, Parsons & Co., 1855. 12°, engraved title, xii, 444 pages, 1 leaf, 4 plates.

Published also in 1856, 1857, 1858, 1860, 1861, 1862 and 1863 with various corrections and additions.

The next census. Facts concerning it.

In Albany Evening Journal, March 26, 1855, one column.

Communication to the editor of the "Ogdensburg Sentinel," dated Albany, April 25, 1855, containing census lists, etc.

In Ogdensburg (N. Y.) Sentinel, May 15, 1855, one column.

Instructions for taking the census of the State of New York in the year 1855; issued by the Secretary of State, to the officers charged with the duty of taking it. Together with the constitutional and statutory provisions concerning the same. Albany: Weed, Parsons & Co., 1855. 8°, 47 pages.

The St. Regis reservation.

In New York Herald, July 15, 1855, one-half column.

Earliest public encouragement of the cultivation of the grape and wine in New York.

In N. Y. State Agricultural Society Trans., vol. xiv, pages 148, 9, 8°. Albany, 1855.

An act to provide for the collection and arrangement of the Indian treaties of the State, with their accompanying documents.

In N. Y. Assembly bill, No. 274, February 28, 1855. Bill drafted by Dr. Hough.

1856.

Preliminary report on the census of the State of New York, for the year 1855. Prepared in pursuance of chapter sixty-four of the laws of 1855, under the direction of the Secretary of State. Albany: Weed, Parsons & Co., 1856. 8°, 46 pages.

Edition, 1,000. Reprinted as N. Y. Senate Doc. No. 8, 1856, 74 pages.

Results of a series of meteorological observations at New York academies, from 1826 to 1850.

In American Association for the advancement of science, proceedings, 1856, pages 231-7.

The St. Regis Indians. [Written July, 1855.]

In New York Daily Times, June, 1856, one column.

Papers relating to Pemaquid and parts adjacent, in the present State of Maine, known as Cornwall county, when under the colony of New York. Compiled from official records in the office of the Secretary of State at Albany, N. Y., by Franklin B. Hough. Albany: Weed, Parsons & Co., 1856. 8°, vii, 136 pages.

Printed for the Maine Historical Society, and included also in vol. V. of its Transactions

Papers relating to the island of Nantucket, with documents relating to the original settlement of that island, Martha's Vineyard and other islands adjacent, known as Duke's county while under the colony of New York. Compiled from official records in the office of the Secretary of State at Albany, New York, by Franklin B. Hough. Albany; J. Munsell, 1856. Sm. 4°, xviii, 162 pages, 1 leaf, map.

Edition, 150 copies. This was the first work printed by Munsell in his celebrated old style type, the font having been procured from England. Issued under the patronage of Hon. John V. L. Pruyn.

New York Assembly Document, No. 60, 1856. Report of the Secretary of State in answer to a resolution relative to savings banks. 8°, 6 pages.

Everything but the signature was written by Dr. Hough.

1857.

Census of the State of New York for 1855; taken in pursuance of article third of the Constitution of the State, and of chapter sixty-four of the laws of 1855. Prepared from the original returns, under the direction of Hon. Joel T. Headley, Secretary of State, by Franklin B. Hough, superintendent of the census. Albany, C. Van Benthuysen, 1857. Folio, lxvi, 525 pages, 4 pages of diagrams.

A part of the edition was printed on fine paper, extra size, and half bound in red turkey morocco, for the use of the Secretary of State, and superintendent of the census. These copies usually contain the census map of 1855, which was published separately.

Results of the New York State census of 1855; and the comparative growth of the city and State of New York between different periods. Read before the American Geographical and Statistical Society, by Franklin B. Hough, M. D., of Albany, July 2, 1857. 8°, 13 pages.

In American Geographical and Statistical Society Journal, July, 1857, pages 205-217. Also New York Daily Tribune, July, 1857, page 3, 5 columns.

The census of New York. Written at Albany, N. Y., December 17, 1857.

In New York Daily Tribune and New York Daily Times, December —, 1857, one-half column each.

Whetstone Gulf, as a place of resort by pleasure parties and lovers of romantic scenery. Address delivered at a maple sugar picnic on Whetstone Gulf, Martinsburgh, N. Y., July 21, 1857.

In the Republican, Martinsburgh, N. Y., July 30, 1857, one and one-half columns.

The character of a curious fossil in the Medina sandstone.

In Lockport, N. Y., Daily Journal, October 23, 1857, one-eighth column.

Historical and comparative statistics of the population of Canada. A lecture delivered at Montreal, Canada, 1857.

In Montreal Transcript, October —, 1857, five columns.

Sketch of a plan proposed for reducing observations upon periodical phenomena to a series of mean dates, and the advantages of this method in developing the laws of climate.

Read before the American Association for the Advancement of Science, at Montreal in 1857. Not printed.

Essay on the climate of the State of New York. Prepared at the request of the executive committee of the State Agricultural Society, and published in the fifteenth volume of their transactions. By Franklin B. Hough. Albany: Van Benthuysen, 1857. 8°, 48 pages, 2 diagrams, map.

Edition of 100 copies printed from the transactions of the New York State Agricultural Society for 1855, pages 189-236.

1858.

A narrative of the causes which led to Philip's Indian war of 1675 and 1676. By John Easton, of Rhode Island. With other documents concerning this event, in the office of the Secretary of State of New York. Prepared from the originals, with an introduction and notes, by Franklin B. Hough. Albany, N. Y.: J. Munsell, 1858. Sm. 4°, xxiii, 207 pages, map.

Proclamations for Thanksgiving, issued by the Continental Congress, President Washington, by the National and State governments on the peace of 1815, and by the Governors of New York since the introduction of the custom; with those of the Governors of the several States in 1858. With an historical introduction and notes. Albany: Munsell & Rowland, 1858. 8°, xviii, 183 pages.

Edition, 200 copies.

The wolf-hunting frauds of Franklin county in 1820, 1821 and 1822.

In Albany Institute Transactions, vol. iv, pages 257-58.

The census systems of civilized nations.

In Hunt's Merchants' Magazine, January, 1858, pages 54-59.

The St. Lawrence. A series of five articles.

In Northern Journal, Lowville, N. Y., July 18, August 2, 9, 22, September 5, 1855, one column each.

The appearance of a lunar halo, seen at Philadelphia, April 27, 1858.

In Albany Institute Transactions, vol. iv, pages 254-255.

Address delivered at the Lewis county agricultural fair, held at Turin, N. Y., September 18, 1858.

In Lewis County Democrat, Turin, N. Y., five and one-half columns.

On the registration of births, marriages and deaths. 8°, 7 pages.

Also, in New York State Medical Society Transactions for 1858, pages 217-223.

Report of the select committee New York Senate on the registration of births, marriages and deaths. 8°, 8 pages.

New York Senate Doc. No. 81, 1858. Written by Dr. Hough.

An act to provide for the registration of births, marriages and deaths.

New York Senate bill No. 189, February 25, 1858. Bill drawn by Dr. Hough.

Communication from F. B. Hough, M. D., on arranging and annotating certain public documents.

In N. Y. Sen. Doc. No. 130, 1858, pages 337-344, being the Seventy-first Annual Report of the Regents of the University.

1859.

Papers concerning the attack on Hatfield and Deerfield by a party of Indians from Canada, September 19, 1677. New York, 1859. 8°, 82 pages, map.

Bradford Club series No. 1. Edition, 100 copies.

Life of Te-ho-ra-gwa-ne-gen, *alias* Thomas Williams, a chief of the Caughnawaga tribe of Indians in Canada. By the Rev. Eleazer Williams, reputed son of Thomas Williams, and by many believed to be Louis XVII, son of the last reigning monarch of France previous to the revolution of 1789. Albany, N. Y. J. Munsell, 1859. 8°, 91 pages.

Introduction and general supervision by Dr. Hough. Edition, 200 copies.

Lowville Academy, semi-centennial anniversary. Celebrated at Lowville, N. Y., July 21 and 22, 1858. Lowville: Published by the home committee, 1859. 8°, 133 pages, 4 plates.

Edition 1,000; printed by Munsell. Edited by Dr. Hough.

Munsell's guide to the Hudson River by railroad and steamboat, with eight colored maps representing every town, village, landing, railroad station and point of interest on or adjacent to the Hudson River, from Staten Island to Troy; with minute descriptions and references for the convenience of the business man and the traveler. Albany: Munsell & Rowland, 1859. 16°, 58 pages.

Edition, 2,000 copies.

On the manner of taking the census.

In American Geographical and Statistical Society Journal, vol. 1, No. 5, May, 1859, pages 153-4, and vol. 1, No. 6, June, 1859, 120-121.

Letter, offering three copies of the Census as prizes at the Lewis county fair. Written at Turin, N. Y., August 26, 1859.

In The Republic, Martinsburg, N. Y., August 31, 1859, one-fourth column, and The Journal, Lowville, N. Y., one-fourth column.

The French colony of Castorland.

In Albany Institute Trans. vol. 4, pages 275-6.

Shall we have a history of Lewis county?

In ———, July 22, 1859, two-fifths column.

1860.

A history of Lewis county, in the State of New York, from the beginning of its settlement to the present time. By Franklin B. Hough. Albany: Munsell & Rowland, 1860. 8°, iv, 319 pages, 22 plates.

Edition, 1,325 copies, and 25 on fine paper. Published by subscription.

Diary of the siege of Detroit in the war with Pontiac. Also a narrative of the principal events of the siege of Major Robert Rogers; a plan for conducting Indian affairs, by Colonel Bradstreet, and other authentic documents never before printed. Edited with notes by

Franklin B. Hough. Albany, N. Y.: J. Munsell, 1860. Sm. 4°, xviii, 304 pages.

Munsell's Historical Series No. IV. Edition, 130 copies, 6 on large paper forms.

Gazetteer of the State of New York, embracing a comprehensive view of the geography, geology and general history of the State, and a complete history and description of every county, city, town, village and locality, with full tables of statistics. By J. H. French. Illustrated. Syracuse, N. Y., R. Pearsall Smith, 1860. 8°, 740 pages, map, 11 engravings, 94 cuts.

Edited and written mostly by Dr. Hough, who collected a very large part of the material.

The comprehensive farm record, with directions for its use. Arranged by Franklin B. Hough. New York: C. M. Saxton, Baker & Co., 1860, 4°, 153 pages.

Edition, 1,000 copies.

The Albany Institute.

In New York Reformer, Watertown, N. Y., January 26, 1860, one and one-half column.

Account of premiums, awarded by law in the State of New York, for the encouragement of household manufactures of woolen cloths, in 1809, 1810, 1811, 1813, 1814, with references to samples of these premium cloths preserved in the library of the Albany Institute. Prepared by Franklin B. Hough. Dated February 14, 1860. 8°, 12 pages.

In Albany Institute Transactions, vol. iv, pages 113-124.

Newport correspondence.

In Journal and Republican, Lowville, N. Y., August, 1860, three-fourths column.

Steamboat excursion.

In Journal and Republican, Lowville, N. Y., July 4, 1860, one-half column.

The American Association for the Advancement of Science. Account of the Newport meeting in 1860.

In the Country Gentleman, vol. xvi, pages 131-147, two columns each.

The visit of Gouverneur Morris to Jefferson county in the summer of 1800.

In New York Reformer, Watertown, January 19, 1860, two columns.

Burial places.

In Journal and Republican, Lowville, N. Y., June 6 and 13, 1860, three-fourths and one-half columns.

Agricultural statistics. 8°, 8 pages.

Also in Country Gentleman and Cultivator, Albany, N. Y., August, 1860, three numbers.

1861.

Proceedings of the Commissioners of Indian Affairs, appointed by law, for the extinguishment of Indian titles in the State of New York. Published from the original manuscript in the library of the Albany Institute, with an introduction and notes by Franklin B.

Hough. Albany: J. Munsell, 1861. Sm. 4°, 498 pages, 3 maps. (Also 40 copies in folio form, same paging.)

This is known as the Albany Institute edition. The same work was issued (edition, 200 copies) in two vols., sm. 4°, and forms part of Munsell's Historical series, being vols. 9 and 10; and of this edition 10 copies were printed on large paper.

Academic Education.

In Journal and Republican, Lowville, N. Y., March 13, 1861, two-thirds column.

Comparative industrial resources of the seceding States.

In Journal and Republican, Lowville, N. Y., July, 10, 1861, two columns.

Industrial resources of the seceding and loyal States.

In New York World, July 19, 1861, one column.

Killed and wounded in the Mexican war.

In Reformer, Watertown, N. Y., August 1, 1861, one-fourth column.

The wants of volunteers.

In Journal and Republican, Lowville, N. Y., November 27, 1861, one and one-fourth columns.

Memoir of Horace N. Bush.

In Journal and Republican, Lowville, N. Y., October —, 1861, two columns.

Incentive to personal distinction in our army.

In New York Evening Post, October —, 1861, one-sixth column.

1862.

On military and camp hospitals, and the health of troops in the field; being the results of a commission to inspect the sanitary arrangements of the French army, and incidentally of other armies in the Crimean war. By L. Baudens. Translated and annotated by Franklin B. Hough. New York, Bailliere Brothers; London, H. Bailliere & Co., 1862. 12°, 260 pages.

A translation of "La Guerre de Crimée," etc., 2d ed., Paris, 1858.

Observations upon periodical phenomena in plants and animals, from 1851 to 1859, with tables of the dates of opening and closing of lakes, rivers, harbors, etc. Arranged by Franklin B. Hough, M. D. Washington, 1862. 4°, 232 pages.

Forms part of vol. 2, part 1, of "Results of meteorological observations made under the direction of the United States patent office and the Smithsonian Institution, from the year 1854 to 1859."

Memorial of the board of trustees of the Lowville Academy for State aid. 8°, 2 pages.

In N. Y. Senate Doc. No. 18, 1862. Written by Dr. Hough.

Washington correspondence, February 14, 1862.

In Journal and Republican, Lowville, N. Y., February 26, 1862, two columns.

Letter written at camp of Ninety-seventh regiment, N. Y. Vols., near Robinson's River, Va., August 16, 1862.

In Journal and Republican, Lowville, N. Y., August —, 1862, one and one-half columns.

Plan for compiling statistics of the present war.

In Albany Institute Transactions, vol. iv, page 298.

1863.

Agricultural statistics.

In New York State Agricultural Society Transactions, 1863, pages 665-672.

Personal observation of the second battle of Bull Run.

In Albany Institute Transactions, vol. iv, page 315.

1864.

History of Duryea's brigade, during the campaign in Virginia, under Gen. Pope, and in Maryland, under Gen. McClellan, in the summer and autumn of 1862. By Franklin B. Hough. Albany: J. Munsell, 1864. 8°, vi, 9-200 pages, plate.

Edition, 300 copies. Published by subscription.

1865.

Washingtoniana: or, memorials of the death of George Washington; giving an account of the funeral honors paid to his memory, with a list of tracts and volumes printed upon the occasion, and a catalogue of medals commemorating the event. By Franklin B. Hough. Roxbury, Mass.: W. Elliot Woodward, 1865. 2 vols., 8°, 272; 304 pages, 3 plates.

Printed by Munsell. Edition, 290 copies; also 90 copies on large drawing paper.

Minutes of a court of inquiry upon the case of Major John Andre, with accompanying documents, published in 1780 by order of Congress; with an additional appendix, containing copies of papers found upon Major Andre when arrested, and other documents relating to the subject. Albany: J. Munsell, 1865. Sm. 4°, 66 pages.

Edition, 100 copies, and 10 additional on large paper. Edited by Dr. Hough, for Francis S. Hoffman of New York.

Proceedings of a general court martial for the trial of Major General Arnold, with an introduction, notes and index. Privately published 1865. 8°, 182 pages, plate.

Edition, 100 copies, and 35 additional on large paper. Printed for F. S. Hoffman. Introduction, notes, etc., by Dr. Hough.

The order book of Captain Leonard Bleeker, major of brigade in the early part of the expedition under Gen. James Clinton against the Indian settlements of western New York, in the campaign of 1779. New York: J. Sabin, 1865. Sm. 4°, 138 pages.

Edition, 250 copies. Printed by Munsell. Edited by Dr. Hough. An edition of 50 copies on large paper.

Bibliographical list of books and pamphlets containing eulogies, orations, poems and other papers relating to the death of General Washington, or to the honor paid to his memory. By Franklin B. Hough. From the Washingtoniana. Albany, 1865. 8°, 59 pages, 2 plates.

Edition, 25 copies.

Biographical notice of Dr. Sylvester D. Willard, late secretary of

the New York State Medical Society, and surgeon-general of New York. By Franklin B. Hough. Albany, 1865. 8°, 9 pages.

Also in New York State Medical Society Transaction, 1865, pages 329-335.

Was Lewis county the original Garden of Eden of the Indian race?

In Journal and Republican, Lowville, N. Y., December 27, 1865, one-half column.

The census of New York, to be taken during the present year, considered in its medical relations. By Franklin B. Hough.

In New York State Medical Society Transactions, 1865, pages 27-29.

State census of 1865.

In Atlas and Argus, Albany, N. Y., May 8, 1865, one-eighth of a column.

The State census.

In Albany Evening Journal, August 16, 1865, one and one-half column.

1866.

The siege of Savannah by the combined American and French forces under the command of Gen. Lincoln and the Count D'Estaing, in the autumn of 1779. Albany: J. Munsell, 1866. Sm. 4°, 187 pages, plate.

Edited by Dr. Hough. From contemporary newspapers, etc. Edition, 130 copies.

The northern invasion of October 1780, a series of papers relating to the expeditions from Canada under Sir John Johnson and others, against the frontiers of New York, which were supposed to have connection with Arnold's treason. Prepared from the originals, with an introduction and notes by Franklin B. Hough. New York, 1866. 8°, 222 pages, plate, map.

Bradford Club series, No. vi. 155 copies printed.

The Cow Chase, a poem in three cantos by Major John André, adjutant-general to the British army in New York in 1780. Albany, J. Munsell, 1866. Sm. 4°, 69 pages, plate, map.

Edition, 130 copies. Edited by Dr. Hough.

Memoir upon the late war in North America between the French and English, 1755-60, followed by observations upon the theatre of actual war and by new details concerning the manners and customs of the Indians; with topographical maps. By M. Pouchot. Translated and edited by Franklin B. Hough, with additional notes and illustrations. Roxbury, Mass., W. Elliot Woodward, 1866. 2 vols. 4°, 268; 284 pages.

Edition, 150 copies. Printed by Munsell; also 50 copies on large paper.

Notices of Peter Penet, and of his operations among the Oneida Indians, including a plan prepared by him for the government of that tribe. [Read before the Albany Institute, January 23, 1866]. By Franklin B. Hough. Lowville, N. Y. 1866. 8°, 36 pages, map.

Printed also in Albany Institute Transactions, vol. 5, pages 275-303, without map, and also printed by Munsell on larger paper, edition, 50 copies.

Castorland colony. [Paper read before the Albany Institute, May 15, 1866.]

In Albany Institute Proceedings, vol. 1, page 47.

Communication concerning a bequest to the Lowville Academy.

In Albany Argus and Albany Evening Journal, September 22, 1866, one-fourth of a column.

The State census.

In Albany Evening Journal, September 24, 1866, one-sixth of a column.

History of the census in New York, and plan proposed for the State census of 1865. By Franklin B. Hough. Read before the Albany Institute, December 19, 1864, and before the American Geographical and Statistical Society, February 2, 1865. Albany, N. Y.: J. Munsell, 1866. 8°, 35 pages.

Fifty copies printed. Also printed in Albany Institute Transactions, vol. v, pages 196-228.

Preliminary report on the census of the State of New York for the year 1865. Prepared in pursuance of chapter 64 of the Laws of 1865, and its subsequent amendments, under the direction of the Secretary of State. Albany: Weed, Parsons & Co., 1866. 8°, 51 pages.

Edition, 1,000 copies; accompanied by a census map not attached to the report.

Statistics of population of the city and county of New York, as shown by the State census of 1865, with the comparative results of this and previous enumerations, and other statistics given by the State and Federal census from the earliest period. Prepared at the request of the committee on annual taxes of the board of supervisors, by Franklin B. Hough. Document No. 13, board of supervisors, N. Y., August 15, 1866. New York: The New York Printing Company, 1866. 8°, 316 pages, map.

Agricultural Statistics. 8°, 186 pages.

In N. Y. State Agricultural Society Transactions, 1866, pages 903-1089.

Visit to the colliery of the Knickerbocker Anthracite Coal Company.

In Albany Argus, February 20, 1865, one and three-fourths columns.

1867.

The siege of Charleston by the British fleet and army under the command of Admiral Arbuthnot and Sir Henry Clinton, which terminated with the surrender of that place on the 12th of May, 1780. Albany: J. Munsell, 1867. Sm. 4°, 224 pages, 2 plates.

From contemporary newspapers, etc. Edited by Dr. Hough. Edition, 130 copies.

Proceedings of a convention of delegates from several of the New England States, held at Boston, August 3-9, 1780, to advise on affairs necessary to promote the most vigorous prosecution of the war, and provide for a generous reception of our French allies. Edited from an original manuscript record in the New York State

library, with an introduction and notes, by Franklin B. Hough. Albany, N. Y.: J. Munsell, 1867. Sm. 4°, 80 pages, diagram.

Edition, 100 copies.

Prize essay on medical and vital statistics. By Franklin B. Hough, M. D. Albany: Van Benthuyssen & Sons, 1867. 8°, 37 pages, and a blank record of 4 pages.

Edition, 100 copies. Also printed in New York State Medical Society Transactions, 1867, pages 87-121. This essay embraces a plan of registration of surgical injuries, since adopted in the armies of the United States and of Russia.

Memorial of James L. Leonard, late president of the Bank of Lowville. Lowville, N. Y., 1867. 8°, 69 pages, plate.

Edition, 300 copies. Printed by Van Benthuyssen, Albany.

Census of the State of New York for 1865. Taken in pursuance of article third of the constitution of the State, and of chapter sixty-four of the Laws of 1855, and chapter thirty-four of the Laws of 1865. Prepared from the original returns, under the direction of Frances C. Barlow, Secretary of State, by Franklin B. Hough. Albany: Charles Van Benthuyssen & Sons, 1867. Fol., cxxvi, 743 pages, and 3 pages diagrams.

Agricultural statistics of the State of New York by counties. From the census of 1865. By Franklin B. Hough. Together with a summary of agricultural statistics reported to the State Agricultural Society. Albany: C. Van Benthuyssen & Sons, 1867. 8°, 187 pages.

Edition, 100 copies. Also in New York State Agricultural Society Transactions, 1866, pages 903-1089.

The census (extracts).

In New York Daily Tribune, January 28, 1867, two and three-fourths columns.

The census of the District of Columbia.

In Journal and Republican, Lowville, N. Y., November 27, 1867, one and one-half columns.

Repetends and magic squares. Paper read before the Albany Institute February 18, 1867.

Albany Institute Proceedings, vol. i, pages 59-61.

Social reunion of the 97th regiment.

In Utica Morning Herald, March 19, 1867, one column.

Reunion of the 97th regiment.

In Black River Herald, March 21, 1867, one-fourth column.

Our State debt.

In Albany Evening Journal, June 20, 1867, one-fourth column.

Remarks of F. B. Hough on the occasion of the dedication services of the Lowville Rural Cemetery, October 9, 1867.

In dedication services of the Lowville Rural Cemetery, pages 5-11.

Letter to A. P. Sigourney, secretary of the Jefferson County Agricultural Society, with list of premiums awarded at the first county fair in 1818.

In Jefferson County Agricultural Society Transactions for 1867, pages 61-65.

New York Convention Manual, prepared in pursuance of chapters 194 and 458 of the Laws of 1867, under the direction of Francis C. Barlow, Secretary of State, etc., by Franklin B. Hough. Part I, Constitutions. Part II, Statistics. Albany, N. Y.: Weed, Parsons & Co., 1867. 2 vols., 8°, x, 586; xii, 462 pages, plate.

Constitution of the State of New York, adopted in 1846, with a comparative arrangement of the constitutional provisions of other States, classified by their subjects. Prepared under the direction of a committee of the New York Constitutional Convention of 1867. Prepared by Franklin B. Hough. Albany: Weed, Parsons & Company, 1867. 4°, 4; 239 pages.

The method of collecting census statistics.

In Albany Institute Proceedings, December 3, 1867, vol. i, pages 66-7.

Clinical charts. 8°. Albany: J. Munsell, 1867. 1 leaf.

1868.

Biographical notice of Dr. Charles Milford Crandall. By Franklin B. Hough. Albany, N. Y.: Van Benthuysen, 1868. 8°, 6 pages:

Also in New York State Medical Society Transactions for 1868, pages 314-317.

On the principles of statistics as applied to the census.

In American Association for the Advancement of Science; Proceedings 1868, pages 145-158.

American degeneracy.

In The Northwestern, Chicago, Ill., September 30, 1868, one column.

The common schools of Lowville village.

In Journal and Republican, Lowville, N. Y., September 30, 1868, one column.

Interesting local history.

In Utica Morning Herald, November 21, 1868, two and one-half columns.

1869.

Ninth census of the United States. Communication from F. B. Hough to Hon. James A. Garfield, chairman of the committee on the ninth census of the United States, February 5, 1869. [Washington, 1869.] 8°, — pages.

Provisions of the National and State constitutions, and laws relating to the right of suffrage; prepared by F. B. Hough, for the select committee of the House of Representatives of the Forty-first Congress, on the ninth census. Washington: Government Printing Office. 8°, 36 pages.

Early observations upon magnetic observations. 8°, 55 pages, map.

In New York State Cabinet of Natural History, twenty-second report, 1869, pages 109-113.

1870.

Letters and extracts from testimonials accompanying the application of Dr. F. B. Hough for appointment as superintendent of the ninth census. Washington, 1870. 8°, 13 pages.

Report of Dr. F. B. Hough [presenting a classification of the results of the census of the District of Columbia in 1869]. 8°, 32 pages.

In U. S. Department of Education, special report of the commissioner, June 13, 1870.

1871.

American constitutions, comprising the constitution of each State in the Union, and of the United States, with the Declaration of Independence and Articles of Confederation; each accompanied by a historical introduction and notes, together with a classified analysis of the constitutions, according to their subjects, showing by comparative arrangement every constitutional provision now in force in the several States; with references to judicial decisions, and an analytical index. Illustrated by carefully engraved fac-similes of the great seals of the United States, and of each State and territory. By Franklin B. Hough. In two volumes. Albany: Weed, Parsons & Company, 1871. 8°, viii, 886 pages, 23 plates; iv, 941 pages, 27 plates, map.

The history of the Constitution of the State of New York. Paper read before the Albany Institute, January 17, 1871, from manuscripts of "American Constitutions."

In Albany Institute Proceedings, vol. 1, pages 216-17.

Address delivered at the semi-centennial anniversary of the Lewis County Agricultural Society at Lowville, September 13, 1871.

In Journal and Republican, Lowville, N. Y., September 27, 1871, four and one-half columns.

1872.

The amount of rainfall during the past four years.

In Albany Institute Proceedings, April 2, 1872, vol. 1, pages 301-3.

Gazetteer of the State of New York, embracing a comprehensive account of the history and statistics of the State, with geographical and topographical descriptions, and recent statistical tables, representing the present condition of each county, city, town and village in the State. By Franklin B. Hough, A. M., M. D. Illustrated and accompanied by a map of the State. Albany, N. Y.: A. Boyd, 1872. 8°, viii, 745 pages; 8 plates, map.

Published by subscription.

Results of a series of meteorological observations, made under instructions from the Regents of the University, at sundry stations in the State of New York. Second series. Form 1850 to 1863, inclusive; with records of rainfall and other phenomena to 1871, inclusive. Prepared from the original returns, by Franklin B. Hough. Published by Legislative authority. Albany: Weed, Parsons & Company, 1872. 4°, xxx, 406 pages, map.

Address read by Dr. F. B. Hough, at the social union of the Ninety seventh regiment, March 12, 1872.

In Booneville Herald, March 21, 1872, two columns.

Field meetings.

In Journal and Republican, Lowville, N. Y., June 26, 1872, two-thirds column.

Obituary notice of Francis Leger.

In Lewis County Democrat, Lowville, N. Y., May 8, 1872, one column.

Obituary notice of Calvin Lewis.

In Lewis County Democrat, Lowville, N. Y., February 21, 1872, one-half column.

1873.

The existing Constitution of the State of New York, adopted in 1846 and 1869, compared with the Constitution of 1777 and 1821, and with that reported by the convention of 1867-68. Arranged by Franklin B. Hough. Albany: Weed, Parsons & Co., 1873. 8°, 128 pages.

This is part of a work never completed.

On the duty of governments in the preservation of forests. [Paper read before the American Association for the Advancement of Science, at Portland, Me., in 1873.] Salem "Salem Press," 1873, 8°, 10 pages.

Also in American Association for the Advancement of Science, proceedings 1873. Sec. B. pages 1-10.

The Hoosac tunnel. Letter written at Lowville, September 18, 1873.

In Lewis County Democrat, Lowville, N. Y., September 24, 1873, one and one-fourth column.

The St. John River.

In Journal and Republican, Lowville, N. Y., October 8, 1873, one and one-half column.

Obituary notice of Gen. Ela Merriam.

In Journal and Republican, Lowville, N. Y., November 26, 1873, one and three-fourth columns.

Papers relating to the expeditions of Col. Bradstreet and Col. Bouquet in Ohio, 1764. [Cleveland, O., 1873.] 8°, 6 pages.

Western Reserve and Northern Ohio Historical Society Publication Tract, No. 14.

Executive power as heretofore and now exercised in the several States of the federal union.

In Albany Institute Proceedings (March 4, 1873) v. ii. page 19.

1874.

Pemaquid in its relations to our colonial history. Address delivered at Fort Popham, Kenebec river, August, 1874, at the 267th anniversary of the landing made at that point by the Popham colony. [n. p., n. d.] 8°, 38 pages.

Also printed in Maine Historical Society collection, vol. 7, pages 127-164.

Our forests. The effect of their destruction upon climate and vegetation. A plea in behalf of trees. [From the Albany Argus, January 27, 1874.] 4°, 8 leaves.

The ancient dependencies of New York, particularly Gardner's and Prudence Islands.

In Albany Institute Proceedings, October 6, 1874, vii, pages 173-4.

Memorial from the American Association for the Advancement of Science upon the cultivation of timber and the preservation of forests. 8°, 3 pages.

In U. S. Senate Doc. No. 28; 43d Congress, first session, pages 1-3. Written by Dr. Hough.

1875.

Constitutional provisions relating to education, literature and science in the several States of the American Union, including all former provisions as well as those now in force, and those proposed by constitutional conventions, but not adopted; with a classified abstract of the more important features and explanatory notes. Washington: Government Printing Office, 1875. 8°, 130 pages.

Circular of Bureau of Education, No. 7, 1875.

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Journals of Major Robert Rogers, containing an account of the several excursions he made under the generals who commanded upon the continent of North America during the late war, from which may be collected the most material circumstances of every campaign

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* Address by Dr. F. B. Hough on State forest management, before the committee on the preservation of the Adirondack forests of the Chamber of Commerce of the State of New York, January 14, 1884. New York: Press of the Chamber of Commerce, 1884. 8°, 13 pages, 1 leaf.

Production of sugar from the maple and some other trees. [Paper read before the American Forestry Congress, May 7, 1884.]

Upon the cutting and seasoning of timber.

In Journal of Progress, January, 1884, pages 52-3.

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The value and management of Government timber lands and distribution of North American forest trees.

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The principle of graphic illustrations.

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State of New York. Historical and statistical record of the University of the State of New York during the century from 1784 to 1884. By Franklin B. Hough, M. D., Ph. D.; with an introductory sketch by David Murray, Ph. D., LL. D., secretary of the Board of Regents. Printed by authority of the Legislature. Albany: Weed, Parsons & Co., 1885. 8°, viii, 867 pages.

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In Utica Morning Herald, February 21, 1885.

Views of Franklin B. Hough on the preservation of forests. 8°, 3 pages.

Also in Albany Evening Journal, March 10, 1885.

* The duty of the State of New York with respect to the management of its woodlands, and the encouragement of forestry.

In Forestry Bulletin No. 3, January, 1885, pages 6-23.

* Bill submitted by Franklin B. Hough. An act to establish a State forestry commission, and to define its powers and duties. Followed by I, Appendix (explaining the provisions of the bill); II, The duty of the Legislature with reference to its woodlands. 8°, 46 pages.

New York State Senate Doc. No. 40, March 20, 1885. It was while engaged at Albany in elaborating the provisions of this bill, by invitation of the Senate committee having the matter in charge, that Dr. Hough contracted a pulmonary complaint which resulted in his death.

X Abstracts of the laws of the State of New York. Being an analysis and classification of all the laws passed by the State Legislature from the beginning of the State government in 1777, to the close of the 108th session in 1885, showing in full the title of every act, with the date of its passage, and references to places where each may be found in full; with a concise abstract of the subject-matter, copious references to documentary and other information having reference to these laws, and statements of the results of elections, where they have been submitted to a popular vote. Also an abstract of all the statutes of the Congress of the United States, and of bordering States, and of Canada, that have been passed prior to the year 1885, having reference to the State of New York, together with full reference to the decisions of State and Federal courts, in which the meaning of these laws has been explained, or their constitutionality decided. By Franklin B. Hough. Albany: Weed, Parsons & Co., 1885. 8°, 18 pages.

Being a statement of the plan, and specimen pages of a projected work, in six volumes, which was substantially completed and ready for the press at the date of Dr. Hough's decease.

An act to aid in the publication of an abstract of the Laws of the State of New York, from the beginning of the State government, in the year 1777, to the end of the present session of the Legislature, inclusive. 8°.

New York Senate bill No. 162, 1885. Bill drafted by Dr. Hough.

The effect of forests in increasing the amount of rainfall:

In United States Treasury Department—Bureau of Statistics—Report on the internal commerce of the United States. By Joseph Nimmo, Jr. Appendix No. 14, 1885. This, his family is quite sure, was the last published work from the pen of Dr. Hough.

UNDETERMINED DATES.

On recent discoveries in science.

In St. Lawrence Republican, Canton, N. Y., one column.

Consistency of Whig principles.

In Lewis County Democrat, Turin, N. Y., one column.

On independence of character.

In same paper, one column.

The force of conscience.

In Northern Journal, Lowville, N. Y., one column.

To take pictures by sunlight without apparatus.

In same journal, one-half column.

The Judiciary.

In same journal, one-fourth column.

The mint, with a description of the processes employed, and the methods of assaying.

In same journal, three and one-half columns.

Paine's gas; the inconsistencies of the alleged discovery of the decomposition of water by electricity.

In same journal.

On the importance of cultivating the sciences.

In same journal, two and one-half columns.

Butternut sugar.

In the Democrat, one-fifth column.

The apple tree worm.

In the same paper, three-fourths column.

On the transmutation of grain.

In same paper, one-half column.

Postage reform.

In Northern New Yorker, Gouverneur, N. Y., one-half column.

Meteoric showers.

In same paper, two and one-half columns.

The Ideal presence.

In same paper, one column.

River Jordan and the Dead Sea. Account of the expedition sent by the United States government to explore the River Jordan and the Dead Sea; five articles.

In the True Democrat, seven and one-half columns.

Executive power.

In Albany Institute Proceedings, vol 2, pt. 1, page 19.

The man that got lost in the woods.

In —, one-half column.

Gold in Lewis county.

In —, one column.

Incidents of the early settlement of Lewis county.

In —, one column.

The forestry question; lessons New York may learn from Europe; and statistical reports.

In —, two columns.

What shall be done with the old sun dial, and the statue of Themis on the capitol.

In —, one-third column.

Captain Ford's journal. Communicated by F. B. Hough. 8°, 14 pages.

Influence of forests and the planting of timber.

In N. Y. Semi-weekly Tribune, two columns.

BIBLIOGRAPHY for DR. FRANKLIN BENJAMIN HOUGH (1822-1885)

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(1876-1883)

Elements of Forestry -- by F.B. Hough. Robt Clarke & Co, 1882. 381 pp. Cincinnati.

- ✓ * Franklin B. Hough, a Pioneer in Scientific Forestry in America -- by Edna L. Jacobsen, New York History magazine, Vol. 15, No. 3 (July 1934), pp. 311-325
- "Remembering Franklin B. Hough," by Frank J. Harmon, American Forests (34-37, 52-54) January 1977, Vol. 83, No. 1.
- Dr. Franklin B. Hough 1822-1885: New York Awakens to Forestry -- Iowa State Journal of Science, Vol. 34, No. 4 (May 15, 1960).

- ✓ * Hough: Man of Approved Attainments -- by Charles Edgar Randall. American Forests magazine, Vol. 67, No. 5 (May 1961).

- ✓ * Franklin B. Hough, A Tribute -- American Forests magazine, July 1922.

Dictionary of American Biography, 1933.

The National Cyclopedic, Vol. 13, page 340.

- ✓ Descendants of Franklin B. Hough -- by Helen Y. Hough. Washington, D.C. 1969. (Library of Congress No.: CS 71, .H837, 1969).

- ✓ * "The History of Forestry in America"-- by W. N. Sparhawk, in 1949 Yearbook of Agriculture, pp. 704-705.

- ✓ * Reports Upon Forestry. 4 volumes, published in 1877, 1880, 1882 and 1884. (First three compiled by F. B. Hough. (U.S. Government Printing Office.)

- ✓ * "On the Duty of Governments in the Preservation of Forests" -- Speech by Dr. Franklin B. Hough, delivered to the 1873 annual meeting of the American Association for the Advancement of Science, Portland, Maine. (Proceedings 1873)

A collection of Hough's public and private papers is in the manuscript and history section of the New York State Library in Albany, New York. It includes numerous letters and diaries.

"The Forestry of the Future" -- Speech given by F. B. Hough at the 1882 convention of the American Forestry Congress in Cincinnati, Ohio. (Part One). (In American Journal of Forestry, Vol. 1 (October 1882), pp. 15-26.

- ✓ * "Forestry in Agriculture: An Accident of History" -- Chapter 1 in Dr. Harold K. Steen's A History of the United States Forest Service, published by Forest History Society and University of Washington Press, Seattle, 1976.

- ✓ * "A Notable Anniversary" -- by Henry Clepper, American Forestry Association, in Science, publication of the American Association for the Advancement of Science, August 24, 1973, Vol. 181, p. 703.

- ✓ * Bernhard Eduard Fernow: A Story of North American Forestry -- by Andrew D. Rodgers. Princeton University Press, 1951, pp. 36-38.

Also see Commissioners of Agriculture, Annual Reports, 1875-1883.

- ✓ * Memorial from the American Association for the Advancement of Science upon the Cultivation of Timber and the Preservation of Forests. In Report No. 259, 43 Congr. 1, March 17, 1874.

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The American Journal of Forestry. Monthly magazine edited by F.B. Hough, Oct. 1882-Sept. 1883. Robert Clarke & Co., Cincinnati, Ohio.

On the Importance of Giving Timely Attention to the Growth of Woodlands for the Supply of Charcoal for Metallurgical Uses. Paper read to the U.S. Assn. of Charcoal Iron Workers, Harrisburg, Pa., Oct. 21, 1880.

Familiar Talk About Trees -- by F.B. Hough. Talk delivered to the New Hampshire Board of Agriculture, Concord, N.H., June 13, 1883. The Republican Press, Concord. 12 pp.

- ✓* The Proper Value and Management of Government Timber Lands. The Distribution of North American Forest Trees. Papers read by F.B. Hough at the U.S. Department of Agriculture, May 7-8, 1884. USDA Miscell. Special Report No. 5, Washington, D.C. 47 pp. 1884.

Hough prepared a series of forestry lectures in 1874, which he delivered from time to time.

- ✓* The Forestry of the Future - a lecture delivered by Hough at the April 1882 organizational meeting of the American Forestry Congress, and published in Hough's new monthly magazine, "American Journal of Forestry", Vol. 1, No. 2, November 1882, pp. 59-63. (Part II.)

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- * The Duty of the State of New York with Respect to the Management of Its Waste Lands and the Encouragement of Forestry -- by F.B. Hough. Talk delivered at the 4th American Forestry Congress at Saratoga, N.Y., September 1884.

(Hough wrote 78 papers and books on a wide variety of subjects during his lifetime)

- * There is an Autobiography written by Hough in manuscript form (unpublished) in the New York State Library in Albany, N.Y.

The numerous papers of George B. Emerson, close friend of Hough, include many letters from Hough, in the Massachusetts Historical Society in Boston. The Society appears to make access difficult, from the experience of Harold K. Steen of the Forest History Society.

Franklin B. Hough's son, Romeyn Hough, published a bulky 10-volume series on Wood Identification containing actual wood samples, including hinges in the binding. A copy is at the Northeastern Forest Experiment Station and at the Forest History Society in Santa Cruz, Calif., and Duke University. Also Patricia Hough, Robert Hough and Barbara Hough Miller. He also wrote "Trees of North America."

Notes on Ancestors of Dr. Franklin B. Hough of Lowville, N.Y., first
forestry agent of the Federal Government, 1876-1885.

(Taken from two stencil publications by Granville W. Hough of Fullerton, Calif., in Library of Congress, June 1977: (1) U.S. Family Distribution, 1619-1880, Hough and Huff, Oct. 1971, 77 pp., Copyright by Granville W. Hough. (2) Hough and Huff Families of the United States, 1620-1820, Northeastern States, Vol. 2, 152 pp., Copyright 1974 by Granville W. Hough.) L-C Ref. Nos.: CS71, .H837, 1971 and 1972b vol. 2. (Granville Hough's full address is: 1026 N. Richman Ave., Fullerton, Calif. 92635.)

The Hough families came from the following countries to the United States: Canada, Ireland, England, Germany, Norway, and Austria. They and their descendants (according to Granville Hough, 1971) pronounced their name as corresponding to the following sounds: huff, how, hoe, hoaf, hoak, hoff, high, and huft.

The Huff families came from England, Germany, Norway, Russia, Canada, and Holland. Many adopted the spelling Huff as a simplification of more complex or less popular forms, such as Hougham, Houghtaling, Houghland, Hufstadler. Hoff is another variation, and there are some 20 other various spellings. Some English Hough families who preferred the Huff pronunciation changed the spelling to Huff.

Dr. Franklin B. Hough's ancestor was William Hough, who was a carpenter from Cheshire in the west of England, who came to Boston in the Massachusetts Colony in 1640 with the party of Rev. Richard Blinman. William Hough married Sarah Caulkins in 1645. They have probably more descendants than any other of the Hough immigrants. He was the third recorded Hough to come to America, and the second to New England; the other went to Virginia. The William Hough family stayed in New England for several generations. (The direct male line is: William, Samuel, James, Daniel, Thomas, Horatio Gates, and Franklin B.)

William Hough lived first in Gloucester, Mass., then moved to Saybrook, Conn., then to New London, Conn. He was born in 1619 in Westchester, Cheshire, England, and died in 1683 in New London, Conn. His first son, Samuel, was born in Saybrook in 1652 and died in 1714, and is the ancestor of Franklin B. Hough. Samuel was married first in 1679 and again in 1685, this time to Mary Bates. Tracing only the direct line to Franklin B. Hough, the descendants are as follows;

James Hough, son of Samuel and Mary, was born in 1688 and was married in 1711 and again in 1718, and died in 1740. His son Daniel, by his second wife, Sarah Mitchell, was born in 1721 and died in 1768. Daniel married in 1741 and again in 1743. His son Thomas, by his second wife, Violet Benton, was born in 1749 or 1750, married Rebecca Ives in 1772, and died in 1815. Thomas was the grandfather of Dr. Franklin B. Hough. Thomas lived in Southwick, Mass., and served in the Massachusetts militia during the Revolutionary War. His second child was Horatio Gates Hough, born 1778. Horatio G. Hough married Martha Pitcher (Year - ?) probably in the vicinity of Southwick, Mass., and they moved to a farm near Martinsburg, Lewis County, in north-central New York State, just west of the Adirondack Mountains and east of Lake Ontario. When Martinsburg became a town in 1814 he was one of the first town commissioners. He was the first medical doctor in Lewis County. Asahel Hough, the town inspector in 1814, was a distant cousin.

Franklin B. Hough (first named Benjamin Franklin Hough), was born in 1822 on the farm near Martinsburg, Lewis County, N.Y. (See the genealogy compiled by Miss Helen Yale Hough in 1969.) Franklin Hough was the son of Horatio Gates Hough and Martha Pitcher Hough. Franklin B. Hough died June 11, 1885 at his home in Lowville, N.Y.

303 Lamarck Drive
Snyder, New York 14226
June 26, 1985

Mr. Dennis M. Roth
Chief Historian
US Department of Agriculture
12th and Independence SW
P.O. Box 2417
Washington, D.C. 20013

Dear Mr. Roth:

Thank you for doing me the kindness of sending the materials on Franklin Hough. The bibliography you enclosed was particularly helpful as I now have knowledge of additional articles which will be of use in my research on Hough's connection with the 97th New York, a regiment in which he served as a surgeon.

Please accept my sincere gratitude.

Very truly yours,

Thomas Grace
Thomas Grace

Good work, Frank

DR



original in
Bios-Pics-Hough



Franklin B. Hough

The centennial history of the Forest Service will be written according to scholarly criteria, keeping the general reader in mind. Occasional anecdotes are appropriate for all audiences and can add to readability. Carefully selected photographs also will enliven the narrative. The flexible target length is 100,000 words, or about 350 to 400 typewritten pages. Completion date for the manuscript is June 30, 1975.

The book will develop along generally chronological lines, relating the growth and activities of the Forest Service to events in national history. As Forest Service interests and responsibilities have been broad, its history is a part of all of American forestry, but the book will of necessity focus mainly on the federal agency. Affairs of the Washington, D.C. headquarters will receive major emphasis, but will be illustrated or expanded by examples of field activities.

With minor exceptions, research is complete. Forest Service records at the National Archives and several regional federal records centers, records of organizations associated with the Forest Service (American Forest Institute, American Forestry Association, National Forest Products Association, National Association of State Foresters, National American Cattleman's Association, Sierra Club, Society of American Foresters, and Western Forestry and Conservation Association), and papers of individuals important to Forest Service history (Hough, Fernow, Pinchot, Graves, Greeley, Clapp, Cliff, Chapman, Zon, DeVoto, Wagner, Carpenter) have been examined. All known collections of importance were studied. Although scattered, the record of Forest Service activities seems complete enough to support a comprehensive history of the agency and its programs.

1783-1885

CHAPTER I

FORESTRY IN AGRICULTURE - AN ACCIDENT OF HISTORY

(It was September 16, 1893. Preceding days in Oklahoma had been blistering hot; crowds of men suffered in the heat. They were waiting for noon. By 7:30 that morning the assembled thousands began to take positions at the starting line -- some paid \$5 for a better spot. Soldiers patrolled the line to see that no one crossed early. Finally it was 12 o'clock and the starter's shots rang out. The men surged forward on horseback, bicycle, on foot, or in horse and buggy, racing for land and a new home.^{1/} Opening the Cherokee Strip in Oklahoma marked the last of the great land rushes, epics familiar to every American schoolboy today. Land was beginning to seem scarce in this vast nation, and those who wished to claim a piece for themselves were willing to scramble for the right.)

Land! (In the America of the late 1780s,) millions upon millions of wilderness acres stretched west (from narrow) clusters of population along the navigable waters of the eastern seaboard. (This acreage, all the way) to the Mississippi River, north to Canada and south (nearly) to the Gulf of Mexico, (had been) included in the treaty with Great Britain which followed the Revolutionary War. (The former collection of coastal colonies became a national expanse beckoning settlement.) Land (not surprisingly became) a dominant theme of American thought.^{2/}

(Consequently, the policy governing the tremendous sweep of American land would grow in the next two centuries into a complexity of legislation and administration.) Within this land policy, American forest policy was evolving, too. The conservation movement began with concern over forested lands and their water sources. Congressional committees responsible for land sifted

(those) bills which ultimately formed the corpus of conservation law. When (Congress established) specialized agencies, to administer forestry legislation, (it placed them) in departments already administering land policy. A history of the U. S. Forest Service, therefore, begins with a review of public land policy.

THE PUBLIC DOMAIN

Land lying between the Appalachian Mountains and the Mississippi River was (placed) in federal ownership immediately following the Revolutionary War. Some exceptions did exist, as certain of the original states insisted upon retaining parcels on the western frontier of the new nation, but approximately one-half of the country became public domain. The fledgling federal government facing large military debts and uncertain income viewed these western lands as an important source of revenue. Tariffs, excise taxes, and land sales were to be the major federal income for well over a century. ~~(Sentence deleted)~~ In addition to the needed revenue from sales, settlement west of the Appalachians would validate still-tenuous sovereignty and bolster the national economy through expanded commerce. Even the Continental Congress, with all of the distractions besetting it, gave substantial attention to public land disposition. (Two ordinances, in 1785 and 1787, established the rectangular surveying system to be used on public lands, determined procedures by which territories would become states, spelled out the principles on land sales and public reservations, and in general laid down the public land philosophy used to date.) Following adoption of the federal constitution in 1789, the U. S. Congress enacted a lengthy series of laws to transfer public ownership of western lands to private; (Congress intended that) ultimately (nearly) all was to be privately owned. Congressional willingness to experiment is well demonstrated by the many variations found in these laws. All contained similar elements,

*some given to
the soldiers.*

however: the land was to be purchased -- not (bestowed) as a gift -- and settlement was to be orderly following surveys.

Land sold briskly except during economic slumps; indeed, one can readily judge the nation's fiscal vigor, year by year, by scanning acreage of public lands sold. Most sales were in 160-acre units, or multiples thereof, although at times very large areas were (marketed) to land companies, which would survey and in turn offer farm-sized parcels to individuals. By mid-(nineteenth) century the land-disposal system was well tested and offered a range of options to the purchaser. Also by mid-century, the public domain was vastly larger than when land policies were developed (sixty and seventy years earlier.) Purchase, negotiation, and war had added the remainder of the continent lying between the Mississippi River and the Pacific Ocean. To deal more effectively with its extensive domain, Congress (had) created the General Land Office in 1812; by 1849 the Department of the Interior was established to cope with a myriad of public land responsibilities.

The Civil War (stands as) a watershed, (a dividing point,) in American history -- no less so for land policy (than for other national concerns.) Without Southern votes to contend with (during the early 1860s,) Congress enacted several major laws that dealt with the public domain and its disposition. Although land grants to canals and railroads had occurred prior to the Civil War, the enormous, precedent-setting grant to the Central Pacific and Union Pacific Railroads assured closer ties between East and West as well as transferring vast acreages to private ownership. An even larger grant to Northern Pacific Railroad was soon to follow. All told, railroads received over 200 million acres during the last half of the nineteenth century. (In return the nation received several transcontinental railroads.)

C)
Congress had been debating giving land away, instead of selling it.
The Homestead Act of 1862, enabled those of pioneer spirit to acquire 160 western acres for the price of a filing fee and living on the tract for five years (proving up). Now the farmer could acquire land via purchase under several public laws, buy from a railroad and be close to transportation, or instead pick a spot and enter a homestead claim with the nearest land office. Through (such) means farmers acquired nearly 550 million acres. In 1850 there had been one and one-half million farms; by 1900 the Bureau of Census would report five and three-quarters million farms in the United States. To better serve the farmer, Congress established the Department of Agriculture in 1862, elevating it to cabinet status in 1889.

() Congress made another decision during 1862 which (affected public lands,)
() The Morrill Act granted 30,000 acres of non-mineral public land to a state for each of its members of Congress as determined by the 1860 census. Two senators and at least one representative in the House assured each state a minimum of 90,000 acres of public land. Proceeds from sales of their grants were earmarked for supporting colleges of agriculture and the mechanic arts. Congress amended the act in 1890 giving additional assistance to land-grant colleges. These schools provided means to prepare technical specialists needed for agriculture, industry, and ultimately forestry. The Morrill Act made nearly 8 million acres of land available for sale and bolstered the nation's educational capacity in the "practical arts."

"Doing land office business," (the thoroughly) American catch (phrase) denoting a (runaway) work load, (came into the language from) the hectic heydays of the land agencies when administrative paperwork at times lagged several years behind events. That the disposal laws and the survey system worked

at all, considering the primitive state of the art and the magnitude of the job, is miraculous. Yet, by all the means available, over one billion acres of public land -- fully one-half of the entire nation -- were transferred to private ownership during the nineteenth century. All things considered, Congress had erected a reasonable and realistic process of land disposal.

Abuses and frauds, the delight of many historians, were bound to occur -- and occur they did. (To make a show of curbing) these frauds and abuses, Congress legislated a number of efforts which were perhaps half-hearted (at best); most congressional interest, (after all,) lay with placing the West in private ownership rather than in impeding the process with intensive policing. (During colonial times, Americans had recognized the significance of local wood shortages and enacted ordinances to regulate short-sighted logging. The British Parliament had decreed in 1691 that trees suitable for masts be reserved for the Royal Navy. Although the colonials recognized the need to maintain supplies for their own use, they observed the mast reservation order in the breach. ** Following the Revolutionary War, several federal statutes reimposed restrictions on cutting wood needed by the American Navy, with about as little success as the British had before.) As early as 1831, Congress forbade removal of timber from the public domain. By 1854, the General Land Office had responsibility for protecting the public domain; during the 1880s, Division P was established to coordinate protection policies. Much can be made of colorful episodes of land agents battling timber rustlers in the Lake States, or theft and fine agreed upon in advance by logger and federal officer, or putting wheels on a boat and dragging it across dry land to qualify fraudulently for a swamp land entry --perhaps too much.

As far as timbered portions of the public domain were concerned, the

* - a contributing cause to the Revolutionary War.

* - This was not the only reason.

There were also many laws enacted fire threatened with the colonial period.

90 years - 1783-1873
problem (of disposition) was two-fold. For the first century of this nation's existence, Congress did not officially recognize timberland (in its legislation.) With minor exceptions, public land was (classified) either (as) agricultural or not suited for agriculture. Congress designed land laws to serve the farmer. ^(sentence deleted) To acquire public land under existing laws usually meant pledging agricultural intent. Other uses were fraudulent by definition, (contributing to) the impressive statistics showing large-scale abuse. No matter how legitimate lumbering might appear from modern perspective, Congress (had) only sanctioned farming. see top of p. conflict

The second reason for frequent operation outside of the letter of the law (may be found in) the nature of government and morality on the frontier. Subduers of the wilderness, taking all of the risks entailed, were not overly concerned about (what seemed to them to be) unrealistic regulations conjured up a thousand miles or more to the east. If (a man was) apprehended and indicted (for some land misuse or another, the) accused frequently (would be) found (by a) jury of (his) peers to be guilty of (nothing) more serious than making the best of a difficult situation. Judge, jury, and defendant were often united against the federal agent, who was considered an outsider. Neither Indians nor "unreasonable" federal laws would impede settling the West.

Whatever judgment one may pass on the seriousness of nineteenth-century land fraud and timber depredation, those directly responsible for administering the law were concerned, at times outraged. Report after annual report of the secretary of the interior and commissioner of the General Land Office from mid-century on carried complaints of theft, misrepresentation, and fraudulent practices.

By 1874, Secretary of the Interior (Columbus DeLano) ^("concern about" deleted) reported, "the rapid

destruction of timber," especially on public lands. He predicted all timber of value would soon be removed unless something was done. Protective legislation was "absolutely necessary," the secretary insisted, to protect the public interest.^{4/}

Administrators (in the Department of the Interior) begged for increased appropriations to (obtain) the staffing (needed if they were) to live up to their commitments. They also recommended repeatedly that defective laws be amended or repealed, or as we have seen, asked for new legislation to deal with the situation. An occasional reformer would attempt verbatim interpretation of the law, causing western outrage to rattle the houses of Congress. It was unfair, claimed those who viewed themselves as victims of unpredictable enforcement, to upset the western way of life with spurts of morality. Congress seemed to agree; increased funding was not forthcoming, laws with obvious loopholes remained in force, and congressmen pressured secretaries of the interior to be less aggressive. western

Thus was the situation in the late nineteenth century.

However, the decade of the 1870s ushered in changes, highly significant in retrospect but nearly imperceptible at the time. Congress recognized timber (land as a legitimate category,) enacting the Timber Culture Act in 1873, a variation of the earlier Homestead Act allowing the settler to substitute planting and cultivating trees for part of the residence requirements. Five years later the Timber and Stone Act authorized sale (of) non-tillable public timber land for personal use. Neither law was motivated by a sense of conservation but each was meant to liberalize timber supplies to meet western needs.

In the main, scientists (and other highly educated men became the ones to) show concern for future supplies; congressional thinking (for the most part) was still at a more elementary level. The versatile and oft-quoted George Perkins Marsh had published his landmark monograph, Man and Nature, in 1864 (to) warn of environmental deterioration and to lecture on the ethics of land use. Annual reports of Interior and Agriculture made frequent reference to Marsh and others, at times reprinting in full a speech or article that carried a conservation message. There were many official warnings, comparing events in the American West to some environmental disaster in Europe, (apparently) caused by similar abuses. (Sentence deleted)

(The states, too, dealt with the resources within their boundaries. Western states owned large amounts of land, acquired when admitted to the union. All states had responsibilities for private land. Early legislation dealt more with protecting commerce than with conservation, but forest fires, forestation, and trespass received a degree of regulation. In March 1885, the first state -- California -- created a forest board, which was limited to education and research. Other states followed suit. Not all that impressive, except when viewed in the exploitive context of the times. Organized private concern had appeared a decade earlier.)

FRANKLIN B. HOUGH

In September 1875 the American Forestry Association held its organizational meeting in Chicago. Called together by John A. Warder, the delegates agreed that collection of statistical information on forest areas, lumber production, reforestation, and botanical descriptions of various tree species was very important. (The group continued to meet and merge with other organizations

having similar interests. Published proceedings made available to a broad audience the many forestry papers read at each session. Certain names appeared over and over again at the American Forestry Association meetings.^{5/} One of these names was) Franklin B. Hough of Lowville, New York.

In August 1873, (Hough) attended the annual meeting of the American Association for the Advancement of Science, held in Portland, Maine. Hough was a physician, historian, and statistician. He had been a member of the association for over twenty years. As a statistician, Hough had analyzed census reports and noticed that lumber production was falling off in some areas and building up in others, indicating to him that timber supplies were being exhausted. Hough wondered how long the other remaining supplies would last. In addition to statistical studies, he was very interested in meteorology and rainfall, at a time when it was generally believed that there was a direct relationship between forests and climate. Hough saw forestry as a composite of natural history, geology, mathematics, and physics. He began to focus seriously on the subject when in 1872 he was appointed to a state commission (New York) to study the need for a public forest park. (He had read and was strongly (Adirondack) influenced by Marsh's, Man and Nature.^{6/}) Now he was to read a paper to his scientific colleagues, which reflected his newly formalized interests.

*1st published in 1869 in London. (S. Low, Son, and Marston)
Subtitle: "Physical Geography as Modified by
Human Action".*

A week before the Portland meeting, Hough noted in his diary:

"Began to write a paper on Forestry." He completed it the next day.

On August 21, Hough jotted: "Read my paper on Forestry and forest culture in the eve at city hall to a large crowd." The assembled scientists received Hough's paper, entitled "On the Duty of Governments in the Preservation of Forests," with favor. The following day they passed a resolution to memorialize Congress "on the importance of promoting the cultivation of timber and the preservation of forests." Hough, Harvard botanist George B. Emerson, and seven others formed a committee to handle the matter. Hough and Emerson would travel to Washington, D.C. to bring the memorial directly to congressional attention. 7/

In November, Hough roughed out the memorial and sent it to Emerson for comment. The following ¹⁸⁷⁴ February, the two arrived in Washington and went directly to the Smithsonian Institution to confer with its director, Joseph Henry, "to talk over the subject of Forestry." They also saw several congressmen and senators, and chatted at length with Commissioner of Agriculture Frederick Watts. The next week, another meeting with Watts produced an invitation for Hough and Emerson to meet President U. S. Grant and present their forestry memorial to him personally. They conferred with Grant "for some time about forestry." 8/

After meeting the president, Hough and Emerson visited the Department of the Interior, where they talked to Willis Drummond, commissioner of the General Land Office. They had met with Drummond before; on both occasions the commissioner showed "lively interest" in their memorial. He promised to endorse it and also to secure the endorsement of Secretary of the Interior Delano. Drummond proved as good as his word, recommending to Delano that he support this memorial, which was "indispensably necessary" to halt timber

destruction and to provide for reforestation. He included with the memorial a draft joint resolution for congressional consideration. Delano quickly approved and forwarded the memorial and draft resolution to President Grant, who in turn sent it on to Congress.^{9/}

The memorial described forest preservation and growth as of "great practical importance." Predicting timber shortages in the near future, the memorial asked for a law creating "a commission of forestry," appointed by the president and the Senate, to study and report on the amount and distribution of woodlands, the influence of forests upon climate, and European forestry methods. The memorial and a draft resolution were received and referred to the Public Lands Committees of the respective houses.^{10/}

By this time Emerson had returned to Boston, leaving Hough in Washington to deal with Congress. Hough met regularly with congressional supporters and spoke to the House Committee on Public Lands about the merits of his memorial. He had been invited to appear before the Senate committee, too, but the opportunity to speak failed to materialize. When he was not campaigning directly, Hough spent long hours at the Library of Congress, reading all he could find on forestry. He seemed especially interested in French forestry methods but read broadly. One day his diary confides that he was determined to find the "origin of the term 'forestry'." He concluded that (forestry was "quite new to the language."^{11/}

On March 4, 1874, Hough met Congressman Mark H. Dunnell of Minnesota, a member of the House Public Lands Committee. From then on Dunnell would act as Hough's champion; for the next decade, they conferred with great frequency about forestry matters. As chairman of the subcommittee reviewing Hough's

memorial, Dunnell arranged to have 5000 copies printed for general distribution and drafted for full committee consideration a bill that contained the memorial's essence. The bill provided for presidential appointment, with senatorial approval, of a man "of approved scientific attainments" who also knew statistical methods and was familiar with forestry. Hough gloated to his diary, "My bill introduced in House." ^{12/}

Waiting for congressional action was excruciating for Hough. Extreme economy was in congressional favor that session, he was advised, and his bill stood little chance. He reported the situation to Emerson in a letter full of "discouragement." Dunnell remained confident, but Hough returned to his room and waited alone. Finally on April 20, Dunnell advised Hough to go home, the bill was dead. Eighteen seventy-four was the same year that Secretary of the Interior (Delano) pleaded for legislative action to stem destruction of timber on public lands, but the bill died in a Congress distracted by greater issues. ^{13/}

At home, Hough continued to study forestry during the remainder of 1874 and through 1875, writing papers and presenting a series of lectures at the Lowell Institute of Boston. *(Sentence on Emerson omitted)*. Hough kept in touch with Dunnell, asking for progress reports on the bill. *"Emerson attended and gave Hough high praise for his efforts."* Showing unusual eloquence, Hough pledged not to "accept failure as a defeat." He would continue to advance the study of forestry through the AAAS and to collect information. Hough suggested that they might again seek presidential influence. Hesitating, crossing out then reinserting a ringing prediction in a letter to Dunnell, "I am convinced that this is destined to be one of the great questions of the near future and that those who take active interest in it now, whether in or out of Congress, will deserve and hereafter secure an honorable place in the Annals of our Forestry." ^{14/}

repeated on p. 22

In January 1876, Dunnell introduced another forestry bill, similar to his earlier one. It, too, made little progress through Congress. (After) he and Hough exchanged ideas on the subject, Hough journeyed to Washington in February to testify on the bill before the House Public Lands Committee. "They listened attentively," Hough thought, "but I felt that they regarded the subject with much indifference." Hough was perceptive; the bill bogged down. Even so, Dunnell remained confident and told Hough that he would undoubtedly be appointed to carry out the bill's provisions. The Minnesota congressman hoped that the (appointment would evolve into something better for Hough.) Then in August 1876, to resuscitate the dying campaign, Dunnell made a motion to transfer the substance of the bill stalled in the Public Lands Committee to the general appropriations bill. The rider authorized \$2,000 to support a forestry study, obscurely tucked away as seed distribution money for the Department of Agriculture. On August 15, 1876, the appropriations bill received approval. The commissioner of agriculture was authorized to "appoint a man of approved attainments" to study and report on forest supplies and conditions. ^{15/}

"So the effort was successful."
Sentence deleted.
Little thought was given to it at the time -- it seemed unimportant -- but the last-minute, parliamentary tactic shifting the bill from the Public Lands Committee to the agricultural appropriations bill began the century-long tradition of having a forestry agency in the Department of Agriculture. *(Sentence deleted)*

deleted: "The significance of this historical accident is readily apparent in retrospect."

Hough heard the news and was delighted. In a lengthy and uncharacteristically detailed diary entry, he explained how he had received word from Dunnell and had started immediately for Washington. Dunnell urged Hough to see Commissioner of Agriculture Watts in order to be sure that he got the appointment; it would be better for Hough to go in person. Hough justified his hasty enthusiasm by explaining: "I said to myself, 'If I go and get the appointment I can exchange

views with Mr. Watts fully and begin with a full understanding of what is expected of me. If I fail, I never shall have reason to reflect that I may have lost an opportunity.'" ^{16/}

Hough could well be optimistic, for Watts had supported forestry on previous occasions. The year before, Watts had reported that because of "rapid deforestation" of large areas, "forestry has excited much attention in the United States." The commissioner feared a "timber famine at no distant day," unless appropriate actions were taken. ^{17/}

^{Aug. 1876}
Hough arrived in Washington to find that Watts was at his home in Carlisle, Pennsylvania. Spencer F. Baird of the Smithsonian joined Hough on the train north, promising full support of his appointment and the accompanying forestry study. At Carlisle, Watts quickly assured Hough that he intended to appoint him as soon as he returned to Washington. He offered Hough a free hand on how to make the study and would see to it that it was published. Hough realized that the \$2,000 appropriation would demand the "strictest economy." He told Watts that he had expected the bill to be approved in its own right, instead of as a rider to an unrelated subject. But since the project authorized was nearly identical to his original proposal, he was satisfied. They parted cordially. ^{18/}

The next morning, Hough "awoke early with an oppressive sense of the magnitude of my newly acquired burdens." After three years of advocacy, he had his prize (and was humbled.) Recovering his composure, he predicted that he would "do credit to myself and the country." ^{19/}

(H deleted here - old p. 13) ("Hough tried to get his appropriation increased"

Returning to Washington, Hough called on Commissioner Watts to discuss forestry matters. They had a pleasant chat, agreeing on Hough's plan.* Hough

**This was apparently in February, 1877.*

decided that no further discussion was needed until he had the report ready to submit. He searched the files of the Department of Agriculture for names of correspondents to contact about forestry, studied a few more items in the Library of Congress, then went home to Lowville to compile his report. 20/ *

Hough had a head start. For at least five years he had been collecting forestry information. On each trip to Washington, D.C. to lobby for support, he spent time at the Library of Congress, reading, translating, or indexing pertinent materials. He never missed an opportunity to ask a diplomatic legation for pamphlets or reports on forestry conditions in its native lands. In slightly more than a year's time, Hough presented his "Report Upon Forestry" to the commissioner of agriculture, as directed by the enabling legislation. An impressed Congress authorized printing 25,000 copies.

The report as a whole is a bit of a hodge-podge, reflecting Hough's varied interests and the sort of materials available for quick gathering. He discussed relevant land laws, how to plant or transplant trees, soil types, use of wood by railroads and iron manufacturers, problems of insects and fire, meteorology and effects of forests on climate, and the forest resources of many states and other nations.

miscellany
His P was moved up from 1st page.
TP moved up from next page.
His statistical tables, which covered as many pages as his written report, was not published until 1880 as the bulk of his 2nd report.

Hough began his 650-page compilation with a few trial thoughts about underlying conditions which affected forests. Property rights, a sacred American tradition, deterred public interference with destructive practices occurring on private land. Still, he argued, the government could invoke its right of eminent domain for public welfare. (Aware that the remaining public domain was slated for private) ownership, he thought another obstacle was the

In the spring and summer of 1877
** Unfairly superficial to Hough. He travelled 8,000 miles around the country to personally visit lumbering areas, plantations, and wood industries. He sent questionnaires everywhere. Visited state officials etc. Wrote to local GLO & army posts, Army Engineers*

lack of publicly owned land available for reforestation. Even if land were available, he pointed out, there were no trained foresters, since there was no hope of employment.^{21/} The situation appeared hopeless -- no jurisdiction over private property, no public lands available, and no (specialists to carry out a program.)

Probably influenced by Hough's study, Watts in his own report reiterated the problem of property rights. "The owner absolutely owns all the rights" except for the government's right of eminent domain and taxation. Therefore, the commissioner concluded, the forest situation in Europe was little (applicable) to the United States. Watts did acknowledge, however, that technical or botanical information obtained in Europe could be applicable to American forests.^{22/}

Bottom page 8 { Hough continued, describing the forest situation in blistering terms, alluding to a pioneer mentality -- "little that can be commended and much that can be blamed." / Not only was the waste of timber shocking, but overstocked markets brought ruin "upon the greedy." Too, trespass -- a euphemism for thievery -- was commonly reported. } *Top page 9* [Enforcement of existing laws and public forest reserves, Hough suggested, would alleviate the problem.^{23/}

(At the same time,) other (anxious) voices were heard, too. Secretary of the Interior Carl Schurz warned of the enormous depredation of public timber and agreed with Hough that enforcement of existing land laws was vital. Schurz was alarmed by the rate at which forests were being "stripped," estimating that within twenty years timber would be in short supply, and so would water. For those engaged in timber theft, he recommended punishment for the buyer of stolen logs, as well as the thief himself. The interior secretary also supported

Watts' contention that the government had no jurisdiction over private property. ^{24/}

Early in 1879, Hough received a lump-sum payment of \$2,000 as compensation for his report. By that time he was already immersed in additional forestry work. He ^{had} travelled through the Lake States and eastern Canada, ^{* in the fall of 1878,} observing forest conditions and gathering information for another volume. Rutherford B. Hayes had been sworn in as president in the spring of 1877, naming able but blunt William G. LeDuc to be his commissioner of agriculture. When Hough returned to Washington after his Canadian trip, he presented a memorandum to LeDuc that described his plans for the next report. The commissioner "professed to be satisfied" and planned to use some of the information in his annual report. ^{25/}

Dec 6, 1878
Jan. 14, 1879

(Next,) Hough vigorously campaigned on Capitol Hill for increased appropriations, with Dunnell supplying either an introduction to a key congressman or by intervening with a colleague himself. No doubt this effort enabled LeDuc to secure a \$6,000 forestry appropriation, of which he earmarked \$2,000 for the West, \$1,000 to send Hough to Europe to study forestry conditions, and \$3,000 for general forestry purposes. Hough and Dunnell were not satisfied with increased appropriations alone and pressed for statutory permanence for the office. As usual, Dunnell was confident, but Hough "was weary of this waiting from day to day." Repeated lack of a quorum prevented committee action; Congress adjourned without even providing for the printing of Hough's second report.

Both he and Dunnell were disgusted. Hough returned again to Lowville. ^{26/}

An appropriation for printing was approved at a special session, but was vetoed by the President. 1880

The next winter, Hough returned to Washington and conferred with LeDuc. They had a "friendly visit," Hough recommending objectives for a forestry commission, should one be established. The two agreed to approach Congress again to fund printing Hough's second report. Keeping up constant pressure,

June 1879

1880
by summer they had obtained authority for printing; the Report Upon Forestry,
Volume 2, finally went to press. ^{27/}

This volume, appearing two years after the first, emphasized foreign commerce. Since funds were still limited, Hough again found himself compiling from available sources. [Frustrated by variations in reporting systems used by other agencies, his main source of data, Hough raged in his opening remarks that "it would be impossible to excuse the stupidity" that authorized lack of continuity under the guise of economizing. ^{28/} That off his chest,] he launched into his report of export statistics for a large variety of forest products, (forestry legislation enacted by states, and the forestry situation in Canada.)

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not deserve
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month?
He seemed to be doing well. In 1881 a Division of Forestry was established in the Department of Agriculture, with Hough as chief. Prior to this time there had been no formal agency, and Hough had been merely a "forestry agent." (But there were bad times ahead.)

Hough's relation with Agricultural Commissioners Watts and LeDuc had been satisfactory, at least to Hough. There were, however, some indications of a cooling with LeDuc before he was succeeded in July 1881 by George B. Loring, President James A. Garfield's choice for commissioner. The new commissioner was a pompous physician who had long wanted the office. The Garfield administration marked the peak of the spoils system; the wishes of special interest groups received the special consideration they sought. ^{29/}

The two physicians could not get along. After one meeting with Loring which he described as "most unsatisfactory," Hough complained that "he does not seem to comprehend my ideas, or I do not his, and it would be the easiest thing in the world for me to resign, or for him to discharge me." ^{30/}

Dunnell offered to talk with Loring to see if he could smooth things out. He discovered that the commissioner was "extremely prejudiced" against Hough but had no intention of firing him, although he would accept his resignation. Dunnell urged Hough to stay on but that if resignation seemed necessary, the congressman would oppose Loring in Congress. The relationship continued to deteriorate, with Dunnell trying to convince Hough to remain. The forestry chief began to see plots against him from other employees of the Department of Agriculture, especially the chief clerk, and the wear on his nerves is evident in his diary. "Feel very low spirited and all my ambition is gone," he confided, "if Loring remains, I see no other better way for me to do, than to resign and go home." ^{31/} *Loring was replaced by Colman a month before Hough died.*

Hough's spirits sank even lower after Loring appointed Frank P. Baker of Topeka, Kansas to be a special forestry agent. The appointment was made without Hough's knowledge, and Baker's previous contribution to the Report Upon Forestry had convinced Hough that he was unsuited for the task assigned. With a perverse sense of optimism Hough resolved to wait for the certain opportunity to make public Baker's "utter incompetence." But worse was in store for Hough's ego. In addition to Baker, Loring had hired another agent, E. W. Ayers. (The new forestry agent had preferred an appointment as senatorial staff, but the senator passed him off to the Division of Forestry.) Hough sneered that Ayers was "a rebel and a Democrat," a resounding epithet in ^{32/} post-Civil War times.

()
In spite of his running battle with Loring, Hough remained. With Dunnell's ever-present enthusiasm and support, yet a third Hough volume on forestry cleared the many congressional hurdles and appeared in 1882. It

was only half the length of the first two volumes, undoubtedly reflecting the hostile conditions under which it was prepared.

Hough focused on "measures deemed of highest importance" in dealing with problems described before, frequently comparing American conditions to those found in Europe. He called attention to the thoughtless destruction of young timber that was needed to supply future generations, "the highest degree of folly." Hough then recommended "that the principal bodies of timber land still remaining the property of the government -- be withdrawn from sale or grant." He proposed that these lands be placed under regulations "calculated to secure an economical use of the existing timber." Timber would be cut under lease and young growth would be protected. Hough had in mind a timber lease system comparable to that used in Canada, to be administered by the General Land Office. ^{33/}

(Here then was the) third of his impressive reports, codifying the forestry knowledge of the western world, compiling statistics on commerce, and recommending appropriate courses of action -- all three for a pittance of appropriations.

Hough had done much. His patient compilations brought together the forestry thinking of the time. He worked faithfully with members of Congress to sustain their financial support. Active in the American Association for the Advancement of Science and the American Forestry Association, Hough kept a steady flow of information traveling between scientists and laymen interested in forestry affairs.

Similar to his daily association with the Department of Agriculture, Hough's affiliation with the American Forestry Association also suffered at Commissioner Loring's hands. Hough had to travel to the 1882 meeting^{*} at his own expense and

* this was the American Forestry Congress organization meeting in April in Cincinnati, not the American Forestry Assn. which met in June in Rochester.

~~This was in Rochester, N.Y. at the end of June~~
on his own time. Ironically, Loring also attended -- as president of the ^{He was elected June 29} conservation group. Hough was a frequent participant at the annual sessions, although he did not attend the organizational meeting of the American Forestry Association, held in Chicago during September 1875. The second meeting was held concurrently with the national centennial commemoration at Philadelphia in September 1876. While in Philadelphia, now as a federal forestry official, Hough read once again, "On the Duty of Governments in the Preservation of Forests." ^{34/} Also in attendance was a young German forester, Bernhard E. Fernow. Ten years later, Fernow would take over the position in the Department of Agriculture that Hough started. They may have met but Hough made no mention of Fernow in his diary accounts of the Philadelphia forestry meeting.

^{new PP inserted} (At the ^{April} 1882 session, ^{*} Hough read a paper entitled "The Forestry of the Future." He predicted that diminishing timber supplies would bring higher lumber prices and offered a detailed economic justification for reforestation. ^{new PP} Hough's paper was only one of many read at the 1882 meeting. Growing interest in forest conservation is reflected in the eighty-seven titles presented at the Cincinnati session ^{*} and the sixty-four additional papers read during the second half of the meeting held in ^{August} Montreal later the same year.) ^{35/}

Other creditable contributions of Hough's besides the third forestry volume appeared during 1882. Robert Clarke, a Cincinnati publisher, invited him to write a book about forestry. Hough proposed two volumes, the first elementary in scope and, if sales were adequate, a more advanced version would follow. He began work on the first volume immediately and six months later he sent the last piece of copy to the printer. He received his first copies of

* - This was the American Forestry Congress, not the American Forestry Assn. which met in ...

Elements of Forestry on July 21, 1882. By the following January, he received royalties on the sale of 690 copies at 20 cents each.^{36/} During the same period, Hough and Clarke also produced, with Hough as editor, The American Journal of Forestry. The first issue appeared in October 1882; yearly subscriptions were \$3. Publication was suspended the following September.

his P as been moved ahead of its original position on p. 19

Amid such success, the final blow came in 1883 when Loring demoted Hough from chief to "agent of the department," the same title held by Baker and Ayers. Hough remained and continued his forestry studies, although he believed in "the utter impossibility of doing anything to please the Commissioner -- or of preparing anything that he would accept." To an overseas colleague he wrote in despair that he doubted Congress would ever take effective action in forestry matters or that any member had even read his reports. The 1884 Report Upon Forestry contained four studies by Hough on use of wood by railroads, Ohio woodlands, forestry commerce in New Hampshire and West Virginia, and maple sugar production. He died the following year on June 11 at the age of sixty-three.^{37/}

this P moved from old p. 19

ready in p. 12

Hough had predicted to Dunnell, nearly a decade earlier and before any tangible forestry program had received federal support, "those who take an active interest in it now... will deserve and hereafter secure an honorable place in the Annals on Forestry."^{38/} His prediction was acute, as Franklin Hough deservedly won his place in American forest history.

repeat bottom of p. 12

If Hough is remembered with favor his successor Nathaniel Egleston, is not. Egleston's most outspoken critic referred to him as "one of those failures in life whom the spoils system is constantly catapulting into responsible positions."^{39/} The record is scanty, but there is evidence to support the

substance of such a description. B.E. Fernow thought little of Egleston - (see Rodgers) "(his) knowledge of the whole subject was even less than that of his predecessor (Hough) and he was at his wits end what to do with the magnificent appropriation of \$5000" (exclusive of salaries).

Most of what we know about Egleston is through his active role in the

American Forestry Association. He served on AFA committees and addressed annual

meetings; his statements are preserved in the proceedings. An objective reading of Egleston's contributions fails to reveal the source of his blemished reputation, as his talks seen as perceptive as those of his contemporaries. But his Report Upon Forestry does show an unevenness and lack of focus (which contrasts with Hough's efforts. ^{40/} *It was largely written by Hough too*

Correspondence between Egleston and others found in scattered collections, however, does suggest that he was unsuited to be chief of the Division of Forestry. Robert W. Furnas, a former governor of Nebraska, had been appointed a forestry agent for the division at Egleston's suggestion.

(In June 1885,) a month after Norman J. Colman was sworn in as commissioner of agriculture, Egleston confided to Furnas that he had yet to obtain an appointment to talk about the role of the Division of Forestry. Egleston wanted to stay on as chief but he did not "exactly like to ask." His concern was well founded, Colman asked for his resignation -- then returned it after holding it a month. *normal procedure* But the situation failed to improve, Egleston waiting in vain for Colman to give him an assignment and feeling too insecure to offer a plan of his own. Colman hired two agents without Egleston's knowledge and without outlining what the new men should do. Befuddled by indecision and uncertainty, Egleston meekly waited to be fired. He lingered in anguished limbo for three years. ^{41/} until relieved by a professional forester, Bernhard E. Fernow, in 1886.

During the decade of Hough's and Egleston's administration, the (Division) of Forestry, although essentially a one-man operation without statutory permanence, established itself in the Department of Agriculture. The four-volume Report Upon Forestry gave official recognition to forestry conditions in the United States and compared them with the situation in other nations. The

commissioner of agriculture, as well as the commissioner of the General Land Office, learned the value of this information. So, too, did congressional committees dealing with agriculture, the public domain, and appropriations. The bureau made no progress in curbing forestry abuses, a responsibility which lay with the Department of the Interior, but it did create a niche for itself in the government bureaucracy. Not a bad showing, considering the mood of the times. It would take two more decades before Congress was ready to approve an effective administrative forestry agency.

Division
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CHAPTER I

FOOTNOTES

1. For a graphic account of the land rush, see: Everett Dick, The Lure of the Land: A Social History of the Public Lands From the Articles of Confederation to the New Deal (Lincoln: University of Nebraska Press, 1970), pp. 289-294.
2. The most comprehensive treatment of American land history is: Paul W. Gates, History of Public Land Law Development (Washington: Government Printing Office, 1968).
3. Emphasis on fraud is evident in Roy Robbins, Our Landed Heritage: The Public Domain 1776-1936 (Lincoln: University of Nebraska Press, 1942) and especially in Dick, Lure of the Land; in his classic study, John Ise, The United States Forest Policy (New Haven: Yale University Press, 1920), appears outraged by land fraud.
4. Secretary of the Interior, Annual Report, 1874, p. xvi.
5. For convenience, the name American Forestry Association will be used. Initially, however, there were two groups, the other called the American Forestry Congress. In 1882, the two merged, adopting the name American Forestry Association, which has remained in use. For a full history of AFA, see Henry Clepper, Crusade for Conservation (Washington: American Forestry Association, 1975), in press.
6. Edna L. Jacobsen, "Franklin B. Hough, A Pioneer in Scientific Forestry in America," New York History 15 (July 1934), pp. 311-318; David Lowenthal, ed., George Perkins Marsh: Versatile Vermonter (New York: Columbia University Press, 1958), p. 268. "Man and Nature" - G. P. Marsh. Ed. by D. Lowenthal Cambridge, Harvard U. Press. 1965

7. Franklin B. Hough, "Diaries," August 12, 13, 21, 1873, Papers of Franklin B. Hough, New York State Library, Albany. A microfilm copy of the diary is held by the Forest History Society, Santa Cruz, California. U. S. Congress, House, "Cultivation of Timber and the Preservation of Forests," Report #259, 43 Cong 1, March 17, 1874.
8. Hough, "Diaries," November 20, 1873; February 2; February 9; February 12, 1874.
9. Hough, "Diaries," February 9; February 12; February 16; February 18, 1874; Drummond to Delano, February 17, 1874; Delano to Grant, February 18, 1874; Grant to Senate and House of Representatives, February 19, 1874, copies in "Cultivation of Timber," House Doc. #259, pp. 3-5.
10. "Memorial from the American Association for the Advancement of Science upon the Cultivation of Timber and the Preservation of Forests," reprinted in House Doc. #259, pp. 5-6. Henry Clepper believes that the idea of a forestry commission was influenced by creation of a Commission of Fish and Fisheries in 1871; see his Professional Forestry in the United States (Baltimore: Johns Hopkins Press, 1971), p. 17.
11. Hough, "Diaries," February 27; March 3; February 13; February 14; February 16, 1874.
12. Hough, "Diaries," March 4; March 17, 1874. Two years earlier Dunnell had supported creation of Yellowstone National Park, apparently Hough was not aware of this: see, W. Turrentine Jackson, "The Creation of Yellowstone National Park," Mississippi Valley Historical Review 29 (September 1942), pp. 202-203.

13. Hough, "Diaries," March 10, March 17, April 3-6, April 20, 1874; Secretary of the Interior, Annual Report, 1874, p. xvi.
14. Hough, "Diaries," 1874-75 passim; Hough to Dunnell, May 11, 1874; Hough to Dunnell, November 13, 1874, Hough Papers. For more details, see: Andrew Denny Rodgers, Bernhard Eduard Fernow: A Story of North American Forestry (Princeton: Princeton University Press, 1951), pp. 36-38.
15. HR. 1310, 44 Cong 1; Hough, "Diaries," February 24, June 10, 1876; Rodgers, Fernow, pp. 38-39. In 1875 Dunnell had tried to get a \$25,000 appropriation to construct roads and survey boundaries in national parks; the effort failed, see H. Duane Hampton, How the U. S. Cavalry Saved Our National Parks (Bloomington: Indiana University Press, 1971), p. 37.
16. Hough, "Diaries," August 18, 1876.
17. Commissioner of Agriculture, Annual Report, 1875, p. 249.
18. Hough, "Diaries," August 22, 1876.
19. Hough, "Diaries," August 23, 1876.
20. Hough, "Diaries," February 24, 29, March 1, 1877.
21. Franklin B. Hough, Report Upon Forestry (Washington: GPO, 1878), pp. 7-9.
22. Commissioner of Agriculture, Annual Report, 1878, p. 28.
23. Hough, Report Upon Forestry, pp. 9, 16.
24. Secretary of the Interior, Annual Report, 1877, pp. xvi-xvii.

25. Hough, "Diaries," December 6, 1878; January 14, 1879; Earle D. Ross, "The United States Department of Agriculture during the Commissionership: A Study in Politics, Administration, and Technology, 1862-1889," Agricultural History 20 (April 1946), pp. 129-143; for discussion of Watts' administration see p. 135; LeDuc's report for 1878 praised Hough's efforts, and he asked for \$6,000 to support the forestry project, see pp 27-32.
26. Hough, "Diaries," February 18, 19, 24, 25, 26, March 1, June 14, 1879.
27. Hough, "Diaries," January 28, June 2-5, 1880.
28. Hough, Report Upon Forestry, Vol II, 1880, p. 1
29. Ross, "Department of Agriculture During Commissionership," p. 135.
30. Hough, "Diaries," January 19, 1882.
31. Hough, "Diaries," January 19, 21, 28, June 18, 1882.
32. Hough, "Diaries," September 16, September 24, 1882.
33. Hough, Report Upon Forestry, Vol III, 1882, pp. 1, 6, 8, 14.
34. Hough, "Diaries," April 22, 1882; September 15-21, 1876; Rodgers, Fernow, pp. 49-50. Hough had attended a meeting a week earlier of the American Forest Council, held at Sea Grove, Cape Point May, New Jersey. The council was affiliated with the AAAS; at the Philadelphia session, the council asked to merge with AFA.
35. Franklin B. Hough, "The Forestry of the Future," The American Journal of

Forestry 1 (October 1882), pp.15-26; American Forestry Congress, Proceedings, 1882, passim.

36. Hough, "Diaries," January 18, 19, July 21, 1882; January 21, 1883.
37. A composite of diary entries suggests that infirmities of age and need for income caused Hough to stay on, even if reluctantly; Rodgers, Fernow, p. 86; Dietrich Brandis, "The Late Franklin B. Hough," Indian Forester 11 (October 1885), p. 429; Eggleston, Report Upon Forestry, IV, 1884, passim.
38. Hough to Dunnell, May 11, 1874, Hough Papers.
39. Gifford Pinchot, Breaking New Ground (New York: Harcourt, Brace, 1947), p. 135.
40. Eggleston, Report Upon Forestry, IV, 1884.
41. Eggleston to Furnas, May 11, June 16, July 20, August 12, 1885, Roll 5, Papers of Robert J. Furnas, Nebraska Historical Society.

THE GREATEST GOOD FOR THE GREATEST NUMBER:

A HISTORY OF THE U. S. FOREST SERVICE

Introduction

I. Forestry in Agriculture - An Accident of History

Concern for dwindling forest resources prompted efforts by Franklin B. Hough and the American Association for the Advancement of Science to have a forestry agency established. Initial efforts were for an agency in the Department of the Interior, but expediency prompted a switch to the Department of Agriculture.

That achieved, Hough and his successor produced a 4-volume Report Upon Forestry.

II. The Watershed of the Nineties

Bernhard Fernow was Chief of the Division of Forestry from 1886-1898. That period saw enacted the 1891 Forest Reserve Act and the 1897 Sundry Civil Appropriations Act, two of the most significant pieces of conservation legislation in U. S. history. Fernow spent most of his official time engaged in or directing research projects. Also during this time the American Forestry Association and Gifford Pinchot emerged as major forces in conservation.

III. An Era of Growth and Cooperation

Gifford Pinchot replaced Fernow in 1898 and with full departmental cooperation began to increase the size and responsibility for his bureau. Pinchot inaugurated cooperative management programs with the Department of the Interior and the lumber industry.

IV. The Forest Service, the President, and the Conservation Movement

Congress transferred the forest reserves (national forests) from the Department of the Interior to the Department of Agriculture and changed the name of the Bureau of Forestry to the Forest Service. The Forest Service was central to the emerging conservation movement, a major theme of Theodore Roosevelt's administration. The conservation movement, ever-growing in scope, received a serious setback when Pinchot was fired for insubordination in 1910.

V. National Forest Administration and the States, Too

Henry Graves replaced Pinchot as chief. During his 10-year term the Forest Service defined its policies on timber and recreation. Difficulties caused by Pinchot's firing required serious attention in order to sustain major programs. Most serious were efforts to transfer the national forests to state jurisdiction and budget reductions. Enactment of the Weeks Act authorized purchase of eastern land for enlarging the national forest system and formalized federal participation in state forestry programs.

VI. Research

Research, a major Forest Service component, advanced significantly by establishment of the Forest Products Laboratory and creation of a Division of Research. The relationship of research to administration was defined and a network of regional experiment stations established.

VII. Fire and Taxes

Proponents of state vs. federal regulation of logging debated for four years, resulting in the 1924 Clarke-McNary Act. Expanding Weeks Law program, Clarke-McNary emphasized cooperative fire protection, not regulation. The act also authorized a major study of forest

land taxation, a subject of much concern. As an adjunct to Clarke-McNary, the McNary-McSweeney Act of 1928 provided for expanded programs in forestry research.

This chapter became chapter VII.

VIII. Reorganization, Recreation, Range, and Routine

The Teapot Dome scandal ended efforts by the Department of the Interior to regain the national forests. Broad national interest in recreation and wilderness prompted Forest Service assessments of its policies. By the 1920s, a major study of range was in order, producing the Rachford Report. Decentralized administration was also examined.

Became chapter 8.

IX. New Deal Planning and Programs

The 1933 Copeland Report served as a blueprint for New Deal forestry programs. Range again required serious study, prompting the Taylor Grazing Act and the Western Range, an update of the Rachford Report. Closely related to need for creating employment during the depression, forestry programs included the Civilian Conservation Corps, Shelter-belt, federal land purchase, and disaster relief.

Became chapter 9.

X. A Crisis of Identity and Contest of Authority

The 1930s saw a nearly successful attempt to transfer the Forest Service to the Department of the Interior. The campaign to retain the agency in Agriculture brought together industrialists, conservation groups, a special lobby, and the Forest Service. Concurrently, the Forest Service reactivated its efforts, quiescent since Clarke-McNary, to improve controls on the lumber industry. Allied against Interior, the Forest Service and the industrialists battled openly, over regulation, airing the relationship between government and the individual.

XI. The War and Post War

Became Chapter 10.

World War II dramatically altered priorities in programs and personnel. Substantial staff time was spent on Post War Planning, anticipating dislocations following the war. Experimentation in cooperative forestry enacted the 1944 Sustained-Yield Forest Management Act. International forestry received increased emphasis following the war, FAO establishing a forestry section. The Forest Service reappraised the forestry situation and tried again to regulate the lumber industry. Industrial and state forestry programs increased.

XII. Multiple Use

Became Chapter 11.

Turning abruptly from regulation, the Forest Service worked to resolve pressing problems of mining on national forests, and inventories of timber and recreation resources. Congress enacted the Multiple Use Sustained Yield Act in 1960, mandating equal consideration to the many national forest uses.

XIII. Ecology and the Environment

(Not yet received)

came after 12.

Increasing public awareness and concern for environmental quality and ecological balance prompted close scrutiny of the concepts embodied in the Multiple Use Act. Citizen groups demanded and received a large voice in formulating policy. The 1960s and 1970s saw a combination of legislative measures and judicial maneuvers pertinent to Forest Service programs.

APPENDIX

1. Representative organizational charts showing administrative development.

2. Statistical tables showing appropriations and expenditures, timber sale volumes and receipts, recreational use, etc. for Forest Service, probably beginning with 1891.
3. Roster of chiefs, assistant chiefs, etc.
4. Chronology of events important to Forest Service history, patterned after the chronology in Dana's Forest and Range Policy.

Bibliography - Essay on sources and selected readings.

Index

Recommendations of Dr. Franklin B. Hough, first United States
Forest Agent, for Conservation of Timber in the Public Domain

I. Volume I, Report Upon Forestry, 1877 (Pages 1-9)

"So abundantly supplied were the older States of the Union with a native-timber growth, that questions relating to permanence of the supply appear not to have suggested investigation through a long period, and in fact the great excess of forest over amount required for proper use, led at first to the clearing off of extensive regions to prepare the soil for cultivation, without yielding in return any direct benefit from the product other than the value of the potash made from the ashes. The misfortune has been, that this clearing was made without a thought as to the probable wants of the future. . . and, as a consequence, the supplies have within a few years past been found scarce, and their prices have advanced to a degree that is sensibly felt by all. . . In the prairie States and in the Territories, the absence of forests has been felt severely from the beginning, and the want . . . has been supplied. . . by bringing these materials from other sections of the country where they grew. This necessity has in these regions, brought the question of forestry before our citizens as one of practical importance . . . But in these older and naturally well-timbered sections of the country, thoughtful persons have for years been watching the wasting of supplies and the complete exhaustion of one forest region after another with an anxiety natural with those who look forward to the probable conditions that must necessarily exist in another generation, and who feel the responsibilities of the present with regard to the future."

"The tenure of lands within the United States is almost everywhere allodial"; (unrestricted) ". . . freehold estates, the absolute property of the owners. . . the owner has no other obligation to others, further than to bear his just share of the expenses of government. . . The government still, however, reserves a right of eminent domain, under which private property may be taken, upon payment of its value, when needed for the public good; and under this right a qualified power is vested in the government for restraining from the use of private property where it may affect the rights of others."

"Neither our national, State, nor local governments are the owners of land upon which timber can at present be planted and cared for until maturity at the public cost, with the least prospect of success. Where a government is administered by officers elected by the people, and where any citizen may be chosen to any office, and especially where these offices have a patronage that makes them especially desirable, they become at once objects of political ambition. Special qualifications for particular stations in public life afford no promise of employment, nor of continuance if employed, and hence we have no inducements to offer a young man who might aspire to a position for which he might have great native ability, and for which he would be willing to undertake the most thorough special education if he felt assured that employment would depend alone upon the most thoroughly approved preparation, or the most rigid examination. Hence it cannot, at least at present, be expected that our governments can undertake the practical management of forests, as is done in Europe, by officials specially trained for this pursuit, with the view of deriving a benefit from the cultivation. They can scarcely do more than prevent depredations upon the timber already growing, if, indeed they succeed in this, where the property to be protected is not immediately under the care of a resident agent, who truly feels the responsibility of his trust, and is able to discharge its duties."

"The experiences of pioneer life, as regards the timber, present little that can be commended and much that can be blamed. It has been observed in all countries and at all periods, that trees furnishing products demanded by commerce, or standing in the way of cultivation, become an object of inconsiderate waste, and not unfrequently to such degree that the markets are overstocked, and ruin is brought upon the greedy but thoughtless adventurers in a business liable to bring an over-supply. This tendency has been exemplified over and over again in our lumber and timber trade, and illustrations are too numerous and too recent to need mention. But, aside from the conceded propriety of proper clearings for cultivations in forest regions, the opportunities for trespass are too open and inviting to be resisted by the class of settlers who generally make the first and furthest advances in frontier settlement; and too often the forest history of our most valuable woodlands would be a record of the doings of timber-thieves. . . fires may be set to burn up all traces of evidence, and . . . may cause infinitely more damage than the depredations they were intended to conceal."

II. Volume I, 1877 (Pages 193-196)

* Suggestions for the Future Management of Timber on the Lands Belonging to the General (Federal) Government

1. (Modification of the terms of the Timber Culture Acts of 1873 and 1874)

"Congress has the undoubted right to fix the terms upon which the public lands shall be hereafter conveyed, although questions might arise with regard to cases in which proceedings have been begun for acquiring titles under existing laws. It is earnestly recommended that a modification of these laws be made, under which no sale or grant of agricultural or pastoral lands now treeless shall hereafter be made, except upon condition that a reasonable amount shall be planted in timber within a certain time, and that this proportion of timber shall be thereafter maintained, evidence of the first planting being shown before the title is issued."

(Issuing land titles on condition that some timber be continuously grown) 2. "It is also within the power of Congress, in the sale or grant of what are now timber lands, to stipulate that a certain portion when cut off shall be protected and allowed to grow up with another crop, and that this proportion of timber shall be thereafter kept up. The title should be issued only upon this condition, the neglect of which by the holder should render it liable to revert to the government. Such a clause of obligation would necessarily follow the title through all its subsequent transfers, and should be well understood by those who might in future acquire and own the land."

3. (Leasing timber for private cutting on public forest lands, as in Canada)

* "The custom of selling only the privilege of cutting the timber upon public forest lands, as is done in Canada, is worthy of serious consideration. The fairest way of doing this would doubtless be to require a percentage to be paid upon the lumber or other products removed, either on the pro rata principle of so much per thousand feet, or per cubic foot, or a general percentage of value, as shown by the market prices of the year.

"From the bulky nature of these products, and the fact that they must leave the forest by a few channels only, such as rivers, canals, or railroads, the operation could be managed with but little difficulty, and opportunities for evasion would be few. In all shipments certificates of clearance should be required, before acceptance for forwarding by transportation companies or otherwise.

3. (Leasing Timber on public lands, Continued)

"Should such a method of leasing timber privileges be adopted, it would be proper to fix the time that the privilege should continue, and to limit the size of timber allowed to be cut, reserving the small trees for future growth. The title being still held by the government, future sales of timber from time to time on the same land, could be made, and a supply thus maintained, not subject to the caprice of private owners or the fluctuations of the markets. Such a system in its simplest forms, implies the necessity of duly authorized agents to prevent depredations, and collect revenues.

"For the fullest measure of public utility, it would require skilled agents for managing these forests, bringing them into best condition for yielding the greatest profit, regulating their working, and looking after their reproduction, as is done in Europe. It is, undoubtedly, good policy to cut timber when fully mature, and where it is needed, and can be sold for its full value; but in every such case at least the same or an equal amount should be reserved for another growth, and if the same areas is to be restored, there is great economy in preserving the young trees and small seedlings by forbidding the burning over of such tracts, or the needless injury of such growth. The careless habits of our woodmen render it doubtful whether these dangers could be prevented, unless the instructions accompanying the lease were simple and precise, and their observance insured by inspections from time to time while the clearing was being done.

"A system of leasing also necessarily implies a survey and exact definition of boundaries by landmarks well established, and if it be by the acre, and not pro rata, a previous examination by competent and trusty agents would be necessary, with the view of knowing the character and value of the timber leased. But, taking all points into consideration, we do not hesitate to prefer the method of charging a percentage upon the manufactured lumber or upon the measured logs or timber, as less liable to mistake or abuse, and as the surest way of arriving at a result alike fair to both contracting parties.

"In the public sales of timber in France, the description and amount of wood to be sold is first ascertained by the forest administration, the minimum price is fixed, and the trees for cutting are marked by the official marking-hammer. The cutting is done by the purchasers within the time and in the manner prescribed by instructions and under the eye of agents who see that the work is properly executed. In Germany, the cutting and removal are generally done by the forest administration, and the products are sold. Whatever excellences these methods may possess, it would probably be difficult for us to adopt either of them at present, if for no other reason, because we have no agents, or class of persons who could be employed as such, that have received the special training necessary for the due performance of such a duty

4. "There is another consideration at this point that deserves thoughtful attention. There are few professions in Europe that require more thorough training or careful preliminary practice under competent direction than that of the official forester. A mistake in sowing or planting a field-crop may be corrected the next year, and the worst that can happen is the loss of one season. But in deciding upon the management of a forest, we forecast the interests of a long period--it may be a century or more of time--and an error in judgment, an act from incompetence, may prejudice the results of many years. In fact no person should be intrusted with such a charge unless known to be qualified. It is equally true that no young man should select such a profession unless he knew with some certainty that, upon passing the required examinations and probation, he would be sure of employment through life with a reasonable salary, sufficient to provide for the wants of old age, or what is equivalent, provision for these wants when his working days are passed.

*
(Conditions necessary for the profession of forestry)

4. (Conditions Necessary for the Profession of Forestry, Contd.)

"These inducements are offered in Europe, but cannot be at present or for years to come with us. The aspirant for the State forest service in Europe, once fairly appointed, and sustaining his reputation for capacity and fidelity, has as reasonable a prospect of continuance, as if in the regular military or naval service. He needs only first the privilege of appearing for competitive examination. If he meets the requirements of the school and passes successfully through the course and subsequent probation, in which his ability to apply in practice the precepts of the school are tested, he knows that he will not need the influence of patrons to secure him place in the beginning of his career, or promotion afterward, according to the rules of the service, and as his merits may deserve. . .

"We have as yet no land-holders who give certain employment to professional foresters; no great forests that the owners would undertake to manage according to the rules of the profession. There is, therefore, no inducement for spending years of special study where the chances of employment are precarious, and so long as forestry remains in its present rude and elementary condition among us, there is more to be gained by teaching its general principles to many than its thorough details to a few.

(3. Leasing, resumed)

* "But the leasing of timber privileges, rules for the proper working, and removal of the products, and attention to the preservation of a young growth, at least by preventing injuries from cattle or depredations of any considerable amount, are matters easily prescribed, and not difficult to enforce. They require no special qualification beyond honesty and a fair business talent, and this system would at least keep in being the forests which will be needed in future, and which may hereafter be managed under systems that we might wish, rather than hope, at present to apply.

"The system rightly managed could not fail of being more than self-supporting from the first, and might, under favorable conditions, prove a source of revenue, while our forest estates would still remain public property, and although shorn of their value for the time being, would slowly recover their former condition, and as prices advanced would share in the profits of enhanced value.

"It is obvious that such a system of leasing and supervision can best be managed in bodies of timber of considerable extent, rather than in detached parcels. It would be impossible to suggest the location or extent of timber-lands that should be reserved without knowing the present state of sale and grants, and the condition of the remaining public lands. The changes that may have occurred since former surveys would render any dependence upon returns then made, often quite uncertain at the present time, and the probability would be that at any sale made upon previous notice, but without recent exploration, the purchasers would know more as to the condition of the land sold than the government itself with the original field notes as its guide, and that the advantage would mostly be on the side of the former."

II. Volume II, 1880 -- (A continuation of the first Report; information and tables)

III. Volume III, 1882 -- Includes a Summary of the neglect of forests in the public domain in the United States; Recommendations for reservation and regulation; a summary of Canadian experience; Suggested Experiment Stations for Forest Culture; a Review of Forests and Climate; the 1880 AAAS Memorial to the States on Forest Management; a detailed summary of forest fires, extent and damage in the U.S. and Canada, Canadian laws, foreign experience and laws, suggestions for control; a review of insect damage and control, etc.

1. (The need to insure a large supply of timber for the needs of the future) (page 2). (Application of forestry depends on owner of the land, p 3).

"In looking forward to the probabilities of future supply of timber, we cannot expect (unless so far as may be derived from Canada) any assistance worth noticing from foreign countries, and must substantially depend upon ourselves for whatever we may require to meet the vast and various wants of our population. Although in some instances the consumption may become less, as from the substitution of iron in civil and naval architecture, or of mineral coal for fuel, we can scarcely expect that the general demand will ever decrease; but that it will steadily advance with our increase in wealth and numbers, and that its supply must depend upon growth within our own territory, and, as the native timber is exhausted, it must in a great degree be reared under the care and protection of man.

"It is indeed true that timber will grow through man's neglect wherever the soil and climate do not forbid, but with due forethought and intelligent care there is no cultivation that better repays the attention bestowed upon it than that of forest trees. . . . To discover this range and limit" (of tree growth by species), "and to practically apply the facts when known to the fullest extent and effect, constitute the principal aim of forestry.

"The work of practical cultivation and protection must, evidently, be undertaken by the owners of the land. It is among the plainest of principles, that neither the General (federal) Government, nor a State or a local municipality, will ever spend its means in planting upon lands where the title is vested in private owners, or that a private owner will ever care for premises not his own. It may be added that no tenant will ever be expected to plant lands where he is not to realize profits from the improvement, and that in general the cultivation of woodlands for a future supply, implies a stability of ownership and a faith in the certainty of returns, which, although it may not be inviting to speculation, is still a positive and easily computed addition to the wealth of the owner, reasonably sure in realization and profitable in amount." . . .

2. (The Duty of the General (Federal) Government as regards forest supplies)
 - a. "The Care of Forests upon the Public Lands; or Their Cultivation upon Lands Still Belonging to the Public Domain."
 - b. "The Collection, determination, and diffusion of facts having practical application to forest culture, for the benefit of those who may wish to apply them in the management of private estates, and the promotion of researches tending to enlarge the boundaries of our knowledge in the sciences that concern this subject," (including those in Europe).

3. (Public Sentiment): "Probable Acceptability of a Judicious Law for Regulation of Timber." (Pages 6-7).

"Having made extensive journeys through these regions and obtained the views of many persons who are most largely concerned in the lumbering opera-

3. (Public Sentiment, Continued)

tions, we are well assured that a law, having for its object a restraint upon waste, economy in use, and the reservation of certain obvious rights for the future, while it had due regard for the needs of the present, would meet with full acceptance and support. The parties who are immediately interested in the subject generally declare their preference for a privilege derived from law to one derived from no right, because they would then have the law for protecting them in its enjoyment; and they express their confident belief that if a privilege were granted for the exclusive use of a given tract of woodland upon payment of a reasonable price, the resources thus secured would be used with far greater prodence and economy than can now be realized in the absence of such privilege and right.

"While much has been said about the reckless disregard of rights of property in the public domain, resulting generally from the total absence of protection, it has been shown many times that the prevailing sentiment in these regions is on the side of law and order, wherever these rights are properly defined and reasonably secured by law.

"No difficulty has been found in the enjoyment of rights under our mining laws, or under other grants of privilege, throughout the whole extent of our Territories, and no reason can be foreseen that should render a legal grant of right in the working of a timber-claim more difficult than these to maintain, or any conditions that might accompany it less likely to be observed. In the absence of all experience, the first enactments, however carefully prepared, might be found to have defects that would need amendment; but under careful and judicious administration these faults would be noticed, and their remedy devised."

4. "As to what can be Learned from the Experience of other Countries"

". . . In British India, in the Australian colonies, and in New Zealand, where extensive tracts of native timber were found for the first supply of European settlers, the same improvident waste occurred upon the public lands as with us. These resources were found to be rapidly wasting away, while no care was taken for their reproduction, until disastrous consequences in the near future became apparent, and the local government(s) have in recent years been actively engaged in considering the measures for arresting this waste.

"As the result of a study made under the advice of the best experience of Europe, systems of management have been advised, and to a certain extent applied. The details of these systems we propose to give elsewhere in these reports, and we deem them worthy of a careful study, as suggesting facts and principles worthy of our attention, under circumstances closely analogous to our own. . ."

5. "General Outline of the New Systems of Forest Management."

"As a general rule, these plans of forest management contemplate a centralized direction, a local supervision directly responsible to the central authority and acting under its direction, and the reservation of extensive tracts of existing timber lands still belonging to the government. These lands are withdrawn from sale or settlement and set apart for forest management; the present supply of timber suitable for use, and of full maturity, being opened for sale under regulations tending to economical use, and to the yielding of a revenue reasonably proportioned to its worth, but not oppressive in degree. For the great body of these native timber lands the supervision is limited at first to the sale of privileges for cutting timber, under the limitations prescribed, the title of the land being still retained by the government for such future improvement as it may find it proper to undertake."

5. "General Outline of the New Systems of Forest Management" (Continued)

"A portion of these public lands, relatively small at first, but increasing every year as experience leads and the means allow, is inclosed and put under forest management by planting, thinning, and other improvement, the intention being to extend this cultivation so as ultimately to meet the full requirements of the future, when the native supply is gone.

"Experiments in acclimatization, and the nurseries for the propagation of valuable species, form an essential feature in these undertakings, and efforts are made to widely disseminate a knowledge of all improvements, and to encourage private enterprise in forest planting."

6. "Modes of Timber Management in Canada." (Page 8)

". . . although the system there in use is crude in its provisions and wholly destitute of any policy tending to secure the growth of new forests, it still yields a considerable revenue to the government, above the cost of management. It has, however, this important feature: The title to the land itself remains vested in the government, and after the expiration of the first temporary leases under which the native timber is cut, it will be available for any course of management that experience may suggest. . ."

7. "Proposed Reservation of Timber Lands." (Page 8)

* "We would therefore earnestly recommend that the principal bodies of timber land still remaining the property of the government (to be specified and described upon particular examination) be withdrawn from sale or grant under the existing modes for conveying the public lands, and that they be placed under regulations calculated to secure an economical use of the existing timber, and a proper revenue from its sale, the title being retained by the Government, and the young timber, in all leases for cutting, being reserved and protected for a future supply."

(a,b) (Dr. Hough recommended that ^{since} most of such lands had not yet been surveyed into sections, and that such surveys in the rough mountains would be expensive and very difficult, that forest districts could be established by using topographic features, in the mountainous areas, before linear surveys were made.)

(c) (Dr. Hough explained why granting cutting privileges would reduce waste, stealing and loss from fire).

(d) "The Wants of First Settlers and their Supplies." (Page 11)

"It might be a measure of policy, rather than of absolute right, to insert a provision favoring the actual settler, by supplying him with timber from lands not his own, to the limit of his own wants, or at least to give him preference upon the most favored terms in the sales from timber lands most convenient for his supply. It would be better if this right of usage were limited as to time, as it might become a serious inconvenience if allowed to gain the tenure of a long-established right. . ."

(e) "The lease of Privileges should be Annual; Rights of Renewal."

"The privileges of cutting timber should be by annual lease, with right of renewal upon certain conditions specified. There should be no renewals without an inspection for the purpose of learning that all the conditions had been observed, nor until all arrears of payment had been made. The Administration should have the right to terminate the occupation at any time, for sufficient cause, and the parties holding these privileges should give bonds for the payment of all dues and damages that might arise from their occupation."

7. "Proposed Reservation of Timber Lands." (Continued)

- (f) (Dr. Hough pointed out the difficulties that prior occupation of valley bottoms by settlers in mountain areas had brought about, such as claiming and using all the timber on higher slopes, and being able to control and prevent access to such timber by others.)

8. "Different Modes of Payment for Privileges Considered." (Page 12)

"There are three modes of payment applicable to the sale of privileges for cutting timber as above recommended, viz.:

(a) A Ground Rent.--

* "Depending upon the area leased, and to be paid annually in advance, or at least amply secured for payment whether the privilege be improved or not. Without being oppressive, it should be of sufficient amount to prevent the holder from retaining more than he could occupy, and this would probably tend to prevent the monopolies that might otherwise arise with the view of controlling market prices within the region supplied."

(1, 2: In these sections, Dr. Hough explains the "Necessity and Justice of giving Rights of Renewal"; and "Conditions for Reservation of small Trees" which he considered necessary to assure future supplies.)

(b) A Privilege of Sale by Auction.-- (Page 13)

(Here Hough notes that though it may appear to yield more income, "the experience in Canada (where this system has been tried many years) is not favorable." . . . in some years the premiums obtained by auction have largely exceeded the ground rents, but . . . they generally fall much below them, and sometimes disappear altogether." (He noted that the premium is often more than the bidder can afford to pay.)

(c) A Tariff, or Rate, to be paid for the Timber or other Forest Products taken from the Premises Leased.-- (Page 14)

* "This may be regulated as found by experience to be best calculated to insure a suitable return to the Treasury, and, together with the ground-rent, should at least be able to cover all the expenses of forest management, including the collection of the above revenues, and all the changes incident to the experimental stations presently to be described."

- (d) "Other Sources of Income.-- Besides these stated sources of income, there might be others arising from trespass, forfeitures, and penalties of various kinds. . ."

- (e) "Power of canceling Leases.-- . . . upon evidence of a violation of the conditions, and upon repeated disregard of these terms the parties should be disqualified from undertaking new leases."

9. "Agencies for Management.--

* "The system would require the appointment of agencies for the issuing of leases and for the collection of dues, and it would be desirable that the management should be under the same control as that for the general care of the Public Lands."

(Following are two sections: "Financial Experience of Timber Management in Canada" and "Agencies for Management of Timber Lands in Canada".)

10. "Recapitulation of Measures Recommended for Management:" (Page 16)

- "(1.) The withdrawal of the remaining timber lands of the country upon the public domain from future entry, gift, or sale, and their reservation for timber growth, excepting as local exceptions may be hereafter made for special reasons, to be ascertained and declared by law.
- "(2.) The annual sale of privileges for cutting timber upon the lands thus reserved, to be offered for competition to the highest bidder who can give adequate sureties for the performance of his engagement--a minimum price being first fixed from the returns of trustworthy agents of the government.
- "(3.) The reservation in all such sales of privilege of young timber of a specified size, and an obligation from the contractor to use due care in the prevention of injuries from fires or other causes, with the penalty of forfeiture of the privilege upon proof of willful neglect of these conditions.
- "(4.) The further payment of a rate to be fixed by law before the sale of privilege, and not liable to change during its continuance, for the timber, lumber, wood, or other products taken from the land included in the agreement.
- "(5.) The right of renewal for a period to be fixed by law, to those who have fulfilled all the terms of their agreement, upon such equitable terms as may be ascertained by experience and fixed by law."

(Dr. Hough added this comment:)

11. "It is highly probable that in a course of years, when the timber regulations of the country had been tested by experience, and the methods of management were better understood, that a more direct management of the public timber lands would be introduced."

"We are fully convinced that the time has already come when this management might be immediately applied to portions of the public domain where, from peculiarly favorable circumstances, the native growth of timber has attracted the admiration of all travelers, and where waste and improvidence have been most conspicuously shown."

(Here Hough described the "Redwood forests of California and other heavily timbered lands upon the Pacific Coast", pages 17-18).

(On pages 19-20, Hough suggests duties and personnel required:)

a. "Qualifications of a Forest Agent."

"A perfect plan of forest management, having in view sustained production through the longest period, implies a special qualification for the service, and both a theoretical and practical acquaintance with all matters affecting the growth and reproduction of woodlands. It requires the preparation of maps and plans and a programme for future management, the location of roads for the removal of products, the measurement of standing timber, the calculations of contents, and all scientific subjects that might arise in reference to a forest. So far as these duties are concerned, they

11. (A "more direct management of the public timber lands", Continued)

can only be properly executed by a local officer specially educated for the business, or under his immediate direction. He should be attached to no routine that would prevent him from studying a subject presenting itself in a new aspect, or from appreciating and applying such modifications of a plan as new conditions might render necessary.

"There is another class of duties that relate to the sale of timber and its delivery, protection from trespass, and other administrative details that can be performed by any person possessing vigilance, energy, integrity, and good business talent. It might be proper to assign these general duties to two classes of agents under one central direction, but acting separately, each in matters that related to his own charge.

"In case of such a division of duties, the one looking after the general welfare of a forest should decide when and where and how a cutting should be made, and should have the care of inspection to insure faithful observance of his conditions, but he should have no interest or motives in any way relating to the sales.

"From an extended correspondence and personal acquaintance with European foresters, we are convinced that there are many persons educated in their schools of forestry who possess all of the qualifications implied in the class of duties first above enumerated, and should occasion arise for this employment it is highly probable that suitable and trustworthy persons could be found in every way qualified for this duty upon reasonable assurance of a permanence of position and adequate pay. To one having an enthusiasm for his profession, the opportunity would present motives worthy of the highest ambition and a wide field for scientific observation and honorable enterprise.

"In the business department of such a forest service there should be no difficulty in finding those who would deserve confidence, and justify any expectations that might be raised in regard to their qualifications for the trust."

(At this point, Hough discussed problems of "vested rights already acquired along the borders of these woodlands".)

(Dr. Hough also anticipated the need to purchase back private forests:)
(Page 21)

12. "The Repurchase of Lands from private Owners in certain Cases."

"In cases where the title has already passed to private ownership, there would probably be found cases, both in existing timber lands and those that have been denuded, where it might be desirable to re-acquire the title in some manner just to the owners, in order to render the proposed forest-conservations continuous, and symmetrical in their boundaries, and convenience in location."

(Here he referred to aid from past land surveys, and gave suggestions for future land surveys for assigning specialists to take note of geology, altitude, soil, timber, topography, etc.)

13. (Hough made this next section a category equivalent in importance to his recommendations for setting aside forest reserves and supervising the timber harvests thereon)

"Experimental Stations for Forest Culture."

13. "Experimental Stations for Forest Culture." (Pages 21-42)

"There is no kind of cultivation that involves a wider range of capabilities than that of forest trees, for we find them of one kind of another, where the aridity of the climate or the qualities of the soil do not forbid, growing in every latitude, from the equator to across the borders of the arctic zone, and at every elevation, from sea level to the 'timberline'."

". . . In the newly-settled prairies, and upon the plains west of the Mississippi River, where the want of timber is among the first to be felt, and where its cultivation is more likely to be first undertaken, there is the greatest need of this knowledge, because the capabilities of soil and climate are in the beginning unknown. . .

"It is in such regions, where there is a strong probability that great advantages may be derived from the introduction of new and valuable species from other regions or countries, or from the practice of new methods of management, that the government might reasonably undertake, under the central direction of the Department of Agriculture, the formation of a system of experimental plantations with the best prospect of success.

"In selecting the locations for these experimental stations. . . it is along the borders of the region where settlement and cultivation have been found possible, with a probability of their permanence, that we can best apply these studies. . .

"In all cases, and at all times, such stations should be centers of influence upon the country around them. . .

". . . we have in every State an agricultural college, or a special department of agriculture in some older institution, which has for its especial object the promotion of rural and industrial interest, and there are almost without exception provided with sufficient opportunities for some degree of experimental plantation. We are well assured that the officers in charge of these institutions would willingly cooperate in any system of observation that might be desired within the range of their opportunities, and at an expense never above the actual additional cost.

"In devising a plan for a system of experimental plantations, we would therefore recommend that our principal efforts should be bestowed upon localities where there is the greatest present need, not with any view of actual production for the supply of wants, but mainly as stations for determining possibilities and methods best worthy of recommendation, to those who might observe the operations or study the reports." (Top, page 24)

(Here Dr. Hough went into detail on locating, establishing, and operating the experimental stations, specifying the prairie regions, the borders of the arid region of the Plains, southern California, Florida, and one for the proper production and manufacture of turpentine--in contrast to the "wasteful" and "reckless" methods then used in America. He also discussed securing production of tree seeds.)

(Dr. Hough specifically suggested that stations be established at certain locations:) (Page 28)

"We would suggest as probably desirable, some point in Western Minnesota, or in Dakota" (Territory); "one in interior of Nebraska, or of Kansas, or both; one in Southern California; one in Florida, and one in Texas."

(The turpentine station would be in addition.) (Dr. Hough urged special efforts by the Department of Agriculture to encourage tree planting among farmers.)

(It is vital to emphasize here that Dr. Hough in his plans for forest experiment stations was thinking almost entirely of tree plantations, of domestic and exotic species, and not of the broad range of research that later became and is today included under forest research.)

Recommendations of Special Committee on Forest Conservation of the American Association for the Advancement of Science to the Governors and Legislatures of the Various States, Transmitted by Individual Memorials in 1880.

(Committee Originally Set up in 1873 at the Suggestion of Dr. Franklin B. Hough)
(A Summary)

1. "A Law protecting trees planted along the Highways, and encouraging such Plantations by deductions from Highway taxes," and in some cases by planting at public expense.
2. "A Law exempting from taxation the increased value of land from the planting of trees, where none were growing," for a period of time.
3. By providing premiums for tree planting through horticultural and agricultural societies.
4. "By prizes for the best Essays and Reports upon subjects of practical Forest Culture," the best ones to be published and distributed.
5. "By encouraging educational institutions. . . to introduce a course of. . . practical Sylviculture."
6. "By Laws tending to prevent Forest-fires, by imposing penalties against the willful or careless setting of such fires, and by enlarging and defining the powers of Local Officers in calling for assistance, and in adopting measures for suppressing them."
7. ". . . Model Plantations might be established and maintained by the State Government, under the care of persons specially trained to the profession of Forestry. . ."
8. "By the appointment of a Commission of Forestry under State authority. . ."

Summary of Recommendations of Dr. Franklin B. Hough, first
U.S. Government Forestry Agent for Conservation of Forest Lands

I. Volume I, Report Upon Forestry, 1877:

He suggested adoption of the Canadian policy of leasing timber on public lands to private operators for cutting, for a fee based on a percentage of the value of the lumber or other wood products removed, as the most feasible way to regulate use of timber on these government lands. He elaborated in his third report, Volume III. It would, he said, keep forests for the future and pay for itself or yield extra revenue.

Hough also urged Congress to impose a condition in selling or granting timbered lands, requiring that a certain portion be kept as a continual source of timber crops. In the non-timbered prairie lands he urged modification of the Timber Culture Acts of 1873 and 1874, to make them more reasonable and to require less land to be planted and kept in trees.

Hough noted the need to fix a time limit for leasing privileges, and to set a size limit on trees to be cut, reserving young trees for future growth. He pointed out that this system would require at the least the employment of agents to prevent deprivations and to collect revenues; also a check of the timber in advance, if a fee is charged by the acre and not on the value of the timber taken.

He observed that to get the most from the public forests, skilled men would be needed to manage them, as was being done in Europe, including forbidding fire and needless injury to the remaining growth. However, he said it would be difficult to do this since we had no trained men.

Hough noted that foresters require thorough training and preliminary practice under competent direction, as well as assurance of steady employment at a reasonable salary, all of which apply in Europe, but will not for years be so in this country. Neither do we have large private forest owners who will hire them.

He said that without these conditions, a young man has no inducement to make forestry his career, and

"so long as forestry remains in its present rude and elementary condition among us, there is more to be gained by teaching its general principles to many than its thorough details to a few."

A Summary of the Contents of the Reports of Dr. Franklin B. Hough
Upon Forestry Made from 1876 to 1884 as Forest Agent
for the U.S. Department of Agriculture

Volume I - Compiled in 1876-1877 and printed by Government Printing Office
in 1878. 650 pages. Indexed. With Tables, Graphs and Sketches.
No photographs. No Table of Contents. Sections not numbered.

Major Sections;

1. Preface - Letter of transmittal from Secretary of Agriculture
William G. LeDuc to President Rutherford B. Hayes. (pp
2. Introduction - General Remarks by Author. (pp. 7-9)
3. Timber on the Public Lands - (Including the early naval timber
reserves set aside and purchased; legislation; practices;
attempts to correct abuses. The Timber Culture Acts. (pp 9-2
4. The Nature of Property in Timber Lands (p 26-27)
5. Comparison of Forest Vegetation of the Coasts of North America
with Asia, and the Lake Superior Region to Alpine Central
Europe (p 27-28)
6. General Distribution of the Forests in the United States (p 28-29
- *7. Sowing and Planting - (Including various advice and experience
here and abroad; transplanting, ~~pruning~~, trimming, thinning,
coppice harvesting). (pp. 30-112) 82pp
8. Use of Wood by Railroads, and Tree Planting by Railroads (pp 112-
9. Wood in Paper-Making, Charcoal, Tanning, Resin Products, Gas,
Distilled Products, Cork. (pp 122-154)
10. Forests as a Shelter for Game (p 154-155)
- *11. Damages from Fire, Insects and Disease (pp 155-193) 38pp.
12. Suggestions for the Future Management of Timber on the Lands
Belonging to the General Government (pp 193-196)
13. Encouragement of Forest Planting by Our State Governments (pp 197
- *14. Connection Between Forests and Climate (pp 221-336). 115pp 26
(Including effects on streams)
15. Reboisement (Reforestation of eroded mountain areas) (pp 336-383
(France, Switzerland, Italy)
- *16. Timber Resources of the United States (pp 384-612). 228pp
Various reports from the States, and Census figures.
17. Schools of Forestry (Europe). (pp 612-632).
18. Index (pp 613-650)

Summary of Contents of VOLUME II of Franklin B. Hough's Report
Upon Forestry, Gathered During 1878 and 1879 as the
Forest Agent for the U.S. Department of Agriculture
Published 1880 by Government Printing Office

Report Upon Forestry, 1878-1879, Volume II

618 pages. Indexed. Table of Contents in detail (pp. V-XVI).
Most of the volume consists of statistical tables of timber re-
sources of the United States and Canada, and imports and exports
of timber products, some going back many years to Colonial times.

Major Sections:

Timber Culture Act of 1878

New Regulations for Use of Timber on the Public Lands

(pp 1-19) 18 pp.

Recent Legislation in the States and Territories (pp 20-34) 14 pp.

Notes on Planting and Growing of Trees in various States;

Lumber trade data from Illinois (pp 34-65) 31 pp.

Miscellaneous Notes on Growth and Cultivation of Trees from
the U.S. and Europe (pp 65-101) 36 pp.

* Statistical Data on Exportation and Importation of Forest
Products, United States, Since 1789, from Secretary of
the Treasury (pp 103-438) 335 pp.

* Timber Resources and Timber Trade of Canada (pp 439-605) 166 pp.
Twelve Graphs Showing Trends in Exports of Wood Products, U.S.A.
(14 unnumbered pages)

51.5 pp

(Counting unnumbered pages for graphs at end, and Roman
numeral pages in beginning, and blank pages, total pages
in this book are 650, same as the first volume, the
maximum specified by Congress)

(The material in this volume is that mentioned in Secretary
LeDuc's letter of transmittal in Volume I. Publication
was held up at that time due to the page limitation im-
posed by Congress.)

648 total pages, + 2 blank pages.

Summary of Contents of VOLUME III of Franklin B. Hough's Report
Upon Forestry, Gathered During 1880 and 1881 as the
Forest Agent for the U.S. Department of Agriculture
Published 1882 by Government Printing Office

Report Upon Forestry, Volume III

318 pages + xii. Table of Contents and Index. Some tables
and sketches.

This volume reviews damages to forests and considers measures
needed to maintain supplies of forest products for future use.
It presents data from various States and foreign countries.

Major Sections:

- Neglect of Forests in the Public Domain in the United States;
- * Recommendations for Reservation and Regulation; Canadian Experience
(pp 1-21) 21 pp.
- * Experimental Stations for Forest Culture (pp 21-42) 21 pp.
- Forests and Climate (pp 42-49) 7 pp.
(International meetings in Vienna, 1873, and Rome, 1877 and 1879)
(Also in Vienna in 1880)
- The 1880 Report of the American Association for the Advancement
of Science Committee on Forest Management; Memorial to the
Governments of the States (pp 49-60) 11 pp.
- Care of Timber Lands for Production of Charcoal (pp 60-68) 8 pp.
- Statistics on Tanning in the U.S.A. (pp 68-128) 60 pp.
- * Summary of Forest Fires (pp 128-259) 131 pp.
(Includes a general discussion, summaries of State legislation;
recent damage by States, deliberate burning practices, Can-
adian reports on fires, Canadian laws to prevent and control
forest fires, historical fires in America, suggestions for
control of fires, foreign laws and experience with forest
fires.)
- * Insect Damage to Forests (pp 259-274) 25 pp.
- Experiments Upon Timber Culture at the College Farm, University
of Nebraska (pp 274-275)
- Review of the Forests and Effects of Use in Various Countries
(pp 275-289) 14 pp.
- Wasteful Use of Timber in Fences in the U.S.A. (pp 289-293)
- Beech and Its Use (pp 293-309)

156 pp.

26 13
32 16



Engraved by J. B. Hough

Franklin B. Hough