

MAINE STATE LEGISLATURE

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PUBLIC DOCUMENTS OF MAINE:

BEING THE

ANNUAL REPORTS

OF VARIOUS

PUBLIC OFFICERS AND INSTITUTIONS

FOR THE YEAR

•
1867-8.



AUGUSTA:

OWEN & NASH, PRINTERS TO THE STATE.

1868.

REPORT

OF THE

COMMISSIONERS

OF THE

HYDROGRAPHIC SURVEY

OF THE

STATE OF MAINE.

1867.



AUGUSTA:

OWEN & NASH, PRINTERS TO THE STATE.

1868.

STATE OF MAINE.

Resolve providing for a hydrographic survey of the rivers of this state.

RESOLVED, That the governor with the advice of the council is hereby authorized to appoint three commissioners to have charge of a hydrographic survey of the state. Said commissioners shall have authority to employ competent engineers to make a thorough hydrographic survey of such of our rivers as they shall deem most advisable, and make a report to the governor and council of the fall and volume of water of said rivers, the supply and constancy of the water, their lake reservoirs and their accessibility, and such other facts as will tend to show their advantages for the employment of manufacturing industry.

RESOLVED, That the governor and council are hereby authorized to cause the report of said commissioners to be printed in such form as will be suitable for distribution in other states and countries, with a view to invite immigration, and the investment of capital in the development of our manufacturing resources.

RESOLVED, That the governor and council shall allow such compensation for the traveling and other necessary expenses of said commissioners, not exceeding the sum of three hundred dollars as shall be just and equitable, and that the sum of three thousand dollars be appropriated for the payment of engineers employed in this survey, for which sums the governor is hereby authorized to draw his warrant on the treasury.

Approved February 28, 1867.

REPORT.

PORTLAND, December 31, 1867.

To his Excellency J. L. CHAMBERLAIN, Governor of Maine :

The Commissioners in charge of the Hydrographic Survey, have the honor to submit a copy of the record of their proceedings in discharge of the trust committed to them, and to transmit therewith the report of Walter Wells, Esq., Secretary of the Board, showing the progress made in the collection of materials for a full report of the Hydrographic features of the State, and the facilities afforded for the profitable employment of its water power.

In the discharge of their duties, the Commissioners could not fail to observe the remarkable configuration of the State, and the extraordinary facilities it affords for the production of wealth, and the maintenance of a large population, and the singular train of events which gave so vast an area of territory to Maine, as compared with other States of New England, (portions of which are separated from each other by natural barriers as applied to the divisions of States or countries,) present interesting topics of discussion to the historian and the political geographer, upon which we do not propose to enlarge, but to which it may be proper for us briefly to refer. Most of the States of the Union have grown into their present shape and proportions from the force of geographical laws, or by those of trade and intercourse, developed at an early day, if not cotemporaneously with their origin. The charters granted to the several original colonies out of which, State Governments have been evolved, were designed to embrace districts of contiguous territory, naturally united by physical laws. Maine on the contrary assumed her present proportions, as the result of the conflicting claims of title to the country, rather than as the result of any natural laws of boundary. Nearly one-fourth of the territory of the State lies within the basin of the river St. John, whose outlet is through the neighboring Province of New Brunswick, which has never been practically

recognized as a part of New England, though included in the great New England charter of November 3d, 1620.

The remaining three-fourths of the territory of Maine, lying upon the Atlantic slope, are divided naturally into several separate districts or hydrographic basins, of greater or less extent, without any natural point of convergence for the whole State; and no locality in Maine is pointed out by any great physical fact, as the commercial metropolis or convenient business center, of so large a district of country, as is the case with Montreal, New York, New Orleans, St. Louis and Chicago.

The railway, the great agency of modern civilization, overcomes natural boundaries, enabling communities separated hitherto by all but impassable barriers, to become united as one, creating not only new social and political relations, but new centers of commerce and trade.

The Pacific Railway, spanning the mountain ranges between the Mississippi and Pacific Ocean, is destined to effect great changes in the commerce of the world, if not permanently affect the course of trade to the East Indies and Australia, connecting necessarily with other lines, so as to cross the breadth of the continent at its widest part, giving to Maine an important share of the most valuable traffic of the world.

The city of Bangor at the head of tide water upon the Penobscot, the greatest river lying wholly in New England, where tide water penetrates farthest into the interior, within a basin of 8,200 square miles of surface area, would have great advantages for a commercial metropolis, but for its high latitude, and the severity of its winter months, shutting it up from navigation for an average period of 125 days in each year.

The upper basin of the St. John above Mars Hill, all of which originally belonged to Maine, containing 12,027 square miles or 7,697,280 acres of territory,—greater in extent than the Commonwealth of Massachusetts,—that which remains to us equalling in size the territory of that great State,—is inaccessible by water navigation, and it is to this day but partially settled, for the want of access to market, although its entire territory, without waste land, has a soil equal in productiveness and fertility to any portion of the United States.

These general allusions to the physical and political divisions of the State, essential to a proper understanding or statement of its

Hydrographic features, might be extended to greater length, but for the value of the space required for facts more closely applicable to the work of a Hydrographic Survey.

The State of Maine extends through $4^{\circ} 23' 33''$ of latitude in length, a trifle more than 301 statute miles, from Kittery Point, at the entrance of the Piscataqua river into the ocean, in latitude $43^{\circ} 6'$, to the outlet of lake Pohenagomook, situated at $47^{\circ} 27' 33'' 25$ of north latitude. It has a width of $4^{\circ} 9' 53''$ of longitude, or 224 statute miles at its widest part, its most westerly point being at the line of Salmon Falls river in the town of Lebanon, and its most easterly point at West Quoddy Head, in the longitude of $66^{\circ} 56' 48''$ west of Greenwich. These are the present limits of the State as defined by the treaty of Washington of the 9th of August, 1842.

The original boundary of Maine extended as far north as $48^{\circ} 8'$, and included the upper basin of the St. John, lying west of a due north line drawn from the monument of the source at St. Croix, to the height of land or divide that separates the waters of the St. John river from those that flow into the St. Lawrence, an area of 5,012 square miles, or 3,207,680 acres being taken from it by said treaty.

The figure of this State as originally constituted, and as it is now bounded, may be compared to an irregular triangle, the apex of which is now formed by the point where the waters of the St. Francis debouch from lake Pohenagomook; the base, the long line of sea-coast from Quoddy Head to Kittery Point. The direct distance from the foot of lake Pohenagomook to the Atlantic ocean is about 250 miles, and at its most southern point, at Kittery, 301 miles, as before stated. The direct distance from West Quoddy Head to the line of New Hampshire is about 210 miles.

The area of the State as originally bounded was about 36,778 square miles. As it lost by the treaty of Washington 5012 square miles, it was thereby reduced to its present dimension of 31,766 square miles,—about the size of the aggregate area of the other five New England States inclusive, and nearly two-thirds that of the area of England.

Viewed as a whole, Maine is undoubtedly one of the most interesting portions of this continent, or of any portion of the earth, from its immense extent of sea-coast and numerous harbors, its

variety of surface, its plains, valleys, mountains, lakes and rivers, its unequalled water power, and the proximity of that power to the sea, and its central position in the great Acadian Peninsula, that portion of the continent lying east of Lake Champlain and the Hudson, and between the St. Lawrence river and the Atlantic ocean, lying in equal proportions on each side of the forty-fifth parallel of latitude, in the temperate zone, with a climate most favorable to physical strength and intellectual activity; and it has been the expressed opinion of the most intelligent and best informed gentlemen engaged in manufactures, and others, that from the bracing climate of Maine, more endurance and better health obtain in the manufacturing establishments of Maine than in those of any other State in the Union.

The whole circuit of its outline boundaries is about 946 miles. But to determine the real circuit of the State,—measuring along the deep inlets and river estuaries as far inland as the ebb and flow of the tide,—it is impossible with our present means of knowledge to state with accuracy. It is believed, however, that the labors of the Coast Survey, now in progress, will make the shore line of the main land, from Kittery Point to Quoddy Head, at least 3,000 miles, while in a direct line it is only 226 miles. Between Cape Elizabeth and Cape Rosier, 90 miles on an air line, the distance will be over 1,200 miles following the line of main land upon tide water.

The southern boundary of Maine, in its whole extent, fronts upon that portion of the Atlantic ocean, in a succession of large bays, anciently known as the Gulf of Maine, which name has been restored upon the maps of the coast survey. The following schedule gives the direct distances upon the line of the coast of Maine, the distances obtained by following the outline of the different bays, the exact geographical position of each, and the several harbors, rivers or streams entering into each bay:

Schedule of Distances upon the Coast of Maine, &c.

Nos.	Bays.	Outline of Bays.	Latitude.	Longitude.	Distance on straight line.	Distance on shore line.	Harbors and Rivers entering the same.
1	York Bay.	Kittery Point to Cape Porpoise.	43° 6' 43° 21' 27"	70° 40' 70° 25' 11"	24	28 1760	1 & 2. Chaney creek. Brave boat harbor. York river. Cape Neddick river. Ogunquit. Webhannet. Merriland river. Branch river. Mousam river. Kennebunk river.
2	Saco Bay.	Cape Porpoise to Cape Elizabeth.	43° 32' 55"	70° 14' 20"	16 3960	22 1320	2 & 3. Little river. Saco river. Spurwink river. Nonesuch river.
3	Casco Bay.	Cape Elizabeth to Cape Small Point.	43° 42'	69° 49' 2"	19 3960	80 2640	3 & 4. Fore river. Presumpscot river. Royal's river. Harrisecket river. Maquoit bay. Middle bay. Harpwell sound. New Meadows river.
4	Sagadahoc Bay.	Cape Small Point to Pemaquid.	43° 50' 12"	69° 30' 02"	18 4000	67 300	4 & 5. Androscoggin. Kennebec river. [riv. Sheepscoot river. Damariscotta river. Medomak river.
5	Muscongus Bay.	Pemaquid to Herring Gut Harb. Marshall's Point Light.	43° 52' 02"	69° 15' 21"	14	40 3000	5 & 6. Muscongus riv. Georges river.
6	Penobscot Bay.	Herring Gut Harb. Marshall's Point Light to Isle of Haut.	44° 0' 51"	68° 43' 15"	30 2640	102 3500	6 & 7. Westkeag riv. Megunticook river. Ducktrap river. Little river. Passawaskeag river. Goose river. Penobscot river. Eastern or Chiboutos river. Bagaduce river.
7	Bluehill Bay.	Isle of Haut to Mt. Desert. Baker's Island Lgt.	44° 14' 27"	68° 11' 36"	20 2600	72	7 & 8. Union river.

Schedule of Distances upon the Coast of Maine, &c., (Continued.)

Nos.	Bays.	Outline of Bays.	Latitude.	Longitude.	Distance on straight line.	Distance on shore line.	Harbors and Rivers entering the same.
					mls. ft.	mls. ft.	
8	Frenchman's Bay.	Mt. Desert. Baker's Island Lgt. to Gouldsboro' Point inside Petit Menan Light.	44° 22' 2"	67° 50' 31"	15	41 2000	8 & 9. Jordan's river. Skilling's river.
9	Narraguagus Bay.	Gouldsboro' Point inside Petit Menan Light to Moose Peak Light.	44° 28' 27"	67° 31' 35"	24	63 1760	9 & 10. Gouldsboro' Dyer's bay. [bay. Pigeon Hill bay. Narraguagus river. Harrington bay. Pleasant river. Indian river.
10	Machias Bay.	Moose Peak Light to Little River Head Light.	44° 39' 45"	67° 11' 45"	23 1320	52	10 & 11. Chandler's Mason's bay. [riv. Machias river. East Machias river. Holmes' stream.
11	Long Reach Bay.	Little River Head Light to Quoddy Head.	44° 49'	66° 56' 48"	20 1000	22 2000	11. Schooner brook. Bog brook. Moose cove. Haycock's harbor. Bailey's Mistake har- [bor.

Aggregate of straight line, 226 miles 3640 feet.
 " " shore " 592 " 5140 "

This estimate of distances is obtained by following the outline of the bays, and not penetrating their indentations. The shore line, including bays, harbors, and deep river estuaries subject to the ebb and flow of the tide, has been estimated at 2,486 miles, measured on our best maps, but the work of the Coast Survey has shown these estimates to be far below the truth, and it is believed that the actual shore line of Maine, by actual measurement, will exceed 3,000 miles.

The eastern boundary line of Maine follows up the channel of the river St. Croix from the ocean, through Passamaquoddy bay, through the Cheputneticook chain of lakes, to the monument at the source of the St. Croix, in a distance of about 88 miles on an air line,—over 118 miles following the line of the water course,—to a point in latitude 45° 56' 36" 8, and in longitude 67° 47' west of

Greenwich,—where an elevation is attained of 538½ feet above the level of mean tide at Calais,—thence along the ancient due north line, as run by Samuel Titcomb and John Harris in 1797, and by Johnson and Bouchette in 1817, a distance of 77 miles, to the river St. John, in latitude 47° 4', and in longitude 67° 47' 30", at monument No. 117, where the surface of the river St. John is 419 feet above tide water, crossing on its way several depressions, beds of streams entering the St. John, the lowest of which, the south branch of the Meduxnekeag, is only 265 feet above tide water. The north branch of the Meduxnekeag is 326 feet, the Presque Isle 322 feet, the river Des Chutes 412 feet, the Aroostook river 345 feet, Limestone river 397 feet, the south branch of Rapide de Femme 631 feet, the main stream of the same river 597 feet, its north branch 601 feet above tide water. From the St. John river to the monument at the source of the St. Croix the average level of the eastern boundary line is 545 feet above the tide level, seven feet only greater than that of the monument at the source of the St. Croix. The high points along the line,—Park's hill, in the town of Houlton, is 814 feet above tide water; Bluehill, in Fremont plantation, is 1,071 feet; Aroostook hill, in Plymouth grant, 885 feet; and Pekonk hill, in township Letter F, R. 1, 847 feet above the mean tide level at Calais.

About three miles east of the point of intersection of the boundary line with the river St. John, the waters of that river have a descent of 116½ feet at Grand falls, in a distance of a few rods. The large iron monument at the source of the St. Croix, erected by Messrs. Smith and Estcourt, is numbered 1, and a series of iron monuments mark its course to the St. John river, numbered from 1 to 117.

A profile of the eastern boundary line of Maine from the ocean to the river St. John, a distance of 195 miles, will be given on the new State map now in process of construction, under the resolve of March 1, 1867.

A schedule of elevations on the eastern boundary line are given in the table below, viz :

Elevations on the Eastern Boundary Line of Maine.

Quoddy Head, on tide water,	.	.	00 feet.
Todd's Head in Eastport, on tide,	.	.	00 "
Calais, at the head of tide water on the St. Croix,	.	.	00 "
Salmon Falls,	.	.	24 "

Railroad crossing of E. and N. A. Railway,	381 feet.
Cheputneticook, or Grand Lake,	382 "
Monument at the source of the St. Croix,	538½ "
Alder Brook,	453 "
Mud Brook,	487 "
Wirley Brook,	531 "
Green's House,	711 "
Park's Hill,	814 "
South branch of the Meduxnekeag,	265 "
North " " "	326 "
Dead Stream,	337 "
River Presque Isle,	332 "
Latitude of Mars Hill,	527 "
River Gizarquit,	460 "
River Des Chutes,	412 "
Bluehill,	1,071 "
Camp Brook,	694 "
Tobique Road,	775 "
Aroostook Hill,	885 "
Aroostook River,	345 "
Limestone River,	399 "
Pekonk Hill,	847 "
Rapide de Femme river,	597 "
River St. John,	419 "

The northern boundary of Maine, commencing at the intersection of the eastern boundary with the river St. John, at monument numbered 117, follows the channel of that river to the mouth of the river St. Francis, a distance of 71 miles and 854 feet, where the level of the river is 606 feet above tide water,—at the mouth of Fish river the height is 556 feet above tide water,—thence up the channel of the St. Francis from its mouth to the outlet of the lake Pohenagamook, a distance of 38 miles and 4,472 feet, the surface of which is 748 feet above tide water, thence southwest from the outlet of lake Pohenagamook on a straight line to the northwest branch of the river St. John, a distance of 63 miles 3,068 feet, thence on a south line to the southwest branch of the St. John, in latitude of 46° 25', a distance of 19 miles 1,672 feet, thence along said southwest branch of the St. John, from the parallel of 46° 25', to its source, a distance of 32 miles 3,764 feet, to a large monument in township No. 5, R. 20, elevated 1,558 feet above tide

water, established by Messrs. Smith and Estcourt, commissioners to run and mark the boundary line under the treaty of Washington. From this point, at the source of the southwest branch of the St. John, the boundary runs along the divide or crest of the ridge that separates the waters that flow into the St. Lawrence from those that flow into the Penobscot and other Atlantic waters, to the northwest corner of the State of Maine, by a very tortuous course, in a distance of 167 miles 4,446 feet, often running over the tops of elevated ridges and mountains. The whole distance from monument 117 at the St. John, following the line of boundary, is 360 miles and 3,950 feet.

The following schedule will show the distances upon it. The elevation of different points upon the line will appear on the proposed profile obtained from a variety of sources, principally from the exparte surveys of the N. E. boundary line in 1840, 1841 and 1842 :

Schedule of Boundary from St. John River Monument 117, at the intersection of the East Boundary Line, to the Northwest Corner of the State, between Maine and New Hampshire.

Point of Location.	Miles.	Feet.	Latitude.	Longitude.	Elevation above tide water in feet.
From Monument No. 117,	-	-	47° 41'	67° 47' 30"	419
To Grand river,	12	600	47° 11' 04"	67° 57' 18"	
Thence to Greene river,	13	500	47° 18' 24" 7	68° 09' 01' 5	
" Iroquois river,	8	528	-	-	
" Madawaska river,	2	616	47° 21' 39" 4	68° 19' 21"	474
" Albert's inn,	11	1848	47° 17' 22" 3	68° 27' 34" 5	
" Baker's river,	2	2376	-	-	
" Fish river,	6	1980	47° 15' 03" 7	68° 35' 20" 2	556
" Little river,	7	200	-	-	
Monument 169, on the Head of Hunnewell's Island,	5	2046	-	-	
Thence to mouth of St. Francis river, " Lake Pettequaggamas at Col. Gram- " ham's Astronomical Station, " Canada and New Brunswick bound- " ary line foot of Beaulic lake, " foot of Lake Pohenagamoock at " large Monument 178,	3	1320	-	-	606
Thence on a straight line northwest bound- " ary to Monument 215, south " side of Lake Ktjemquespam, Thence to Great Black river, Monument 248, " Monument 276, near Lake Ishar- " gan,	9	2904	47° 14' 26" 12	69° 02'	
" Monument 309, southwest branch " of the St. John river,	4	5000	47° 18'	-	664
" source of _____ river at large " Monument 318,	24	1848	-	-	748
	23	4884	-	-	
	21	4224	-	-	
	17	4620	-	-	
	19	1672	-	-	
	32	3764	-	-	

Schedule of Boundary, (Continued.)

Point of Location.	Miles.	Feet.	Latitude.	Longitude.	Elevation above tide water in feet.
Thence to Metjarmette lake or Portage, near Monument 322,	4	4752	-	-	1287
“ Monument 336, on the dividing line between the Penobscot and Portage lake,	19	5016	-	-	1598
“ Tascheraus, Kennebec road, large Monument 351,	14	2904	45° 48' 36" 7	-	2012
“ Monument 374, near Lake Emily, Hogsback Monument, between Monuments 389 and 390,	7	4752	-	-	
“ Monument 400, north of Leech lake,	10	660	-	-	
“ Moose Hill Monument 405,	10	264	-	-	
“ to Monument 416, near a stream,	6	2640	-	-	
“ Dead River Depot, between Monuments 425 and 426,	12	4072	-	-	
“ Monument near head of Moosehorn lake,	9	3696	-	-	
“ Monument 441, close to source of the Dead river,	3	1056	-	-	
“ Monument 451, head waters of the Cupsuptic and Arnold's rivers,	8	3168	-	-	
“ Monument 469, head of the waters of the Magalloway river, Saddle Hill,	7	528	-	-	2225
“ Crown Monument 474, northwest corner of the State, and forming the dividing line between New Hampshire and Maine,	13	1056	-	-	2640
	6	2376	45° 18' 24"	71° 6' 41"	2568
Total from Monument 117 to northwest corner of State,	360	3950	-	-	

The western boundary of Maine extends from the monument at the northwest corner of the State,—elevated 2,568 feet above tide water,—over the line anciently run, to the sea, at the mouth of the Piscataqua river, a distance of about 163 miles 3,960 feet, dividing Maine from the State of New Hampshire.

The original grant of August 10, 1622, from the New England Company, made the Merrimac river the western boundary of “the Province of Maine.” A division between Gorges and Mason, the proprietors, was effected, and the Piscataqua became their line of boundary,—New Hampshire falling to Mason, while Maine was retained by Sir Ferdinando Gorges.

The grant to Gorges from the Crown of 1639, described the western boundary of Maine as beginning “at the entrance of Pascataway harbour, and soe to passe up the same into the river

Newichawanocke, and through the same into the farthest head thereof, and from thence northwestwards, till 120 miles be finished," &c.

This line of boundary was first run out by New Hampshire, in 1741, by Walter Bryant, who extended it up the Piscataqua, through the Salmon Falls river to its source, estimated at about 40 miles, and to a point 30 miles north of the source of that stream. Instead of running northwestwards, as required by the charter of Gorges, he ran his line north, two degrees west, true course, or north, eight degrees east by the needle, showing at that time a variation of ten degrees west,—when his labors were suspended by the complaints of the authorities of Massachusetts, of which Maine formed a constituent part,—though the line was run in accordance with the order of the king in council of March 5, 1740.

New Hampshire, in 1768, employed one Isaac Rindge to complete the running of the line, who extended it on the same general course to a point within six miles of Umbagog lake.

In 1789, Jeremiah Eames and Joseph Cram completed the running of the line, their most northern point, however, was 17 rods and 7 links short of the true one, south of the divide between the waters of the St. Francis and of the head waters of Megalloway, an affluent of the Androscoggin river, which point was established by monument 474, by Messrs. Smith and Estcourt, commissioners to run and mark the line under the treaty of Washington. The western boundary line has never been accurately measured, nor have the elevations been ascertained by any uniform authority, those given, having been obtained from railroad surveys, and other unofficial sources.

From the ocean to the source of the Salmon Falls river the distance is 45 miles. From this point to the Saco river is 23 miles 3,960 feet, and the boundary line passes over a very broken country, the elevation of the Saco river at the State line being 450 feet above tide water. From the Saco to the Androscoggin river, a distance of 25 miles, the boundary line runs over a still more broken surface, passing over Mount Royce, which overlooks the valley of the Saco river at Fryeburg. The surface of the Androscoggin river where it is crossed by the State line, between Gilead and Sherburne, is 790 feet above tide water. From the Androscoggin river to the northern shore of lake Umbagog, in a distance of 30 miles and 1,330 feet, the line runs over high mountain ridges

and deep valleys, whose streams enter the Androscoggin, the level of Umbagog lake being 1,256 feet above tide water, as ascertained by careful surveys, in locating the line of the Atlantic and St. Lawrence Railroad.

From the north shore of lake Umbagog to the Northwest State corner, a distance of 34 miles 3,960 feet, the line passes over a succession of elevated ridges or mountains and deep valleys, Mount Carmel being no less than 3,711 feet above tide water.

These figures show that the distances of the boundary to be as follows :

From Quoddy Head to monument No. 1,	118 miles.	
From No. 1 monument to monument 117, at the St. John river,	77 "	
Eastern boundary,	195 "	
Northern boundary line from St. John river to Crown monument, or northwest State corner,	360 miles 3,950 feet.	
From Crown monument to Kittery point,	163 " 3,760 "	
Southern line on the ocean,	226 " 3,640 "	
	946 " 990 "	

We have given in brief terms above the outline boundaries of the State, and the elevations at different points as far as ascertained. Profiles of its eastern, northern and western boundaries will be given on the new State map, and form an interesting feature upon it, which map is now in process of construction. It is designed to embody in an authentic form on this new map the results of all previous surveys and explorations, and it is believed that Maine will then possess a map of reliable authority, secured at a trifling expense as compared with what has been expended by other States for similar purposes.

The United States government expended \$169,000 in running and marking the boundary line from the monument at the source of the St. Croix to the St. Lawrence at St. Regis, under the treaty of Washington, a distance of 659 miles, but failed to publish any information touching the natural features of the country, or to give a profile of elevations of its northern or northwestern boundary lines.

The astronomical observations of Major Graham and Col. Pipon, astronomers of their respective commissions for running and

marking the boundary line, the determination of the position of important points, the tabulation of the angles and measured distances, and the tabulation of the monuments on the line, promised years ago, with an index map of the New England States, Eastern New York, and a portion of British North America adjacent, including the maritime provinces, have never yet been completed, or if completed, or any portion of them, have not been published or made accessible to the public.

The progress of intelligence and the demands of business have been such since that period that all the information in possession of the United States government is most desirable if not absolutely demanded for its economical value and uses.

Agriculture is greatly influenced by the comparative elevations of the earth's surface and the proximity of lakes and mountains. The influence of these upon the climate, and determining the amount of rainfall, is an element in estimating the value of water power. Hence we have thought it advisable to embody in this report such information as we have been enabled to gather as to the topographical and physical geography of the State, and give a list of elevations of different regions. The following table gives the elevations on the western boundary line as far as ascertained :

Elevations on the Western Boundary Line of Maine.

Kittery point, at tide water,	00 feet.
Mouth of Cocheco river,	00 "
Head of the tide at S. Berwick,	00 "
Portsmouth Company's mill pond at S. Berwick,	32 "
Salmon Falls Company's mill pond, 2 falls,	73 "
Great Falls Company's mill pond in Berwick, 4 falls,	107 "
Mast point reservoir northwest corner of Berwick,	180 "
Foot of three ponds in Lebanon, 8 falls,	353 "
Level of three ponds in Lebanon,	367 "
Horn pond in Acton, 7 falls,	479 "
Elevation of Northeast pond,	499 "
Saco river in Fryeburg,	450 "
Grand Trunk Railroad,	791 "
South shore Umbagog lake,	1,256 "
Summit of Mount Carmel,	3,711 "
New monument on the northwest corner No. 474,	2,568 "

The following table, prepared by John F. Anderson, Esq., Hydrographic Engineer, from information gathered from various sources, and verified by comparisons and actual surveys, gives the elevations of the Saco river, from the line of the P. S. and P. Railroad at Saco, 63 feet above tide water, to its source. The actual fall of the Saco below the railroad bridge being 40 feet, all of its water power being employed in manufacturing, as will appear in the detailed report of the Secretary of this Board :

Elevations along the Saco River.

Authorities		Surface of land.	Water.
Hall's Survey of Saco River Railroad marked H.			
Wadsworth's Survey of Saco River Railroad marked W.			
Anderson's " Port. & Roch. " " " A.			
Grant's Survey of Port. & Ogdensburg Railroad marked Gr.			
Guyot's Paper upon the Appalachian System marked G.			

Miles.		Feet above high tide.	
	Initial point, the center of the Portland, Saco and Portsmouth Railroad track, 400 feet east of Saco Depot, assumed and computed height, (H.)	63	-
8 4-10	Saco river, about 400 feet above Salmon Falls, (H.)	-	109
9 6-10	Port. & Roch. Railroad crossing above Bar Mills, (A.)	-	137
14	Below Moderation Mills, (H.)	142	-
	Above Moderation Mills, (H.)	160	-
16 7-10	Top of a "horseback" ridge, (H.)	270	-
20	Little Ossipee, (H.)	232	-
21 6-10	Half mile west of Steep Falls, (H.)	278	-
27 7-100	Saco river, quarter mile above Gould's Island, (H.)	-	252
30 22-100	Great Ossipee, (W.)	-	271
34	Foot of Great Falls, Saco river, (W.)	-	271
34 1-4	Head " " " " low water, (W.)	-	343
	" " " " high water, (W.)	-	346
35	Saco river at Hiram bridge, low water, (W.)	-	344
	" 400 feet above do. (H.)	-	351
39	Ten Mile brook, (H.)	359	-
42	Shepard's river, near Brownfield Centre, (H.)	368	-
44 1-2	Fryeburg river, on plains, (H.)	388	-
48	" " near village, (H.)	414	-
	South Conway post office, (G.)	450	-
56	North Conway,	-	-
62	Crossing of road junction of Ellis & Saco river (G.) water (Gr.)	576	543
62 3-4	Saco river, (Gr.)	-	555
63 1-2	" " (Gr.)	-	571
65 1-4	" " (Gr.)	-	605
66 16-100	" " (Gr.)	-	618
67 9-10	" " (Gr.)	-	653
68 89-100	" " (Gr.)	-	700
70 1-10	" " (Gr.)	-	755
70 94-100	Water in Saco river, (Gr.)	-	821
72 72-100	" " (Gr.)	-	887
74 12-100	Underpinning old Crawford house, (Gr.)	994	-
74 12-100	Old Crawford house or Davis tavern, (G.)	986	-
75 52-100	Water in Saco river, (Gr.)	-	1055
76 9-100	" " (Gr.)	-	1155
78 3-10	" " (Gr.)	-	1242
79 23-100	" " (Gr.)	-	1284
79 8-10	" " (Gr.)	-	1324

Elevations along the Saco River, (Continued.)

Miles.			Feet above high tide.
79 86-100	Underpinning of Willey House,	(Gr.)	1340 -
-	Willey House,	(G.)	1335 -
81 1-10	Water in Saco river,	(Gr.)	- 1493
81 73-100	" "	(Gr.)	- 1672
82 2-10	" "	(Gr.)	- 1886
-	The Notch,	(G.)	1904 -
82 72-100	Crawford House,	(G.)	1920 -

JOHN F. ANDERSON, *Engineer Hydro. Survey.*

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Elevations above tide water along Portland and Rochester Railroad.

Gorham village,	220 feet.
Line between Gorham and Buxton,	192 "
Buxton Centre,	175 "
Surface of Saco river at railroad crossing,	143 and 146 "
Hollis Centre,	173 "
Weymouth's, near west line of Hollis,	277 "
Hanson's, near Waterboro' Centre,	285 "
South Waterboro',	264 "
Shaker pond,	223 "
Alfred village,	264 "
Mousam river, railroad crossing,	214 "
About the level of Springvale village,	262 "
Deering's pond in Lebanon,	350 "
Top of horseback in Lebanon,	294 "
Base of " "	234 "
Surface of Salmon Falls river at Great Falls, N. H., above the falls,	90 "

The Commissioners have collected from a variety of sources, facts which enable them to give elevations upon various points on the Androscoggin, Kennebec and Penobscot rivers, as follows :

Elevations on the Androscoggin River.

Tide water at Brunswick,	00 feet.
Height at upper dam Brunswick,	40 "
Little River Station,	- "
Lewiston,	160 "
Livermore Falls,	- "
Canton Point,	- "

Rumford Point,	639 feet.
Bethel,	683 "
State line,	791 "
Gorham Station,	802 "
Head of Berlin Falls,	1,048 "
Umbagog lake,	1,256 "
Richardson's lake,	1,456 "
Molchunckemonk lake,	1,486 "
Rangely lake,	1,511 "
Head of Androscoggin river,	3,000 "
Northeast head of Magalloway,	2,640 "
North " "	2,270 "
Northwest " "	2,917 "

Elevations on the Kennebec River.

Tide water, Augusta,	00 feet.
Foot of Ticonic bay,	36 "
Foot of Kendall's mills dam,	76 "
Head of Kendall's rips,	91 "
Moosehead lake,	1,071 "
Wood pond,	1,094 "
Source of Sandy stream,	1,868 "
Source of Wood stream,	2,089 "
Height of lake Emily,	1,950 "
Southwest head of Moose river,	3,113 "

Elevations along the Penobscot River.

High tide at Bangor,	0
Foot of Corporation dam in Veazie,	5 443-1000
Top " "	20 806-1000
Foot of falls at Basin mills in Orono,	27 297-1000
Head " "	35 497-1000
Stillwater, in Orono village,	37 572-1000
Foot of falls at Great Works, in Oldtown,	57 588-1000
Head " " "	68 648-1000
Foot " Dwinel's mills, "	71 82-1000
Head " " "	78 325-1000
Foot " Milford,	80 719-1000
Head " "	92 385-1000
Mouth of Passadumkeag,	106
" Mattanawcook, Lincoln,	172

Mouth of Mattawamkeag,	196 feet.
Penobscot lake, head of southwest branch,	1,509 "
Sources of the Penobscot in Sandy bay township,	2,100 "
Penobscot river head, No. 5, R. 19,	1,808 "
" " northwest branch, in township No. 6,	
R. 18,	1,742 "

The following interesting table will be of great economical value, as indicating the natural routes of communication between the Penobscot and St. John basins. This portion of the State is the least known of all to business men and tourists:

Elevations on the divide between the Penobscot and St. John waters.

Monument at source of St. Croix,	538 feet.
Lewis', on the Fish river road, No. 7, R. 5,	1,084 "
Head of Seboois lakes, No. 8, R. 7,	928 "
Little Millinocket lake on the Aroostook,	978 "
Height between Aroostook and Allegash river, at lake	
Pomgocquemock,	1,049 "
Fourth lake in township No. 7, R. 9,	878 "
Head of Chamberlain lake stream in township No. 7,	
R. 9,	1,134 "
Height of divide in township No. 6, R. 9,	1,040 "
Telos canal, No. 6, R. 11,	914 "
Height of Cusabaxis lake in township No. 5, R. 12,	929 "
Portage between Mud pond and Umbajujus lake,	962 "
Height of portage between Allegash lake and Cogaumock stream in township No. 7, R. 14,	1,710 "
Horn pond, at the head of Wadleigh's brook, in township No. 8, R. 15,	1,835 "
Francis lake, head of Turner brook, in township No. 8, R. 16,	1,632 "
Mucalesa pond, township No. 5, R. 16,	1,879 "
Upper St. John ponds in township No. 4, R. 17,	1,989 "
Portage between Baker's lake stream and Abecotnetic lake in township No. 6, R. 17,	1,492 "
Height of the northwest branch of the Penobscot, township No. 6, R. 18,	1,742 "
Height of Penobscot river in township No. 5, R. 19,	1,808 "

The Board were in hopes to have been able to give a list of elevations on the lines of the several railroads of the State, but find

themselves compelled to be content with a single line of levels across the breadth of the State, from the Piscataqua to the St. Croix, a distance of 303 miles, which is to form the trunk line of communication between the lower Provinces and the commercial metropolis of the Union.

Elevations on the line of railway extending from tide water at the Piscataqua river, the western boundary line of Maine, *via* Portland, Waterville, Bangor, Lincoln and Winn, to the eastern boundary line at the St. Croix, at the foot of the Cheputneticook lakes, a distance of 303 miles :

Distance between Stations.	Total distance.		Feet.
—	—	Portsmouth,	0
6	—	Elliot,	21
7	13	South Berwick Junction,	93.4
4	17	North Berwick,	136.2
6	23	Wells,	200.9
5	28	Kennebunk,	122.5
8	36	Biddeford,	71.7
2	38	Saco,	89.3
7	45	Scarboro', (Oak hill,)	31
6	51	Portland,	0
51 miles on the Portland, Saco and Portsmouth Railroad.			
1	52	Commercial Street, Portland,	0
5	57	Falmouth,	32
4	61	Cumberland,	64
2	63	Yarmouth Summit,	113
1	64	Yarmouth Junction,	75
3	67	North Yarmouth,	75
4	71	Pownal,	120
3	74	New Gloucester,	100
6	80	Danville Junction,	188
28 miles on the Grand Trunk R. R.			
6	86	Auburn,	210
1	87	Lewiston,	212
7	94	Greene,	308
5	99	Leeds Station,	260
3	102	Monmouth,	270
6	108	Winthrop,	213

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Distance between Stations.	Total distance.		Feet.
6	114	Readfield,	320
8	122	Belgrade,	260
9	131	West Waterville,	243
6	137	Waterville,	105
3	140	Kendall's Mills,	120
6	146	Clinton,	128
5	151	Burnham,	158
7	158	Pittsfield,	202
7	165	Newport,	192
3	168	East Newport,	251
4	172	Etna,	250
4	176	Carmel,	149
5	181	Hermon Pond,	140
10	191	Bangor,	0
110 miles on Maine Central R. R.			
1	192	Point of Rocks,	0
1	193	Rose place,	0
2 1-2	195 1-2	Veazie road crossing,	68
3 1-4	198 3-4	Basin Mills,	35
1 3-4	200 1-2	Orono,	37
2	202 1-2	Great Works,	57
1	203 1-2	Lower Oldtown,	78
1	204 1-2	Milford,	92
17 6-10	222 1-10	Passadumkeag river,	103
13 9-10	236	Mattanawcook stream, Lincoln,	172
10 8-10	246 8-10	Winn small stream on railroad track,	210
3 6-10	250 4-10	Mattakeunk stream,	199
1 8-10	252 2-10	Gordon brook,	231
2 7-10	254 9-10	Scatterac falls on Mattawamkeag,	275
3 5-10	258 4-10	Mattagoodus stream,	301
3 3-10	261 7-10	Mud Pond stream,	301
4 4-10	266 1-10	Summit between Mattawamkeag and Bas- kahegan,	616
5 1-10	271 2-10	Hot brook,	417
5 7-10	276 9-10	Baskahegan river five miles below lake,	370
4 4-10	281 3-10	Forks of Crooked brook,	366
9 1-10	282 2-10	Calais and Houlton road,	412
6 9-10	289 1-10	Tomah stream one mile below lake,	380

Distance between Stations.	Total distance.		Feet.
6 1-10	295 2-10	Summit betw'n Tomah stream and St. Croix,	545
2 4-10	297 6-10	Outlet of Lambert lake,	388
5 5-10	303 1-10	St. Croix river,	381
110 miles on the E. & N. A. Railway.			

Many points of elevation on other lines may be given. The recent surveys on the Belfast and Moosehead Railroad, show a summit of 580 feet in the Dixmont Notch, on the Newport route,—and an elevation of 400 feet on the summit at Unity by a more westerly line. On the line of the Bangor and Piscataquis Railroad there is a summit of 310 feet in Orneville, and an elevation of 340 feet at the proposed terminus of the line at Dover and Foxcroft village. The elevation of the Farmington Station, the terminus of the Androscoggin Railroad, is 441 feet above tide water. Sebago lake is 247 feet above the level of the tide at Portland.

In examining the entire surface of the State, with a view to an estimate of its average elevation, and a statement of its Hydrographic features, we give only approximate estimates, from facts gathered from private sources, the record of various surveys, and the returns of municipal officers.

Surveys made by the United States Government for canal purposes prior to 1830, give us the elevations of the valleys of some of the western rivers, and the height of the divide between various interlocking streams.

The *ex parte* surveys of the N. E. Boundary, made in the years of 1840, 1841 and 1842, afford much information as to the height of the sources of the rivers along our northern and northwestern boundaries.

The facts thus ascertained, in addition to those obtained from private parties,—the reports of Geological Surveys, and of railroad surveys, enable us to estimate the elevation of the surface of Maine for the purpose of illustrating the capacity of its water power.

With all the facts at command, the average elevation of its surface above tide water, may be estimated at about 1,000 feet, nearly equal to that of Moosehead lake, 1071 feet above tide water, situated but a little to the northwest of the geographical center of the State.

The extraordinary amount of available water-power found within the limits of Maine, exceeding unquestionably that of any other portion of the earth's surface of equal extent, is the result of its peculiar physical configuration, and its geological structure. Occupying the center of the Acadian Peninsula on its southwest slope, between that great estuary the St. Lawrence on the one side and the Atlantic ocean on the other, the interior is so elevated above the level of the sea, as to secure a large and uniform amount of rain-fall, while its water-courses, seeking the most direct route to the ocean run nearly at right angles in their general course, with the rock stratifications.

Among the remarkable facts in the physical features of the State, is the proximity of the upper waters of Moosehead lake to those of the west branch of the Penobscot, and the vast economical results which may flow out of this state of things. It is comparatively easy to turn the Penobscot river into Moosehead lake at the northwest carry, and equally easy to draw off the lake into the Penobscot river at the northeast carry, and by raising suitable dams at the outlet of the lake, to retain a volume of water adequate to meet the requirements of business in the lowest drought of the summer. By this means the depth of water in the Kennebec could be so increased in the season of river navigation as to add greatly to its volume, and maintain on both rivers a more uniform supply for log-driving purposes and for the interior navigation.

Another striking fact deserves notice upon the Androscoggin waters. The upper lakes apparently had at one time an outlet by way of Ellis river, through the town of Andover, which is more than eight hundred feet below the level of Richardson's lake, but which outlet was cut off by the raising of their southern shores or the cutting down of the present channel. A short cut or canal into Black brook, the head of Ellis river, from the lake, would allow the water to flow through this short route, in a distance of twenty miles, to the Androscoggin, instead of the circuitous one of more than one hundred miles from the lake to the mouth of Ellis river in Rumford. A survey of this route has been made through the enterprise of individuals in view of an improvement of facilities, in sending lumber to market.

The chain of lakes which form the source of the main St. Croix river, are so much elevated above the waters of the Mattawamkeag, that the Cheputneticut lakes could be easily turned into the Baskahegan, and largely swell the volume of the Penobscot.

Should the Legislature think it proper to authorize a further continuance of labors on the part of the Board of Hydrographic Survey, so as to enable it to present practical and economical suggestions, with estimates of the value of the water-power of specific localities for manufacturing purposes, bringing into view the surrounding advantages, such as means of supply of agricultural products and building materials, and the comparative accessibility of different sections to market, the labors of the Commission it is believed, may repay the State in the form of augmented population, increased capital, and greatly enlarged annual production of wealth.

The publication of statistics of industry in connection with the development of the water-power of the State, will also have the effect to increase the value of our natural products, and extend railroads into the interior, thereby enhancing the value of lands, farms, water-power, and all other fixed property, including mineral products, now remote from market.

On some streams in New England the water-power is fully used, and successions of dams, rising one above another, like a succession of stairs, flow back the waters, till the level of the pond below reaches the foot of the dam above, as in the case of the Blackstone and Pawtucket rivers, so that no power is allowed to run to waste. Such an exhibition or demonstration on one of the leading rivers of Maine, like the Androscoggin, Penobscot or the Kennebec, would give more practicable power employed in manufactures than is now in use on any of the rivers of New England.

The Acadian Peninsula from Gaspé to the Connecticut, is distinguished by a highly corrugated surface, mainly of stratified rock, running nearly parallel with the general line of the sea-coast.

The dividing ridge which separates the Atlantic from the St. Lawrence waters,—from the head of the Connecticut to the Bay of Chaleur,—attains for the most part an average elevation of 2,000 feet, receding as you approach the St. John waters from the granitic outcrop at the head of the Connecticut, of which the White Mountains form the general base or geological center. The north-west State corner, at the extreme northern point which divides it from New Hampshire, 2,568 feet above tide water, is near the general level of the divide, that separates the waters of the Androscoggin and Kennebec from those of the St. Francis and Chaudière.

There is a single depression at one of the heads of Dead river, between it and the Chaudiere, where the height is 1,554 feet only, crossing into the waters of the Spider river, whose outlet is into Lake Megantic, this lake being 1,291 feet above tide water.

Penobscot lake, near the northwest head of the Penobscot river, is 1,509 feet above tide water; while the lake opposite, forming the head of Portage river flowing into the Chaudiere, is 1,543 feet above the tide. The boundary line at Taschereaus on the Kennebec road is 2,012 feet above tide water; and at the Metjarmette portage, where the waters of the Penobscot and St. John and Chaudiere rise near together, the height of the boundary is 1,808 feet. Horn pond, at the head of the longest affluent of the Cogaumock, a branch of the Penobscot, is 1,835 feet above tide water; and the Telos canal, connecting the waters of the Chamberlain lake, at the head of the Allagash, with the waters of the Penobscot, is 914 feet above tide water,—the elevation of that portion of the State lying in the St. John basin being considerable below that of the Atlantic slope. The highest point on the Fish river road from Mattawamkeag to the St. John, being but 1,084 feet at the divide between the waters of the Mattawamkeag and the Aroostook, and the divide between the waters of the Aroostook and the upper Eagle lakes but 807 feet above the tide water; so that the elevation of that portion of the State of Maine lying in the St. John basin, does not probably exceed 850 feet, while the Atlantic slope will exceed 1,100 feet in average elevation.

The source of the Saco, at the notch of the White Mountains, is 1,904 feet above tide water. The sources of the Androscoggin, not counting mountain streamlets or brooks, are from 2,500 to 3,000 feet; those of the Kennebec, an average of 2,200 feet; and the Penobscot, an average of 2,000 feet on its west branch, and about 1,200 feet on the east branch, and still lower upon the Mattawamkeag waters.

The Penobscot occupies very nearly the entire breadth of the State, in the latitude of $45^{\circ} 40'$; and (its most northern branches rising as far north as $46^{\circ} 20'$,) the dividing ridge between it and the St. John waters will average about 1,000 feet to the head of the Allagash waters; and from thence to the Canada line above Metjarmette portage, about 1,800 feet above tide water; and from thence along the serrated line to the corner of New Hampshire, the elevation will average about 2,400 feet along the general level of the divide, without reference to mountain ridges and ranges.

The large district of the State between the White Mountains and Mount Katahdin, distinguished by the frequent occurrence of mountains of intrusive rock of a granitic character, lying south of the boundary line, rising high above the average level, may be estimated as equal to the more depressed sections lying in the valleys of the rivers, and upon plains nearer the seaboard.

The great natural divisions of the State, may be stated as follows:

1st. The upper basin of the St. John, including those districts lying upon the waters of the Meduxnekeag and Presque Isle of the St. John, not claimed by Great Britain, containing 622 square miles of territory or 398,969 acres,—the entire basin belonging to Maine at the present time forming an aggregate of 7,638 square miles or 4,890,320 acres.

2d. The Penobscot basin, estimated to contain 8,200 square miles or 5,248,000 acres.

3d. The Kennebec basin, containing, by estimation, 5,250 square miles or 3,360,000 acres.

4th. The Androscoggin basin, including those portions lying in New Hampshire whose waters are drained through our own State, which forms a Hydrographic basin, equal to 4,000 square miles or 2,560,000 acres, of which 3,500 square miles or 2,240,000 acres lie within the limits of this State.

5th. The basin of the St. Croix, which forms our eastern boundary for more than one-half the distance, has a Hydrographic basin equal to about 2,000 square miles of territory, including those portions which lie in New Brunswick, that portion lying in this State containing about 1,500 square miles or 960,000 acres of territory.

6th. The basin of the Saco, containing 1,350 square miles or 804,000 acres, including the tributaries lying in New Hampshire which are drained into this State, the aggregate territory included in Maine being equal to 625 square miles or 400,000 acres.

7th. The basin of the Piscataqua, which forms our western boundary from the ocean at Kittery to the head of Salmon Falls river, containing in both States an area of 525 square miles or 336,000 acres.

These seven distinct Hydrographic basins or districts, embracing the largest portion of the State form portions of its external boundary, the waters of two of which only, the Penobscot and the Kennebec, lie wholly within the State.

These different basins are shown on the map of the river systems of the State, prepared under the direction of the Board with great care, the alignment by the Secretary and the coloring by Wm. Percival, Esq., C. E.

We do not propose at this time to enter into any discussion of economical questions connected with the use of water for manufacturing purposes, but to present for the information of the State authorities certain leading facts. The elaborate calculations and estimates of the Secretary of this Board will hereafter present the economical results, which can only be fully shown by a careful inquiry into the value of water-power as an industrial agent, with the most careful presentation of all the elements of value, such as volume and constancy of supply, as effected by evaporation or other meteorological facts. He will also present in detail the available water-power in the several cities and towns in the State, with aggregates and tables; showing the amount of water-power available, what is now in use, and the best method of utilizing that which is now running to waste.

Of all the agencies known to civilized man, running water is the cheapest and most effective, when it is unfailing in its supply, as is preëminently the case with the water-power of Maine.

All the country lying in the valley of the Mississippi, in fact all lying south of the 43d parallel, is subject to severe drought in summer, paralyzing industry and precluding the possibility of reaching the highest results of mechanical skill in the production of wealth. The moist climate of England has made her superior to the continental nations in the great departments of human industry, and if the Island of Great Britain possessed water-power equal to that of the State of Maine, her industry, great as it now is, would be vastly in excess of any present results. The machinery of Great Britain is driven mainly by steam power, which is comparatively cheap from her abundance of coal, and so great are the skill and capital of England, that they take up raw material of every country, transport it thousands of miles from its place of production, convert it into fabrics in infinite varieties, carry these back and sell them at a profit to the parties who produce the raw material.

The climate of Maine, though not so moist as that of England, produces annually a greater amount of rain-fall, and is equally healthy, enabling operatives to continue labor throughout the year

with less diminution of strength than in any warmer latitude; and there is no reason to doubt that with full employment of her water-power in the most productive forms of industry, she could maintain a population as dense as that found in the manufacturing districts of England; and might with adequate capital, in a comparatively short period of time, contain population and wealth equal to that of the other States of New England at the present time. The cotton manufactures of Maine might compete with those of Lancashire, as soon as the supply of capital and labor could be as cheaply afforded to our manufactures as to hers.

The ordnance surveys of Great Britain, so many years in progress and nearly completed, give at a glance an accurate view of every physical feature of the country; every road, every house, every hedge row, almost every tree in the kingdom, is delineated in a style that enables the traveller or proprietor of real estate to see at a glance, not only its mountains, rivers, plains and valleys, but the exact position of each, and the character of the natural productions of the soil. By this means the remotest district of the kingdom from the capital is made familiar to every one, and the value of landed property comprehended at a glance throughout the entire realm. In such a work as this, our State would form a most striking picture from the number and beauty of the lakes of the interior as compared with those of other countries; and when the interior of our State shall be reached by railways, the lands and forests, most remote from market, even those upon the waters of the Penobscot and St. John, now of trifling value, would command prices nearly equal to those in convenient proximity to the open sea.

In view of the importance of more exact knowledge of the physical character of our whole State, and of a better acquaintance with districts hitherto inaccessible to market, the Commissioners deemed it advisable, before making minute surveys of particular districts, to obtain some general knowledge of the water-power of the whole State. Printed circular letters were sent into every city, town and plantation in this State, inviting information from the municipal officers thereof, believing that a vast expenditure might be saved from the labors of engineers by the obtaining of all known facts touching the water-powers of different localities in the possession of the municipal officers of each. Two engineers were appointed, as will be seen by our records, in the expectation

that returns from the several cities, towns and plantations, would be made in such season, that surveys might be advantageously made the present year, the Board being of opinion that it would be inexpedient to send engineers into any city or town until returns had been received therefrom. Many of the cities and towns delayed their returns to so late a day that any considerable expenditure for surveys on the part of engineers seemed impracticable during the past season. Such results as have been obtained appear in this report, or will appear in the report of the Secretary, in which the water-power of the different towns in the State, as received, will appear in their regular alphabetical order. A large portion of the appropriation placed at the disposal of the Commissioners still remains undrawn in the hands of the Treasurer of State.

The extraordinary development of available water-power in Maine results from its geological structure. The surface of the State being chiefly of slate formation under various designations,—silicious slate predominating along the sea board, mica slate and mica schist of softer texture farther inland, and clay slate farther from the sea shore,—and in the northern portions of it, in the St. John basin, calcareous slates, mixed with limestone, raised or cut through by intrusive rocks, of granite or trap formation,—the elevation, displacement or fracture of these stratified rocks, has occurred in long folds or lines of corrugation, rising one above another to the axial ridge, that forms the divide between the St. Lawrence waters and those flowing southward into the Atlantic ocean. These folds or corrugations, originally lay in deep troughs or basins, forming lakes and ponds of every possible shape and size, and every variety of feature. As the water courses cut through the sides of these basins, they descended to the sea in a succession of cascades of greater or less elevation, or have cut down the channels through soft rock to a regular incline, as in the case of the river St. John from Grand Falls to the rocky barrier near the city of St. John; the Penobscot, from the Grand Falls to Oldtown and from Bangor to the sea, and of the Kennebec, from Ticonic Falls to the ocean.

The St. John basin, as a whole, is much more level than any other portion of the State, and has less water power in proportion, although the southern sections bordering the Penobscot waters, abound in lakes, many of them of very considerable extent. The channels of the streams are worn deeper through this softer rock

formation, which rock formation increases in softness as you recede from the White Mountain district,—the rocks upon the Saco and Androscoggin being harder than those of the Kennebec; and those of the Penobscot softer than either. Hence the water power of the State capable of beneficial use for manufacturing purposes, is relatively most abundant and valuable in proportion to its nearness to the White Mountain region, the base of the Acadian Peninsula.

The White Mountains fall off at the northeast and east into long ranges of hills, between which lie the great basins forming the head waters of the Androscoggin and Kennebec, which are the most remarkable of all, for the extent of their lakes and reservoirs, whose outlets are available for manufacturing purposes. West and northwest of the White Mountains as far as Lake Champlain, the country lies in long ranges of mountains, in nearly parallel lines, running north and south, with such sharp declivities as to afford few lakes, as compared with the country north and east of them.

The geological features of that district or section, lying east and south of the Penobscot waters, is of a somewhat different character from that of other parts of Maine, from the peculiar features of its rock formation, the deep troughs or basins which form the lakes in the valleys of its several rivers, and the comparatively level character of the country above the sea. The line of the divide between the waters of the Mattawamkeag and of the west branch of the Schoodic river, is marked by the most striking contrasts in the geological features which distinguish them.

The Alpine region between Mount Katahdin and the White Mountains, now covered with the original forests, has the amount of rainfall greatly in excess of the average of the State within 50 miles of the seaboard, which is equal to 43 inches in the year, so that by retaining the vast quantities of water deposited within the upper basins of the Androscoggin, Kennebec and Penobscot, by suitable dams upon the Umbagog waters, of Moosehead Lake and the upper Penobscot lakes, the annual summer average outflow of water, in the time of drought, might be doubled, giving an annual average of available water-power without example.

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