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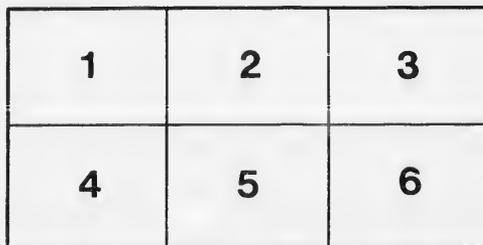
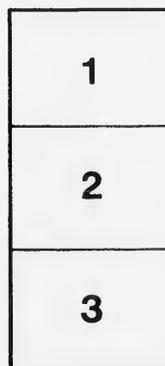
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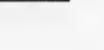
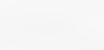
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NOTES ON THE NATURAL HISTORY AND  
PHYSIOGRAPHY OF NEW BRUNSWICK.

BY W. E. GANONG.

- 23.—THE FORESTRY PROBLEM IN NEW BRUNSWICK.
- 24.—COST OF A TOPOGRAPHICAL SURVEY OF NEW BRUNSWICK.
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ARTICLE V.

NOTES ON THE NATURAL HISTORY AND PHYSIOGRAPHY OF NEW BRUNSWICK.

BY W. F. GANONG, PH. D.

23.—THE FORESTRY PROBLEM IN NEW BRUNSWICK.

(Read March 7th; revised December, 1899.)

The greatest natural source of wealth of New Brunswick lies in her forests. These are steadily deteriorating. The public is uninformed and hence indifferent as to their fate. These three facts constitute a forestry problem of the gravest character, and one vastly important to the future of this province.

Probably there is no other part of the earth's surface that originally bore a nobler forest on a land so richly watered. Some of the most valued timber trees of the northern temperate zone grew in New Brunswick, and completely clothed her hills and valleys from her farthest inland waters all around to the sea. Every part of the province is penetrated by streams which, while swift, are never torrents; and these by the melting of the abundant snows of winter are made passable for the lumber which thus may be carried cheaply into the many large rivers, and down these to the harbors at their mouths. Immense tracts in the province are admirably adapted for tree growing, and are useless for any other known purpose. Thus has Nature provided in New Brunswick the conditions for a great industry, and thus does she point out our most profitable occupation for the future, when lumbering must be based upon forestry, which consists not in the hunting of trees but in their cultivation.

In the meantime, however, New Brunswick forests are being irretrievably damaged. I do not now refer to defects in forest regulations, systems of cutting, stumpage, etc., for I know nothing about this subject. I have inferred, however, from the numerous newspaper writings of the late Edward Jack, who knew these matters so practi-

cally and thoroughly, that our general system of forest management is far from provident. But there is one deadly enemy of our forests whose worst visitations can never be entirely recovered from, and that is the great forest fires. It is not only the timber they destroy that makes these fires so bad, for in a generation or two it may be partially restored, but it is the permanent injury they do to much of our soil whereby its capacity to produce trees for the future is permanently lessened or even practically destroyed. Where naturally the soil is thin, as it is over the rocky hills underlying much of our forest land, the roots and other organic matter binding it together is utterly burnt out by the great fires, and the rain washes the earth off into the streams, leaving behind but the naked rocks, hostile to vegetation. Most of that soil was placed there originally by the ice of the glacial period, and has ever since been held in position by its continuous covering of vegetation; once removed it can be restored only with the most extreme slowness. An awful example of this practically permanent destruction is to be found in an area many miles square on the upper Lepreau river; the still standing rampikes and great stumps show how fine a forest once clothed this land, which now is but a stony desert that not for generations, and perhaps never, can again bear trees. Here is a tract of country that might to-day be yielding a revenue to the province and supporting a considerable village at the mouth of the river, but it lies waste and useless because a fire twenty years ago was not stopped in time. This is an extreme case, but large areas in the province have suffered in but little less degree. The prevention of forest fires is the first problem of forestry in any country, and it has to be solved not only by stringent laws upon railroads, lumbermen, hunters and settlers, but also by a ranger service, a corps of men whose business it is to watch for fires in the dangerous season, and to extinguish them at their beginning. The ranger service may well be combined with that of fish and game wardens, and even with some phases of lumber surveying.

But in addition to loss of timber and permanent injury to the soil, there are yet other losses suffered through the deforesting of a country.\* Aside from the still unsettled question as to the effect of forests upon

\*The reader who wishes further information upon these subjects will do well to turn to the publications of the Division of Forestry of the U. S. Department of Agriculture, including their recent "Primer of Forestry" and articles in the Year Books of the Department, and also to the reports of the Maine Forestry Board.

the amount and regularity of annual rainfall (both of which, as many students think, are increased by the presence of forests, to the great advantage of the farmer) it is everywhere known that the removal of forests leads to great fluctuations in the water level of rivers, periods of extreme low water alternating with destructive floods. This not only interferes with navigation upon the smaller rivers, but greatly lessens the value of their waterpowers, a subject certain to become of great practical importance in the near future, since, as the leading authorities agree, the improvements in the conduction of power by electricity are sure to make natural sources of power again of value. Destruction of forests, too, destroys their game-producing power, and the fish-producing power of their streams, and hence removes their attraction to wealthy sportsmen whom New Brunswick is doing her best to attract. Yet other losses, sentimental as well as economical, which a people may suffer with loss of their forests, will occur to all.

Deforesting may, of course, occur in other ways, and lead to the same losses, though these are far less in degree than fires entail. Land cleared for cultivation, though partially kept intact by the farmer's crops, suffers slow deterioration, but this loss is unavoidable and slight in proportion to the gain. Especially reckless lumbering sometimes lays an area well nigh waste, allowing of similar deterioration, particularly since such places are very liable to fires. At the present day the forests are threatened by a new danger—the rapacity of pulp-mills, which take lumber even as small as five inches diameter, and hence practically clear the land where they operate, leaving little to grow into timber for the future. No pulp-mill should be allowed to operate in New Brunswick in a way to deforest any piece of land, for a speedy profit of this kind will be dearly paid for in the future. The only wise method in forestry management is to keep a forest intact, and this can be done only by a system of rotation in cutting, by which the larger trees alone are removed, the smaller being left to grow. The prevention of forest fires, and a wise system of cutting, would make the annual lumber crop as certain and as continuous as the agricultural crop. This would give permanence to settlements in the lumber districts and increase the prosperity and contentment of our people. What would it not mean to Charlotte county to-day if her lumber had not been recklessly cut away and her best lands badly burnt over?

It will be a long time yet before tree-planting will pay in New Brunswick, though some day it will. There is one situation, however, in which I think a certain amount of cultivation would pay in the near future. In St. John and Charlotte counties, and in lesser degree in other parts of the province, are many abandoned farms growing up in trees. Left to themselves these trees are oftener than not of worthless sorts, and grow so densely as greatly to injure one another in the struggle that ensues. If pine and the best spruce were established on these lands, and kept thinned out, they would in time yield ample returns, returns that no individual can afford to wait for, though a government, with its borrowing capacity, can. Care should be taken in future, too, not to grant for settlement land that is better suited for trees than for agriculture.

Under so purely democratic a government as that of New Brunswick, no legislature can afford to take steps not backed by public opinion. Any movement entailing much present expense for a distant return would undoubtedly be condemned by the people. If, however, the great importance of this subject to the future of the province were generally understood, the people could be trusted to respond in its favor as they have for education and other great interests. It is, however, the duty of the government to take the first step, which should be towards the acquisition and dissemination of knowledge upon the subject of forestry in all its aspects and in its relation to allied interests, such as game preservation, fishing licenses, water-powers, location of settlements, etc.; and, following this, should come the formulation of a broad plan for the economic management of these great public interests. The experience of other countries shows that such wide-reaching investigation must be made independent of the exigencies of local politics, which can be done only by placing the whole subject in the hands of a commission, unpaid except for expenses, composed of the most public-spirited and able citizens. Surely New Brunswick is not so poor that she cannot command this service from her sons.

#### 24.— COST OF A TOPOGRAPHICAL SURVEY OF NEW BRUNSWICK.

(Read April 4th, 1899).

In a former note upon this subject (No 14), I pointed out that a survey of New Brunswick upon the plan and scale of that of Massachusetts would cost at least \$351,000, and probably much more,

perhaps \$500,000. Mr. Henry Gannett, Geographer of the United States Geological Survey, and the leading American authority upon this subject, in acknowledging the receipt of a copy of the aforementioned note, writes me as follows: "Referring to what you say concerning a survey of the province, let me suggest that a scale of about two miles to an inch is sufficiently large for present requirements. This is the scale which we are using in this country for the greater part of our territory and find it, on the whole, most satisfactory."

"The expense of a survey for this scale, including all the operations incident to the production of the manuscript maps amounts on an average, to about \$5.00 to a square mile, which for the area of New Brunswick, will be about \$140,000, which is not a prohibitive price to pay."

A very complete, and of course authoritative, account of the methods of conducting topographical surveys and of constructing topographical maps is given by Mr. Gannett, in his "Aims and Methods of Cartography" recently published by the Geological Survey of Maryland (Special Publication, Volume II., Part IIIA, 1898), and this work is invaluable to all interested in this subject.

A topographical survey of New Brunswick must in time be undertaken, and so great will be its scientific and economic benefits that this Society should use its utmost influence to have it begun as soon as possible.

## 25.—WHAT IS THE HIGHEST LAND IN NEW BRUNSWICK?

(Read April 4th; re-written December, 1899.)

In former notes of this series (Nos. 5 and 19), it was pointed out that two hills compete for the honor of being the highest in New Brunswick, namely: Big Bald Mountain on the South Branch of Nepisiguit, and another unnamed mountain three miles south of Mount Sagamook near Nictor Lake. The latter of these two, I shall, for reasons to be given in a later note (No. 30) call Mount Carleton.\*

The height of Big Bald was measured in 1880 by Mr. Ells, and

\* I find that I was probably mistaken in my supposition (Note 19) that this mountain was the one to which the name Bald originally and properly belonged. It is Sagamook which is called Bald by the guides and others, and on the early plans. Mount Carleton appears hitherto to have been entirely unnamed.

found to be 2,500 feet, as given in his Geological report. The geological map marks it, however, as 2,700 feet; but as Mr. Ells is the only one who has measured it, the greater height upon the map appeared to be an error. Mr. Chalmers, however, has recently written me as follows: "So as to settle the question of the height of Big Bald Mountain, South Branch Nepisiguit, as far as it is possible to do so with the aneroid, Mr. Ells and I have gone carefully over his notes and barometric readings again. He has two sets of readings, one taken while going up river from Bathurst Harbour, the other taken when returning. Observations were made regularly every day, and at the camping grounds morning and evening several times. Working out the figures both ways we find the results to be very close, and the mean elevation of Big Bald Mountain to be 2,715 feet above sea level." This gives a definite basis for the height of 2,700 feet commonly assigned to that mountain.

Some new facts as to the height of its rival, Mount Carleton, are here to be presented. In August last, I climbed and measured it. I made it by direct measurement with aneroid 112 feet higher than Mount Sagamook, and this I made by a mean of two measurements, 1,633 feet above Nictor Lake. Nictor Lake I made by a mean of fourteen measurements, all corrected from simultaneous readings at Fredericton, (see later Note 31) 837 feet above sea level. This would make Carleton 2,582 feet above the sea level. I have reason to think, however, that this result is considerably too low. I have found that my barometer moves slightly sluggishly, and moreover other good measurements of Nictor Lake and Sagamook Mountain have given considerably higher results. Thus Mr. Chalmers gives the height of Nictor Lake as 878 feet, and Sagamook as 1659 higher. On this basis Carleton would be 2649 feet. There is, however, another set of measurements of lake and mountain which cannot be disregarded, the more especially since they were made with mercurial barometers, which are much more reliable than aneroids. In 1839 a series of such measurements, checked by comparison with a fixed station at Grand Falls, was carried across the province by way of Nictor Lake, by a Mr. Wightman, employed by the British government in connection with the elucidation of the highlands of the boundary disputes, and the results are given in full in the Blue-book, "The North American Boundary," 1840. All of his measurements however, while relatively accurate, are absolutely

too low, and we must apply to them a correction of fully 100 feet.\* As the mean of many careful observations he made the surface of Nictor Lake 777 feet above the sea, *i. e.*, with the correction 877 feet. He made Bald Mountain (or Sagamook) 2496 feet, *i. e.*, 2596 with the correction. If to this we add the 112 feet which Carleton surpasses Sagamook or Bald, we have as the height of Carleton 2708 feet, which is very close to the 2715 of Big Bald.

If one were to take Hind's correction of 123 feet for Wightman's results, instead of the 100 here adopted, it would make Carleton 2731 feet, thus surpassing Big Bald considerably. I by no means think, however, that reliance can be placed upon these latter figures, but they at least should make us cautious in forming a judgment as to which is the higher mountain. Big Bald and Carleton must be very near the same height, with the probability in favor of Big Bald. The relative heights could be best settled by a comparison of careful theodolite measurements made from the summit of each upon the summit of the other.

#### 25.—ON A DIVISION OF NEW BRUNSWICK INTO PHYSIOGRAPHIC DISTRICTS.

(Read May 2nd, 1899.)

Whoever attempts a systematic description of any class of facts or phenomena, or treatment of phases of local history, for the whole of New Brunswick, must feel the need for some natural and recognized

\* Wightman's figures are too low, because it was assumed that the levels along the St. John, from Fredericton to Grand Falls, made in 1826 by Foulis, were correct, whereas they are inexplicably erroneous and low. Hind (Geological Report, 1865, 31) has shown that this is the case, and arguing from levels taken by Graham in connection with the survey of the north line in 1842, and from those on the Royal Road, he reasons that Foulis' figures are about 123 feet too low. Other measurements by Wightman himself show a discrepancy between head of tide above Fredericton and high tide on Bay Chaleur of 77 feet, which is explained by the report as due to high tide level at Fredericton being 80 feet above high tide level at St. John. This we now know is erroneous, for Duff has shown (this Bulletin, XV, 69) that mean tide at Fredericton is only about 14 feet above mean tide at St. John, and hence high tide level is about the same at both places. But I think Hind puts the correction for Wightman's error too high, for I think Graham's figure of 419 feet for the river above the fall is too high. It is higher than the Royal Road levels. Graham, moreover, gives the monument at source of the St. Croix as 538 feet above mean tide at Calais; later measurements of the surface of Grand Lake (from which there is continuous deadwater to the monument) based I believe on railroad levels, given on the geological map, make it only 499 feet. Probably we would be safe in giving a correction of 100 feet to Wightman's figures, though if we wished to be extra conservative we might restrict it to the correction supplied by Wightman himself in his difference of 77 feet above high tide in Bay Chaleur, plus 3 feet to reduce the latter to mean tide, that is, in all 80 feet.

division of the province into districts. In a work now nearing completion I have had to make such a division, and thus have given some study to the subject, with the following results. For a detailed natural division the counties, with their artificial boundaries, are not available; and the geology, with its correlated topography, is too irregular and complicated. We do find, however, a convenient and fairly natural division in the river systems, which for historical purposes is especially suitable, since they have powerfully influenced the distribution of settlements. But if we attempt to separate these systems by lines drawn along their watersheds (as is done on the accompanying map, fig. 1), we see at once that in a general way there is a correspondence between counties and river systems. This is, of course, no mere accidental coincidence, but is the result of a true causal relation, for the principle that has determined the setting off of our counties has been that of grouping them around the river basins and running their boundaries along the watersheds.\* It will obviously be convenient in making our natural divisions to pay as much attention as possible to the familiar county divisions, and hence the boundaries of the latter may well be used to settle doubtful points in the natural divisions. There are two cases in which it is profitable to use the county divisions to determine details of the natural divisions—first, in the points of separation of the systems along the sea coast (for here the county lines have been very wisely chosen), and second, in the secondary division of the large St. John system. The geology also, in doubtful cases, may be called to aid. Taking into account all of these factors, the river system districts of New Brunswick would appear to be as follows, and as traced on the accompanying map. Natural divisions should obviously be known by indigenous names, for which, happily, convenient Indian names are available.

- I. *The Passamaquoddy (or Charlotte) District.* Includes the basins of all rivers from the Cobscook to Point Lepreau.
- II. *The Woolastook (or St. John) District.* Includes the entire St. John System and the smaller rivers from Point Lepreau to Martins Head.

\* That river systems and counties do not correspond yet more closely is due to three causes:—First, county lines are, for convenience of running and marking, best made straight, while watersheds are crooked; second, the geography of the province was imperfectly known when some of the lines were established by law, and hence they do not run as it was supposed they would; third, some of our rivers run so far across the province and head so near the basins of others, it is practically more convenient to allow their heads to fall into other counties. Such is the case with the St. Croix and Magaguadavic, Washademoak and Salmon River, Miramichi, and Restigouche.



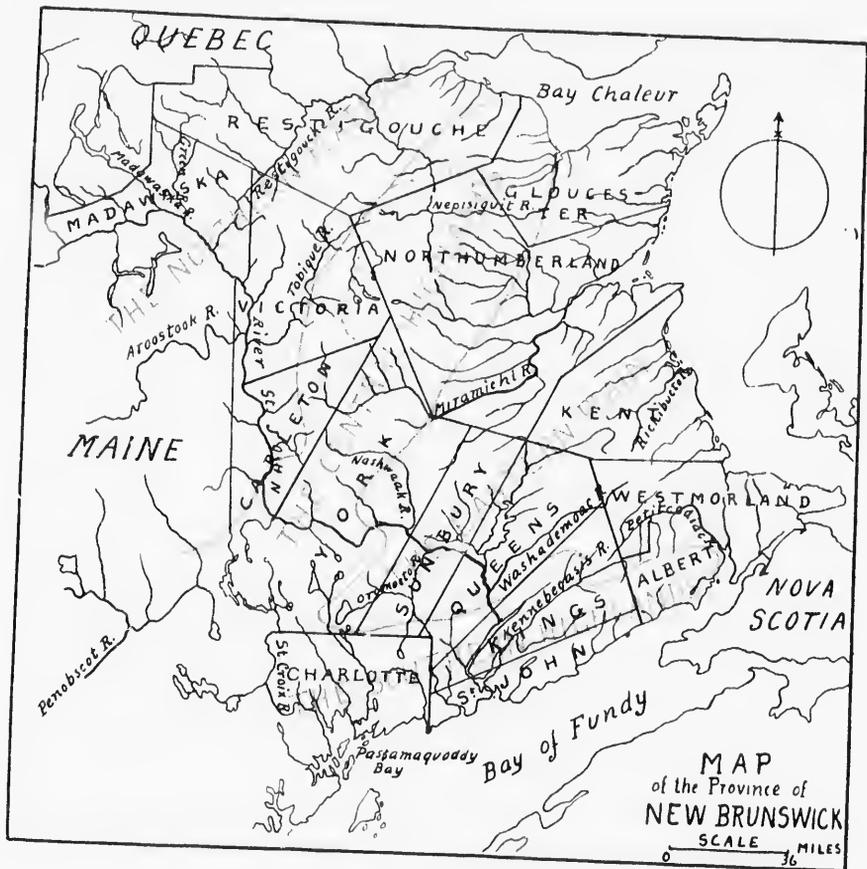


FIG. 2.

Since however it is far too great to be treated as a unit, it may be subdivided as follows :

- A. *The Madawaska Sub-district.* Includes all north of a line separating Grand River and Little River, crossing the St. John at Grand Falls, and separating the Fish River and Aroostook system.
  - B. *The Tobique (or Carleton-Victoria) Sub-district.* Includes all north of a line separating Becaguinec from Nacawiac and Nashwaak, and Eel River from Sheogomoc, crossing the St. John on the edge of the granite at Middle Southampton.
  - C. *The Nashwaak (or York Sub-district).* Includes all north of a line between the Little River and Nashwaak systems and between the Oromocto and Longs Creek, crossing the St. John with the County line.
  - D. *The Oromocto (or Queens-Suubury) Sub-district.* Includes all north of a line between Belleisle and Washademoak and between Nerepis and Oromocto, crossing the St. John with the County line.
  - E. *The Kennebecasis (or St. John-Kings) Sub-district.* Includes all south of the preceding to the Bay of Fundy.
- III. *The Petitcodiac (or Westmorland-Albert) District.* Includes the basins of all rivers falling into the Bay of Fundy and Baie Verte from Martins Head to Cape Tormentine. The County line might seem a more logical division between this and the Woolastook district, but Martins Head is so much more natural that it would seem better to adopt it as the division point.
  - IV. *The Richibucto (or Kent) District.* Includes the basins of all the rivers from Cape Tormentine to Point Eseuminac.
  - V. *The Miramichi (or Northumberland District).* Includes the basins of all rivers from Point Eseuminac to Barreau Point (between the Tabusintac and Tracadie.)
  - VI. *The Nepisiquit (or Gloucester) District.* Includes the basins of all rivers from Barreau Point to Belledune Point, including Miscou and Shippegan.
  - VII. *The Restigouche District.* Includes all north and west of Belledune Point. Belledune Point gives a more natural division than Little Belledune Point, near which the County line starts.

The above division of the province by river basins will probably be found most useful for purposes of detailed description of provincial phenomena, and of local history, etc.; but a more strictly natural one, taking account of the geology and accompanying topography, will be needed for some purposes. Unfortunately, as stated above, our geology appears too complicated to admit of a very detailed division of the province upon this basis. A general natural division is, however, possible, as shown on figure 2. Although the geological boundaries



are fairly distinct, the accompanying topography is not, and, hence, sharp lines are impossible, and the boundaries shown on the map are only approximate. The divisions may be named as follows :

- I. *The Northern Plateau*, including the great Upper Silurian Area of the Northwestern part of the Province, with Lower Carboniferous outliers on its margin in places, forming mostly a great peneplain 800 to 1000 feet above the sea.
- II. *The Central Highlands*, of Archaean Felsites and of Granite, bordered by Cambro-Silurian Slates, consisting of irregular ridges, forming the axis of the Province, and culminating in the high hills, 2000-2700 feet above the sea, between the headwaters of the Tobique, Nepisiguit and Miramichi.
- III. *The Eastern Plain*, of Carboniferous bordered by Lower Carboniferous sandstones. This is a peneplain, is highest in its western part and slopes off to the eastward where it is low and level.
- IV. *The Southern Highlands*, also of ridges of Archaean Felsites and of Granites intermixed with Silurian and Devonian rocks reaching heights up to 1400 feet, and merging in Charlotte with the Central Highlands. This may perhaps better be called *The Southern Ridges*.

27.— ON A MARKED BROWSING-EFFECT OBSERVED NEAR ST. STEPHEN.

(Read May 2nd, 1899).

Five miles below St. Stephen, on the peninsula between the St. Croix and Oak Bay, is a high granite hill, called locally Dickie's Mountain. It is notable for the superb view it commands, and is recorded in the Society's Bulletin as the best mapped hill in New Brunswick (Bulletin No. XVII, page 123). The top is largely bare rock, but bears here and there small spruces, many of which attract attention through their unusual form, for they are hour-glass shaped, or at times like two cones, with the base of one resting upon the apex of the other (see the third in the accompanying Figure 3). The lower cone is the most symmetrical, extremely dense, and always approximately of the same height, as the axe introduced into the three figures will show. The upper cone may be absent altogether, or developed in various degrees, and is always loose in structure, and quite like any other spruce. One is at first inclined to ascribe the appearance to clipping by man, or to some growth conditions peculiar to the locality, but it is no doubt a marked kind of browsing effect. The place is a sheep pasture, and these animals probably bite off the young terminal

buds in spring, forcing the plants to branch profusely, as a hedge does when clipped. This is confirmed by the broken appearance of the tips of the branches. The sheep browse as high as they can reach, but finally the main terminal bud gets beyond them and thenceforth develops



FIG. 3. Browsing effect upon spruces.

normally. Three stages in the development of the upper cone are shown in the three accompanying figures which are traced from photographs, and therefore are accurate. No doubt this effect is common enough, though I have seen it in but two or three other places, and never so perfectly as here.

28.—AN OPTICAL ILLUSION ON THE PEAT BOGS OF CHARLOTTE COUNTY.

(Read June 6, 1899)

In a paper on "Raised Peat-bogs in New Brunswick," published two years ago (*Trans. Royal Society Canada, new series, III, sec. iv, 150*) I pointed out what seemed to be a rising and sinking of the surface of the Lepreau bog to an extent of several inches, under the influence of weather conditions which I could not determine. The only rule about the movement seemed to be this, that it rose in bright and fell in dark.

weather. In a letter dated July 1st, 1898, Dr. C. Weber, of Bremen, Germany, a distinguished authority on Peat-bogs, gives me an entirely different, and doubtless correct, explanation of the phenomenon which he illustrates by the accompanying figure (Fig. 4). He shows that it

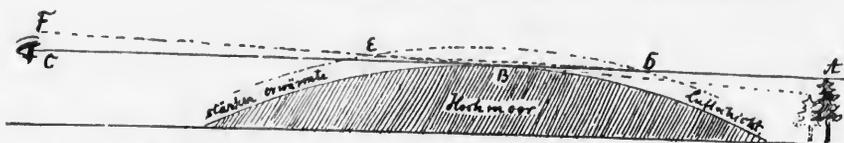


FIG. 4. Diagram of rays over a raised peat bog in dark and bright weather. Hochmoor = raised bog: B = its highest part. Stärker erwärmte Luftschicht = more strongly warmed layer of air.

is an optical illusion, caused as follows: if in dull weather, the eye of an observer standing near the margin of the bog (*i. e.*, C in Fig. 4), be at such a height that the top of some object on the opposite margin is just visible, (*i. e.*, A) the ray from one to the other will be straight. If now, the sun appears, the layer of air in contact with the bog will become more strongly warmed than the layers above it, and hence it will become rarified and less refractive. When the ray from the object reaches this layer, it passes into a less dense medium and hence bends from the perpendicular, *i. e.*, away from the surface of the bog (*i. e.* from *b* to E). In issuing from this layer, it re-enters the denser layer, and hence it will be bent towards the perpendicular, and therefore still farther upward from the surface (*i. e.*, from E to F). Consequently the ray will pass over the head of the observer (to F), who, finding it necessary to rise vertically some inches to again see the object, naturally thinks the bog itself has risen.

#### 29.—ON THE PHYSIOGRAPHY OF THE NICTOR LAKE REGION.

(Read December 5th, 1899).

At the eastern head of the Tobique River, in the north of the New Brunswick Highlands, lies Nictor, fairest of New Brunswick lakes. It is absolutely wild, unvisited save by an occasional sportsman or naturalist, and may be reached only by a several-days' canoe journey. It is unsurveyed, wrongly mapped, and scientifically little known. For these reasons, the following observations, made during two visits

to the lake in 1898 and 1899, will doubtless be acceptable; and because of the great interest of the place, I shall try to make my account monographic.

*History.* The lake makes its first appearance in historical records upon Franquelin's fine map of Acadia, of 1686, (Fig. 5, A). He does not name the lake, though he marks the portage to Nepisiguit (Oniguen is the Maliseet *Oonegun*—a portage), and he names the Little Tobique, *Nipisigooichich*, or Little Nepisiguit, probably its

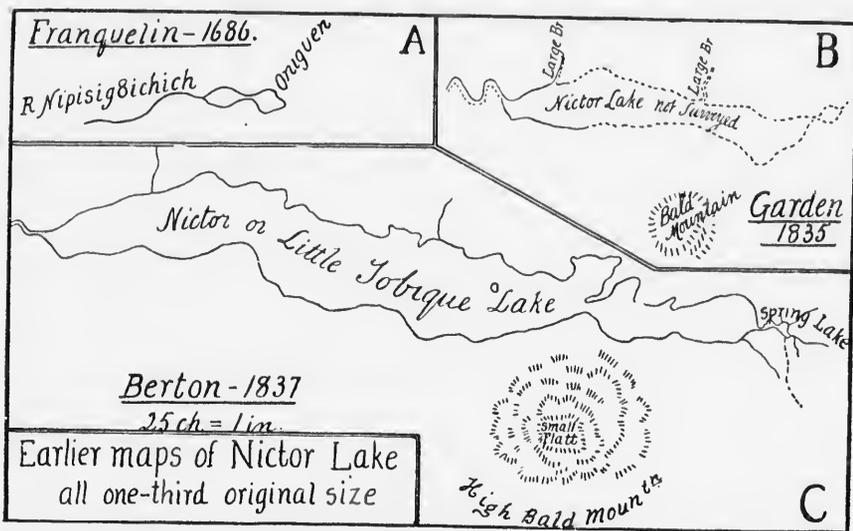


FIG. 5. Early Maps of Nictor Lake.

Micmac name. How remarkably this map influenced all others of this region for over a century, I have elsewhere traced.\* The lake next appears, though very imperfectly, upon the fine engraved Baillie and Kendall map of 1832; but it was first sketched by a surveyor in 1835, when Garden made the MS. map shown herewith (Fig. 5, B). In 1837 Deputy Berton made the MS. sketch shown in Fig. 5, C, which is the original of every published map of the lake down to the present day. In August, 1899, I made a survey of the lake, the first

\* Trans. Royal Soc. Canada, new ser., III., II., 364, where the New Brunswick part of the map may be found.

ever made, resulting in the accompanying map (Fig. 6). I used a fair prismatic compass, and a simple home-made apparatus on the stadia principle for measuring distances; the general shape must be nearly accurate, though its proportions may be somewhat in error.\*

The lake must have witnessed events of no small interest, but these are unwritten and lost. It was one of the most ancient and frequented highways across the province, and has seen the passing of warriors, hunters, missionary priests, traders, grand seigniors, governors and scholars. It was probably somewhere in this vicinity that the good Father Bernardin perished on his way from the Nepisiguit to the St. John, in 1621, as related by LeClercq. The first mention of it in print that I have found is in Wightman's report on barometric measurements, made in 1839, contained in a British boundary Blue-book of 1840. Governor Head was here in 1849, as Gordon tells us, but he left us no account of his travels. Governor Gordon came in 1863, and has left us in his "Wilderness Journeys" a most interesting account of his impressions, as well as the first printed description of the lake. He admired it as possessing "more beauty of scenery than any other locality I have seen in the province, except, perhaps, the Bay of Chaleurs," meaning, of course, the head of the Bay, above Dalhousie. He gave to Bald Mountain the name Sagamook—(mount of chiefs)—which it still bears. Later in the same year Professor L. W. Bailey visited the lake, and has given us our first scientific notes upon it, particularly its geology.† Since then Messrs. Hind, Ells, Chalmers, and Hay, have briefly visited it with results contained in well-known reports.‡ There are references to Nictor Lake in various reports, guide books, sporting books, etc., but I believe the above-mentioned include all real sources of information. Nearly every writer, from Gordon to the present, speaks of the beauty of the lake.

*Place-Nomenclature.* On the map (Fig. 6) are two sets of names, one in Roman letters, including those already more or less in use (for a list of which I am indebted to Mr. George Armstrong, of Perth Centre), and another set in italics which now appear for the first time. The latter I have myself given, for reasons and upon a principle fully set

\* I was accompanied and aided by my brother, Mr. Arthur Ganong. The preceding summer I was with Mr. G. U. Hay, who has described our trip in this Bulletin (XVII. 153).

† In his "Report on the Mines and Minerals of New Brunswick," (1864), and also in his "Notes on the Geology and Botany of New Brunswick," (Can. Nat., 1864).

‡ Geological Reports: this Bulletin IV, 104.

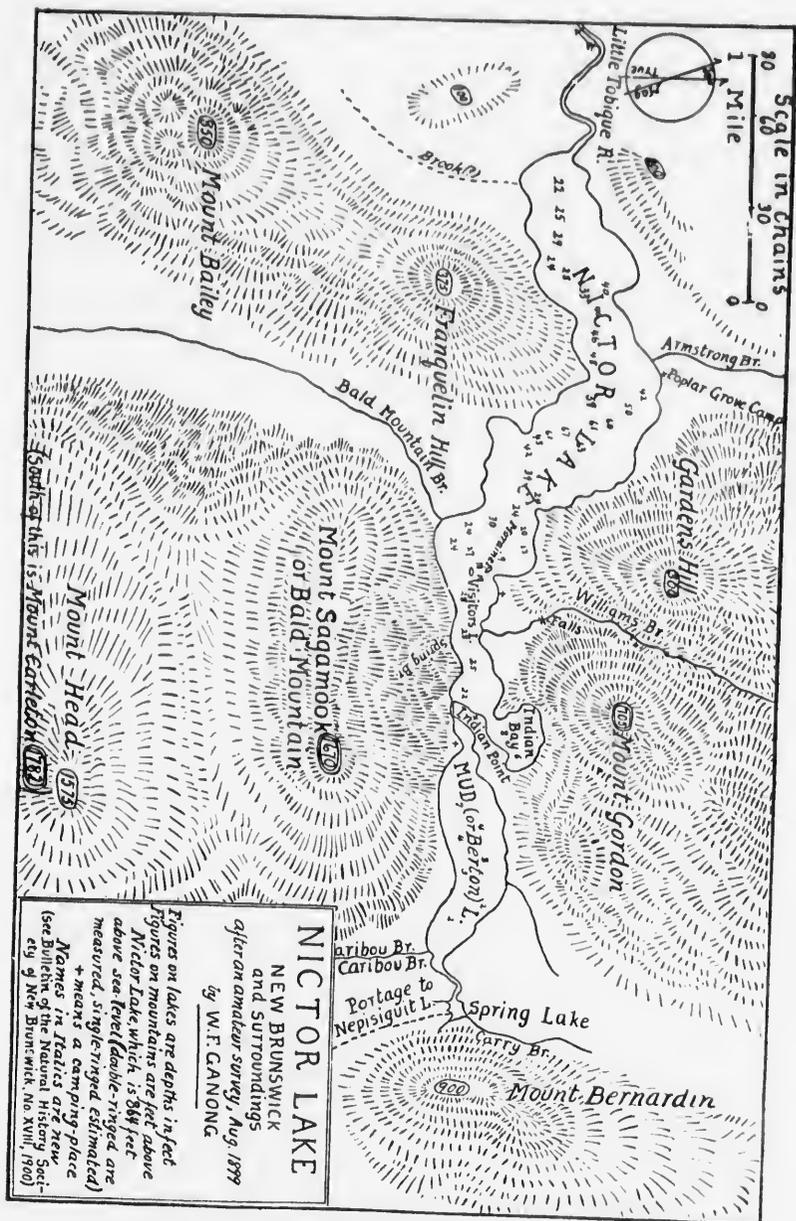


Fig. 6. Map of Nictor Lake.

forth in the next note of this series (No. 30). Most of them are sufficiently explained by the facts given in the preceding section, *i. e.*, they commemorate those who have been in some way closely connected with the history of the lake. Moraine Island describes its formation as a glacial moraine. Nictor is a corruption of the Maliseet Nictau,

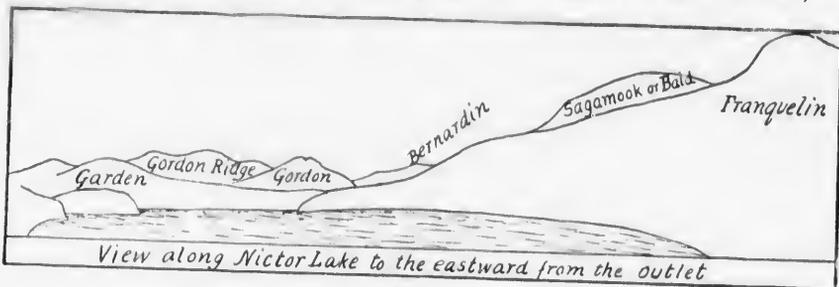


FIG. 7.

meaning Forks, and applied by the Indians to the main forks of Tobique. It was extended to the Little Tobique, and then to the Lake.

*Description.* The most striking and charming feature of Nictor consists in the splendid forested hills among which it winds. In the beauty of its hill scenery no other lake of the province can compare with it. The hills are highest towards the east (their heights are upon the map), and as one enters from the Little Tobique he sees the fine range

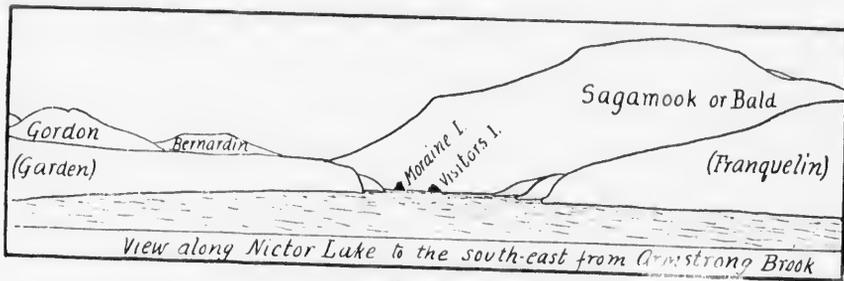


FIG. 8.

crudely shown in Figure 7. This figure will be sufficient to admit of their identification, but gives no conception of their real grandeur. In some respects they show yet better from farther up the lake (Figure 8), and here the stately form of Sagamook shows to best advantage. Best of all, however, are the views from the little island under Saga-

mook, from which all the prominent hills about the lake are visible. The view to the east is the finest (Figure 9), but to the west it is little inferior (Figure 10). Above all and over all, however, towers grand Sagamook. Rising steeply over sixteen hundred feet directly from the lake, higher than any other New Brunswick hill rises from the water, clothed with living forest, except for a few bold bosses near



FIG. 9.

its summit, shrouded often in mists, it is easily the finest, even though not the highest, of New Brunswick hills. Happy is he who, from the ideal camping place upon the island, can watch day after day these beautiful hills in their varying lights and colors, and can know they are his own.

Next in charm to the hills is the virgin forest which clothes them. This is everywhere entirely unbroken, except for the few naked spots

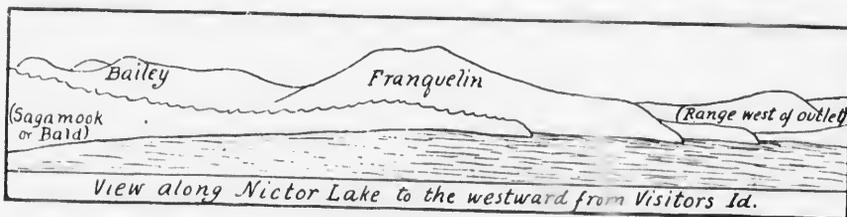


FIG. 10.

near the summit of Sagamook. There is no trace of fire, nor of the lumberman. Probably in no accessible part of the province is there a finer forest, or one more nearly primeval than this. It is of the mixed growth of our common provincial species, and it is a fine sight to see the splendid spruce in sombre green towering above the level of the brighter green hard woods. This forest owes its preservation to the expensiveness of driving lumber down the crooked Little

Tobique. But the shadow of the deadly pulp-mill already looms over it, and its glory will soon depart.

This forest is extremely rich in game, especially moose and deer. The lakes contain many trout and other fish, though in this respect they are inferior to the Nepisiguit lakes.

*Physiography.* The lake is 864 feet, more rather than less, above mean sea level. Its maximum depth is 67 feet, surprisingly little for a hill lake.\* This depth diminishes to only 28 feet directly under Sagamook, and lessens eastward so that Mud or Berton Lake, separated from Nictor only by a morainic ridge and connected with it by a short brook falling from one to two feet, is but a few feet deep, though it is made thus shallow by deposits of organic mud similar to that found in so many of our "mud lakes."† The shores of Nictor are usually bold and rocky, but in places the shores are of loose morainic materials, and but rarely of gravel or sand. There are but two islands, one of them narrow and low, apparently a moraine, and the other of highly tilted slate rising abruptly from the bottom. The latter bears a few trees and bushes, and forms the most charming camping-ground that I know of in New Brunswick. Four large brooks flow into the lakes, of which two, Bald Mountain and Caribou, flow in broad deep valleys, which are doubtless the courses of ancient rivers. Williams' Brook is new, and has upon it, not far from the mouth, an irregular fall of some eight feet, whose murmur can be heard from afar on still days, and the mist from which in certain weathers hangs like smoke over the slope of Gordon. A striking place is Spring Lake, practically an immense spring with a summer temperature of but 41° or 42°. The lakes empty by the Little Tobique, a very winding stream of much, though rather monotonous, beauty, but perfectly ideal for the amateur canoeman.

*Origin of the Lake.* I believe the lake occupies an ancient valley of erosion choked by glacial drift. As I shall show in a later note, the entire upper valley of the Nepisiguit is very ancient, and it could not have emptied by its present course. It probably therefore ran into Nictor Lake by way of the portage valley now followed by Caribou Brook. The valley of the Little Tobique, though perhaps post-glacial

\* The deepest known lake in New Brunswick is Clear Lake, Lepreau, 78 feet (this Bulletin, XIV, 48).

† This Bulletin, XVII, 126.

in spots, is certainly pre-glacial as a whole. By its extension back the lake was doubtless robbed from Mamozekel waters, into which it once probably flowed along the low valley now occupied by Bald Mountain Brook.

The geology, as traced in general by Bailey, Ells, and Chalmers, is shown upon the geological map. All the large hills about the lake and its entire eastern end are of Pre-cambrian felsites, but Silurian rocks appear at the western end. One very remarkable fact about the geology of the lake, first referred to by Bailey, is the presence of the little island of slate, Visitor's Island, completely surrounded by felsites. It may represent the remnant of a tongue of Silurian rocks extending along the bed of the lake to this point, which would give a great age to this valley. The island slopes down so steeply and abruptly on the north side as to suggest a fault running along the axis of the lake. Were it not for its relatively enormous size, 100 feet long by 50 wide, one would be tempted to view it as simply an enormous boulder. But this is but one of the very many attractive problems awaiting solution in this region.

*Natural History.* No study whatever has yet been made of the zoology of the region, and but little of the botany.

*The Neighboring Highlands.* To the north of the lake the mountain ranges appear irregular, and I have not tried to work out their particular arrangement. On the southern side, however, they are as follows: Sagamook is not an isolated mountain, but is the northernmost of three parallel ridges forming together a great island or plateau of felsite (see map, Fig. 6, and also the map accompanying the next note, Fig. 13). This plateau has Nictor Lake on the north, the deep valley of Caribou Brook and the portage on the east, Bald Mountain Brook valley on the west, and a valley between Nepisiguit Lakes and the Mamozekel on the south. Sagamook is separated from the next ridge, Mount Head, by a valley not over 300 feet deep, while a somewhat deeper valley lies between Head and Mount Carleton. The appearance of Head and Carleton from Sagamook is shown by Fig. 11. Mount Carleton is over 100 feet higher than Sagamook, and is easily recognized by its bold, bare, saw-like top. Still farther to the southward one can see the summit of Mount Winslow, not a part of this plateau (Fig. 12). On the westward of the valley of Bald Mountain Brook runs a fine range of hills south-west. It begins at Nictor Lake

with Franquelin; next is Bailey, and then follows a series of six or more crests, which are to be named for the geologists who have investigated the structure of the province, and which, therefore, may well be called the Geologists' Range. But on these matters future communications will be made to the Society.

The impression of this plateau which one gains by viewing it from either Nictor or Nepisiguit lakes is extremely misleading. Thus

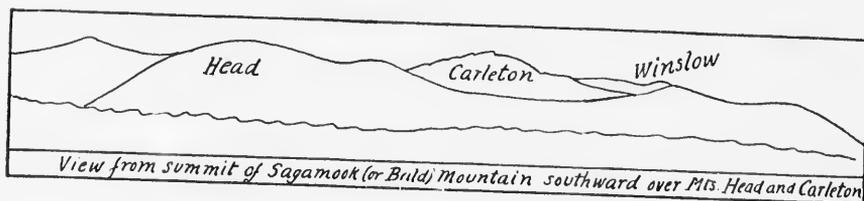


FIG. 11.

the summit of Mount Carleton is not visible at all from Nictor Lake nor from the Upper Nepisiguit Lake, though it is from the Lower Nepisiguit Lakes. Again, the summit of Sagamook is not visible from the Upper Nepisiguit Lake, but only from the lower lakes. It is only by visiting the summits of these mountains and comparing the different views thus obtained, that one can gain a correct knowledge of their relationships.

A great charm of these mountains is the view from their summits. That from Sagamook is particularly grand. From the naked bosses

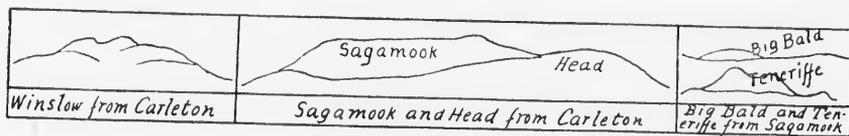


FIG. 12.

at the west end one can look away over the rolling Silurian plateau to the mountains of Quebec and Maine, while from the highest point of the mountain, a bare place near the eastern end of the ridge, one can see far off to the north and east, and the fine range of mountains through which runs the Nepisiguit, and the great mass from which rises Big Bald on the South Branch. But even these views are sur-

passed by those from the summit of Mount Carleton,\* for here from one spot the eye may range without hindrance in every direction, and there cannot be a grander outlook over a more rugged country anywhere in this province. Everywhere lie the splendid hills with innumerable crests, as if the sea, with its rollers and breakers were suddenly stilled to stone. They stretch away vast, silent, patient, as unvexed by the little affairs of man as by the shadows of the summer clouds floating above them. They are nearly all forested and unburnt, a great contrast with most other parts of the province. As one stands upon the summit of one of these rarely-visited hills on a fair summer's day, and looks upon these unspoiled hills and forests, the very rugged foundations of his native land, he cannot but feel an exaltation which is one of the best joys of life.

Nictor Lake, therefore, lies to-day not only by nature the most charming place in the interior of New Brunswick, but as yet entirely unspoiled. But the doom of the summer hotel even now threatens its shores, and the pulp-mill its forests. But why should not the people of New Brunswick prevent its despoiling, and set aside the lake and its shores as a provincial park, to be kept wild and beautiful for their enjoyment forever? It can be sacrificed for a small present profit, or saved for a large one in the future. But there is another reason for the preservation of the lake region. In the very near future New Brunswick must turn her attention to systematic forestry, or else lose her chief source of wealth, and resort to direct taxation of her citizens. The first step towards such forestry must be the setting aside of certain areas to be managed on good principles, as a nucleus for forestry extension, and for instruction in forestry management. Nowhere in the province in an equally accessible place is there so fine a forest as here, or one which it would be easier to manage on correct principles. Various states of the United States are making reservations about the heads of their principal rivers for the purpose of preserving forest and game and water supply, as well as for wild parks. Let us be warned in time and set aside here a forest and game preserve and wild park for the future instruction and enjoyment of our people.

\* Mount Carleton is most easily reached from Nictor by taking a compass line to it from the highest point of Sagamook.



## 30.—PROPOSALS FOR A NOMENCLATURE OF UNNAMED NEW BRUNSWICK HILLS AND MOUNTAINS.

(Read December 5th, 1899).

It is a fact that the great majority of New Brunswick hills and mountains, including some of the very finest, are to-day quite nameless. In the settled districts, it is true, they are mostly named, but most of New Brunswick is unsettled. This seems the more remarkable when it is recalled that practically all of our streams and lakes, even to small brooks and ponds, and in the wildest parts of the province, are named. But for this the reason is plain. Our water-courses have a relation to our interests through their use for lumbering, hunting and fishing; hence they must often be spoken of, and names for them arise. But our mountains only exceptionally affect our interests in these or other ways, hence are rarely spoken of, and names do not arise for them. Such is the condition at present, but it will not always be so. As the province becomes settled, as hunters and tourists visit it more, as a provincial literature arises, as forestry becomes systematized, as maps become more accurate and detailed, as scientific explorations become more extended and minute, a need for names for our mountains will be felt, and they will gradually come into use. Unless, however, some broad and consistent plan for the giving of such names be adopted, those which will arise will be often of the most trivial, inappropriate and inconvenient sort. One has only to instance the very numerous and confusing Bald Mountains.\* Is it not possible to inaugurate some plan which will provide for our mountains a convenient, appropriate and pleasing nomenclature? Certainly such a matter is eminently one for consideration by this Society.

If now, we pass to details, three questions arise: first, what kind of names should be given; second, what shall determine the adoption of proposed names; third, how may they be introduced into general circulation? We may most conveniently consider these questions in reverse order.

How many names, deliberately given, be introduced into general circulation? Guides, lumbermen, and most others who are much in

\* Attention was first called to incongruities and inconveniences in our place-nomenclature by Professor Bailey (*Mines and Minerals of N. B.*, 1864, pp. 8, 9).

the woods, make no use of maps, but adopt names only as they hear them, or as they arise naturally from the fixation of descriptive phrases, the method by which nearly all place-names arise among uneducated people. Yet such people, as I have often observed, have great respect for maps, and for their "correct," *i. e.*, printed names; and undoubtedly they would adopt them when brought to their attention, for otherwise unnamed places, provided only they are pronounceable and familiar enough in form to be easily remembered. But surveyors, tourists, hunters, scientists, and the better class of guides, do use maps, and unhesitatingly adopt their names. The number of such visitors to our mountains is increasing, and if the new names are on the maps used by them, they will be adopted; the guides will then hear them and pass them to others, and so on, until in time they will become widespread and fixed. The great practical point, then, is to secure their insertion upon all new maps, not only upon geological and other scientific maps, but upon all those issued by the Provincial and Dominion governments. If the Society approves of this plan, and will use its influence to urge the adoption of these names in all official publications, setting the example in its own publications, it will go far to secure this desirable end.

We next consider what shall determine the names to be adopted. I would suggest that such names be adopted and approved by the Society as are given upon the same principles as are recognized among scientific men for the naming of new species of animals or plants; that is, the first name applied to a previously unnamed place shall be accepted when published with such a description and illustration as will enable any other person to recognize it. The illustration should be a drawing, or better a photograph, or a survey (not a sketch) map accurately locating the place.

We ask, finally, what kind of names may best be given? Here we are much aided by taking account of the known qualities of the best place-names. The best names are, first, *melodious*, that is, they have a well-balanced succession of a few pleasing easily-pronounced sounds; second, they are dignified, that is, are free from incongruous associations, and have sounds consistent with the character of the place; third, they are individual or unique, that is, are applied to but a single place, and not met with elsewhere. Few names can realize all of these qualities, but they put before us an ideal to be striven for.

As to the actual words chosen, they may be drawn from any one of several classes. First, there are descriptive names; but these are good only when they describe some striking and easily-recognizable quality of the place, and are such as are not likely to be in use or to be adopted elsewhere. Our mountains, however, are not unlike enough to one another to make many such names available. Then there are Indian names, especially when these are familiarized into an easily pronounced form. Unfortunately, however, our Indians appear rarely to have had native names for mountains, and this, of course, for much the same reason that their white successors have none. Again, names may be drawn from those of persons or events prominent in the early history of the province. In these we have a great store of pleasing, easily-pronounced, already more or less familiar, words; and, as to their appropriateness, it is surely fitting that the names of those who have laid the foundations of the province should be lastingly commemorated in her eternal foundation hills. Most of our new names will probably be drawn from this source. Of course such names will be applied, as nearly as possible, to places associated with the person or event commemorated. It is a fact, too, that more honor would be done a person by naming for him a smaller mountain in an accessible and much visited place, than a larger one in a place inaccessible. There should be, too, some proportion between the importance of the place and the prominence of the person commemorated; the greater hills should be named only for those of provincial prominence, while the smaller may well be devoted to the names of those whose importance is only local.

With the convictions here expressed, and following the principles here recommended, I have ventured to apply names to the more prominent mountains about Nictor Lake and along the upper Nepisiguit. This region includes some of the highest, and perhaps scenically the finest, of New Brunswick mountains, and is withal fairly accessible.

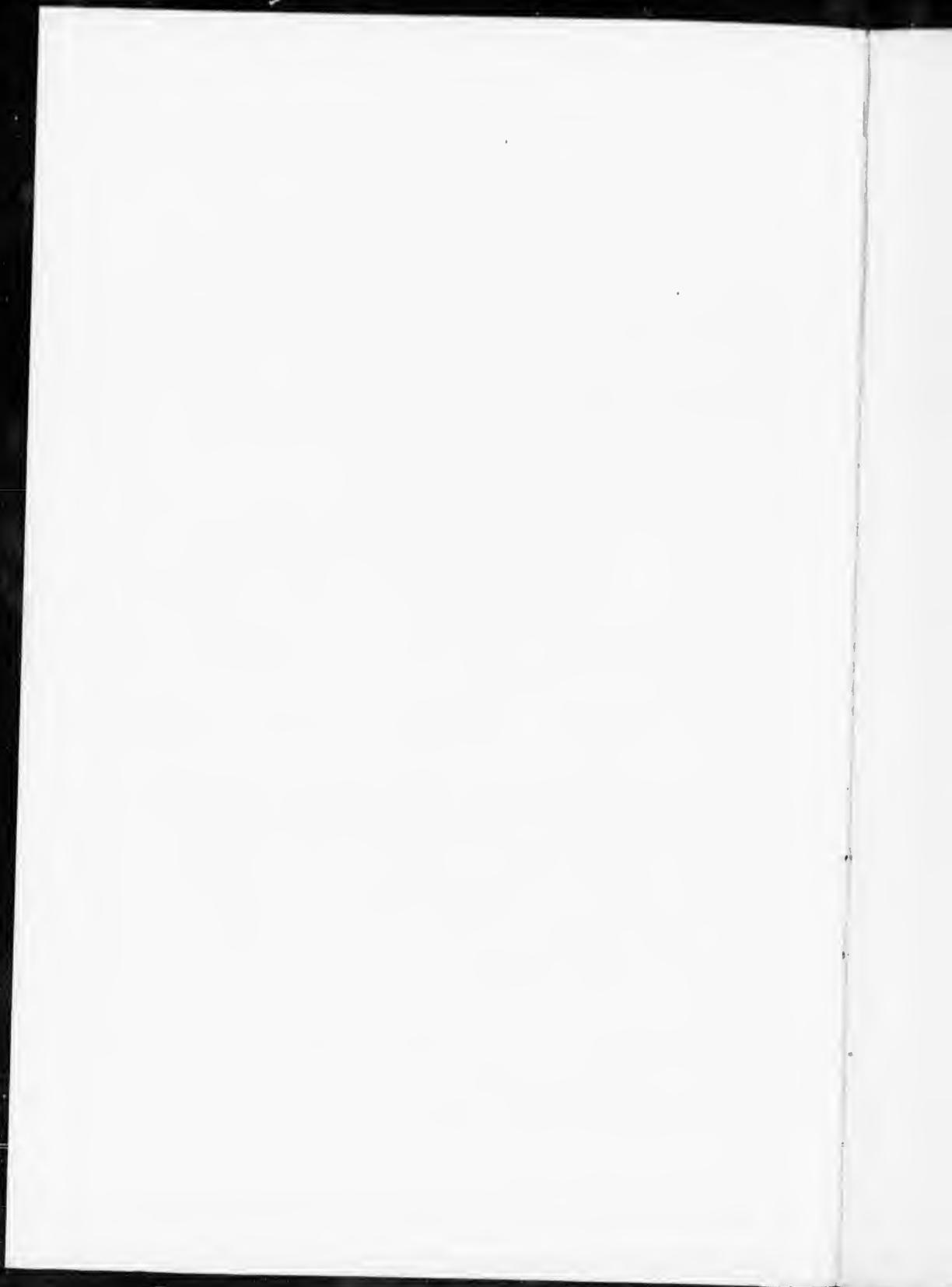
About Nictor Lake is a particularly fine series of hills, described and figured in the preceding note (No. 29). The map accompanying that paper, as well as the one with this, show all new names in italics.

*Mount Bernardin* is named for the Recollet Missionary, who, about 1621, perished of cold and hunger somewhere in this vicinity while on his way from the mouth of the Nepisiguit to the St. John. *Franquelin* is for the great French cartographer, who was the first, in









1686, to place Niotor Lake upon a map. *Garden* is for the surveyor who, in 1835, was the first to sketch a modern map of the lake, and to apply the name Niotor to it. *Berton* (lake, not mountain), is for the other surveyor who, in 1837, made the sketch map which has been the original of all published maps of the lake even to the present day. *Head* is for a governor of the province who was here in 1849 and named Mount Teneriffe. *Gordon* is for another governor, whose charming book, "Wilderness Journeys," published first in 1864, gives the first published description of the lake. It was he who named Mount Sagamook. *Bailey* is for the naturalist, Professor in the University of New Brunswick, who gave us, in 1864, the first scientific account of the geology and botany of this region. *Carleton*, applied to what is much the highest mountain in this part of the province, and possibly in the entire province, is named for Thomas Carleton, governor of New Brunswick from its foundation in 1784 until his death in 1817. Mounts Carleton, Head and Sagamook form a plateau, which, since its peaks are named for two governors, and by another, may well be called *The Governors' Plateau*. In Niotor Lake lies a little island named from its mode of formation, *Moraine Island*. South of Carleton lies another high and conspicuous mountain named *Winslow*, in honor of Edward Winslow, who was so closely associated with the foundation of the Province of New Brunswick, and who is as yet uncommemorated in any place-name.

As one stands upon the western end of Sagamook, he can see running off to the southwest a fine range of very prominent hills, with several rounded summits. This range begins with Mount Bailey and terminates near Bald Head, south of the Tobique. Since Bailey is one of the range, the other summits may well be named for the other geologists who have worked in this province, *Gesner*, *Robb*, *Hartt*, *Matthew*, *Dawson*, *Ells*, *Chalmers*, and the range may well be called the *Geologists' Range*. No maps or figures are here presented, for I hope soon to give it further study.

We pass next to Nepisiguit waters, of which a map is given herewith (Fig. 13), and we may well commemorate in its numerous grand hills those who have been prominent in the history of the river and the region of the North Shore about its mouth. We come first to a large lake. It first appears on the excellent map of 1685 by the Recollet missionary, Jumeau, as *L. aucler*, and the name is restored.

From no part of this lake can the summits of Sagamook or Carleton be seen, nor, of course, can the lake be seen from their summits, but they can be seen with great distinctness from near the summit of Teneriffe (Figs. 14, 15). In addition to those already mentioned, one sees a low rounded hill, which shows more distinctly from the lower end of the lake, named for *Jumeau*, the lake's first cartographer. To

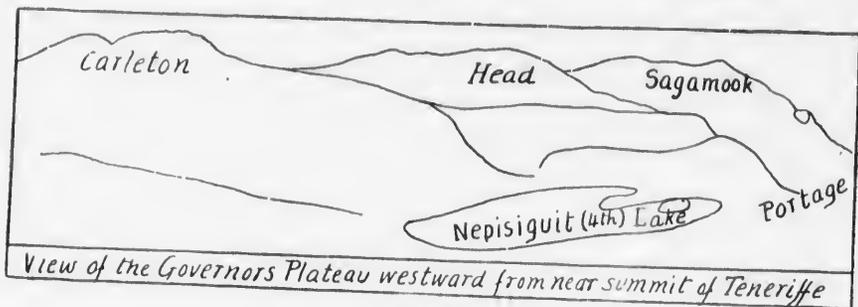


FIG. 14.

the northward stands up a splendid very high rounded dome, falling outside the limits of the map, but shown in Fig. 15, easily seen from Sagamook and from other directions, which is named *Mount Villebon* in honor of the most prominent of the French governors of what is now New Brunswick when it was a part of Acadia.

Below Aucler are three other shallow lakes, from the easternmost of which an arm, forming another lake, runs to the southward. This is

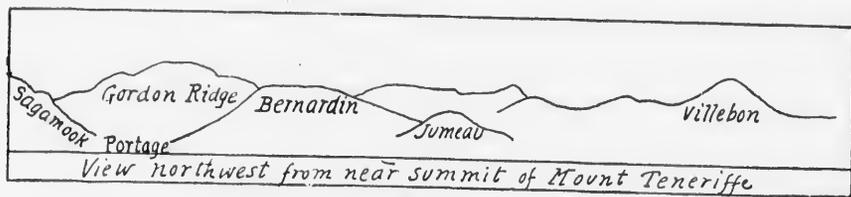


FIG. 15.

remarkable for its great deposit of diatomaceous earth, described in an earlier note (No. 17), whence it may be well called *Diatom Lake*. South of these lakes and parallel with them runs a splendid ridge, known appropriately to the lumbermen as the Green Range. It is, I think, continuous with Mount Winslow, but I am not sure of this.

South of it stands Mount Teneriffe, from which a fair view may be obtained to the westward (Figs. 14, 15), and a particularly grand one to the eastward (Fig. 16). From here two mountains falling outside the limits of the map show up with particular distinctness, the round dome of Big Bald on the south branch of Nepisiguit, and to the left of it a pointed mountain with three bare spots near its summit. The latter is named *DesBarres* for the man, afterwards governor of Cape Breton, who first thoroughly surveyed our coasts, and who mapped, in 1780, the interior of New Brunswick far better than any other cartographer until well into this century. This is, I think, the mountain shown on the geological map at the forks of the south branch of Nepisiguit (just west of the large N).

We begin now to descend the river. As in other rivers of the province the lumbermen have a nomenclature of their own for the

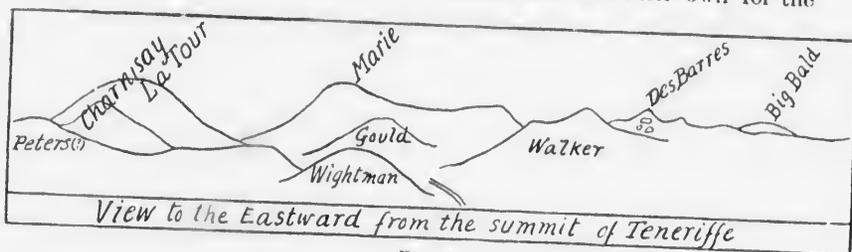


FIG. 16.

rapids, rocks, points, etc., along the river, and these names (for much help in compiling which I am indebted to Mr. P. J. Burns, M.P.P., of Bathurst,) are given on the map. As to the mountains, the first we meet is the symmetrical hill around which the river flows, which may well be named *Mount Cooney*, in honor of the author of the "History of Northern New Brunswick and Gaspé," (1832), in which is found the first, and, on the whole, an accurate description of the river. Northeast of this is a prominent symmetrical mountain, which is named *Mount Peters*, for the surveyor whose accurate map of the river, made in 1832, is the basis for all subsequent maps. From the forks of the Little South Branch three fine mountains may be seen at once, one of which was named *Felspar Mount* by Professor Bailey in 1863, and on the slope of which he describes a remarkable chasm. That to the east of it is named *Mount Walker* in honor of Commodore Walker, who was the first English settler at the mouth of the river,

where in 1768-1776 he had a large trading establishment described by Cooney. The rounded mountain just north of the river here is named *Mount Wightman*, for the surveyor of Fredericton who, in 1839, carried a line of barometric measurements through this region for the British government, as described in a Boundary Blue Book for 1840. Farther down on the south bank is a distinct, though not a high hill, which should be named *Mount Gould* (on the map, by mistake, Gould), for Arthur Gould, who at one time owned the site of Bathurst and attempted to make a settlement there. Lower still, on the north bank, towers up a splendid symmetrical rounded mountain, prominent in the landscape from both up and down river (see Figures 16, 18), showing from the west a marked red color; this is named *Mount LaTour* for the Sieur de LaTour, so well known in our provincial history. Just west of it is another of similar character, but not so large, and more deeply stained with red, and this is named for *Chornisay*, his rival. Directly south of LaTour, across the river, is a splendid wooded ridge, as high as or higher than LaTour itself, and as prominent, but of softer and more pleasing character, which is named *Mount Marie*, for our Provincial heroine, the wife of LaTour.

From Mount LaTour to Portage Brook the hills are high,\* but none stand out distinctly until the brook is reached. Portage Brook occupies a deep and broad valley, with splendid hill ranges along both sides, and these are named the *Missionaries' Range* and the *Acadians' Range* to commemorate two peoples prominent in the history of the North Shore. One of the hills in the Missionaries Range, the prominent one as seen from below the brook, in the angle between brook and river, is named for *LeClereq*, who, in 1691, published a most valuable book containing much information about the lower part of the river. It will be well in the future to apply the names of other missionaries to other summits of this range, and likewise to apply the names of prominent Acadians to the summits in the Acadian range.

Just below the South Branch, on the south side, are two prominent rounded hills (Figure 17) which may be named *Mount Halion* and *Mount Winemowet* for two Micmac chiefs mentioned by Cooney.

\* From the river alone one is apt to be misled as to the character of these hills along the river. They appear like long ridges, and one imagines deep valleys and other ridges behind them. In fact they are often but the edges of a great plateau, into which the river has cut a deep valley. It is only to more or less isolated mountains and ridges that names are applied in this paper.

Lower, on the north bank stands out a very prominent mountain (Fig. 17), which is named *Mount Membertou* in honor of the grand old Micmac sachem, friend of the French, and one of those who saw Cartier on the North Shore in 1534. Descending the river one presently sees a bare reddish summit appearing over a wooded ridge, the first glimpse of Fronsac (Fig. 17), and later there comes into view

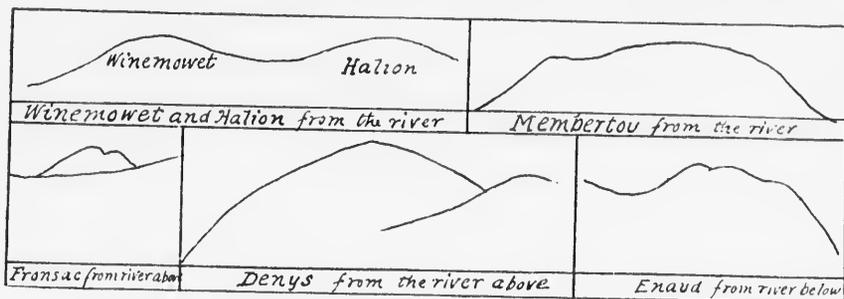


FIG. 17.

the symmetrical mountain locally called Bald Mountain (Fig. 17), but much better to be known as *Mount Denys* in honor of the first settler at the mouth of the river, and the author of one of the most important early works on Acadia, published in Paris in 1672. North of it lies *Mount Fronsac* (Fig. 18), somewhat higher than Denys itself, but otherwise less distinctive, named for the Sieur de Fronsac, Denys' son, who lived and had a fort at Miramichi. Southwest of Denys there

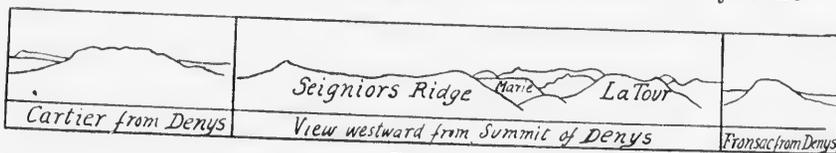


FIG. 18.

towers up a bare mountain visible from many points (Fig. 18), the highest and most conspicuous in this vicinity (sometimes, I believe, called Little Bald Mountain), which may well be named *Mount Cartier* in honor of the first explorer and map-maker of our North Shore. To the westward rises a high and prominent ridge, which is named the *Seigniors Ridge* for the French Seigniors who once possessed much of New Brunswick, and played some small part in her history. To the eastward is a lower mountain, which shows more prominently from

the river below (Fig 17), and this is named *Mount Enaud* (also spelled *Enault*) for one of the most prominent of the early settlers at the mouth of the river, mentioned by Cooney.

Below Indian Falls no more prominent mountains appear. The country becomes a flat plateau, sloping evenly and gradually eastward.

### 31.— ON HEIGHTS DETERMINED WITH ANEROID IN 1899.

(Read December 5th, 1899).

In the course of a canoe trip up the Tobique and down the Nepisiguit in August last, I made many measurements with a good aneroid. These were all taken contemporaneously with the readings made at Fredericton by Dr. Harrison for the meteorological service, and I wish to express my thanks to him both for adjusting my aneroid and also for a long series of readings used in computing results. I have since found that my aneroid tends to read a trifle low, especially on the greater heights; hence the following figures are to be taken as below, rather than above, the truth. Those marked with a star (\*) have never before been measured. The heights are all above mean sea level at St. John. The position of all of the places, except the last in the list, may be seen upon the map accompanying Note 30.

Forks of Tobique (or Nietau). Mean of two measurements, 576 feet. Wightman gives (with an added correction explained earlier in Note 25) 575 feet for four miles below Nietau.

Surface of Nietor Lake. Mean of fourteen measurements, 837 feet. Chalmers made it 878, and Wightman (corrected) 877. Mean of the three, 864.

Sagamook (or Bald) Mountain. Mean of two measurements, 1633 feet above the lake. Chalmers gives 1659, and Wightman 1719. Mean of the three, 1670 above the lake, and 2534 above the sea.

\*Mount Carleton. By direct measurement 112 feet higher than Sagamook, and hence 1782 above Nietor Lake, and 2646 above the sea.

\*Mount Gordon, on Nietor Lake. 705 feet above Nietor Lake, and 1569 above the sea.

\*Bank of Caribou Brook, half way across the Nietor-Nepisiguit Portage, 984 feet.

Surface of Nepisiguit Lake. Mean of five measurements, 1011 feet. Chalmers gives 996; mean of the two, 1003. Mr. Chalmers statement that this is the highest lake in New Brunswick, was of course made before the heights of the lakes on the south branch of Tobique, which are much higher, were measured. By direct measurement I made it 145 feet above Nietor Lake, *i. e.*,  $864 + 145 = 1009$ .

- \*Mount Teneriffe. By direct measurement, 1105 feet above Nepisiguit Lake, and hence 2108 feet above the sea. Mr. Chalmers is in error in stating that this is about as high as Sagamook. Even as seen from Sagamook it is much lower.
- \*Mount LaTour. By direct measurement, 1150 feet above the river. As this falls 160 feet between the lake and Portage Brook, and the fall is considerably greater below than above it, the river is here probably 940 feet above the sea, and hence LaTour is 2090 feet above the sea.
- \*Mouth of Portage Brook, river level. Mean of five observations, 843 feet.
- \*River at camping place near the "bear house" at foot of Mount Cartier or Bald Mountain. Mean of four observations, 715 feet.
- Mount Denys, or Bald Mountain, above Indian Falls. By direct measurement, above the river at the camping place, 1175 feet. In 1898 I made it 1170 feet; mean, 1172. This agrees well with the height of 1183 feet on the survey map of 1832 by Peters. Mean of these two, 1138, which, added to the river level, gives 1893 feet above the sea. Chalmers, following Ells, gives 1922; mean, 1907. There are higher mountains in the near neighborhood.
- Mount Enaud, or Bald Face Mountain, is given on the Peters map as 998 feet high, that is, of course, above the river, and hence about 1690 feet above the sea.
- \*Lower end Indian Falls. Mean of three measurements, 632 feet.
- \*Mouth of Nine-mile Brook. Mean of two measurements, 429 feet.

