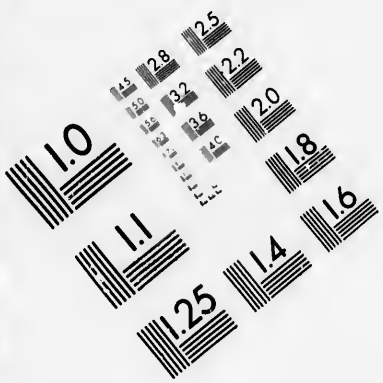

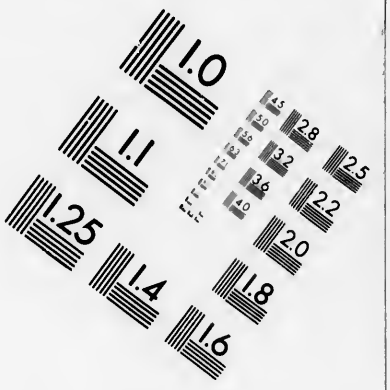

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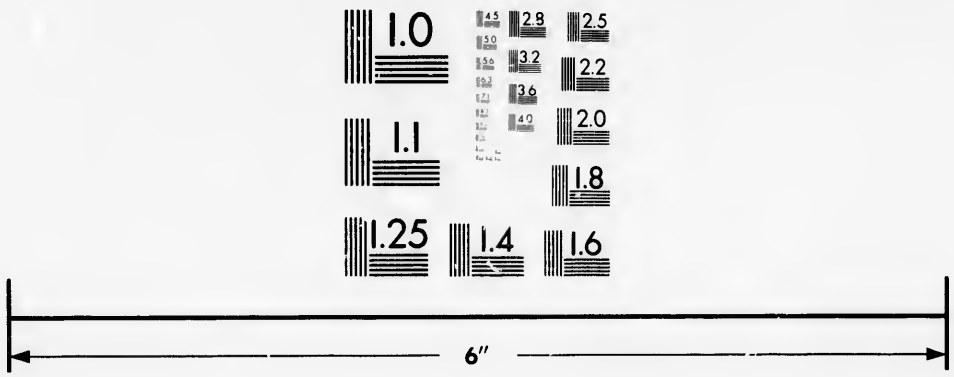

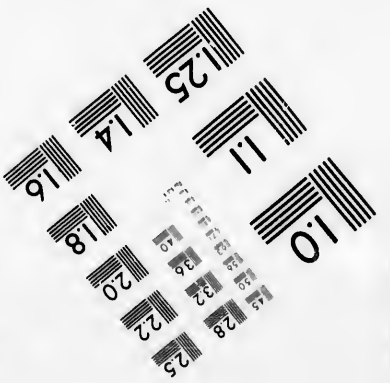

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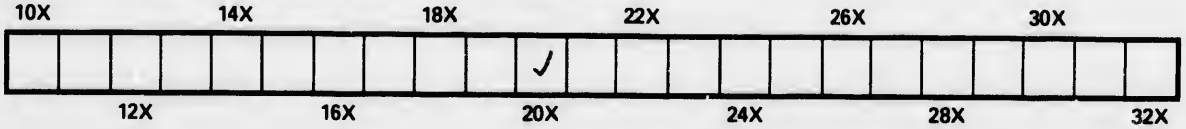

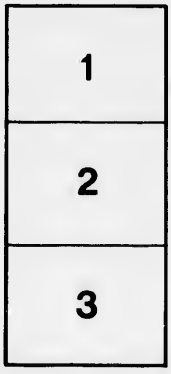

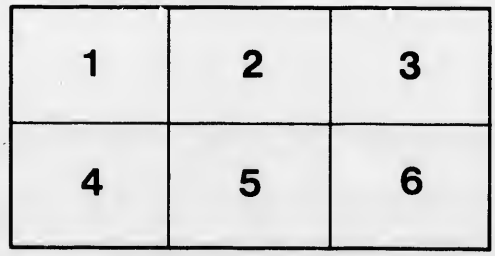

ON THE ACADIAN AND ST. LAWRENCE WATER-SHED.

By L. W. BAILEY.

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ON THE ACADIAN AND ST. LAWRENCE WATER-SHED

BY L. W. BAILEY.

Read before the Nat. Hist. Society of New Brunswick, April, 1889.

The tract of land which constitutes the great divide between the basin of the St. Lawrence on the one hand, and shore of the upper St. John and Baie Chaleur on the other, is one of much interest for several reasons. Geographically it corresponds very nearly to the line separating the Provinces of New Brunswick and Quebec; politically, it has had great significance in connection with the various international and inter-provincial boundary disputes, as it still marks in a general way the line of separation between races of different language, customs and descent; physically, its character is such that, until a comparatively recent period, it has acted as a very serious barrier to inter-provincial communication; and finally, from a geological point of view, it is of interest as forming a portion of one of the great cordilleras of the continent, the eastern extremity of the great Appalachian mountain-system. It is proposed in the present paper, to give a brief summary of some of its characteristics, as viewed in the last two aspects.

Regarding the Gaspé peninsula and its direct extension westward, as properly marking the limits of the area under discussion, this may be said to have the general form of a broadly curving belt convex to the northward of which the sides are nearly parallel and at a distance from each other of about ninety miles, while its length from Cape Gaspé to the Little St. Francis river, is 250 miles. While on the northern side it forms the south shore of the St. Lawrence, and is of very regular outline, it is on the southern side less clearly defined by the valley of the St. John river above Edmunston, and farther east by that of the Restigouche river and the Bay Chaleur.

Though everywhere hilly, the district in question can only at comparatively few points be properly described as mountainous. Its true character is rather that of an elevated plateau, having in the Gaspé peninsula an average elevation of 1000 feet, but declining to the westward, upon which are held up, along certain lines, somewhat more prominent ridges, while the sides have been broken up and made hilly by the effects of deep and irregular erosion. Of the ridges referred to, the most considerable are those forming the Shickshock Mountains, included wholly within the Gaspé peninsula, and having a length of about sixty-five miles with a breadth of from two to six miles, at a distance of about twelve miles from the St. Lawrence. Their maximum elevation is from three to four thousand feet, and the district which they form is one of an exceedingly rugged but picturesque character. From the summit of Mount Albert, nearly 4000 feet high, not less than (158) one hundred and fifty-eight distinct peaks were observed and triangulated by Mr. A. P. Low, who also describes the intervening valleys as having often the character of deep cañons, traversed by narrow but deep streams with numerous rapids and falls. In addition to the main chain of the Shicksocks, a second range, of less elevation, but still including some lofty peaks, is found between the latter and the coast, while here and there, on either side of the axis, are isolated granite hills, such as Table Top Mountain, rising fully 2000 feet above

the general level of the surrounding country, and nearly bare of vegetation. Towards Lake Metapedia and the line of the Intercolonial Railway, the great ridges of the Gaspé peninsula become much less prominent, but a little to the westward of the lake, another range, that of the Notre Dame Hills, rises somewhat abruptly from the surrounding plateau, and stretches away in the direction of the head-waters of the Grand Metis and Patapedia rivers. It does not, however, quite reach these latter, and to the westward of these streams no ridges of a well defined or continuous character are to be met with.

The rivers which drain as well as owe their origin to the great belt of high land here described, present many interesting features. They are quite numerous, including, in the Gaspé peninsula proper, the St. Anne des Monts, the Dartmouth, York and St. John at the eastern end of the peninsula, with the Grand Pabos, Bonaventure, Big and Little Cascapedia, tributary to the Bay Chaleur. Farther west we have, on the north or St. Lawrence side, the Little and grand Metis, the Rimouski, the Trois Pistoles, Riviére Verte and Riviére du Loup; while on the southern side, besides the Metapedia, there are the Restigouche, with its tributaries the Patapedia and Quatawamkedgwick, the Madawaska, the St. Francis, the Big Black and Little Black rivers, with others of minor importance. As might be expected, the streams flowing northward into the St. Lawrence are, as a rule, much smaller than those flowing in the opposite direction, but if we include the entire distance of the latter to the sea, the contrast is in some instances quite remarkable. Thus while few of the streams tributary to the St. Lawrence show a greater length than thirty miles, the length of the Metapedia, including the lake, is nearly sixty miles, that of the Restigouche from the source of the Kedgewick nearly ninety miles, and the St. John, measured in the direct line from Temiscouata to the Bay of Fundy, 260 miles, or from the source of the St. Francis, over 300 miles. The streams on the north shore also differ in being usually more irregular in course, with more

numerous and larger falls and rapids, being sometimes inaccessible for considerable distances. A more curious and more interesting feature is the fact that many of the streams, on either side of the general water-shed seem to have been but little affected by the position of the latter, having their source upon one side of this and their discharge upon the other. Thus in the Gaspé peninsula, as described by Richardson and others, the Matane, the Ste. Anne des Monts and the Chatte all take their sources south of the general height of land, and have cut deep gorges through the latter on their way to the St. Lawrence, while one branch of the Matane, rising north of the axis, flows across the latter to its junction with the main stream, and thus has its waters twice intersect the principal range of elevations. On the other hand the St. Francis, rising in a lake of the same name, is only twelve miles distant from the St. Lawrence, and several miles north of the sources of the Trois Pistoles, and yet flows southward across the range to its junction with the St. John.

Another noticeable feature is the number, size and depth of the lakes connected with the streams draining the southern side of the water-shed. Of these, Lake Temiscouata is the largest, being about thirty miles in length, with a breadth varying from one to two miles, and a depth (which is nearly uniform through a large part of its length) of 220 feet, its elevation above the sea being 467 feet. Lake Metapedia has an area of twelve square miles, about half that of Temiscouata, and an elevation of 480 feet, but has much less depth. Near Temiscouata, and in connection with it, are the Squatook Lake and Cabano Lake, both remarkable for their depth, while farther west, on the line of the St. Francis, are Pohenagamook or Boundary Lake, Glazier's and Beau Lake. It is noticeable that most of these lakes occupy long narrow troughs having a nearly north and south course, or transverse to the trend of the hills in which they lie, and that this course is extended in nearly the same direction by the streams to which they give origin. The valleys of these streams, as in the case of the Metapedia

and the Madawaska, are now largely filled with drift, and there can be but little doubt that all of them mark old channels of sub-aerial erosion, the partial damming of which has originated the lake-basins which now characterize them.

The climatic features of the region under review may be readily inferred from its position and physical aspects. While its comparatively high latitude determines great inequality in the length of the seasons, a long winter and a very short summer, its altitude further tends to reduce the mean temperature of the latter. The temperature of the coastal waters, these being a part of the great southward flow from the Arctics, being also very low, leads to a further chilling in the air above them, and the effects of this are readily recognizable in the prevailing winds. Fogs are not uncommon, even over the higher portions of the district, and the rain and snow fall both excessive. Ice sometimes remains in Lake Metapedia as late as the 24th of May, and upon the adjacent hill tops, as well as in ravines and gullies, great banks of snow often linger far into June. Frosts come early in autumn, and may come, even with severity, at any time of the year. Long continued and excessive heats are of rare occurrence.

The climatic features of the region are reflected in its vegetation and animal life, although the former is also largely influenced by the character of the soils and drainage, as these in turn are by the nature and structure of the rocks beneath. The larger portion of the district is forest-clad, the clearings being for the most part confined to a narrow belt, five to fifteen miles wide, skirting the St. Lawrence, to isolated settlements around the shores of the Gaspé peninsula, to the immediate neighbourhood of the Temiscouata Portage Road, and to the more recently opened line of the Intercolonial Railway. The trees most commonly met with are spruce, fir, hackmatac and white birch, but in favorable situations and on lands of moderate elevation yellow birch and sugar-maple are also not uncommon, and along the river valleys, groves of black ash and poplar.

The immediate banks of streams are bordered by the ubiquitous alder, amid which in autumn glow the rich berries of the mountain ash. On the higher summits the vegation is of course more scanty, and in the Shickshocks, as already described, these are often quite bare of trees. Of herbaceous plants there is, of course, in the district as a whole, a considerable variety, but little has yet been done in working out the details of their distribution. Of those occurring in the vicinity of Lake Temiscouata a pretty full list has been published by Mr. J. J. Northrop (Bull. Torr. Bot. Club, Nov., 1887), and supplemented by another prepared by Mr. Ami of the Geological staff. With few exceptions the species named are the same as those found in the valley of the St. John river, but many forms, both of trees and herbs, common in the latter have not yet been noted in the hilly district to the north. The following list embraces a few forms observed by the author on the banks of the upper St. John, near Fort Kent, *Parnassia Caroliniana Tanacetum Huronense, Oxytropus Campestris, Veratrum viride Hedysarum boreale, Allium Shoenoprasum, Heracleum lanatum, Rosa blanda, Lilium Canadense, Potentilla fruticosa, Anemone Pennsylvanica, Thalictrum dioicum, Castilleia pallida, Silene inflata, Diervilla trifida, Lysimachia stricta, Brunella vulgaris, Pyrola secunda, P. elliptica.*

As to animal life, the same forms are found as occur in the less inhabited parts of our own province. Bears are very common, and red-deer and caribou but little less so, while moose are comparatively rare. Both birds and insects present considerable variety, but as yet have been but little studied. The remarkable clearness and coolness of the streams, and the depth of the lakes, are especially favorable for the development of fishes, and few regions in the world can excel in attractions for the sportsman, those afforded by the waters of the Restigouche and its tributaries, the Cascapedia, the Matane and the Grand Metis. In the larger lakes, in addition to trout, are found the white fish, the toque and the tuladi. Turtles, sometimes of large size, were often seen basking on the muddy banks of streams,

and at some points, specimens of cray-fish were also observed. The soils of the region under discussion can be best considered in connection with the geological formations which have determined them.

The oldest rocks of the Gaspé Peninsula proper, are, according to Mr. Ells, those which make up the mass of the Shickshock Mountains, and consist chiefly of epidosite, garnetiferous gneiss, horneblendic, chloritic and micaceous schists, together with large masses of serpentine, portions of which are distinctly stratified, while others suggest an eruptive origin. These rocks were described in the Geology of Canada, by Richardson and Logan, as being an altered portion of the Quebec group (Sillery), but are referred by Ells, chiefly upon lithological grounds, to the Pre-Cambrian. The only point where the belt of rocks so referred has been observed by the present writer is on the eastern shore of Lake Metapedia. They here consist of heavy masses of grey, greenish and purplish amygdaloid, holding considerable quantities of epidote, and bear some resemblance to the Huronian of southern New Brunswick, but not more than they also do to similar masses occurring in connection both with the Cambro-Silurian and Silurian formations. To the north of these volcanic rocks, upon the same lake, the rocks are chiefly hard massive sandstones of a greenish (or rarely purplish) color and distinctly bedded, but with these, at two points, are beds in which the sandstones, by the enclosure of limestone pebbles, become a coarse, gritty conglomerate. These rocks have also been referred to the Quebec group (Sillery) but they have as yet yielded no fossils, and further investigation of their relations is required. At the extreme northern end of the lake, the rocks are undoubtedly those of this latter group, and from near Sayabec Station on the Intercolonial Railway to St. Flavie, are exposed in a very remarkable and almost continuous section, showing repeated alternations of bright red, green, grey and black slates, with beds of massive grey or whitish sandstone. The former resemble the strata which at other points along the south shore of

the St. Lawrence have been described under the name of the Levis rocks, and the latter bear a similar resemblance to the so-called Sillery, but it may well be doubted how far these and the numerous other sub-divisions adopted by Richardson in his report on the geology of southeastern Quebec, are capable of being sustained by actual facts. A new and good opportunity for the study of these rocks has recently been furnished by the line of the newly opened Temiscouata railway, and was availed of by the writer and Mr. W. McInnes during the past summer; but with the result of showing that along this line at least no good reasons exist for the adoption of such sub-divisions. It has been supposed by Richardson that in addition to the several members of the Quebec group proper (Sillery, Lauzon and Levis) a portion of the sandstones found at St. Antoine and Frazerville (Riviére du Loup) are of Potsdam age, but it is impossible to see in what respects the rocks thus referred to differ either in character or relations, from those elsewhere referred to the Sillery sandstone. The topography of the country underlaid by these Quebec rocks is exceedingly broken and rugged, the repeated alternations of hard and soft strata, together with excessive folding, having been especially favorable to the formation of steep and bold ridges separated by narrow and deep valleys. The massive sandstones, from their peculiar whiteness and absence of vegetation, are especially conspicuous, but are exceeded in elevation, as well as in the craggy character of the scenery which they determine, by the hard and glossy slates which at various points rise from beneath them. Near the axis of the divide the land is, as has been stated, somewhat flatter, but here large tracts are so thickly strewed with blocks of the dark grey Sillery sandstones that little else is visible. In all parts, except where intervales occur, the soils are of the most meagre character, and the settlements, chiefly French, of the poorest description.

The transition from the Quebec or Cambro-Silurian rocks to those of the Silurian system, is everywhere well marked, being seen alike in the character and attitude of the beds.

The contrast in the latter respect is especially noticeable, for while the strata of the older series are everywhere highly inclined and sharply folded, those of the younger, along the line of contact, are very generally nearly flat. While, too, the former are largely made up of slates, often brilliantly or variously colored, and without conspicuous fossils, the latter are usually grey or dark grey in colour, consist largely of limestones, and abound in corals and other organic remains, often of large size. The contrast in many places has been made still more striking by the effects of erosion. Thus along a large part of its northern edge, the Silurian presents the appearance of a bold or even precipitous escarpment, separated only by a deep and narrow valley from the irregular and usually lower tract to the north occupied by the inferior group. This feature is very strongly marked between the Grand Métis river and the Rimouski, determining in part the eminence of Mount Commis and wholly that of the Bois Brulé, and though to the westward of the Rimouski it becomes less evident, it re-appears with special prominence at Temisconata Lake, here originating the remarkable eminence known as Mount Wissick, Mount Lennox or the Big Mountain.

The order of succession and the equivalency of different members of the Silurian system in northern New Brunswick and adjacent portions of Quebec and Maine, have long been wrapped in much obscurity, the difficulty of their determination arising partly from the great sameness of the formation over large areas, the excessive folding and strong slaty cleavage by which it is generally characterized, and finally from the comparative paucity of fossils. An examination however of the section afforded by Lake Temiscouata and its vicinity has recently done much to remove this obscurity and to afford a key whereby the geology of the districts named may be more satisfactorily correlated not only with each other, but with more distant parts of the continent.

It will not be possible in this place to dwell at length on the details of this section (which will be fully described in

a forthcoming report, by the writer and Mr. Wm. McInnes, to the Director of the Geological Survey), but the following brief summary embodying the more important results, will probably be of interest.

The strata in question naturally fall into three groups. Of these, the first are those which directly constitute the eminence of Mount Wissick. At their base they exhibit a considerable thickness of a pure and nearly white highly vitreous sandstone, with thin beds of conglomerate, followed by a mass of shales partly grey and partly bright green and red, above which, forming the principal mass of the mountain, are thick beds of grey limestone, the whole having a thickness of about 600—1000 feet. Their dip is for the most part at a low angle and at the northern base of the mountain, where it rises precipitously from the lake, their unconformity to the Quebec group, consisting here of black and green slates which are highly disturbed and altered, may be readily witnessed. In the shales and limestones the fossils are abundant and large collections recently made show that with the possible exception of the sandstones at the base, the strata are newer than the Niagara formation, the lowest fossiliferous shales being about the equivalent of the Guelph formation of Ontario, above the Wenlock, but below the Ludlow group of England, while the higher range through this last named group to and possibly through the Lower Helderberg. A similar but less complete succession has been observed by the writer on the Rimouski river, in Bois Brulé Mountain at St. Blondine, in the valley of the Neigette, on Taché Road at St. Gabriel, on the Grand Metis, and finally on Lake Metapedia, and from each of these, fossils of similar character have been collected. On Lake Metapedia, the basal sandstones were also found to be fossiliferous, including among other forms that of *Pentamerus oblongus*, a *Murchisonia* and *Oriostoma*.

The second series of rocks shown in the Temiscouata section is separated from the last by an interval of about 800 yards without exposures, and differs greatly both in

character and attitude. The lowest beds are conglomerates of very coarse character, and attain a thickness of not less than 1000 feet, with a nearly uniform south-easterly dip of 50°. The pebbles in the conglomerates include many of limestone, and have apparently been derived from the disintegration of the slates and limestones of the Quebec group, but are not at present known to contain any fossils. Above the conglomerates is a considerable breadth of slates, also usually inclined southwards at high angles and including some beds of limestone, above which we finally have a great body of sandstone rock, peculiar, in addition to its hard and massive character, in being often of greenish or purplish color, with veins and blotches of epidote and bands of purple jasper. These rocks which form upon the lake the promontory of Point aux Trembles, and thence extend up the Tuladi river to Squatook Peak, which is composed of them, have been in earlier publications supposed to be younger than those of Mount Wissick and to be possibly Devonian. But collections of fossils recently made from both the slates and sandstones, and examined by Mr. Ami of the Geological Survey, would seem to show that they are really the older of the two, representing probably the lower part of the Niagara formation, and perhaps the Medina or Clinton group. From this it would also follow that we have here a great physical break in the Silurian system, its upper members being not only unconformable to the lower, but spreading beyond the limits of the latter, and thus made to rest directly upon the rocks of the inferior Quebec group.

The third and last group of rocks found at Temiscouata Lake consists of fine grained slates, with some sandstones of grey and dark grey colors, all of which are more or less calcareous, and are further noticeable for their repeated and complicated corrugations and the general presence of a very strong slaty cleavage. The direct contact of the slates with the sandstones of Point aux Trembles has not been observed, but from their general position in relation to the latter and from such fossils as have elsewhere been

obtained in them, it is conjectured that they are more recent than the latter. In this case they can not be far removed in age from the rocks of Mount Wissick, and are perhaps to be regarded as the equivalents of the latter, deposited under somewhat different conditions.

Applying now the key thus afforded, we find that the succession of rocks constituting the first of the above divisions, that of Mount Wissick, is but repeated, with eventually the same character and fossils, and with the same low dip all around the northern margin of the Silurian tract, from Rimouski to Lake Metapedia, and eastward into the interior of the Gaspé peninsula. So, similarly, to the southward of these strata, we find the country drained by the Restigouche and its tributaries, the Quatawamkedgewick, the Patapedia and the Metapedia, everywhere occupied by slates similar to those of the lower part of Lake Temiscouata and the Madawaska. At no point, however, distant from the lake, has anything been observed corresponding to any portion of the intermediate division, which must accordingly either be wholly wanting or concealed from view by the superposition of the higher and unconformable members of the system. In New Brunswick the slates are also predominant, being the prevailing rock through all the northern counties, though sometimes becoming so calcareous as to constitute true limestones, but with these, at a few points, are also found beds which appear to represent the inferior group. Thus on the Siegas River, in Victoria county, where the beds are nearly vertical, the slates are accompanied, first, by a coarse and very peculiar conglomerate (holding elongated, curved and disrupted pebbles of limestone, mingled with others of serpentine), and, secondly, by beds of sandstone not unlike those of Point aux Trembles, and carrying fossils indicative of a similar horizon. Again, on the Beccaguimec River in Carleton county, on the extreme southern edge of the Silurian tract, the succession of beds bears much resemblance to that observed near its northern edge, and again holds similar organic remains, while, finally, it is possible

that still another such area exists near the mouth of the Shiktehawk. In the State of Maine, the three groups of strata described are still more clearly represented, for while there, as in the province, the slates are the most commonly occurring rocks, comprising all the country drained by the upper St. John, as well as large areas about Presquile and Houlton, we have, in the Fish River Lakes, and again at Ashland, beds of limestone, abounding in fossils which are nearly parallel with those of Mount Wissick, while finally, in the valley of the Aroostook and covering large areas, are conglomerates and sandstones, which are the evident continuation of those of the Siegas River, presenting precisely similar characters and associations, and carrying the same fossils. In northern Maine, however, there are with these undoubted Silurian strata, great masses of volcanic rock, felsites, quartz-porphyries and amygdaloids, as well as fine silicious slates and purple micaceous and gneissic sandstones, the relations of which are not yet fully known. Beds of Devonian (Oriskany) age also occur, as they do both in New Brunswick and in the Gaspé peninsula, but are much less widely distributed than has been previously supposed. Finally, the slates are at a few points unconformably covered by bright red sandstones and conglomerates similar to those of the Tobique valley in New Brunswick, and the Bonaventure district of Quebec, which are referable to the Lower Carboniferous formation.

Thus the succession of events indicated by the rocks in the early history of the region under discussion would appear to be as follows. The great period of upheaval, mountain-making and metamorphism which brought Archaean time to a close, having served to determine and to some extent to limit the great St. Lawrence or Acadian basin, by lifting above the sea the ridges which still border it,—the Laurentides north of the St. Lawrence valley, ridges of similar rock along the New England coast, some of our own southern hills and similarly some of those of Nova Scotia, Cape Breton and Newfoundland—we find in the Cambrian and Cambro-Silurian periods which succeed,

that over the intervening seas were in process of accumulation a vast thickness of sedimentary beds, pebble, sand, mud and lime-beds, spread horizontally over the sea-floor, and receiving from time to time the more durable relics of the life,—Brachiopods, Crinoids, Graptolites, &c.,—with which those seas were filled. Another period of upheaval then ensued, and, through pressure brought to bear upon the same sea-floor, portions of its surface became crumpled up into folds and ridges, and its materials more or less altered in character. At the same time, along the south side of the St. Lawrence, where the foldings are most numerous and excessive, the ridges thus produced were thrust above the sea level, thus defining that great estuary upon the southern as well as on the northern side, and embracing the system of heights (the Notre Dame Mts., &c.) already described as extending through the Gaspé peninsula and forming the great divide between the St. Lawrence and the Bay Chaleur. Along the southern side of the Lower Silurian rocks thus folded, we have seen that the Upper Silurian rocks meet them unconformably, and from their northern edge, in some places not more than nine miles from the shores of the St. Lawrence, spread southward to the Bay Chaleurs and upper St. John, as well as farther, over all the northern portions of New Brunswick and Maine. From the absence, or slight representation, through most of the Gaspé peninsula, of the inferior portions of the system (Niagara group) we may infer that, for some time after the opening of the Silurian era, this district still remained too elevated to be reached by oceanic waters: but the occurrence of limestones of this age at Cape Gaspé, as well as on Anticosti, filled with marine organisms, shows that in these localities at least the great St. Lawrence Gulf was still in existence. At the same time, the occurrence of the heavy beds of conglomerate, fully 1000 feet in thickness, with the succeeding shales and sandstones, carrying Niagara fossils, on Lake Temiscouata, would seem to indicate that these waters of the Gulf spread westward, at least as far as that point, though of diminished

depth, and (to judge from the coarseness of many of the beds,) with currents of considerable power. Similar strata occurring on the Siegas River in New Brunswick, on the Beccaquimec River in the same province, and on the Aroostook River in Maine, indicate that these also were regions of similar shallow waters, with similar powerful and variable currents, and, as it would seem, subject at times to sub-marine volcanic ejections. Connected with these accumulations, and possibly in part determined by them, the floor of the gulf underwent frequent oscillations of level, and along certain tracts even more marked movements occurred, tilting (as at Burnt Point and Point aux Trembles) the heavy beds, and giving them their present steep inclination, while at others only gentle undulations were the result. Finally, over the irregular floor thus produced were deposited the later beds of the Silurian sea, mostly in the form of fine calcareous muds, now hardened into slates, but in places in the form of pure limestones (like those of Dalhousie, Mount Wissick, Square Lake, Ashland, &c.) now filled with the relics of their ancient populations. These too have since felt the force of the great earth movements which have in all ages operated so widely and so powerfully in the history of our globe, and their effects are readily witnessed in the tilted and crumpled character of many of the beds, more particularly about the Grand Falls of the St. John, but never since have they been submerged to anything like their former extent, the later beds of the Devonian and Lower Carboniferous being much more limited in this distribution, and as regards the latter at least, found in what must have been very shallow and isolated basins.

Of the still later chapters in the history of the region we have been discussing, two only can here be referred to, and these but briefly. Everywhere over the district are to be seen evidences of a former extensive glaciation in the smoothing, polishing and striation of rock surfaces, in the occurrence of travelled boulders, and in the existence of drift-dammed pond and lakes, kames, &c., some of which

are quite remarkable. The depth of some of the lakes like the Temiscouata, the Squatook and the Cabano, occupying as they do north and south depressions and with nearly flat bottoms, would seem to point to ice-movements as having been closely connected with their position and character. But what is of still greater interest is the evidence which the district everywhere affords, of a northern as well as a southern driftage at some time during the ice period, the great ridge becoming itself a centre or axis of ice distribution as it is now of the rivers which drain it. This fact is strikingly seen in the occurrence of great boulders of fossiliferous Silurian limestone strewed over the Quebec rocks at the upper end of Lake Temiscouata, and which have been derived from Mount Wissick to the south, again in the similar occurrence of such boulders at the northern end of Lake Metapedia, and finally their occurrence, in large numbers, along the St. Lawrence shore, as noticed about the Grand Métis river and Rimouski. Similar facts have elsewhere been observed by Mr. Chalmers, and are referred to in his reports on the Superficial Geology of the district.

Of the early human period, but few relics, so far as known to the writer, have yet been found in the region here considered. None were observed by us around the shores of Temiscouata Lake, but near the outlet of the First Tuladi Lake, are numerous fragments of chipped flint, together with a few sherds of pottery, indicating the former presence here of the early Pre-Historic races. So also we have failed to find any relics of this character on the St. John river above Edmunston, although below that point, and especially about Grand Falls and Aroostook Falls, they are not uncommon.