

Appendix  
(G. G. G.)

9th June.

SUCCESSION AND DISTRIBUTION OF  
THE ROCKS OF THE DISTRICT.I. CONGLOMERATE LIMESTONE, PILLAR SANDSTONES, AND  
GRAPTOLITIC SHALES.

The rocks displayed on the south side of the St. Lawrence, the whole way between Cape Chat and the northern base of the hills, standing on the bold finger-shaped promontory of Cape Gaspé, possess characteristics, rendering it expedient in my opinion, to class them for the present in one group. Black bituminous shales, with calcareous sandstones, are more or less associated with the whole; and graptolites, occurring chiefly in the black shales, are the only fossils yet observed, with the exception of a few broken shells met with in a more arenaceous member of the formation.

To separate the group into its component parts will be a task of very considerable difficulty. For the district through which these range is yet wholly covered with the moss and trees of the forest, which conceal the faces of their escarpments, and while it is thus next to impossible to bring them at once into place by a direct line of transverse section, it would demand a greater expenditure of time than circumstances justify, to follow them up to such a line on the strike, from the localities of their best display, by means of the parallel ridges and valleys resulting from the harder and softer qualities of their lithological composition.

The only direct line of section measured and examined across them all was in the valley of the Chat. But though on the banks of this stream there may be a sufficient amount of stratigraphical exposure to be of essential service in carrying on the range of the rocks, when their relations have been elsewhere ascertained, there is not enough to afford data for determining in the first instance the general character or thickness of the distinct masses, or their succession in the order of superposition. On the St. Lawrence, on the contrary, there is a great exhibition of the strata and they strike out upon it in succession; but they do so at so very small an angle to its trend, that from the lowest rocks in the neighbourhood of Cape Chat to the highest in that of Cape Rosier, there is interposed a distance of one hundred and forty miles, while the same series of deposits occupies but eighteen miles in a direct transverse line to the northern base of the Notre Dame Range of Mountains.

As the rocks come out upon the St. Lawrence they exhibit a very contorted condition. The flexures are numerous, and some of them so violent that serious inversions of the strata occasionally present themselves; and it is frequently very difficult to determine whether the mass under inspection be a new member of deposit, or the repetition of one previously noted. To arrive at accurate results it would be necessary to dial the whole coast, marking with great care the attitude of the strata in succession wherever they are visible, for there is yet no detailed map of it on so large a scale as to render measurements upon it available for geological purposes.

It is uncertain whether the whole of the rocks it would be convenient to class with this group are included in the District which has been examined; and there being indications that the south side of the St. Lawrence continues to present up to Quebec the same slightly oblique course to the run of the ridges, it is not improbable other divisions may crop out above Cape Chat, which have a lower geological position than the strata in its vicinity.

1. The lowest in the neighbourhood of the Chat are seen at a projecting point of land between it and the Ste. Anne river, where a considerable extent of strata are laid bare at the ebb of tide. The strata are highly tilted, and several dislocations occur; but it can be made out, that based upon a strong bed of gray oolitic limestone, ten to fifteen feet thick, with a thinner one a short distance above it, consisting of flat calcareous pebbles lying on one another as if carefully packed on their sides, there reposes

limestone, separated by thin bands of black bituminous shale, with occasional thicker beds of the shale holding large calcareo-arenaceous nodules or isolated masses, becoming very conspicuous in a considerable bed of bituminous-argillaceous shale at the top, where the nodules or patches sometimes resemble septaria, and are occasionally composed of a dull olive gray chert, weathering to a dingy red, in which the cracks or veins hold a mineral undistinguishable in its general appearance and combustible nature from good sea-coal. These beds may be altogether about 240 feet thick, and they are succeeded by a deposit of argillaceous shales or slates, green for about fifty feet at the bottom, red striped, and partially spotted with green for 230 feet in the middle, and green striped with red for 120 feet at the top; and wherever there is a green stripe or spot it is usually accompanied by a black line or speck along the middle or in the centre of it. Upon these shales rests an unequal gray oolitic conglomerate limestone bed, sometimes twenty feet thick, with large flat pebbles and small boulders of gray limestone and gray calcareous sandstone, and occasional crystallized nodules of pyrites, followed by alternating beds of black shale, and light and dark gray sandstones in some of which specks of blende appear; to which succeed green shales striped with black; then very pyritiferous black shales; and alternating with them at the top, thin calcareous sandstones and arenaceous limestones; terminated by another band of gray oolitic limestone conglomerate, and one of gray coarse-grained calcareous sandstone. Including the two limestone beds which would both yield material for burning, the thickness of this part of the deposit may be about five hundred feet.

The whole of the deposits given amount to about 1140 feet in thickness, and the distinguishing features they present are the bands of conglomerate limestone, and the bituminous mineral so much resembling coal. This is found not only in the septa of the cherty nodules which have been mentioned, but also in many small cracks across the strata, and in more parts than one of the vertical thickness. A similar mineral, in an analogous position, is found in the rocks at Point Levi and Quebec, and in the museum of the Quebec Natural History Society a block of it, procured in the neighbourhood, containing about a cubic foot, is preserved. Some have been inclined to suppose that it might indicate the proximity of workable coal, and indeed I have been asked whether a mine upon it, in a position which I have not yet seen, but where according to information received, a cart load of it has been obtained, would be likely to be successful. Now none of the material where it has come before me in situ, bears any analogy in the mode of its occurrence to workable coal. This is always found in extensively continuous beds conformable with the stratification; where as the mineral in question occurs in cracks cutting the strata across for greater or less distances. It is true that where faults or dislocations exist among coal seams, there is often met with running across the stratification what by Scotch miners is termed a *wise*, and by Welsh, a *leader* of coal, which in general is a thin, confused, irregular interrupted black more or less carbonaceous sheet, conducting up or down, as the case may be, in the plane of dislocation, from the termination of a coal-bed on one side to that on the other; and there is no doubt it is the result of the grinding of the terminal edges of the strata against one another, when the slip producing the dislocation occurred. Without a slip or displacement, therefore, no leader would be found, and none in any case would hold true coaly matter extending beyond the distance between the separated edges of the coal-bed. Now in the case of the bituminous mineral, the cracks in which it occurs are, in many instances, unaccompanied by any displacement of the strata, and in others, where the extent of the dislocation (that is the upthrow or downthrow, as it is called) is visible, no layer holding any of it occurs among the beds. Independent of all this, the formation in which the mineral is found, is an inferior member of a group of rocks, whose place is in all probability a very considerable distance below the position of the true workable coal-bearing measures, and we are, therefore, not warranted in expecting coal seams to exist in it. The rock is supposed to be the equivalent of a part of the Hudson River Group of the New-York geologists.

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