

Appendix  
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guishable from fine-grained greenstone trap. In the slate the stratification is often marked by slight differences of color, in the direction of which it is occasionally cleavable: the bands in other instances are firmly soldered together, but in both cases joints usually prevail, dividing the rock into rhombohedral forms, which are sometimes very perfect.

The limestones belonging to the formation are probably confined to one band, the thickness of which in different parts may range from fifty to 150 feet. The texture of the rock is usually compact, but sometimes partially granular, and its colours are green, buff and dark gray, the two former prevailing; some of the beds are occasionally met with of a dull white with a waxy lustre, which weather to a yellowish brown on the exterior and appear to be dolomitic. The whole band is in general thin bedded, and a diversity of quality in the layers, probably arising from the presence of more or less silicious matter, causes the surface of weathered blocks to present a set of bold but minute ribs of various thicknesses, which, when the beds are much affected, as they often are, by diminutive undulations, contortions and dislocations, exhibit on a small scale, a beautiful representation of almost all the accidents that occur in stratification, affording very excellent ready-made geological models. Interstratified beds of chert are very frequently met with in the band, and they vary in thickness from mere lines, to the measure of several inches. The same diversity of colour belongs to the chert as to the lime-stone.

The igneous rocks, which, from what appears to me their peculiar relation to the stratification as overflows, it will be convenient to consider constituent parts of the formation, may be classed as a whole, under the denomination of greenstone trap. The masses they present are sometimes very great, and in such cases, the trap usually consists of a greenish-white feldspar, and dark-green or black hornblende. The feldspar, however, is sometimes tinged more or less with red, and the trap then occasionally appears to pass into a syenite by the addition of a very sparing amount of quartz. These two forms of the trap are almost always highly crystalline, and in general not very fine grained: the greenstone, however, sometimes displays a fine texture, and in such cases, a large amount of it frequently holds much disseminated chlorite, giving a very decided green colour, and patches are found containing so great a proportion of the mineral as to yield with facility to the knife, affording to the aborigines of the country an excellent material for the manufacture of their *calumets* or tobacco pipes. In addition to the chlorite, epidote is a prevailing mineral in this quality of the trap. Associated with the chloritic greenstone, amygdaloid was in one place seen, some of the cellules of which contained quartz, others calc-spar, a third set held bitter spar, and some few specular iron. The amygdaloidal trap was very distinctly arranged in layers, which, though they did not exceed two or three in number, gave with beds of porphyritic greenstone, containing large crystals of feldspar, occurring near the amygdaloid, a stratified aspect to the whole of the mass of trap associated with them. No such decided appearance of stratification was met with in the more crystalline greenstones. They usually displayed, however, parallel planes of division in several directions, and it frequently happened, that some of these parallel planes were only moderately inclined; but there were observed no distinguishing marks on the surfaces, or in the quality of the rock, to lead to the certain inference that one part was placed prior to another; and no columnar structure at right angles to any set of planes, such as so clearly indicates the overflows of trap on the north shore of Lake Superior,

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though carefully looked for, was anywhere found. In respect to the last species of evidence, however, it must be remarked, that the trappean hills of the Huron region under description, are so generally rounded into *mouttonné* forms, by supposed glacial action,—the parallel grooves resulting from which are seen on almost all exposed surfaces, with bearings seldom exceeding or even reaching forty-five degrees on one side or the other of north and south—that few bold naked vertical precipices are met with in which the display of such a columnar structure, if it exists, might be expected. It is, therefore, in most instances, only by a reference to its immediate relation to the sedimentary rocks on each side, that the general attitude of any band of the greenstone can be made out. In very few places, indeed not over two or three, were there met with exposures, such as to show the trap in actual visible stratigraphical contact with the sedimentary rocks; but in many transverse sections on the different lakes and rivers visited, in rising inclined flanks of hills in the strike of the stratification, while sedimentary rocks, with a very moderate dip, constituted the base, greenstone was found to compose the summit; and exposed parts of the two rocks in this relation were frequently brought so near together, though not seen in contact, while there was no evidence of dislocation between them, that little doubt was left of the one resting on the other.

Of the members thus constituting the formation, the sandstones, or quartz rock, with their subordinate conglomerates, both in individual ranges, and in the aggregate, appear to possess the largest volume; the greenstones seem to be next in importance, some of the bands attaining 600 to 1,000 feet; the syenitic conglomerates and their associated slates follow, and the limestone band, of which the thickness has been stated, though very persistent, is of trifling comparative amount.

The stratigraphical position of the several descriptions of rock, in their relation to one another, as parts of a whole, has not yet been well determined, and although it may turn out that a preponderating amount of each may occupy some specific place in the series, it seems probable that none of them, with the exception of the limestone, will be found wholly absent from any considerable grade of the vertical thickness, in some part of that grade's geographical distribution. With the exception of the limestone, the different descriptions of rock, whether of small or great measure, appear to dovetail among one another, individually thinning down to an edge both ways on the strike. This thinning down was more particularly observable in the syenitic conglomerates, and in the greenstones; their extension appearing to bear some proportion to their thickness. Between great neighbouring masses of the quartz rock, and the syenitic conglomerates, there usually appeared a passage from the one to the other, by the interstratification of smaller bands; but this did not seem to be the case between great neighbouring masses of igneous and sedimentary strata: small bands of trap, however, when obscurely exposed, may perhaps occasionally have been mistaken for dykes, which exist in very great abundance. The limestone band is neither at the base nor summit of the formation, but how far it may be from the one or the other, it is not yet possible to say: from a section at LaCloche, it appears probable, it may be farther from the bottom than the top. Whenever seen, it was found in contact either with syenitic conglomerate or quartz rock, both above and below, with the former oftener than the latter; and there appeared to be a greater transverse continuance of these rocks, particularly the latter, under than over. The limestone has not yet been seen in contact with any of the greenstone overflows; but on Echo Lake,