

the following section was measured in ascending order:—

	FEET.
1. A slope or talus over the stream.....	25
2. Grey calcareous shales with <i>spirifer mucronatus</i> and numerous fossils.....	4
3. Bed of compact encrinal limestone.....	2
4. Soft shales, thinly laminated next the limestone, filled with fossils, among which <i>Cystiphyllum cylindricum</i> (Halls Rep. 4th Dist. N. Y.) is very abundant; the upper part decomposes into a clay, and fossils are found in the decomposed edges .....	20
5. Decomposed shale or clay, not well exposed.....	80
6. Grey encrinal limestone, weathering into small lenticular fragments, and holding bivalve shells, corals and encrinites.....	2

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“ At Jones’ mill, on the third lot, south boundary of Bosanquet, on the bank of a small tributary of the Sable, another section is exposed, which in ascending order, is as follows:—

	FEET.
1. Brownish grey-weathering shales, holding <i>spirifer mucronatus</i> in great abundance, and a few other bivalves and corals.....	25
2. Encrinal limestone.....	2
3. Decomposing shale, with <i>Cystiphyllum</i> .....	3

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“ At Austin’s mill, on the fourth lot of the first range of Bosanquet, on another small creek, there is a corresponding section, where the encrinal limestone which forms the uppermost layers of the exposed strata, is about five feet thick. Below the encrinal limestone, the shales are characterized as at the other places by a profusion of *spirifer mucronatus*; and in the bed of the creek at a level probably about fifty or sixty feet lower than the upper limestone bed, there is a band of hard and compact arenaceous limestone, about seven inches thick, overlaid by black shales holding *Atrypa*, *Leptæna*, and *Chonetes*.

“ The overlying bituminous shales of the Portage and Chemung group were found at two localities not observed previously; one in the bed of a stream supposed to be the north branch of Bear Creek, near Kingston’s Mills, on the seventh lot of the third range of Warwick; and the other at Branon’s mills, on the twentieth lot of the seventh range of Brooke, in the bed of the east branch of Bear Creek. In each of these instances the shales are characterized by spherical concretionary calcareous nodules and masses, as at Kettle Point: but with the exception of some rather obscure scales of fish, which were found at the exposure in Warwick, no fossils were discovered at either place. The debris of the Hamilton shales with *spirifer mucronatus*, *Atrypa* and corals, were found abundantly among the drift; and large masses of the encrinal limestone lay at the bottom of the creeks, and in the surrounding country.

“ In my Report of 1848–49, the clays of the township of Plympton, on the shore of Lake Huron, are described under the head of Drift, and the fossils in the limestone pebbles are represented as those peculiar to the Corniferous formation; a comparison of the Plympton fossils with the collection of the present year however tends to show that the clays and organic remains in the limestone are derived from the ruins of the decomposing shale of the Hamilton group, while the pebbles of quartz, granite, and altered

rocks, are portions of the lake drift. It appears highly probable that a large portion of the clay country in the neighbourhood of Chatham, and at the mouth of the Thames, takes its argillaceous character from the same source, and that the limestone formerly mentioned, but not yet examined, which occurs in Harwich, belongs to one of the beds of encrinal limestone of the Hamilton formation.

“ The result of the evidence thus obtained leads to the conclusion that the trough or belt of the Hamilton formation, running across the peninsula, is considerably broader than previously represented, and that it contains near its centre, one and probably two outlying patches of the superior formation; because if it be admitted (which is most probably the case) that the asphaltic deposits and the petroleum springs of Bear Creek in Enniskillen on the one hand, and the petroleum springs of the Thames in Mosa on the other, take their origin from the bituminous shales of the Portage and Chemung group, the lower formation protrudes through, and probably divides the shales at Smith’s mills, on the Sydenham River, in the township of Euphemia, as described in my Report of 1850–51, where the prevailing fossil is *spirifer mucronatus*, which at the time I wrote that Report, I supposed to be identical with a very similar species, peculiar to the Corniferous limestone.

“ The absence of exposures of the older strata, in consequence of the great thickness of the drift deposits through the western region, renders it very difficult to give a perfectly accurate outline of the various boundaries of the formations; judging however from the facts above stated, together, with others previously mentioned in other Reports, it is probable that the eastern outcrop of the Hamilton formation commences on Lake Huron, near the town line, between Stephen and Hay, and then runs southerly, parallel to the Sable River, through McGillivray, Williams, Adelaide and Caradoc; thence bending easterly, it crosses the Thames near Munsey Town, and afterwards holds an easterly course towards Long Point, parallel with Lake Erie. The western outcrop may be supposed also, from data given in former Reports respecting the distribution of the Corniferous limestone, to run across from Lake St. Clair, somewhere near the mouth of the Thames, through East Tilbury and Raleigh, towards the Rondeau on Lake Erie.

An inspection of the geological map of Western Canada, by Sir W. E. Logan, accompanying a paper on the *Physical Structure of the Western District of Upper Canada*, published in the *Canadian Journal*, August, 1854, 1st Series, will show that the trough or depression mentioned by Mr. Murray, occupies that part of the peninsula which is intersected by the Thames, Black Creek and Bear Creek, the transverse axis of which probably passes through the townships of Chatham, Camden, Dawn and Zone, with a north westerly and south easterly extension towards Lakes Huron and Erie. It is in the rocks occupying that depression, consisting of the black bituminous Hamilton shales, overlaid in patches by the Portage and Chemung group, that the oil appears to have accumulated in fissures or crevices.

The whole of the western peninsula portion of the province has been subjected to a very considerable