

derives its appellation,) to yield building materials, the rock then becomes applicable as road metal, for which it is well adapted; the horn-stone prevails chiefly in the lower part of the formation.

Hamilton Group.

In a low cliff on the west side of Cape Ipperwash or Kettle Point, there is displayed a vertical amount of about twelve to fourteen feet of black bituminous shale, which splits into very thin laminae, and weathers to a dull lead colour, marked in many places by extensive brown stains from oxyd of iron, while patches of the exterior in such parts as are not washed by the water of the lake, are encrusted with a yellowish sulphurous looking powder.* Many nodules and crystals of iron pyrites are enclosed in the shales, and many peculiar spherical concretions. On the east side of the Point the upper beds of the section are concealed by debris, but the lower come out from beneath the bank, exposing their surfaces a little above the level of the water, studded by the spherical concretions, over an area of several square acres. The resemblance these concretions bear in many instances to inverted kettles has probably been the origin of the name commonly applied to the Point; they are of all sizes from three inches to three feet in diameter, and while many of them are nearly perfect spheres, others are flattened a little, generally on the under side; sometimes they present one sub-spherical mass on the top of another, the upper of which is smaller than the under, giving a rude resemblance to a huge acorn; the masses split open with facility, both vertically and horizontally, and when double forms occur they are readily divided horizontally. These concretions are all composed of a dark gray crystalline limestone, presenting in many cases a confused aggregation of crystals in the centre, from the nucleus formed by which slender elongated prisms radiate very regularly throughout the mass to the circumference. In the nucleus are sometimes met with small disseminated specks of blende, but these were not observed to extend to the radiating prisms, which both in their terminations on the exterior of the sphere, and in their filiform aspect in the radii on fractured surfaces, give the mass very much the semblance of a fossil coral, for which it might readily be mistaken.

The shale is fossiliferous, and among the remains a fucoid resembling the *Fucoides cauda galli* of Vanuxem is very abundant, chiefly in the lower beds. Stems of plants supposed to be species of *Calamites*, in some instances seven to eight feet long with a breadth of three inches, are frequently seen about the middle of the section, and in these are sometimes remarked patches of a thin coating of coal, which no doubt when freshly exposed, invested the whole plant. In one place a *Lingula* (but neither of the two species represented by Mr. Hall as belonging to the Genesee slate,) was found associated with plants, in addition to what appears to be a number of minute orbicular microscopic shells.

The whole of the beach where these bituminous shales occur, appears to have been overrun by fire, which is mentioned by the Indians and others acquainted with that section of country, to have originated spontaneously, and to have continued burning for several consecutive years. That rocks containing so much bituminous matter, once ignited, should not

cease to burn for months or even years, is very probable; but it is difficult to ascertain satisfactorily whether the fire was the result of natural causes or of accident. Spontaneous combustion is known to be of frequent occurrence near collieries, where bituminous shale is thrown up in heaps as refuse resulting from the working of the coal, when the shale is of a crumbling nature, and is accompanied by iron pyrites, a mineral present in most coal seams. It is not in my power to explain the phenomenon clearly, but it is supposed to be connected with the decomposition of the pyrites; but in the case of Kettle Point the same materials, bituminous shale and pyrites are present together, and it is not unreasonable to suppose that their action on one another may have originated the ignition. We observed that on digging a foot deep or more into the shingle, a faint and almost colourless vapour immediately arose from the opening, which, gradually increasing in volume and density, in the space of two or three minutes, became a distinct smoke, emitting an odour very similar to that produced by the combustion of a sulphurous coal, and evolving at the same time a considerable heat. The shingle of the beach, which is almost exclusively derived from the formation, is of a bright red colour wherever the fire has extended, the bituminous matter having entirely disappeared.

The black colour and inflammable nature of the bituminous shales of Kettle Point have suggested to some persons, as in the case of the bituminous shales of the Utica slate in other parts of the Province, the possibility of their proximity to available coal seams. But the formation to which they belong is well known in the State of New York, where useless and expensive experiments were made in it, before the institution of the State Geological Survey, in a vain search for mineral fuel: the formation has the name of the Hamilton Group, at the base and at the summit of which there are black bituminous shales, in the former case called the Marcellus, and in the latter the Genesee slate, either of them corresponding with the general condition of the Kettle Point shales; but between the Hamilton Group and the coal areas south-east of Lake Erie, on the one hand, and north-west of Lake St. Clair on the other, there occurs an important group of sandstones (called the Chemung and Portage Group); no trace of these sandstones any more than of the Carboniferous Group, has yet been met with in Western Canada.

Drift.

A great accumulation of drift was observed on the margin of the lake and on the banks of the rivers south of the Rivière au Sable (north,) consisting of clay, gravel, sand, and boulders. Allusion has already been made to their distribution on the coast, and from this they extend into the interior, and cover the greater part of the country between Lakes Erie and Huron. The clay in the cliffs overlooking the latter, was found to be very calcareous, containing sometimes so much as 30 per cent. of carbonate of lime, and constituting a rich marl, which would be of advantageous application, in an agricultural point of view, to the sandy portions of the district. The clay often contains numerous pebbles and boulders of limestone, quartz, granite and allied species derived from the ruins of rocks similar to those found in place in one part or other of the shore around the lake. Those of limestone were often discovered to hold fossils peculiar to the Corniferous formation, especially in the Township of Plympton, where they were numerous but usually water worn. The sands met with on the coast consisted of fine grains of white quartz; equally fine grains of mica, felspar and limestone were distributed in smaller proportions,

* The substance is soft, dull, earthy, of a sulphur yellow, and in addition to possessing the exterior aspect, gives the blow pipe reactions of *Humboldtine* or ovalite of iron. It instantly blackens in the flame, without any sulphurous odour, and becomes magnetic, leaving, by the continuance of the heat, a bright red stain.