

Finally, at a period subsequent to the deposition of the shell limestones, another great convulsion appears to have occurred, probably of diluvial origin, one effect of which appears to have been a rushing current of water from the north east. Such a current has, almost certainly, passed over the face of the country; strewing the south-west sides of the lakes, and the whole country to the south west, with diluvium, and boulders of the rocks now in *situ* on their northern borders.

The same great agent appears to have brought the boulders of old shell limestone from the vicinity of Hudson's bay, to have carried the agates of the lake Superior amygdaloid far to the south west, and the native copper from the vicinity of that lake down the valley of the Mississippi.

We have now completed our endeavours to give an outline of the geology of lake Superior. The task which we have assigned to ourselves has been executed, we are fully conscious, with a degree of ability very far short of our inclination to forward or our admiration of the science to which the subject we have treated belongs. Yet, there is this consolation and hope left to us.—It is, that his efforts can scarcely be entirely useless, who adds but one grain to the heap of information, where the object to be attained is so noble, and so perfectly worthy of the best efforts of the human mind.

---

ART. II.—*Memoranda respecting colouring materials produced in Canada. By William Green, Esq.*

---

This country produces various substances fit for the use of artists as pigments.

In the parish of l'Ancienne Lorette and in that of St. Augustin near Quebec, there exists in alluvial soil at the depth of three feet a horizontal stratum of fine yellow clay.

This earth has a very deep and rich hue, and with white in various proportions it gives all the tints which the best yellow ochres afford. Burnt, it gives a light red resembling that formed by burning yellow ochre, but inclining more to orange.

It is an opaque colour, and mixes well with oil or with water; and in oil it dries well.

The Magdalen Islands, in the gulf of St. Lawrence produce a red earth which is brought to Quebec in lumps. In these are interspersed minute portions of some white substance, which seems of the same consistence as the red earth.

The texture of this earth is extremely fine, and the quantity of foreign gritty matter deposited on washing it in water inconsiderable. It nearly resembles Indian red. I do not perceive any inferiority, or any other difference than this—that the Canadian earth, in its natural state, is rather the paler of the two, with more of the hue of red lake—yet it is a very deep red, quite as deep as can be required for any purpose in painting. Burnt, it becomes more bright. With white the tints are all beautiful. Those formed from the raw material partake of the hue of red lake, and those made with burnt earth seem tinged with vermilion. This substance, both in its natural and in its prepared state, might be worthy the attention of artists, being quite as beautiful, and probably as useful, as Indian red. In price there is great disparity, the red earth being sold at Quebec for three pence a pound, which is only half the price of common red ochre, (burnt sulphate of iron), and the price of Indian red being in London above two shillings an ounce. Yet all the red ochres, whether native or artificial, which are used in the arts, are, with the single exception of Indian red, inferior to this earth.

The red earth is somewhat transparent, but by no means sufficiently so to be removed from the class of opaque colours. It mixes with oil, and with water, and in oil it dries readily.

At St. Paul's Bay, on the north shore of the St. Lawrence, 60 miles N. N. E. of Quebec, an earth is washed down from the

the mountains which is of less weight than most other earths. In its dry state, it is of a rich cinnamon colour. In oil it is transparent, and of a tint intermediate between those of raw and of burnt umber. Made red hot and extinguished in water, a sulphureous odour is given out, and the burnt matter well washed and dried, inclines rather more towards red than before, but loses its transparency. In this state, it would probably have no peculiar utility. The transparent tint it affords with oil in its raw state might be very useful, unless the sulphur it appears to contain should impair its properties. This, however, may not be the case; as vermilion, which is a sulphuret (of mercury) is durable, whether combined with other colours in oil or not. As a colour for glazing, this circumstance might form a slighter objection than it might do, were the substance used in combination with white or other colours—indeed it appears best adapted for glazing, as there is no peculiar beauty in the tints it forms with opaque colours.

Many of the spontaneous vegetable productions of this country are capable of affording brilliant and durable colours to the painter and the dyer. The Indians extract from the root of a wild plant which bears some resemblance to madder, a very bright and permanent red dye, with which they tinge their porcupine quills, elk hair and other substances. A red lake has been extracted from it by boiling it in a saturated solution of alum in water, (after having separated a quantity of brown colouring matter by washing the root in cold water, in which the brown, but not the red, matter is soluble; and precipitating the red substance from the aluminous solution by means of an alkali. The volatile alkali is the best. The hue of this lake, when used in oil, is equal in beauty, but not in intensity, to that of the finest carmine, and resists the action of light much longer. Patches of various specimens of carmine and red lake from cochineal were painted in oil on a window pane, which all faded, more or less, and some nearly disappeared on being exposed to strong light for two weeks;—whereas patches of red lake from the Indian plant

plant still remain unchanged, after exposure in a similar situation during two years. This plant is called by the Hurons *Tsavooyan*. It is found of superior quality in the interior. The Hurons derive their supply from Caughnawaugha, although their woods at Lorette produce it. Its root, when dry, is scarcely thicker than a coarse thread, and runs horizontally through the loose soil formed in the woods by the decay of fallen leaves. Its stalk is four sided, furnished with short retroverted hairs, and is surrounded at intervals by small oval leaflets forming a star. The stalk, from its length and weakness, becomes procumbent. It is a *galium*. On extraction from the soil, the root is frequently quite colourless and transparent, resembling undyed silk; but in a few minutes after extraction it acquires its dark hue, and the property of yielding its brown and its red colours. Another plant grows in similar situations, which has the same name of *Tsavooyan*, but which does not resemble madder: The roots, and the roots only, of both *Tsavooyans*, have some external resemblance, but differ in many respects. The latter is bright yellow, the former deep brown. The latter is not used in dyeing, but is valued as affording an agreeable bitter, and as having the property; when chewed, of curing some kinds of sore mouth.

The Indians dye a very bright and durable yellow, with the seeds of a shrub common on the banks of rivers and lakes. The leaves are fragrant, the seeds very aromatic, and the plant has the aspect of a dwarf willow. It is probably *myrica gale*. The Hurons call it *Otsigooura Osooqua*, which signifies yellow dye stuff.

A very rich and durable brown for dyeing, and a lake of the same colour for painting, are afforded by the outer husk of the butternut. (*Juglans cathartica*.) The colour is copiously extracted by infusion in warm water, and may be precipitated either by alum or muriate of tin—and if by the latter, it will dry the quicker in oil. It is of a tint intermediate between those of asphaltum and prussiate of copper.

The