

to the submedial era. Resting upon these dark shales, are red shales, and red sandstones.—These are well disclosed about Oakville, and Wellington Square—or we may say, from the mouth of the Credit River southward to Burlington Bay. Then, resting upon these red shales, is that thick, dense, unstratified mass, which has been termed red marl, and which is well disclosed on the shores of the River from the town of Niagara to Queenston, and at many other places upon the south side of the Lake; there are but few organic remains in the red shales, and perhaps none in the red marl. It is out of these black and red shales that the whole of the basin of Lake Ontario is excavated; for although at the eastern end the bottom is transition limestone, the excavating waters have not cut deep into it, but have rather cleared away the softer formations and left the surface of the rock bare.

Before proceeding further, it will be proper to draw your attention for a few minutes to the immense denudations which are found in so many parts of North America.

From the Rocky Mountains to near the east end of Lake Ontario, the stratification is remarkably regular, and nearly horizontal, the dip being only from 20 to 30 feet a mile to the southward. There are a few places where the strata has been slightly upheaved, and probably a few places where it has been depressed, but in general there can be no doubt that it rests, even now, just in the same position as when it was at first deposited. But it is far different indeed with the eastern parts of the continent. Nearly the whole of that range of mountains between the coast of New England and Lake Ontario, is of volcanic origin, and has again and again been rent and torn by awfully conflicting forces. Even the valley of the St. Lawrence is a valley of depression; and the rock at the Falls of Niagara has evidently been acted upon by subterranean heat, whilst under great pressure. Thus, whilst the eastern parts of the continent have undergone so many changes by volcanic agency, the western parts have nearly escaped from the ravages of that power; but these western parts have been nearly as much changed by the action of water as the eastern parts have been by the action of heat. The basins of Lakes Superior, Huron, Michigan, St. Clair, Erie, and Ontario, are all valleys of denudation; so also are the Seneca, Cayuga, and

all the others of the small Lakes between the summit elevation of the land and Lake Ontario. Many traces of this denuding power are also found in the Mississippi and the Missouri valleys, and in that vast extent of country which is situated to the northward of the great Lakes. But as these last have not come under the observation, perhaps, of any one present, it will not be necessary to enter into farther details concerning them upon this occasion.

It is difficult to fix upon the precise geological era when these denuding waters passed over this continent, from the circumstance, that we have no formation in the great central valley of North America, newer than the coal formation, except the tertiary; but even this circumstance furnishes us with important data concerning the denuding deluge, for it proves that these vast plains had emerged from the ocean about the era of the coal formation, and had never again been under the waters of the ocean, except when this denuding deluge passed and repassed over them. The whole of these denudations have been effected at an era subsequent to the era of the coal formation, and there is no proof to the contrary, but every probability is in favour of the position, that they were all effected by one and the same deluge. The course of this deluge has been from north and north west, to south and south east, as is evidenced by the diluvial remains which mark the course of its ravages; for whilst the crest of its advancing waves, and the reaction of its receding waves, had been producing those vast excavations above alluded to, the materials excavated; had been deposited by its eddying waters, and now form the diluvial masses, or the heights which skirt these excavations.—This is beautifully illustrated by the heights in the townships of Beverly, Dumfries, &c. at the head of Lake Ontario, which are elevated from 1100 to 1200 feet above the level of the sea.—The upper portions of these heights are almost entirely formed of Detritus from the underlying group of magnesian rocks, which have undergone such extensive denudation in the adjoining townships of Trafalgar, Nelson, Flamborough, &c. The same phenomena are observable upon the heights which separate the waters that fall into the Lakes, from the head waters of the Susquehanna and the Alleghany rivers, almost all of which are crested with detritus from the excavations to the northward.