With this comparison I must conclude this paper, already extended beyond my first intention; but, with permission of the Institute, I hope on some future evening to complete these climatic remarks, by noticing the occasional phenomena and periodic events, which, with their causes and effects, contribute largely to our meteorological knowledge, and the probable and possible productions of our country.

Art. VII.—Geology of the Site of the Belleveau Mining Operations.—By Rev. John Burwash, M. A., Communicated by John T. Mellish, M. A.

(*Read May*, 1877.)

I.—Character of the Rocks.

The following paper is compiled from notes of observations made during a visit to the property of the Belleveau Albertite and Oil Company, in July, 1876. I may be allowed to state that my stay was short, and that my opportunity for personal observation was limited; but through the kind attention of Mr. Patrick, the Manager of the Mine, who conducted me to the principal exposures, and gave me the benefit of his knowledge of the locality which he has thoroughly studied, I was able to make a much better use of my time, and to obtain a much better knowledge of these rocks than would otherwise have been possible. I found Mr. Patrick practically well acquainted with the stratigraphy of the Carboniferous series in Nova Scotia, and his opinion of the position and relations of these beds, is well worthy of attention.

The place where the Company have sunk their shaft is situated in the Parish of Dorchester, between Memramcook and Peticodiac Rivers, about a mile from the latter, and about five and one-half miles in a direct line from the Albert Mine. It is, Mr. Patrick informed me, on the same line of upheaval as the latter; that is, taking the general direction of the strike at the Albert Mine, you would come to the Belleveau property.

There are two principal kinds of rock—shales and conglomerates. The shales are very characteristic of all places where veins

of Albertite occur, and are described in Dr. Dawson's account of the geology of Albert Mine, under the name of Albert Shales. They can be traced all the way from Albert Mine to Belleveau. They, nearly all, contain Carbonate of Lime; some beds having crystals of calcite disseminated through them. They are bituminous, and it is a matter worthy of investigation, whether some of the beds could not be advantageously used for the production of oil or gas. As these shales are supposed to be the origin of the mineral, Albertite, the amount of their development and their bituminous character are matters of great importance to the miner in prospecting for this mineral.

The conglomerates are in massive beds, forming on account of their weathering more slowly than the softer shales, the summits of the ridges between which the shales form the depressions. They are grey, greenish grey and reddish grey rocks; some quite coarse, others passing into a gritty grey sandstone. One of the lowest beds of this rock deserves special mention. It has been named by Mr. Patrick "oil rock." It is a grey, micaceous sandstone, thoroughly saturated with, and having the characteristic odor of petroleum. It occurs, as Mr. Patrick informed me at the Albert Mine, and crops out in several places between that and Belleveau. On digging through this rock considerable quantities of petroleum flowed into the pit; and Mr. Patrick thinks that this is the source of nearly all the oil which has been found in this region. It is his opinion that oil might be obtained in paying quantities by boring where a considerable thickness of this rock is found near the surface; a condition which exists in the northern part of the Company's claims.

2.—Order of Strata.

The relative position of these shales and conglomerates is a somewhat difficult matter to determine. The spot selected for mining at Belleveau has the appearance of a centre of disturbance. The character of the beds would suggest the idea that some explosive force, confined within the earth, had there found vent. This disturbance and contortion of the Strata is especially seen on the Southern half of the claim. Here, Mr. Patrick thinks there is a

great fault, the direction of which is 73° E. Along the line of this fault the shales are thrown up against the conglomerates, dipping from them at a high angle. This being the case, his opinion that the conglomerates overlie the shales, is probably correct, and goes with the description of their relations elsewhere, as given by Dr. Dawson. The strata of the conglomerates are nearly horizontal, while those of the shales dip southward at a high angle.

At a short distance north of the line of fault, there is a noteworthy outcrop, which seems to be the summit of an arch; the beds on the north being similar, in inverted order to those on the south. At this point, the shales are very much contorted, being corrugated as if by a combination of upward and lateral pressure. As an example, illustrating the forces at work in producing this formation, I obtained a piece of shale 15 inches in length, bent into the form of a double hook, or letter S., and having that peculiar "slickensided" appearance indicative of great pressure. This arch has its parallel in the arched strata near the Albert Mine, which are similarly contorted, and contain, like these, remains of fish of the general Palæoniscus. In fact, the general resemblance between the arrangement and conformation of the strata at Belleveau and Albert Mine is somewhat remarkable, especially when we take into account their disturbed condition. This resemblance is such as to justify the remark of Mr. Patrick that a section might be made of one, which would, with very little alteration, represent the other. North of this arch, in the bank of a small brook, there is exposed a considerable thickness of shale. Reckoning from this point to the arch, it would appear that these shales which are generally regarded as the source of the Albertite, are as fully developed here as at Albert Mine.

With respect to the question of the probable occurrence of any considerable quantity of Albertite in this locality, as the matter will shortly be practically tested, speculation is out of place.

Should the mining operations now in progress be successful, an impetus will be given to those researches which alone can develope the mineral wealth of our country; and in the case of Albertite prospecting, with largely increased chances of success.