from its ores, my connection with geology relates more to the application of materials. But I well know the value of fossils as an indispensable means of research, and unless Canadian fossils are properly described, Canadians themselves will never thoroughly understand their own economic minerals, or sufficiently to protect them from imposition; nor will the study of Canadian minerals enter into the educational system of the country. In the form given to the testimonial which you do me the honor to present to me, it is gratifying to me to observe typified a discovery which, in my pursuits as practical collier, I was so fortunate as to make, by which coal and its associated fossils were drawn into closer relation than had ever been known before. By it the practical researches for coal were greatly facilitated; and, as a practical collier, I can assure you that it is only in a knowledge of the differences that exist between such kinds of fossils as this testimonial indicates, and others of a distinct description of organisms, that you have the most certain means of discriminating between the coal of Newcastle and that of Bowanville. One pleasing circumstance that attaches to this testimonial is, that amongst those presenting it there are so many engaged in the practical business pursuits of life, as it gives me an assurance that they are convinced of the usefulness of geological investigations. And I beg to assure you that, as marking the good will of so many of my fellow-citizens, I shall always regard it with feelings of satisfaction and pride.—*Montreal Gazette.*

V. Papers on Physical Science.

1. FIGURES AND DESCRIPTIONS OF CANADIAN ORGANIC REMAINS, BY THE GEOLOGICAL SURVEY OF CANADA.—DECADE III.

On the title of the above work meeting our eye, we were pleasurably struck with the opposite coincidence of its first appearance, so immediately after the bursting of the coal-mine bubble at Bowmanville.

For some time past it was generally known to be the design of the Provincial Geological Survey to publish an illustrated account of the Canadian fossils, and from the well-known acumen and untiring efforts of Sir William Logan, and of our esteemed townsman, E. Billings, Esq., Paleontologist to the survey, something of a superior order was looked for; but although we have had opportunities of bearing testimony to the talents of both these gentlemen, we must confess that we were not prepared for such a rich intellectual treat, as was afforded us by a perusal of the decade just issued.

The artistic portions of the work, especially the illustrations, is of a very superior description, and calls for more than ordinary encomium; indeed it serves as a convincing proof that Canada can now achieve within herself, in the first style of art, all that we have hitherto expected from and looked for in other quarters; and to the "Geological Survey of Canada," is due the merit of introducing the best artists in our midst.

In the first article, from the pen of Mr. Billings, we have a "Descriptive account of the Geological position, structure and classification of the Cystideæ of the Lower Silurian Rocks of Canada." In the introductory portion of which we are told that the work is intended for the use of the students of Canadian geology, and on this account that a more general summary of what is known of the history of these extraordinary organisms is given than would have been the case were the work intended for scientific men alone.

Mr. Billings concludes the first section of this most interesting paper with a minute description of the external form and internal structure and organization of the Cystidæ.

In the second section we have an elaborate account of the Ambulacral orifices of the Cystidæ and their collateral congeners, the crinoidea or lily encrimites and star fishes.

The third and concluding section consists of a catalogue and description of the lower Silurian species of Cystidæ proper to Canada, and it is a source of no small pleasure to us to observe that out of eight genera comprising nineteen species, no less than ten of them were procured from the immediate vicinity of the city of Ottawa.

The second paper in this decade is devoted to an enumeration and description of the Star Fish of the lower Silurian rocks of Canada, and is also written by Mr. Billings. The catalogue consists of three genera and nine species, six of which, in like manner to the foregoing, were found in this neighborhood.

The next article, on the Cyclocystoides, a new genius of Echinoderms, is supplied conjointly by Mr. Salter and Mr. Billings. It describes two species only, one of which also is peculiar to the Trenton limestone of this locality.

The last and concluding article of the decade is descriptive of the Paleozoic Bivalve Entomostraca of Canada, and is from the pen of J. R. Jones, Esq., F.G.S.

In this paper we readily detect most unmistakeable traces of much intricate labor, and of deep and minute research. The size of some of the shells described did not exceed the one-thirtieth of an inch, and none of them the one-sixth of an inch, in length. And although we do not find from the accounts given of them that any of them were discovered at Ottawa itself, nevertheless by far the greater number of them did once inhabit various portions of our noble river from Pacquette's rapids down to Hawkesbury and Grenville.

The Decade contains about twenty superior wood cuts, besides eleven lithographic plates, all of the very finest style and finish; and whilst we most heartily congratulate Sir Wm. Logan on the success of his enterprise, we look forward with unmingled pleasure soon to receive one of the Decades now in progress.—*Ottawa Citizen.*

2. OBSERVATIONS ON THE FALLS OF NIAGARA.

Professor Henry, at the recent scientific meeting at Baltimore, read a paper of "Observations made at the Falls of Niagara." September 1, 1857. He said:

It is well known from the experiments of Jule, the investigation of Clasius, Rankin, Thomson and others, that the agitation of water or any other liquid evolves heat. Jule has found that the mechanical energy generated by the fall of one pound weight through 750 feet is sufficient to produce a rise of temperature of one degree of Fahrenhouit's scale in a pound of water.

It appears from a series of measurement made by my friend Z. Allen, of Providence, Rhode Island, some years ago, and published in Silliman's Journal, that 701,250 tons, or upwards of fourteen hundred millions pounds of water are precipitated over the great cataract of Niagara during every minute of time, and thus acquiring a mechanical energy greater than the estimated steam power now in use in all the civilized world. This energy, however, is not alone expanded in generating heat; a portion of it is absorbed in wearing away the rocks and in excavating the gorge in which the water flows. Another portion is absorbed in producing a tremor in the earth and in the air; also curents in the atmosphere and in the water below the Falls; another in compensating for the loss of rotatory power of power of the whole earth in the ascent of the particles from the ocean. A greater portion, however, is probably expended in producing the vapor in the constantly ascending column which we have before described.

The principal object of my investigation at the Falls was to ascertain whether there was any difference in the temperature of the water above and below the cataract. Unfortunately I was not provided with very sensitive instruments, and was obliged to make the observations with two thermometers which I selected from a number found in the shop of a watchmaker at the village near the bridge. The two give the same indications, and although the actual graduation could not be depended upon, still they served to show differences of temperature with as much precision as the length of degrees on the scale would permit.

The temperature of the air above the Falls was 71½°, and about the same below. At the latter place it however partook of the temperature of the spray with which the air was filled where the observation was noted.

The temperature of the water was taken above the falls from the eastern edge, near the head of the staircase, from the race-way, near the bridge across the rapids, from about the middle of the bridge itself, from the eastern shore of Goat Island and from the foot of the tower at the very verge of the precipice. Several observations were made at each place, which did not differ from each other to exceed more than a tenth of a degree. The average temperature thus obtained was 69 degrees. I was surprised to find a temperature so high and so uniform, since the day previous (the 30th of August,) I had found the temperature in the steamboat channel of Lake Huron 57 degrees. This increase of temperature was probably due to the passage of the water through the broad, shallow basin of Lake Erie. The uniformity of temperature at different points along the Falls, was probably caused by the mingling of the water in passing through the narrow straits at Detroit and over the rapids of Niagara river. The result was, however, unexpected, since I had observed in Lake Superior considerable variation, indicating currents of different temperatures. The absorption of so much heat during the passage through Lake Erie must materially influence the climate on the shores of that body of water.

Observations were next made below the Falls, and for the opportunity of making these, I was indebted to the kindness of the captain of the small steamboat "The Maid of the Mist." The temperature was noted as near the perpendicular fall as could be approached from the deck of the steamboat amid the spray, at intervals, for considerable distance across the river. The results agreed among themselves and the average gave almost precisely the same temperature as that which had been found above. I regret that the thermometers employed were not more sensitive, though I am confident that on this