

greatly deteriorating the value of his property. The surrounding country was clay overlying porous chalk. On examining into the matter, I found that an extended system of drainage, by means of the so-called "dumb wells," had come into operation in the district during the preceding three or four years, and had thus gradually affected the water power of the stream. These dumb wells are pits dug through the clay into the absorbent chalk, and afterwards filled up with rounded stones or other matters admitting the free passage of water. Drains being led into these, the greater part of the rain-fall is carried into them, and so down into the underlying porous rock. *Whenever therefore a Geological investigation of a district points out the existence of permeable beds, lying at an accessible depth beneath stiff clay lands, and good surface drainage is not readily obtainable, recourse may be had to the method just described.*

We cannot consider these "instances of scientific results acquiring practical importance" very flattering to our Geological Survey, or likely to win for it a cheerful support and encouragement from the practical men of Canada.

With reference, indeed, to the first illustration, it does not seem to be very improbable that an hour's inspection of the water marks on the banks and in the valley of the streamlet would have furnished the information to be deduced from "a Geological Survey of such a district before the erection of bridges;" such, we apprehend, is the modest plan which would have been adopted in Canada; and as to the existence of available 'permeable beds,' the first well sunk in a district must lead to their discovery. Hundreds of mill-streams in this country are annually failing in their supply of water, and at the same time freshets are becoming more sudden and destructive, yet no one would venture to advocate the expediency of sustaining a geological survey with a view to arrive at the explanation of these frequent and easily interpreted occurrences. Mr. Chapman, however, was asked to give instances from his "own experience in such Surveys of the practical importance of results which at first sight might appear to be exclusively of scientific interest," and with commendable candour he limited his instances to those which had come under his independent observation; not that the illustrations advanced can be said to be possessed of much scientific value to the geological world, however important they may have appeared to a Hertfordshire miller; yet, experience is always worth consulting, whether won in the difficult pursuit of truth at the bottom of "dumb wells," or acquired by the patient study of the water shed of a refractory streamlet.

Ques.—"Have you had an opportunity of ascertaining the progress that has been made in the Geological Survey of this Province; and what is your opinion of that progress?" *Ans.* "I have devoted several days to a very careful examination of the work already performed, and the materials collected under Mr. Logan's direction, and I can only express my wonder that so much should have been done; considering more especially the small means hitherto at Mr. Logan's disposal, the want of Topographical Maps, and other difficulties incidental to a new country." No one would suppose that a just appreciation of the value of the results already obtained by the Survey, could be derived from an inspection even during broad-day light of the minerals collected, as they may have been obtained from localities commercially inaccessible; but, when they "lie in a great measure, buried in packing-cases in the vaults and sheds of the Survey Office,"* the difficulty is proportionately increased. It is only by a study of the published reports of the work already done, that correct impressions can be obtained of the real value of the Survey. We confess, therefore, to some degree of surprise at finding Mr. Chapman state in the conti-

nuation of his evidence, that "several of Mr. Logan's valuable reports, moreover, are out of print, and *I have been quite unable to obtain copies of them.*" This explains at once the error alluded to in the May number of this Journal respecting the discovery of the tracks of a crustacean in the Potsdam Sandstone, the inference being that Mr. C. was not familiar with the contents of the Reports of which he had been unable to procure copies.

Mr. Chapman is asked by the Committee to state some of the new Scientific Truths which have been derived from the Survey, and he enumerated among others the following:—"Another very interesting discovery is that of the crustacean tracks on the Potsdam Sandstone. The celebrated discussion to which this has given rise in England has attracted the attention of scientific men all over Europe to the results of the Survey." Had Mr. Chapman enjoyed the opportunity of studying Mr. Logan's admirable Report for 1851 and '52 he would have known the name and designation of the real discoverer; or had he met with the fourth edition (1852) of Sir Charles Lyell's Manual of Elementary Geology he would have found the following circumstantial notice of the "tracks," with the date of the discovery, and thus avoided leading the Committee into error on a subject familiar to every amateur geologist in Canada:—

"*Tracks of a Lower Silurian Reptile in Canada.*"—In the year 1847 Mr. Robert Abraham announced in the *Montreal Gazette*, of which he was editor, that the track of a fresh water tortoise had been observed on the surface of a stratum of sandstone in a quarry opened on the banks of the St. Lawrence at Beauharnois in Upper Canada. The inhabitants of the parish being perfectly familiar with the track of the amphibious mud-turtles or terrapins of their country, assured Mr. Abraham that the fossil impressions closely resembled those left by the recent species on sand or mud. Having satisfied himself of the truth of their report, he was struck with the novelty and geological interest of the phenomenon. Imagining this rock to be the lowest member of the old red sandstone, he was aware that no traces had as yet been found of a reptile in strata of such high antiquity. He was soon informed by Mr. Logan, at that time engaged in the Geological Survey of Canada, that the white sandstone above Montreal was really much older than the "Old Red" or Devonian. It had in fact been ascertained many years before, by the State Surveyors of New York (who called it the "Potsdam Sandstone"), to lie at the base of the whole Silurian series." * * * Early in the year 1851, Mr. Logan laid before the Geological Society of London a slab of this sandstone from Beauharnois, containing no less than twenty-eight foot prints of the fore and hind feet of a quadruped, and six casts in plaster of Paris, exhibiting a continuation of the same trail. * * * Numerous other trails have since been observed (1850, '51), in various localities in Canada, all in the same very ancient fossiliferous rock; and Mr. Logan, who has visited the spots, will shortly publish a description of the phenomenon." We may here remark that Professor Owen first inferred (1851) that the tracks were those of a fresh water or estuary tortoise. Agassiz supposed that they were crustacean, in which view Professor Owen coincided in 1853. (See Journal of the Geological Society August, 1853.)

Mr. Chapman being requested to state to the Committee some of the advantages derived from the Survey by the discovery of materials of economic application, replied:—"With regard to economic discoveries, I may state generally that the survey has brought to light the existence of beds of workable

* See Report of Committee.