

3. *Are Protichnites and Climactichnites the tracks of Trilobites?*

In his description of *Protichnites*, Prof. Owen says:—"The *Limulus*, which has the small anterior pair of limbs (near the middle line) and the next four lateral pairs of limbs bifurcate at the free extremity, the last pair of lateral limbs with four lamelliform appendages, and a long slender hard tail, comes the nearest to my idea of the kind of animal which has left the impressions on the Potsdam sandstone"*. In 1862, Dr. J. W. Dawson tested this opinion by actual experiment, on a sandy beach near the mouth of the Scarborough river, on the coast of Maine. Having caught a *Limulus* he kept it alive for several days, and "tried its mode of locomotion under various conditions on the sandy shore, and preserved sketches of the markings"†. His figures and descriptions prove clearly that the tracks on the sandstone could have been made by an animal having a structure like that of *Limulus*. The grooves along the side of the track were made by the edges of the broad cephalothorax, the small pit-like impressions by the extremities of the large limbs, the transverse grooves by the lamelliform feet, and the median groove by the telson. If it be granted that *Asaphus*, in addition to its thoracic legs, possessed a set of lamellar swimming-appendages under the pygidium, then the structure of the under-surface would be sufficiently like that of *Limulus* to enable it to produce the same markings. The median groove might be made by a Trilobite with a caudal spine like that of *Megalaspis hevos* (Angelin). This species is a true *Asaphus*. The large Trilobite of the Potsdam sandstone, *Dikelocephalus*, differs little in general structure from *Asaphus*, while the pygidium of several of the species evinces a tendency to become spinous around the margin. The genus *Aglaspis* (Hall) appears to me to be a Trilobite of the same group; and, moreover, the specimens figured seem to be the tail and not the head. What are supposed to be the eyes are the bases of two spines, like the one that occurs on the pygidium of *Bathyrurus spiniger* (*Acidaspis spiniger*, Hall).

Dr. Dawson, after comparing all the facts, says:—"On the whole we may safely conclude that, if any of the larger primordial Trilobites were provided with walking- and swimming-feet of the type of those of *Limulus*, but differing in details of structure, they may have produced both the *Protichnites* and the *Climactichnites*." Prof. J. D. Dana, also speaking of the latter, says:—"It has been regarded as the track of a very large Gasteropod; but it is quite as probable that it was made by the clusters of foliaceous appendages of one of the great Trilobites—these appendages being its locomotive organs"‡. The following, therefore is the present state of the question:—

1. The tracks could have been made either by a *Limulus* or by a Trilobite.

* Quart. Journ. Geol. Soc. vol. viii. p. 224.

† Canadian Naturalist and Geologist, vol. vii. p. 276.

‡ Manual of Geology, p. 185.