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occurs are nearly flat; they have, however, a dip to the eastward, which is towards the limestone, the nearest development of which is about a mile distant. Near Beauharnois the breadth of the Potsdam belt is about five miles, and from this position it gradually widens to the southward, the rock being traceable by many exposures, some of them of considerable extent, on the one hand all the way to Keesville, where it holds *Lingula antiqua*, and on the other to Potsdam and farther to Hammond, where, as well as at Alexandria, *Lingula prima* is met with, these *Lingulæ* being hitherto considered the most ancient evidences of organic life in America.

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4. Description *of the* Impressions *on the* Potsdam Sandstone, *discovered by* Mr. Logan *in* Lower Canada. By Prof. Owen, F.R.S., G.S.

The evidence of the track and foot-prints submitted to my examination by Mr. Logan consists of a slab of the sandstone with eighteen impressions of the right fore and hind feet, and ten of the left fore and hind feet, with a faint trace of a broad track between them, and of six casts in plaster of Paris (each cast being twenty-six inches by fifteen inches) of successive portions of the impressed rock, and each cast exhibiting from twenty-six to twenty-eight impressions of both the right and the left feet, with the broad and shallow median channel better marked in most of the casts than on the portion of the sandstone. The successive foot-prints are more numerous than any which have been previously discovered, and the circumstance of the corresponding prints recurring at regular intervals affords the strongest proof of their having been made by successive steps.

The foot-prints are in pairs, and the pairs extend in two parallel series, with the channel exactly midway between the right and left series.

The outer impression of each pair is the largest, being about an inch in diameter, and is commonly a little behind the inner one, which is about eight lines in diameter. Both are short in proportion to their breadth, with faint indications, in some, of divisions at their fore-part.

The two prints forming the pairs here and there are confluent or touch each other, but are commonly from four to six lines apart; and the pairs of the same side succeed each other at intervals varying from one inch and a half to two inches and a half, the common distance being about two inches. The interval between the right and left pairs, measured from the inner border of the small prints, is three inches and a half, and from the outer border of the large prints is seven inches. The median track is one inch and a quarter in breadth, and sinks about two lines below the surface where deepest impressed; varying in depth, but not in its relative position to the right and left foot-prints; and being deepest where the pairs of foot-prints are confluent and at shortest intervals; at which parts the median channel

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is seen to sink down more steeply at its sides than towards the bottom.

The inference to be deduced from the above characters is, that the impressions were made by a quadruped with the hind feet larger and somewhat wider apart than the fore feet: with both hind and fore feet either very short, or prevented by some other part of the animal's structure from making long steps; and with the limbs of the right side wide apart from those of the left; consequently that the quadruped had a broad trunk in proportion to its length, supported on limbs either short or capable only of short steps, and with rounded and stumpy feet, not provided with long claws. There are faint traces of a fine reticulate pattern of the cuticle of the sole at the bottom of some of the foot-prints on the portion of sandstone; and the surface of the sand is generally smoother there than where not impressed, which, with the rising of the sand at the border of the prints, indicates the weight of the impressing body. The median impression may be interpreted as due either to the abdomen or the tail of the animal. If to the latter, the tail must have been very thick, more depressed, or flattened horizontally, than rounded, and not compressed or carinate below, as in the tails of the *Crocodilia* and aquatic *Batrachia*. From the breadth of the impression a corresponding great length of tail might be inferred from the analogy of the *Reptilia*; yet there is no indication of any bending or movement of such a tail from side to side; and an additional element for guiding our choice from the two hypotheses of the cause of the median track is afforded by the fact that, throughout the great length of the trail of the quadruped, as exhibited by the plaster-casts, the median track never curves in any degree nearer to the right or the left foot-prints, but preserves an exact mid-distance between them.

As the shape of the body and the nature of the limbs indicated by the foot-prints accord best with those of the Chelonian reptiles of the 'estuary,' 'fresh-water,' or 'land' families,—the shape of the foot-prints being decisive against the marine species,—the median groove may have been scooped out of the soft sand by the hard and prominent median surface of a plastron. If this were so, it may be inferred that the species was a fresh-water or estuary tortoise rather than a land-tortoise, the true *Testudines* carrying their trunk higher when they walk than the more depressed *Emydes* do, and some of them having the plastron concave on its under surface; whereas in the flatter *Emydes*, as *e. g. Emys speciosa*, the middle of the fore-part of the plastron projects: and I am disposed to infer a plastron to have made the impression rather than a tail, not only from the shape of the impression, and its constant relative position to the legs, but also from the fact of its being deepest where, from the more confused or crowded grouping of the foot-prints, the animal appears to have been moving more slowly or resting: where the foot-prints are better defined, and indicate a steady rate of progress, the median impression is fainter, as if the trunk had been better lifted from the ground; and I may remark, that the difference

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in the size of the fore and hind feet is such as we find in some existing Terrapenes, *e. g.* the *Emys geographica*.

The more obvious inferences are the same which are deducible from other foot-prints in sandstone, viz. that the animal which made them was walking in air. In the present instance it is plain that they were not left by an amphibious fish, such as the sand-hopping *Lophiidæ*, but by a veritable air-breather; and they must have been made under those circumstances so well explained by Sir Charles Lyell, in his paper on Recent and Fossil Rain-prints (*vide supra*), as being essential to their preservation, viz. on an extent of sandy shore lying between high and low water mark.

Amongst the air-breathing classes of *Vertebrata*, the shortness of the steps and the median track of the impressions in question point plainly to the *Reptilia*; and here, from the breadth and shortness of the body, our choice lies between the *Batrachia* and *Chelonia*; and, on the grounds assigned in the above description of the tracks, I incline to refer them to a species of Terrapene or Emydian Tortoise.