

## Note on the tortoise traces seen in the Red Sandstone\*

William Buckland

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(Extract of a letter to Mr. Underwood)

....Dr. Duncan of Dumfries found, in a New Red Sandstone quarry near that town, some impressions of the feet of animals, some of which are not very clear, while others are as clear as the moment they were made. The tortoises, because the traces appear to have been produced by these animals, walked here and there to get to the water at the bottom of the sand slope which preserves many of their footprints. A piece taken from the quarry bears more than 40 of these tracks, which form a complete trackway like those left by a hare in snow. A large piece of this sandstone was taken to London, and I don't have the slightest doubt that these impressions weren't produced by tortoises. A lot of people can't believe their own eyes, or rather aren't afraid to express an opinion on these curious discoveries<sup>1</sup>.

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<sup>1</sup> During my stay in Glasgow, Professor Thomson related to me a curious fact, that appears to me allow one to consider the surface of these sandstone beds as representing the surface of a beach bathed by the sea. In a sandstone quarry in part of this carboniferous formation, which is exploited in that town in the same way as in Glasgow, to be used for buildings and foundations, the layers are noticeably horizontal, perfectly distinct, and separated by a very thin bed of coaly debris; the surfaces of these beds, which have been excavated over a large area, show very regular undulations, sometimes sinuous and parallel, sometimes forming a kind of very elongated mesh network, exactly like one sees in the fine sand of an extensive and slightly-inclined beach, when the sea lightly oscillates on the shore while the tide drops. In this case one sees also the light objects such as charcoal held in suspension by the water, and deposited on the sand when the water retreats, and thus covering the surface of the beach.

It seems to me, as its observed in the same area and in rocks of the same formation, to be perfectly in accordance with Mr. Buckland's report, that the surface of these sandstone beds represented at some time the surface of a beach, with the lesser undulations preserved without much change.

(A. Brongniart)