

were *not* absent from the earliest fossiliferous formations. From none of the great geological formations were fishes absent, — not even from the formations of the Cambrian division. “The Lower Silurian,” says Sir Roderick Murchison, in a communication with which, in 1847, he honored the writer of these chapters, “is no longer to be viewed as an invertebrate period; for the *Onchus* (species not yet decided) has been found in the Llandeilo Flags and in the Lower Silurian rocks of Bala. In one respect I am gratified by the discovery; for the form is so very like that of the *Onchus Murchisoni* of the Upper Ludlow rock, that it is clear the Silurian system is one great natural-history series, as is proved, indeed, by all its other organic remains.” It may be mentioned further, in addition to this interesting statement, that the Bala spine was detected in its calcareous matrix by the geologists of the Government Survey, and described to Sir Roderick as that of an *Onchus*, by a very competent authority in such matters, — Professor Edward Forbes; and that the annunciation of the existence of spines of fishes in the Llandeilo Flags we owe to one of the most cautious and practised geologists of the present age, — Professor Sedgwick of Cambridge.

So much for the *fact* of the existence of vertebrata in the Lower Silurian formations, and the *argument* founded on their presumed absence. Let me now refer — their presence being determined — to the tests of size and organization. Were these Silurian fishes of a bulk so inconsiderable as in any degree to sanction the belief that they had been developed shortly before from microscopic points? Or were they of a structure so low as to render it probable that their development was at the time incomplete? Were they, in other words, the embryos and fœtuses of their class? or did they, on the contrary, rank with the higher and larger fishes of the present time?