

It is intelligible that these different lines in the genetic view of nature—the different trains of reasoning which, in the course of our century, have started independently in astronomy, in geology, and in natural history—should, as they develop and expand, come into contact, and in the event either support or invalidate each other. The former was the case when the geological record, the discoveries of palæontology, were brought in to throw light on the history and development of species; the stories of nature, as written from the point of view of the embryologist, the systematic zoologist and botanist, and the palæontologist, seemed more and more to confirm and support each other. The same cannot be said if we write the history of our earth from the point of view of the geological record on the one side and from that of the purely physical data afforded by thermodynamics on the other. Lord Kelvin has shown¹ that the untold

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We had only solar and stellar chemistry: we now have solar and stellar physiology" (Presid. Address, Brit. Assoc., 1871. See 'Popular Lectures and Addresses,' vol. ii. p. 180).

¹ The literature of the subject begins with Lord Kelvin's Address to the Geological Society of Glasgow, February 27, 1868, which had been preceded by a paper read before the Royal Society of Edinburgh in 1865, briefly refuting the "Doctrine of Uniformity in Geology." The address began with the words: "A great reform in geological speculation seems now to have become necessary," and in the sequel stated: "It is quite certain that a great mistake has been made—that British popular geology at the present time is in direct opposition to the principles of natural philo-

sophy." These papers are reprinted in the 2nd vol. of 'Popular Lectures and Addresses' (see pp. 10 and 44). The attack was taken up by Huxley in his Address to the Geological Society for 1869, reprinted in 'Lay Sermons,' &c., 1891, p. 198. In a rejoinder to this, delivered in the same year at Glasgow (*loc. cit.*, p. 73), Lord Kelvin shows how the current geology was in the habit of looking upon geological time as "an element to which we can set no bounds in the past any more than we know of its limits in the future" (quoted from Page's 'Text-book'), that Darwin's arguments themselves involve an almost unlimited duration of the conditions admitting of the operation of natural selection, since, in his view, "in all probability a far longer period than 300 million