

organism, is the apparent design and purpose, without which neither could be conceived to have been formed.<sup>1</sup> Here, then, the idea that it was a process of natural choice, of automatic adjustment, which produced the apparent end and purpose at the moment when the structure itself was produced, came as a great relief.<sup>2</sup> It explained how it comes about that nature, even with unloaded dice, so often—yet not always—throws doublets. It permitted naturalists and physiologists to use purpose and final cause, not as an explanation, but as an indication where to look for causal—that is, for mechanical—connections. Accordingly the first systematic attempt to use natural selection in the explanation of the adjustment of the internal parts of an organism, which is due to Prof. Wilhelm

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Natural  
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<sup>1</sup> "The main problem which the organic world offers for our solution is the purposefulness seen in organisms. That species are from time to time transformed into new ones might perhaps be understood by means of an internal transforming force, but that they are so changed as to become better adapted to the new conditions under which they have to live is left entirely unintelligible" (Weismann on Nägeli's "Mechanisch-Physiologische Theorie der Abstammungslehre" in 'Essays upon Heredity,' Engl. transl., p. 257).

<sup>2</sup> See Du Bois-Reymond's Address, "Darwin versus Galvani" ('Reden,' vol. i. p. 211, &c.): "Here is the knot, here the great difficulty that tortures the intellect which would understand the world. Whoever does not place all activity wholesale under the sway of Epicurean chance, whoever gives only his little finger to teleology, will inevitably arrive at Paley's dis-

carded 'Natural Theology,' and so much the more necessarily, the more clearly he thinks and the more independent his judgment. . . . The physiologist may define his science as the doctrine of the changes which take place in organisms from internal causes. . . . No sooner has he, so to speak, turned his back on himself than he discovers himself talking again of functions, performances, actions, and purposes of the organs. The possibility, ever so distant, of banishing from nature its seeming purpose, and putting a blind necessity everywhere in the place of final causes, appears therefore as one of the greatest advances in the world of thought, from which a new era will be dated in the treatment of these problems. To have somewhat eased the torture of the intellect which ponders over the world-problem will, as long as philosophical naturalists exist, be Charles Darwin's greatest title to glory" (p. 216).