

contemplation of the result may permit us to trace backward the process by which it was brought about; but we are not warranted in assuming that it existed independently, like the plan of a building or the purpose of an instrument. In the place of a growth according to a prearranged plan, Darwin put the conception of an automatic adjustment called "natural selection"; in the place of a conscious end or purpose he put the conception of a mere result, a product, the "surviving fittest."¹

The development and proof of Darwin's ideas gave a new impetus to biological research, as it did also to the science of the history and economy of nature. The fact that the phenomenon of selection, or rather of automatic crowding out, presupposes intimate relations and contact of every living thing with numberless other similar and dissimilar beings, led naturalists into the open air, to

¹ A very full appreciation of the great change that has come over the sciences of nature through the influence of Darwin will be found in the various writings and addresses of Prof. Haeckel, notably in his address to the German Association in 1877 at Munich, "Ueber Entwicklungslehre" (reprinted in 'Gesammelte populäre Vorträge,' vol. ii. p. 97). A more critical examination, referring specially to the central biological problems, is the address by Du Bois-Reymond, delivered in 1876 in the Berlin Academy, and reprinted in 'Reden,' vol. i. p. 211, with valuable literary notes. He there discusses how far the principle of natural selection, in addition to the general doctrine of descent, has been adopted or opposed, and refers to the outstanding difficulties. "One of the greatest difficulties," he says (p. 226), "presents itself in physiology in the

so-called regenerative power, and—what is allied to it—the natural power of healing: this may now be seen in the healing of wounds, in the delimitation and compensation of morbid processes, or, at the farthest end of the series, in the re-formation of an entire freshwater polyp out of one of the two halves into which it had been divided. This artifice could surely not have been learnt by natural selection, and here it appears impossible to avoid the assumption of formative laws acting for a purpose. They do not become more intelligible by the fact that the regeneration of mutilated crystals, observed by Pasteur and others, points to similar processes in inanimate nature. Also the ability of organisms to perfect themselves by exercise has not found sufficient appreciation with regard to natural selection."