view, are extremely rare and exceptional. Between these two views, the cosmical and the terrestrial, the wider [1] and the narrower views of life, biological theories have fluctuated even in our century, and are still fluctuating.

1. The cosmical and the terrestrial views.

[1] One of the foremost upholders of the wider conception of animation as a universal property of all matter is the celebrated German naturalist, Prof. Ernst Haeckel of Jena. See, *inter alia*, his Address "Ueber die heutige Entwickelungslehre im Verhältnisse zur Gesammtwissenschaft," 1876, reprinted in 'Gesammelte populäre Vorträge,' &c., part ii., Bonn, 1879, p. 119: "The recent controversies regarding the properties of the Atoms, which we must accept in some form or other as the ultimate elementary factors of all physical and chemical processes, seem to be most easily settled by the assumption that these smallest particles of mass, as centres of force, possess a permanent soul, that every atom is endowed with sensation and motion," &c., p. 109: "Arriving at this extreme psychological consequence of our monistic doctrine of development, we attach ourselves to those ancient conceptions as to the animation of all matter which, in the philosophy of Democritus, Spinoza, Bruno, Leibniz, Schopenhauer, have already found varied expression." The cosmical origin of life has also been put forward by such authorities as Helmholtz and Lord Kelvin, as long ago as 1871. (See Helmholtz's lecture "On the Origin of the Planetary System," 'Popul. Vorträge,' &c., vol. ii. p. 91, and Lord Kelvin's celebrated address to the Brit. Assoc. at Edinburgh in 1871, reprinted in 'Pop. Lects.,' &c., vol. ii. p. 199, &c.) This theory of "Panspermia," of the cosmical or ubiquitous nature of the germs of life, has also been proposed by biologists such as H. E. Richter (1865), and has been more fully elaborated by Prof. W. Preyer since the year 1880: it has received further support in the genetic theories of the chemical elements and compounds put forward by him in 1891 ('Die organischen Elemente und ihre Stellung im System,' Wiesbaden), and in 1893 ('Das genetische System der chemischen Elemente,' Berlin). Of the fourteen elements which are common to organic substances, he says (p. 49) "that they belong to the oldest elements"; that "they admit of more varied relations," and "agree with the assumption that, before being condensed as at present on the surface of the earth, they formed at higher temperatures more stable protoplasms which might be in other places the carriers of life"; and he has no doubt "that there existed before the present terrestrial phytoplasma and zooplasma another plasma, which ultimately came from the sun" (p. 50). In fact, Prof. Preyer asks whether, instead of living being evolved from dead matter, the latter is not rather a product of the former. See also the reference to organic evolution as a cosmical process in Sir N. Lockyer's 'Inorganic Evolution' (1900, p. 168). In many of the writings of the celebrated German physicist and philosopher, Gustav Theod. Fechner, the fact is emphasised that we never see the organic developed out of the inorganic, but that everywhere the living generates not only the living but more frequently the inanimate. See Lasswitz, 'G. T. Fechner,' Stuttgart, 1896, p. 130, &c.