

which there belongs to pure and to applied science, the continual contest which exists there between metaphysical and exact reasoning, and the general ebb and flow of rival currents of ideas, all seem to have been necessary to raise to the rank of an exact science those researches which deal with the phenomena of *life* and *consciousness* in their normal and abnormal forms of existence. In the hands of German students¹ chemistry and physics, botany and zoology, comparative anatomy and morphology, pathology, psychology, and metaphysics, have laboured from different and unconnected beginnings to produce that central science which attacks the great problem of organic life, of individuation, and which studies the immediate conditions of consciousness. *Physiology*, or to use its more comprehensive name, *Biology*,² may be

21.
Biology a
German
science.

¹ The two greatest discoveries in physiology belong to England. These are Harvey's discovery of the circulation of the blood in the seventeenth century, and Charles Bell's discovery of the difference of sensory and motor nerves in the early part of this century. The two men, however, who have done most to establish physiology as an independent science, whose systematic works have done most for the student of physiology, are probably Haller (see *supra*, p. 176), whose 'Elementa' cast into the shade all older handbooks, and Johannes Müller (1801-58), whose 'Handbuch' (1833-40) was translated into French and English. See Du Bois-Reymond, 'Reden,' &c., vol. ii. pp. 143, &c., 195, 360, who also points out how in other sciences, like mathematics, physics, chemistry, Germans made use almost exclusively of translations of French and English text-books and handbooks, whereas in physiology they

furnished for a long period the systematic treatises for the whole world (vol. ii. p. 196). Physiology has therefore with some right been termed a German science (see Helmholtz, 'Vorträge,' &c., vol. i. pp. 339, 362; Du Bois-Reymond, 'Reden,' vol. ii. p. 265). Compare also what Huxley says, 'Critiques and Addresses,' pp. 221, 303. On the connection of physiology with all other sciences see likewise Helmholtz, *loc. cit.*; Du Bois-Reymond, vol. ii. p. 341; Huxley, 'Lay Sermons,' &c., p. 75; 'Science and Culture,' p. 52: "A thorough study of human physiology is, in itself, an education broader and more comprehensive than much that passes under that name. There is no side of the intellect which it does not call into play, no region of human knowledge into which either its roots or its branches do not extend," &c.

² The word "biology" seems to have been first used by G. R.