

called the conscious automaton theory, is the central conception in psychology as a natural science, or, as I have termed it, of the psycho-physical view of nature. It was prepared<sup>1</sup> by earlier thinkers, such as Descartes, and, in a different form, by Spinoza,<sup>2</sup> and by Leibniz's doctrine of pre-established harmony.<sup>3</sup> It has been strengthened by the physiological theory of reflex action,<sup>4</sup> and, independently, by psycho-physics in the narrower sense of the word, as founded by Weber and Fechner. But the possibilities of the automaton theory were not scientifically tested till towards the end of the nineteenth century. In this country, two thinkers

<sup>1</sup> The doctrine of psycho-physical parallelism and its historical genesis is given by Huxley in his address before the British Association Meeting at Belfast in 1874, "On the Hypothesis that Animals are Automata, and its History," in which he goes back to Descartes and Charles Bonnet. A good account of the theory is also given by Prof. Wm. James in the 5th chapter of his 'Principles of Psychology'; and it is fully discussed by Prof. James Ward in his Gifford lectures, 'Naturalism and Agnosticism,' vol. ii. pt. iii.

<sup>2</sup> The passage from Spinoza which is constantly quoted, and, as Prof. Ward says, usually in ignorance of the context, is in 'Ethica,' part ii. prop. 7: "Ordo et connexio idearum idem est ac ordo et connexio rerum."

<sup>3</sup> Leibniz, as Huxley (*loc. cit.*) tells us, also invented the term "automate spirituel" and applied it to man.

<sup>4</sup> Du Bois-Reymond, in his "Éloge" of Johannes Müller, has shown that the principle of reflex action dates back to Descartes, who also introduced the term re-

flex. Next in time came Willis ('De motu musculari,' Amsterdam, 1682). The subject seems to have been overlooked to such an extent, that Prochaska (1784) got for a long time the credit of having established the notion of reflex action, and even his work had to be rediscovered by Eduard Weber (1846), after the principle of the transition of a reaction from the afferent to the efferent nerves in the central organs had been prominently put forward by Legallois (1811), Marshall Hall (1835), and Johannes Müller (1835). In more recent times, Prof. Pfüger's "Laws of Reflex Action," and his and G. H. Lewes's theory of the presence of consciousness in the spinal cord, have formed the subject of much discussion and much experimental work. A good historical account will be found in the 13th Leçon of M. Ch. Richet's 'Physiologie des Muscles et des Nerfs' (Paris, 1882), and a discussion of the whole subject in Prof. Wundt's 'Physiologische Psychologie,' ch. xxi., where especially the difference between automatic and reflex movement is brought out.