

The dualistic view by Sir John Eccles in the brain-mind problem

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The brain-mind problem has attracted attention for more than 2000 years. Initially, the ideas generated and discussed were purely theoretical speculations, since very little was known about the workings of the brain, and were essentially in the realm of what is now referred to as philosophy. However, the remarkable achievements in neuroscience over the last century and especially over the last few decades have brought philosophers and neuroscientists together.

Sir John Eccles was not only a great scientist, but he manifested since the beginning of his career a deep interest in understanding the nature of the human being and the brain mind problem. He was a dualist and tried to explain the Cartesian dualism in modern way by taking into account the most recent discoveries in the brain.

The concept of a correlation between brain and mind, both for a single individual and from one individual to another, has received a large amount of support in the last few decades with the use of imaging techniques where the metabolic activity of the brain can be measured in a conscious human being in relation to simultaneously occurring mental activity. These techniques are Positron Emission Tomography (PET) and functional Nuclear Magnetic Resonance (fNMR). Using these techniques it is possible to demonstrate, for example, that the supplementary motor area of the human cerebral cortex shows an increased metabolic activity when an individual is trying to perform complex movements of the fingers in his imagination, without making any actual movements and the increase of activity within this area is similar to that observed when he or she actually carries out the movements. These modern approaches provide evidence of a close correlation between physical processes in the brain and mental activities.

In the last part of his life Sir John was impressed by these new discoveries and attempted to take them into account to explain the relationship between brain and mind. With the philosopher Karl Popper he wrote a book on this issue, although the two authors had different views. John Eccles remains a committed dualist; he has reassessed Cartesian dualism and proposes an interaction between the brain and the (metaphysical) mind based on groups of neurones of the cerebral cortex; the apical dendrites of such a group run closely apposed in a small bundle (which he refers to as a “dendron”) towards the surface of the cortex. To each dendron is associated a “psychon” that represents a basic elementary unit of perception. In this “interactionist dualism,” psychons provide the basis for the unity of perception, as in an impressionist painting in which the separate flecks of colour can combine to provide the complete image without being perceived

individually. This proposal of Eccles indicates its Cartesian roots by the fact that he suggests that dendrons and psychons are two different “substances” and the proposal therefore retains the concept of a dualism of substance. Moreover, Eccles postulates that there is a two-way interaction and that psychons have an active role in the initiation of physical processes in the dendrons. In this way, the dendrons provide the physical substrate for the interaction between the physical world and the metaphysical world of mental processes that Descartes ascribed to the pineal gland. But how can a mental phenomenon that has no source of energy give rise to a phenomenon that depends on energy? Eccles proposes that a psychon can be considered as analogous to a probabilistic quantum field similar to that described by the physicist Margenau, although Margenau’s idea is not widely shared by other physicists. The energy required to move a particle that would start the process of exocytosis at a synaptic level could be returned at the same time and place by the liberation of molecules of neurotransmitter. The principles of quantum physics allow that energy can be extracted provided that it can be restored at the same instant. Eccles’ view is perhaps unique in retaining an authentic Cartesian flavour.

Only a few people nowadays agree with a mere dualism of substance, while most believe in a property dualism that they prefer to name monism. However, the brain-mind issue still remains the great mystery of our Universe and the neurosciences are still the most fascinating field of the human knowledge.