

BOOK REVIEWS

The Purposive Brain. By Ragnar Granit. Cambridge, Mass.: MIT Press, 1977.
Pp. 244. \$11.95.

This book is by one of the leading neurobiologists of our time. At the end of a long and very productive life of research it is attractive to adopt a philosophical attitude and to scan a wide field of biological science. It emerges that it has to be considered in a framework different from that of the physical sciences. This is particularly so when one considers the essential feature of a biological organism, namely, purposive behavior. The title of the book, *The Purposive Brain*, is both a challenge and a paradox. The brain is a material structure with a basis of operation that by the neurosciences is being more and more reduced to physical terms—the immensely complicated anatomical arrangement of neurones with their action potentials, synaptic potentials, electrochemical gradients, etc. How can such a structure perform in a way that we are justified in referring to as purposive? The evolutionary process has given rise to organisms that are designed for efficient existence under a wide range of environmental circumstances. Survival requires control, adaptability, and learning. For these functions the nervous system was evolved, and, as evolution prospered, the ever-increasing demands for these performances were met by nervous systems of progressively increasing complexity in both structure and function. Level upon level of development eventually resulted in the fullness of time in the human brain. It is this brain that is the principal theme of the book, as witness the picture of the brain with its sulci and gyri on its jacket.

It might be inferred from the title that the author is a dualist-interactionist and that the purposiveness of the brain is dependent on the operations of a self-conscious mind which is in liaison with the brain, which in this way is provided with purposiveness. But the text does not bear out this inference, for it seems to be written in the mode of a psychophysical identity theorist. I must confess that the subtlety of the author's expressions leave me in some doubt as to his philosophical position. For example, according to the psychophysical identity theory in its conventional form, we are told that the brain really has a purpose, and not an apparent purpose due to a mental action on it. We are informed: "I am quite satisfied with 'purposiveness' because, as we shall see, many nervous acts definitely have a purpose, but otherwise vary in nature from automatism to definite conscious awareness of what is supposed to be achieved. In considering the central nervous system, the essential point is not that one need be aware of the goal but that the act as such is purposive."

A very good illustration of the operation of emergent evolution is given in the section on the progression from mechanoreceptors (tufts of hair or cilia) on the skin of a primitive fish to the lateral line organ of the fish, to the vestibular canal system, and to the otolith organs and the cochlea that gradually became perfected in birds and mammals to give signals in response to accelerations in die three planes of space, to posture, and to sound. These peripheral transformations had matching developments in the brain, giving the organism performance in response to environmental change that would foster survival. This section of the book reminds me of Sherrington's superb illustrations of the wonders of evolution. But Granit has misgivings: "Even purposiveness begins to look questionable when we think of musicality and musical creativity as the end product of the development of the tufts of hair on the skin of a primitive fish. There is no explanation of the talent that made possible the creation of the Symphony or the Marriage of Figaro. Why has musical creativity turned up at such high levels of excellence? A possible answer is that this talent has proved harmless in the process of natural selection and so has escaped annihilation." Having no better answer, evolutionists are embarrassed by questions of purposiveness . They should begin to wonder...