THE Living Brain

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W. GREY WALTER

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Foreword

THIS BOOK is intended for general reading, for those who are interested in themselves and other creatures. Most of it is matter of recent discovery, but it has been presented simply so that even the most unexpected information should be intelligible to all. To some, the subject itself may seem risky: after giving a series of talks on it in the Home Service of the BBC I was told that one or two listeners said they felt a kind of impudicity about brain surveying brain, as if suddenly coming upon themselves for the first time naked in a looking-glass. Our peeping here is as innocent as Alice and kinder than Analysis. While mirroring indeed some parts of the human organism too long hidden, this book will be found a gentle book. There is no immodest exposure, no baring of the soul; nor any shattering of illusions, except perhaps for those who may have been so simple-minded as to think the mechanism of mind simple. Neither the new facts of life nor their philosophical consequences are presented as conclusive. Fresh realms of knowledge and conjecture are explored without pretence of reaching the limits of either, their boundaries always receding as we advance. Thus it is also a pious book if measured by standards of habitual reverence for the known as well as the unknown in face of successive revelations. Omar said: "I have learnt nothing from

life except my own amazement at it." That is too little, but it is a beginning. It is an aspect of the matter which to some readers—modest, thoughtful, religious—may seem more important than the excitement of discoveries, whatever their clinical or social utility, or the desirability of removing error from our way of thinking about the brain. And in this reverent attitude to Man the author is with them, standing bareheaded among the villagers where "still they gaz'd and still the wonder grew That one small head could carry all he knew."

W.G.W.

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". . . . an enchanted loom where millions of flashing shuttles weave a dissolving pattern, always a meaningful pattern though never an abiding one; . . ."

Sir Charles Sherrington, O.M.

CHAPTER 1

Lords of the Earth

Consider the original of all things, the matter they are made of, the alterations they must run through, and the result of the change. And that all this does no manner of harm.

Marcus Aurelius

BY BRAIN is meant, in the first instance, something more than the pinko-grey jelly of the anatomist. It is, even to a scientist, the organ of imagination. "Enchanted loom" it was called by a great physiologist. Another has likened it to a calm lake on which ripple-systems weave patterns. The first image is a reminder that magic may be a function of mechanism. The second invites us to embark on the surface of something deeper than we know, and subject to storms.

With licence of such teaching, we may begin by saying that *cogito ergo sum* is physiologically true. Man, for our present purpose, is specifically what he is by virtue of thought, and owes his survival in the struggle for existence to the development of that supreme function of brain. He is *sapiens*, the thinking species of genus *Homo*—the discerning, discreet and judicious one, even if he does not always live up to all these meanings of the name he has given himself. But the brain has many other functions, so many and so various that it may be well to proceed first by elimination.

No other animal is equipped for being *sapiens*. It is in fact a difference of equipment and not of opportunity. In terms of behaviour, the gist of it is that, when we come across something new, we do not necessarily respond to it at once in a particular manner. We think it over. We can imagine making one of a number of possible responses, and imagine it so clearly that we can see whether it would be, if we made it, a mistake, without having to commit ourselves to action. We can make our errors in a thought and reject them in another thought, leaving no trace of error in us.

Very early in the human story the brain must have acquired the mechanism of what we recognise in action as imagination, calculation, prediction. Later came the processes of abstract reason and the control of what we call violence. The operation of these mental controls, as will be seen, can be recorded as electrical eddies swirling in subtle patterns through the brain. But our most sensitive instruments, amplifying the electrical changes ten million times or more, detect only isolated and intermittent elements of these higher functions in the brains of other animals.

Thus the mechanisms of the brain reveal a deep physiological division between man and ape, deeper than the superficial physical differences of most distant origin. If the title of soul be given to the higher functions in question, it must be admitted that the other animals have only a glimmer of the light that so shines before men. Aristotle's frontier of learning stands. The nearest creature to us, the chimpanzee, cannot retain an image long enough to reflect on it, however clever it may be in learning tricks or getting food that is placed beyond its natural reach. Unable to rehearse the possible consequences of different responses to a stimulus, without any

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