A Note on Myeloarchitectonics

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It is perhaps not surprising that the histology of the brain, seemingly a descriptive science, should be strongly subject to philosophical opinions, in the extent that frequently the results obtained on the background of those philosophy may be inapplicable to research inspired by another. We have witnessed this sort of misunderstanding in the field of the descriptions of the local variations of texture in the cerebral cortex of man, the so-called architectonics of the cortex. C. Vogt, under whose immediate influence the architectonic school had flourished, informs us in a retrospective and programme article (C. and O. Vogt, '53) of the stand of the empirical scientist (his own stand) on the subject of mind-body relations which he may define as to the place and form of the occurrence of somatic phenomena accompanying psychological events, but not as to the essence of the connection. Thus subdivision of areas became the ultimate goal of anatomy and localization of function the leading spirit in physiology, since what happens within a particular area, was apparently considered as pertaining to the mode of psychophysical connection about which the empirical scientist in Vogt's sense is agnostic. Histological analysis of the architectonic school stops at this level.

Quite contrary to this approach, the cybernetical program (McCulloch and Pitts, '43; Wiener, '43; v. Neumann, '51) permits us to think of psychological and neurophysiological complexities as being ultimately isomorphic and describable in terms of the same abstract logical structure. If different histological patterns are correlated with different functions, it is of prime interest to study these patterns in detail in order to learn something about the as yet obscure problem of the nature of nervous integration. Ideally, we should like to describe the structure of the gray matter as a mathematical function whose variables are the states of the individual neurons and whose constants are to be obtained through a translation from neurohistological (and physiological) data. Attempts at such a translation were made in this laboratory for the cerebellar cortex (Braitenberg, '61; Braitenberg and Orecchio, '66) and for the cerebral cortex of man (Braitenberg and Lampari, '66). It is in this spirit that we take up again the problem of local variation of fiber patterns in the cerebral cortex of man, in order to obtain some additional information for a theory of the function of the cortex.

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Oddly enough, while we know very little indeed about the fundamental wiring diagram of the cortical grey, we are assured by the workers of the architectonic school that there are at least 66 different variations of this diagram in the cortex of the frontal lobe (Vogt, '61), 91 alone on the dorsal surface of the temporal lobe (Bock, '30), 63 in the parietal (including post-central) lobe (Bateson, '36) etc. These findings are of such fundamental interest for any cybernetical theory of the cerebral cortex that we cannot accept them without a methodological discussion. Criticism of the architectonic parcellation was expressed by Laslby and Clark, '46; Bailey and v. Bonin, '51; Le Gros Clark, '52; Sholl, '53 and others. The author has approached the problem directly in a description of the myeloarchitectonic variations within the frontal lobe (Braitenberg, '56) and in a survey of some fiber patterns in the whole cortex (Braitenberg, '53). The general conclusions in which this led...