tion to the localized systems of projection and associational neurons, there is in the cortex an enormous mass of non-specific tissue. This is everywhere abundant; it varies in structure from place to place and in function from moment to moment. It integrates all cortical activities, synthesizes experience and provides the plasticity of structure requisite for learning and higher mental processes in general.

Reviewing what is known of the phylogeny of the cerebral cortex, it appears that the integrative, associational and synthetic functions have predominated from its inception. Some measure of localization is always present. Only the analytic functions of the projection systems can be charted in mosaic patterns. The segregation and separation in space of the data derived from diverse sensory experiences seems to be an essential prerequisite for the association and synthesis of these experiences and their conversion into appropriate patterns of response. In lower mammals the localization of systems of projection and stable patterns of association is far less refined than in man and the mass-action of the cortex bulks larger. The more refined localization of these two types in the human brain is of great significance in clinical neurology and especially in surgery. The elaboration of these localization patterns goes hand in hand with a still greater increment in the poorly localized synthetic and integrative functions. It is these latter which have most significance for psychology and psychiatry.

The evolutionary history of the lateral geniculate body shows how a highly specific pattern of localization has gradually emerged from a diffuse and non-specific arrangement. The totalizing functions of correlation and integration have not been impaired by this process of local differentiation; on the other hand, they have been amplified and special apparatus has been elaborated (chiefly in the cerebral cortex) to ensure their progressive enhancement and to maintain their dominance over all other components of the behavior pattern.

The evolutionary history of those sensory-motor systems, like the olfactory and auditory, where precise localization in space is not an important factor, presents a radically different morphological picture, the details of which can not here be entered into.

Some cerebral functions are very precisely localized, as every clinical neurologist knows. Having determined the exact pattern of this localization for some one sensory-motor system, the clinician or the experimentalist is inclined to generalize and try to fit all his experience into this pattern. But a point is soon reached where this attempt breaks down. The observed facts do not fit the pattern. The functions performed are extremely diverse. Some of these functions are performed by local areas of gray that can be charted on the surface in mosaic patterns, like the projection fields of the cortex. These fields are interconnected by a complex web of fiber tracts which are stable structural features; these also are localized in space, though in patterns which can not be charted on the surface in mosaic designs. And permeating all this stable architectural fabric there is an enormous mass of neuropil and other less specific tissue whose structure is generalized and whose functions are more labile and modifiable.

This interstitial nervous tissue serves the primitive integrative or totalizing functions and also correlation and conditioning of reflexes and all higher mental processes, including the semantic or symbolic activities. This type of tissue is highly elaborated in the cerebral cortex. It is not structurally homogeneous or physiologically equipotential, yet it has no stable patterns of anatomical localization comparable with those of reflex arcs or cortical projection centers. The pattern of performance varies from place to place and from time to time. But this pattern is not self-determined; for its action at any moment depends on the structural organization and physiological activation of the more stable tissues with which it is organically related.

It is evident, accordingly, that no single formula of cerebral localization of function can be written. Each type of performance has its own anatomical pattern which must be discovered by patient research. For some types of function there are no local organs with stable or rigid arrangements of neurons, for these organismic or totalizing activities are general in their reach and fluid in character. Yet the tissues which perform them are not structurally homogeneous or physiologically equipotential. In these integrating functions the amount of tissue activated is a factor in the situation, as Lashley has shown, but diversification of structure and of pattern of activation is essential, for this is the apparatus of our mental life in both its analytic (sensory) and its synthetic (rational) aspects.

C. JUDSON HERRICK

UNIVERSITY OF CHICAGO

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