THE INTERACTION OF PHYSIOLOGICAL AND PSYCHOLOGICAL
PROCESSES IN ADAPTATION*

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The invitation to give the third lecture in memory of the late Dr. Richard Hutchings is a responsibility which I take as an honor. It is my hope that my remarks may render some small homage to the memory of this great man. My predecessors in this annual lecture, Dr. Winfred Overholser and Dr. Harry C. Solomon, dealt in considerable measure with historical aspects of psychiatry. In such surveys, the work and place of Dr. Hutchings in this state and the emanation of his influence to the four corners of the globe have a status which I am hardly qualified to summarize or to assess. My objective is to provide a series of miniatures from the gallery of science which are symbolic, if not actually representative, of the diversified interests of this physician, who was distinguished not only as a man, but also for his professional and scientific achievements. I hope to describe different approaches and ways of viewing man, not as a static abstraction, but as a living, changing being who seeks equilibrium, and who, if he at times despairs at the unpredictable alterations which life imposes, also rejoices at times in the challenge which change evokes.

The word adapt is defined in the Oxford Dictionary as "make suitable to or for a purpose." This is well exemplified in Dr. Hutchings' life, his ability to meet new situations and, with purpose, to master them.

The history of nations may be viewed from such a viewpoint of adaptation, according to Toynbee.1 Those peoples so situated that they encountered the challenge of climate and circumstance sufficient to evoke effort responded with productive endeavor that overflowed the banks of immediate need to irrigate vast fields. Those who faced no challenge in their sybaritic life of ease could watch the stream flow serenely by within the banks of conventional

*The third Hutchings Memorial Lecture, Syracuse, N. Y., October 1, 1951. (Richard H. Hutchings, M. D., who died October 28, 1947, was a past president of the American Psychiatric Association, and a former superintendent of St. Lawrence and Utica (N. Y.) State Hospitals. He was professor emeritus of clinical psychiatry at the College of Medicine of Syracuse University and was editor of this QUARTERLY at the time of his death. A series of annual lectures, sponsored by a memorial committee of former associates and friends, is being given at the Syracuse College of Medicine as a memorial to him.)
existence that required no change. Those who faced the overwhelming flood of an environment too devastating to be canalized barely managed by exertion of all their powers to eke out an existence.

People, like nations, wilt when they do not have to strive, or falter or go down when overwhelmed by extreme events, but they prosper when change challenges them to an effort to which they can adapt successfully. Such generalities are statistical truths of course, and successful survival or unhappy failure sometimes occurs in what to us are contradictory circumstances that can only be explained by generalities about unfathomed capacities for achievement and unrecognized tendencies to dissolution.

If we turn now from considerations at the level of culture and community, to examine some physiological aspects of the individual organism's adaptive responses, three broad variables must be recognized if our concern is to learn more about behavior as a whole. These are: (1) the effector tissues—those that exhibit adaptive change, (2) the internal co-ordinating mechanism; and (3) the influences, or stimuli which impinge on the organism from the environment, including the memories and tissue modifications of former experience. Because of this lecturer's special interests and the practical consideration of time, attention will be explicitly focused mainly on the second of these, the internal co-ordinating mechanisms, though the other two variables must inevitably receive oblique acknowledgment.

Recognition of man's ability to meet physical change and psychological adversity, to survive and grow strong in the face of trials and danger has long been recorded in sagas and folklore. This has provided inspiration but not systematized knowledge. The first highly organized attempt to understand how the body re-acquired its former equilibrium after physiological change came in the mid-nineteenth century. Claude Bernard not only found the facts but framed the concept that is now a commonplace, the body's tendency to maintain a constant internal environment.

At the beginning of the present century Cannon began his researches on the autonomic nervous system and adrenalin, researches which revealed many adjustments made by the body to external noxious stimuli and internal emotional disturbances. Subsequently, he originated the term "homeostatis" to indicate the tendency of the body to return to normal after exhibiting physio-