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WITH THE AUTHOR'S COMPLIMENTS

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## THE BIOLOGICAL VERSUS PSYCHOANALYTIC DICHOTOMY

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One of the principal functions and type of behavior which distinguishes man from other species is language and its different forms. The technical languages available to a given individual distinguish him from his fellows. Highly specialized languages may contribute to misunderstanding by generating confusion, friction and hostility. I hope to avoid this by staying as close to everyday English as the subject allows.

A technical language embodies the concepts, methods and results of the given science in which it was developed and in which it is developing. As has been shown many times, scientific advances mean new language in which the thoughts and observations can be expressed with a minimum effort, minimum confusion of terms and maximum precision of concepts. Sometimes purely theoretical advances are made by exact and painstaking analysis of the basic language of a given science—the basic assumptions are examined and defined with new precision and new clarity; the clearest examples of this process are in the field of physics where the art and the science of the language structure has been condensed by borrowing from and inventing new mathematics. Einstein's General Theory of Relativity is such an example. He examined the Newtonian postulate of absolute time and space, recast it with relative space-time assuming the limiting velocity of light and came up with a testable new theory.

Such new advances as these are developing in the overlapping languages of biology, psychology and psychiatry. Two recent books, a long general one by J. H. Woodger on "Biology and Language" and a short specific one by E. R. Ashby on "Design for a Brain," illustrate the power of carefully analyzing basic assumptions. Using this approach, one can easily show and feel for oneself the immense hoax perpetrated by language of separating chemical-physical, physiological, anatomical phenomena from psychological ones; in other words, the dichotomy of brain-mind is generated by and in the languages used rather than in the phenomena described. If, like Woodger, one sets up a language appropriate to the small segment of reality one's science is considering, then it is not fair, in language strategy, to use that language to express something belonging to another segment of the universe.

Particularly is this true in considering the relations between

biology and mental health—in which the observer and the subject may, in many regions, be so much alike that the observer sees himself in the subject rather than something new and interesting and of general scientific value. The physicist, the chemist, the biologist and the animal psychologist all have a distinct advantage over the clinical psychologist, the psychiatrist and the sociologist in that their subjects cannot reply in English—and cannot look human enough to cause the observer to see disturbing images of his own thoughts in their behavior. As is well known by now, training techniques of some value have been worked out to minimize this pitfall of identification in the latter group of workers; it may be that this pitfall may never be avoided completely but at least some large advances have been made. As is also well known, small amounts of controlled and temporary identification with the subject are useful, if not absolutely necessary, for advances in research on human subjects. From the welter of facts of individual variation and variability, general laws on the one side of human behavior, and on the other, of human thought, emotions and motivations may be worked out in the two languages at present employed; probably, however, a third language will be developed, including the previous two as special cases of a more general formulation. This will only be possible as more observations accumulate in which data are derived by the behavioristic, introspective, physiological, biophysical, biochemical and other methods simultaneously and then only when concomitant correlates are established linking these areas of observation one with the other over very short time intervals through long periods of time.

I will give an example of this approach and some of the dangers involved. Beforehand, I wish to present some background in electrophysiological research for this proposal and show how far from realization this is, even with the methodologies to be employed.

That changes in consciousness (in the subjective language) can be induced by electric currents applied to the brain from outside has been known since the time of Helmholtz—he discharged Leyden jars charged from a static machine through his own head and warned that too many jars should not be used or one becomes unconscious. That stimulation of parts of the brain of animals and of humans can cause movements of their muscles has been known since late in the last century (Fritsch and Hitzig). That natural afferent stimulation can cause slow electrical changes to appear in the cortex was found in the 1800's. Early in the 1920's, it was found that even the scalp in human subjects show minute variations of potential generated in

the brain which change with different gross behavioral and subjective states. In the 1930's, Marshall, Gerard and Saul first found rapid electrical responses to natural stimuli. In the last 20 years, the specific responses of different electrical stimuli in different parts of the brain have been found in unanesthetized animals and in human patients during neurosurgery: there are profound differences in effect from one part to another for the same amount and kind of electric current. On the behavioral side, observations range all the way from small movements of single muscles to complete interference with all movements. On the subjective side, in human subjects recent reports range from "something is moving my finger" to "I was suddenly terribly frightened and couldn't think," depending on the part of the brain through which the current passed.

These observations and many others have given rise to the postulate that every bit of behavior and every bit of subjective life have their parallel in the electrical activity of the whole brain at each given instant. These observations have further led to another postulate—that electrical currents suitably placed and timed within the brain can conceivably control the brain's activities and hence the thoughts and emotions as well as the behavior of the whole organism.

These two postulates are probably incomplete—the general biochemical state of the body, the environmental stimuli occurring concomitantly, the stored and built-in reaction patterns and the memories are all left out. In addition, there is a methodological catch to both of the postulates. No means is at present available to either pick up or to introduce electrical currents which does not carry with it injury to the brain which is being observed or controlled: electrodes inserted into the brain, no matter how fine, injure brain cells on the way to the site of implantation. Thus, the brain containing large numbers of electrodes is different from what it was before insertion.

More and more people *are* inserting electrodes into animals and into men in the hope of doing something positive in the treatment of diseases, including mental ones. The danger, which I mentioned earlier, is that the results on animals, incomplete and half-digested as they are, will be applied to men prematurely—this is happening at present in at least four locations (1). It reminds one of Moniz starting lobotomies on humans after experimentation with only two chimpanzees, Becky and Lucy, and before these animals were carefully evaluated by all possible approaches.

It may be that the two postulates above are correct as amended, but this does not justify experimenting on men in the name of mental health research at this early date, if ever.

Let me give you some intermediary steps—some extrapolations of where this “biological” research should proceed before it gets out of control. There is much to be done with neurosurgical patients who must have the skull opened in order either to save life or relieve an intolerable disease situation such as grand mal seizures due to a removable lesion. Some research on these patients by cooperating experts in psychology, psychoanalysis, psychiatry and sociology can evaluate the influence of the operative procedure and of electrical stimuli applied to the presenting tissue on that patient’s subjective life and overt behavior. Correlations could be drawn between the patterns of electrical activity, the present behavior and the reports from the patient, in the light of a thorough knowledge of past thinking, reaction patterns and memory.

We are still early in this field—much too early and the normal afferent and efferent paths to a human’s brain are still the best means we have for communication and for therapy. Learning to translate a patient’s private language into one’s own private language and then to interpret his behavior and talk in terms of one’s own language, retranslating some of it back into the patient’s language and giving it to him is still the best treatment method available, with all its short-comings. As was expressed by Freud, someday we may know enough biochemistry to treat quickly and effectively each mental disease on its own biochemical substratum—but our ignorance keeps us using that which works slowly and expensively now.

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#### B I B L I O G R A P H Y

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