Discussion

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DRS. KATZ, NEAL AND SIMON have made a clinically useful description of the aged patients in their clinic, indicating the high degree of motivation that exists in patients brought for observation for mental disorder. Populations so highly motivated certainly could be subjected to some type of objective examination in addition to the clinical observations made.

From these observations it becomes clear that aged patients are more sensitive to situational changes and show greater lability in their response than their younger colleagues. Consequently, the interview results are highly dependent upon the tension and rapport which exist between the patient and his examiner. Also, while the clinical observations are useful and lead to deeper understanding, they remain, at best, the private property of the observer since we do not know the basis for his conclusions unless the methods applied are made more public. For these reasons, supplementation by objective approach is highly desirable.

Dr. Brožek reviewed the physiological aspect of aging with special reference to: (1) skeletal frame, which undergoes least change, (2) composition of body tissue and muscle and adipose tissue, the last showing gradual increase with age, and (3) distribution of soft tissue constituting the padding over the skeletal frame. At present the only available data are those based upon animals, but the eventual availability of such measures on human material may yield information on the physiological aging process as a substrate for behavioral aging. In reviewing the constitutional psychopathology of aging, Dr. Brožek points out that three aspects of this problem can be subsumed under the headings of constitution, fatigue, and strength. Constitutional changes are the changes in physique with age which seem to be quite definite, and the notion that constitution remains constant with age is not tenable. With regard to fatigue, a contrast is made between it and the feeling of being old. The author tries to develop a neurophysiological mechanism which might be required for distinguishing fatigue as opposed to the mere feeling of being old. He attempts to measure the loss of strength with age through measuring the changes
in the structure of the limbs. Measurements of the thickness of overlying skin and subcutaneous fat are assayed in this approach. It is found that there are very definite age changes in the compressibility of skin folds which make such measurements rather difficult unless a control is introduced for this compressibility.

Dr. Birren points out that it is important to study the process of aging in such a fashion that its regularities rather than its irregularities will become apparent. Whenever an older individual is placed in a testing situation in which he has to anticipate the occurrence of certain stimuli or make immediate responses to a stimulus, it becomes clear that his performance will reflect either a lower level of activation in general (that is, a lower level of wakefulness or alertness and general responsiveness) or a general set for responding slowly. It is quite clear that, despite his habitual slowness in responding, he retains the capacity for rapid action when it is demanded. For example, an application of small electric shock when reaction time slows down brings about a striking differential in his behavior by making him respond much more quickly than he did before shock was introduced. However, despite this acceleration he still does not respond as rapidly as the younger individuals without shock. This would indicate that the difference between the old and the young is not in the motivational factor alone as had been suspected. However, after regular fore-periods it seems that the older subjects improve their mean speed of response relatively more than the younger subjects do. Since the author does not indicate whether the value of the initial level has been partialled out through covariance, it is difficult to tell whether the change is independent of the initial difference between the two groups. It might be interesting to apply techniques such as the sensory shift technique developed by Dr. Sutton of the Biometrics Research Laboratory in the New York State Department of Mental Hygiene to see whether a differential still remains between the young and the old when motivational factors are randomized.

One of the striking findings of Dr. Birren's study is the increase in storage capacity for memory coming with age. For example, while the physiological, sensory, perceptual, and psychomotor responsiveness of the individual which depends upon reception and encoding of immediate sensory input declines with age, the conceptual behavior which depends largely upon storage of information seems to maintain its high level throughout the old age period and sometimes even increases in contrast with the level attained by younger individuals. However, when a group of older but physiologically not so healthy individuals with one of healthy people of their own age, the former seems to be less than that of the latter will show no better capacity in conceptual function than the younger individuals, and are inferior to the healthy. Just how the storage capacity of these individuals in physiological impairment remains a problem for research.

Another finding which may cast light on our studies of reaction time in young and old people. Reaction time increases significantly. Since the major time is accounted for not by the sensory receptor or effector, but by the central connections between them, we must conclude that the decline in sensory acuity or capacity can not account for the increase in reaction time, the increase must occur in the central synaptic connections. Some have been proposed to explain this phenomenon, including the spontaneous firing of nerve cells in less synchronous with age, producing neural "noise" with signal detection and decoding. This may also explain down of reaction time in schizophrenia. If this is a facet to the similarities that have been postulated between schizophrenic and aging processes.

Thus, the schizophrenic is characterized by a more than 20 years his senior, according to Vera Norris (Men 1958, Maudsley Monographs, No. 6, pp. 317). The attitudes in sorting behavior, confusion, and performances offer other parallels as do the changes in psychomotor and perceptual functioning. In view of the above, we contrast old schizophrenics with young schizophrenics and, in contrast with the double effect of both aging and schizophrenia show some interaction effect between the two trends.

In another study, Birren reports the results of the Wechsler Bellevue Intelligence Test, using a component technique. He found that about 50 percent variance was attributable to factor I, which he defined as intelligence. The second factor accounted for 11 percent variance, and was regarded as the aging factor because of its positive correlation with vocabulary and a negative cor...
of older but physiologically not so healthy individuals is contrasted with one of healthy people of their own age, the capacity for storage of the former seems to be less than that of the latter. The physiologically ill show no better capacity in conceptual functioning than do the younger individuals, and are inferior to the healthy older individuals. Just how the storage capacity of these individuals is affected by their physiological impairment remains a problem for further investigation.

Another finding which may cast light on the above comes from studies of reaction time in young and old people. After age 60 simple reaction time increases significantly. Since the major portion of reaction time is accounted for not by the sensory receptor nor by the muscular effector, but by the central connections between input and output, we must conclude that the decline in sensory acuity or in muscular reactivity can not account for the increase in reaction time with age. The increase must occur in the central synaptic connections. Various theories have been proposed to explain this phenomenon, including the possibility that the spontaneous firing of nerve cells increases or becomes less synchronous with age, producing neural "noise" which interferes with signal detection and decoding. This may also explain the slowing down of reaction time in schizophrenia. If this is true, it adds another facet to the similarities that have been postulated between the schizophrenic and aging processes.

Thus, the schizophrenic is characterized by a mortality rate of groups 20 years his senior, according to Vera Norris (Mental Illness in London, 1958, Maudsley Monographs, No. 6, pp. 317). The abstract-concrete attitudes in sorting behavior, confusion, and perplexities of schizophrenics offer other parallels as do the changes in physiological, sensory, and perceptual functioning. In view of the above, it might be well to contrast old schizophrenics with young schizophrenics against the background offered by the contrast between old and young normals. Will the older schizophrenic show a decline in speed commensurate with the doubled effect of both aging and schizophrenia, or will he show some interaction effect between the two trends.

In another study, Birren reports the results of a factor analysis of the Wechsler Bellevue Intelligence Test, using Hotelling's principal component technique. He found that about 50 per cent of the total variance was attributable to factor I, which he designated as general intelligence. The second factor accounted for 11 per cent of the total variance, and was regarded as the aging factor because it has a positive correlation with vocabulary and a negative correlation with speed.
tests. But power tests tend to behave in the same way, being negatively correlated with speed and positively correlated with unspeeded tests of capacity. Perhaps the second factor is merely a "power" factor which may not be specific to age.

The search for regularity in the aging process which all the contributors to this session were seeking, may encounter an obstacle which may be insurmountable. In all of their approaches the assumption is generally made that chronological age is a good reference point for the aging process. But this is a doubtful assumption since aging is such an individual process with some individuals maturing much more rapidly than others. In cross-sectional studies, not much can be done to remove this obstacle. In longitudinal studies it becomes possible to utilize the age of maximum performance as a reference point, the way S. A. Courtiss did with reference to physical growth. Once we have examined a sufficient number of individuals longitudinally it may become possible to find benchmarks that will distinguish between the rapidly and slowly maturing individuals. Perhaps a typology of individuals characterized by different patterns of aging in their various functions will be required before much progress can be made in disentangling the skein of facts which the observation of the aging process reveals.