TWO DIRECTIONS OF MEMORY

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The idea underlying this paper may be summarized by the following two quotations from Kurt Goldstein.

> The most general formula to which the change of behavior after brain injury can be reduced is probably: The patient has lost the capacity to deal with *that which is not real—with the possible* (1, p. 30). *Therefore brain-injured persons, whose change we characterized as a loss of attitude toward the possible, as an impairment of freedom, are completely helpless when facing an anxiety situation* (1, p. 306).

Memory is commonly described as a "faculty." We are able to recall, in a patchy manner, certain events, usually of a highly emotionally-charged form, which we describe as "our earliest memories." The first memory of an individual may correlate with the state of development of the nervous system, especially with the myelination of nerve fibres.

The time when these memories emerged can only inaccurately be assigned, and certainly varies from about eighteen months to three years after birth (according to individual subjective estimates). Some psychiatrists believe in the importance of prenatal "memories." Certainly the act of being born confers no special date on the developing nervous system.

For memory to exist at all, the sense of time must be intact. The "time sense" and "memory" are strongly interdependent. We feel that the time sense is a present, personal, active process, equivalent with other sensations; and memory is the experience, the perception *in extenso* of the time sense.

It is here suggested that many of the categories of conscious activity could be more easily studied under the one heading of memory, if we were less rigid in our application of the term to the ability to "select from the past" and *only from the past.*

Development of Continuous Memory

At about two years of age, walking and the rudiments of speech are established. At about the same time, the elements of spatial orientation also are established. The child starts to make planned journeys and has the elements of skills. Thus, during the third year of extra-uterine life, the infant acquires the basic techniques for human existence.

At this time of emergence into childhood from infancy, with the acquisition of *gnosis* for language and spatial orientation, the child develops a continuous memory (though he does not realize that he has done so). This continuous memory persists throughout life in the way which we commonly know it. Memory emerges into continuity from a series of "islands." These "islands" are made up of details of exceptional circumstances.

Always in recalling one's earliest memories, one has before one's mental eye and ear some little scene—as in a scene from a play. This memory is often incorrect. The place, the time, the circumstances, and order of events may all have been different from our "recollection" of them. One is forced to conclude that much of what is recalled of the earliest memories is an unrecognized elaboration or distortion of a scene, resembling, in some few features, the scene as recalled by other witnesses.

The island appears upon a formless mental background which is comparable in psychological content with unconsciousness. This background may also be likened to lack of perception, which may be exemplified by asking the reader to consider the visual field at the back of his head. We have no *gnosis* for visual activities which would occur if we did have eyes at the back of our heads. Yet one can imagine that one *might* have eyes at the back of one's head, and one can imagine the field of vision which would be provided (from memory of what we know to be behind our ears, or from turning round and seeing what might be visible if we had the occipital eyes).

The description of the change from this largely unperceived world with the few isolated views (now called "earliest memories") to the assumedly continuous recall of the social person is given in some such account as this: "I remember one or two events between, probably the age of two and three. Then there is nothing special until my memory became continuous, about three or four or even five."

Everyone believes he has had a continuous memory since childhood. We maintain this belief while admitting that much is forgotten, some things lost beyond recall, others lying in a dormant state from which they may or may not be released, perhaps by normal daily events, perhaps only by an epileptic fit. To obviate this difficulty it is assumed that "memory" is selective; that *events of importance are chosen because of their usefulness in directing future conduct*; that trivial events are forgotten for the opposite reason. Only by the assumption of the selective memory may we avoid the critical observation that

memory is not continuous; nor always wisely selective. On further investigation of the origins of continuous memory we find that it is impossible to say when our memory did become continuous.

There is not time now to discuss the variations of form of memory with age and disease, except for some reflections on the memory of maturity. The memory of maturity is assumed to be the most valuable, being "full and rounded," and not yet impaired by the failings of disease and senility. A mature person feels that he has reached a state of experience when he has to act on his judgment and principles if ever he is to do so, before decline and regret for inaction overwhelm him. So maturity is the period of advance and self-establishment, which later will form the most intense subjects of reminiscence.

In maturity, the experience and the storing capacity are at their best. Selection from recollections of a very diverse degree permit wiser decisions and actions than would be attended similar circumstances in youth.

Contrariwise, in maturity a man becomes "set in his ways:" so that he is less flexible, more inclined to use his selection of memories in idiosyncratic ways, conforming with the pattern of his established way of life. Thus a recollection of unhappiness, or poverty, or affronts in youth may obtrude more frequently than the episodes of warmth, contentment, generosity and encouragement. In consequence of, and in keeping with, such memories, a man may direct his personal and public life. For memory, which subsumes past experience, is the process or means by which future experience is sought and managed.

THE POSITIVE NATURE OF MEMORY

It is our habit to assume that memory, being a "faculty," is some sort of personal possession, comparable with a physical organ—"of course I have a memory." It has been stressed elsewhere (2, 3, 4) that perception is a positive, dynamic, active *process*; that perception is not a passive attribute imposed upon us by the outside world. Now memory is a form of perception (of time); and is thus equivalent to the time sense, and comparable with the visual or auditory sense.

When we remember something, we perform at a present time, a positive action related to the present moment, and directed to the future, just as in seeing, hearing, and being aware of the position of our limbs.

When we talk about "past events," we mean that they are past in relation to a "now-point," which appears to be moving "into the

future." Certainly, the "now-point" is a personal and present state of awareness, which ends with unconsciousness. The "now-point" serves to distinguish our own individual past from our future.

At the present time, our "now-points" are so equally adjusted, because of the general uniformity of our surroundings and the structure of our bodies, and especially of our nervous systems, that we have a kind of communal "now-point." This state will soon be altered for the first time in the history of living matter, because present-day science and technology have at last, and very suddenly produced methods by which at first a few, and later many of us, may be given an entirely new set of circumstances (to which our nervous systems are completely unadapted) of space and speed, which will produce great personal changes in the time sense, with the production of a number of different time senses, all equally valid, but totally different from one another.

We usually have the feeling of the "now-point" or "present" as an advancing point or edge (of something undefined, but often labelled "time"), in a manner comparable with a pointer moving over a scale, a machine advancing along a course, or even as the blade of a circular saw cutting into material pressed upon it and flowing past. The main characteristic of the "now-point" is its elusiveness, for as soon as it is proclaimed, it is obsolete, being continually renewed or replaced. We are able to think, therefore, of any number of combinations of—*past*: "*now-point*": *future*.

BACKWARD AND FORWARD MEMORY

We may as easily consider the "now-point" in the near or remote future. We say, "A time will come when I shall do such and such." We "imagine" ourselves in the future circumstances (just as we may in "memory" imagine ourselves in past circumstances—only the present being "real"). It is an accepted human social convention to speak in this manner, for although many details of a future situation may be missing, the main outlines are probable, and the proposed action possible, even if the background varies considerably from the expected, in the meanwhile. This process is termed planning, planning ahead, looking ahead, making *provision* for the future, etc. We do it all the time!

In this process of planning, we make use of memory, by applying our present memory to a future set of imaginary, but likely circumstances. (Imagination is another form of forward memory.) From

what we recall of the past, under the labels of memory and experience, we calculate the probabilities of future events. In meteorology, the process is called "forecasting the weather;" in medicine, "giving a *pro*gnosis;" in gambling, "laying the odds;" in accountancy, "budgeting;" in politics, "exploring every avenue, and considering every *foreseeable* eventuality."

If memory is necessary for planning and prediction, a defect of memory should apply to future events equally as to past events. Such expected failure we find in practice, when we consider those suffering from cerebral disease. The defect is most striking when it results from damage to a person "of superior intelligence."

Clinically, such a brain-damaged person is said to have lost his "drive, initiative, imaginative and creative powers." He is lacking in "judgment and foresight." His behavior is altered—"he does not seem to mind what becomes of him." He loses his social graces, and his habits become, at first, tiresome, and later abhorrent, with incontinence of urine or faeces in his clothes or bed.

It is suggested that the decline in cerebral function prevents the patient from remembering what the consequences of his actions will be, *when he carries them out in the future.* He "forgets" (i.e. fails to *predict*) that if he is incontinent of faeces, in a few minutes time he will be uncomfortable, in disgrace, and in need of attention.

A young patient, mainly well preserved socially, with gross cerebral atrophy, after operation for partial removal of a cholesteatoma, often passed his motions into his trousers. On being questioned why he did this, he replied, "It is much more convenient."

Though future memory may be less accurate in detail than memory for past events, it may be highly efficient. On occasion, future memory may surpass past memory, especially if the subject be questioned about a past event which he has not had to keep close in mind. For example, he may give a more accurate answer to "Who will be at the meeting on Monday?" than "Where and when was your nephew christened, and who else was present?" If he has to read a paper at a meeting, he will, if he is the next speaker, know far more about what will soon be said, than about what the last speaker has been saying. A past event is signified chiefly by circumstantial proof of its occurrence; a future event by lack of such proof. Though forward memory —this process of deducing future possibilities and probabilities on the basis of past events—often takes the respectable form of "planning," it is also one of the chief sources of diversion, under the name of

"gambling," or "making a career." It is also a great source of language components.

CONCLUSION

The philosophical and technological implications of this forward-looking memory process from the neurological standpoint have not yet been realized. Many of us are afraid of losing our footing if we spend too little time among those phenomena which we call facts. Yet the *behavior* of the human race, in mass and as individuals, is a strictly factual, if complex, neurological field of study. That we have an appointment to keep and we know it, is surely as factual as the alpha-rhythm which we hope we should show in the highly artificial circumstances of having an EEG done. As citizens or as neurologists we must not be left with that most tragic mixture of forward and backward memory "if only I had known then what I know now, things would have been different."

The "attitude towards the possible" is a splendid and illuminating concept, equal in conceptual importance with those other concepts of Goldstein, "concretization" and "catastrophic reaction." Since the human organism is aware of "the possible" and can maintain an attitude towards it, he shows himself capable of a form of foresight, of seeing into the future. Perhaps, in the course of evolution, in which man has been present for so short a time, forward memory will advance, first to equal, and later to surpass past memory. This statement is an attitude towards the possible.

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