

Boyer, John C. - The Human Mystery -
(Bantam, New York, Sept, 1980)

Boyer believes that biological evolution for man is at our end because evolution goes on less than 20% of the way to state. "Natural selection is no longer permitted to happen."

... the remarkable feature of Eccles' view is not our emphasis on the brain but the important claim, indeed convincing proof, that mind to some extent all physical organs and is something else. (Eccles)
Reviewer: Henry Margham, Yale.

A.G. KARCZMAR AND

1979

J. C. Eccles (Ed.) Reason and Human Behaviour
Springer Verlag, New York —

Preface by Eccles: --- At one level of our problem-solving and investigation we can regard the brain as a neuronal machine of almost infinite complexity. Even from our present fragmentary knowledge we can appreciate how it can give us the immense variety and subtlety of performance throughout life, and develop the intelligence range of storage and retrieval that we experience in our memory. However, there is another aspect of brain function that is beyond our scientific comprehension at the present time, and that is its relations like to conscious experience. The brain cannot be viewed like a machine arranged to the scope of a machine or a Turing and life- however, yet it has been exposed to in many papers, particularly those concerned with philosophical problems. I agree with the behaviourists at the beginning that most conscious experiences are just reducible to physical, and that we do not yet have any satisfactory approach to the mind-brain problem. This problem seems to exercise our minds intractable the more we advance in the scientific study of the brain. — // Contributions by Eccles: P. 39, Nothing by Eccles on Sperry in this book.

P.167 Source of ambiguity + identity (self) bridges periods of consciousness + sleep. --- "opposite
 Behaviour + stimulus -> ignores the physical experience that precede it as if the primary reality."
 As Full + Page. normal identity (more abstractly) P.168 - but when - "brain states not
 not necessarily no blowing patterned experience in general and time of our lowest infirmity
 complexity, with only 1 minute function, less than 1% of cortical activity, - our going to
 the subject as a conscious experience. Pattern guard as repeating it. - "I will refer shortly
 to what attacks on by-passing) when the resting state on the biophysical, areas of the
 brain, and then to the what seem to be in state of affairs over much on human
 brain, namely the scientific study of the right + left hemispheres after section of
 brain commissures in dogs, who still have been carried out in the last few
 years in Los Angeles under the general direction of Roger Sperry, -

P.169 Investigations on the Human Brain after Commissural Section. - This work has been
 published and discussed on many occasions by Sperry and his colleagues (15-21), but
 it is my thesis that the extraordinary implications of this work for the mind-brain problem
 have not yet been fully realized by philosophers and scientists. This has occurred because
 the climate of opinion is not yet ready for these most surprising and revolutionary results.
~~The following~~ P.170 These split-brain cases have been systematically investigated in a

P.170 (cont.) most skilled and patient manner by Sperry and his associates who have amassed a wealth of data that has been confirmed again and again in the sequence of patients. Great care has been exercised throughout the experimental design in order to eliminate all inadvertant cross-cueing. ... To me the outstanding discovery in the investigations is the uniqueness and exclusiveness of the dominant hemisphere, that is, the speech hemisphere, in respect to conscious experience. The friends and relative of the subject recognize his expression in language and his memory as being not greatly disturbed by the operation, despite the elimination of the whole performance of the right hemisphere. The unity of self-consciousness or the mental singleness that the patient experienced before the operation has been retained, but at the expense of unconsciousness of all the happenings in the minor hemisphere. This minor hemisphere continues to perform as a supremely intelligent animal brain with a refined stereognostic performance, but none of the goings-on in that hemisphere gives conscious experiences to the subject. It is remarkable to see the superior stereognostic performance programmed by the minor hemisphere to the left hand, all unbeknown to the subject who sees it with amazement and chagrin. ... In other respect, the minor hemisphere is deficient... (Word recognition is limited to names of common objects.) This recognition transcends a simple name-object identification in that it discloses a language comprehension, e.g. "measuring instrument" for ruler, "used for lighting fires" for match. In this manner the minor hemisphere can... (also), ... display a simple learning in new situations. Despite all this apparently intelligent behavior, the subject never derives any conscious experiences from the "goings-on" in the minor hemisphere in all of its operative procedures. ((How does he know?)) In fact, as stated above, the

subject disclaims responsibility for these appropriate and intelligent actions programmed from his minor hemisphere. ((How can the left H. know what the right H. did, and how can the right H. claim responsibility if it can't talk!!!)) - (P.171) Poor transmission through subcortical pathways leads only to vague experience of discomfort or embarrassment the subject can not explain. (Ecclles thinks that's surprising.) - I now formulate the radical hypothesis that, even before section of the corpus callosum, the "goings-on" in the minor hemisphere did not directly give the subject any conscious experiences, a hypothesis that I tentatively suggested several years ago. (28) Ref: to The Brain and the Unity of Conscious experience" (1965). In order to make this hypothesis of mind-brain interaction explicit I present a diagram (Fig. 7) that portrays the flow of communication between major subdivisions of the brain and also to and from the outside world. ((I think the same diagram is in "The Self and its Brain". It shows the mind outside the brain and interacting only with the left hemisphere.)) P.172 It is, of course, not implied that the conscious self is hovering in space above the dominant hemisphere. ... On this hypothesis we regard the minor hemisphere as having a status of a very superior animal brain. ... no conscious experience. Moreover, there is no evidence that this brain has some residual consciousness of its own. Sperry postulates that there is another mind in this brain, but it is prevented from communication with us because it has no speech. I would agree with this statement if it would be linked with the further statement that in this respect the minor hemisphere resembles an animal brain, though its performance is superior to that of the

(P.172)(Cont.) highest anthropoids. In both of these cases we lack communication in a rich linguistic level, so it is not possible to test for the possibility of some consciously experiencing being. We therefore must be agnostic about the question of mental activities and consciousness in the manner in which I have defined it at the beginning. (E. makes much of the fact that even persons who are lefthanded are mostly left H. dominant, except when there was a braininjury to the left H. in early childhood.) --- (That's in P.169) --- P.173 again: Moreover, the most searching investigation discloses that the minor hemisphere does not have in the smallest degree this amazing property of being in liaison with the conscious mind of the subject in respect either of giving or receiving. ... Acute problem of what would happen if there is bilateral speech, as has been claimed to occur as a rare anomaly. ... Serafetinides showed that loss of consciousness (and aphasia) occurs for some minutes in the dominant hemisphere after sodium a... injections - but only very shortly if the injection is administered to the minor hemisphere - E. thinks that proves his hypothesis. (Results were criticized and are ^{irreversible} ~~unrepeatable~~). More evidence needed. Loss of consciousness occurs only when both h. are affected. -- // Question: Is there some anatomical structure in the left H. that is not matched in the right H.? - (Planum Temporalis bigger on the left.) Finer diff. await electron-microscopic techniques. --- Speech in man unique. Developed rapidly during last 2 million years. No higher apes can speak. Communication at different level. Lower than right H. performance of Sperry's work. (One boy with birth defect in left H. could write correctly with left hand to right H. input, but could not say correctly what he wrote. Left H. had remained speech centre.)

Various specific performances of the dominant and minor hemispheres as suggested by the new conceptual developments ~~by~~ of Levy-Agresti and Sperry. There are some additions to their original list:

Dominant Hemisphere:

Liaison to Consciousness
Verbal
Ideational
Analytic
Sequential
Arithmetical and
Computer-like

Minor Hemisphere:

No such liaison
Almost non-verbal
Musical
Pictorial and Pattern sense
Synthetic
Holistic
Geometrical and Spatial

← (Eccles added this one)

P.174 Reconsideration of the Mind-Brain Problem. Reference to Popper's 3 worlds.

P.175 The information flow diagram of fig. 7 can also form a background to the recent conceptual formulations of Sperry in mind-brain interaction. In general terms he states (Sperry R.W. in perception and its disorders, Res. Publ.Ass. Nerv. Ment. Dis. Vol.48 (1970)) (Perception in the absence of the neocortical commissures.) : "Conscious phenomena in this

Sperry quoted!

scheme are conceived to interact with and to largely govern the physio-chemical and physiological aspects of the brain process. It obviously works the other way round as well, and thus a mutual interaction is conceived between the physiological and the mental properties. Even so, the present interpretation would tend to restore mind to its old prestigious position over matter, in the sense that the mental phenomena are seen to transcend the phenomena of physiology and biochemistry." ... "Consciousness does do things and is highly functional as an important component of the causal sequence in higher level reactions. This is a view that puts consciousness to work. It gives the phenomena of consciousness a use and a reason for being and for having evolved. " ... In another publication he states: (Sperry, R.W. Psychol. Rev. 76, 532 (1969) - A modified concept of consciousness). "In the present scheme the author postulates that the conscious phenomena of subjective experience do interact on the brain processes exerting an active causal influence. In this view consciousness is conceived to have a directive role in determining the flow pattern of cerebral excitation."... The split-brain investigations have, I think, falsified the psychoneural identity hypothesis, which has also been strongly attacked on philosophical grounds (Polton). It is demonstrated that the minor cerebral hemisphere with its ongoing activities that can be categorized as displaying memory, understanding even at a primitive verbal level, and concepts of spatial relations does not give any conscious experiences to the subject, who remains in conscious liaison only with neural events in the dominant hemisphere. Evidently, the concept of psychoneural identity has lost its primitive simplicity of identification of neural activities of the brain.

in general with conscious experiences derived therefrom. In particular, sophisticated, intelligent and learned activities of the minor hemisphere do not achieve liaison to the consciousness of the subject. Moreover, as Sperry has realized, the problems have to be approached at a new level of understanding, the holistic approach. And this occurs in special regions only of the cerebral cortex and in special states of these regions. Moreover, psychoneural parallelism has to be rejected, for on this view the mental states are ineffective, being merely spin-offs of neural activities that they cannot influence. A further remarkable outcome of the split-brain investigations is that there is almost no cross-communication at the cerebral level except via the corpus callosum and the anterior and hippocampal commissures. The proposal by Penfield that mental unity is achieved by transmission to and from the centrencephalic system in the brain stem is, of course, falsified by the failure of any conscious appreciation of activities in the minor hemisphere after commissural transection. This unity must normally be achieved by the intense impulse flow through the cerebral commissures. Evidently immense and fundamental problems are involved in the evolution of the brain that occurred as man was gradually developing his means of communication in speech. One can imagine that speech and brain development went on together in the evolving process and that from these two emerged the the cultural performance of man. Over hundreds of millennia there must have been a progressive development of language from its primitive forms expressive cries to a language that became gradually a more and more effective means of description and argument.

In this way, by forging linguistic communication of ever increasing precision and subtlety, man must gradually have become a self-conscious being aware of his own identity or selfhood.
As a consequence, he also became aware of death, as witnessed so frequently and vividly in other members of the tribal group that he recognized as beings like himself. (At least a hundred thousand years ago - ceremonial burial customs.) ...development (P.176) of technology that distinguishes the Neolithic age from the relatively slow development of the long Paleolithic era. In the maturing civilizations the exigencies of survival were no longer dominant in the thoughts of men and the creative imagination of man could instead be expressed in literature, in art, in architecture, and in the further developments in religion, in philosophy and in science that are associated with his attempts to understand the manner of being he was, his origin, and his destiny.

Dr. Sperry believes Eccles took his downward - causal stream concept of
mind over + accepted with it, after first knowing mind to select conscious men to control
in the organism. -- (1953) -- Sperry, he says, expanded the "limits of consciousness men" already in
his 1952 Paper + again in 1964 at the National Institute for Mental Health. -- Eccles only
expressed it in 1967 -- showed the checks all the differences on that.

1965

Eccles, Sir John # The Brain and the Unity of Conscious Experience

The 19th Arthur Stanley Eddington Memorial Lecture 15. Oct. 1965

Cambridge, at the University Press. (Great Britain) -

Professor of Physiology, Australian National University, Canberra. -

Foreword by W.H. Thorpe and W.B. Harland: "... Man's rapidly increasing control over natural power holds out prospects of material achievements that are dazzling, but when this increased control of material power can be retarded by a great natural and spiritual advance, it threatens the catastrophic breakdown of civilization. Consequently, the need now more acutely felt as never before arises of the kind of understanding to be gained through the serious study of scientific, philosophical and religious truth."

This lectureship was instituted in 1947 -- the lecturer was to deal with some aspect of contemporary scientific thought considered in its bearing on the philosophy or on ethics. -- hope to maintain Eddington's concern for relating the scientific, the philosophical and the religious methods of seeking truth and with

Eccles, Sir John The Power and the Unity of Conscious Experience.

P. 11/2 written also in parallel direction but not by experiencing either - and every thing first written and but does it all at the same time - After a few minutes, first written needs from the environment, and written by experience, involving short little ones on one side - does does on other side produced by exam - First written always observed every side - and written 50/50 - Continue - active or perception of production - for written + written! P. 13 - These experiences at each stage, as a consequence of action or trial - and over learning the basic unity is held by strong assimilation from the action are in the front so that they give a real picture of the external world that is reached by touch and movement i.e. the world of visual perception becomes a world in which we can operate more effectively --- we do not learn from a world independent of experience but from "participatory learning" - this conceptual world is richer when against the back we in operate; it is more rich than any single piece of action when the mind is in the front and we are learning - involvement inf. + conscious inf. from most in eyes are the best we are learning - involvement inf. - from most in hands operational = signature with stimulus inf. - if not distinct - from movement ->

Eccles, Sir John The Brain + the Unity of Consciousness Experiments

P.82. - consciousness appears only 1/5th of a sec. after stimulus onset. - Time for transmission from one hemisphere to another = only 1/100th of a sec. - at least one synaptic delay when the signal before a potential is established that gradually circulates here. - "activity in one half of about cells would be initially self-referential and each neuron cell by synaptic delay would be active along neural cells. - The immunity of this pathway spread throughout the neuronal pathways of the brain is beyond all the ordinary. This transmission occurs within a period of 1/100th of a sec. in which the activity in any neuron is required to report a sensory input is processed by the flow in the next neuron and happens in a few milliseconds, while judgement, correlations with remembered experiences, aesthetic evaluations, undeniably solve, Answer Power --- " - P.83 Only an extremely small fraction of all the sensory input is actually experienced = Only a very small fraction of the incoming neural input is actually experienced in which in visual perception from movement in movement - Only an extremely small fraction of peripheral input remains for all movement. - Only an extremely small fraction of peripheral input remains for all movement. - P.84 - those direct observations of movement appear upon these - movement. - P.85 to Sperry's split-brain work + unity of consciousness - movement split-brain

involved with a experiment on familiarity. - of awareness the involved different ability, overall
 involvement conflict. Some conflict of awareness were learned in appeared memories with
 a quickly in learning transfer Roverschtein. - (P. 27) - ~~the~~ exp. are 2 human subjects compared. -
 1964, 1965, Spring Here's a diff. in spacing 65:11 words and? (3m Roman + German) experience -
 Eccles Ed. Title of sp, called "Hemisphere Interactions + the Mind - Perceptual Problems" - the other title is the
 "The Great London Anniversary" in the same life Pillsbury (1964) - P. 28. They are not to
 attention applied to the left visual field, awareness of photographs, but with-
 out being able to give an account of what they were seeing. If unimpeded,
 they do not know what the left side is doing. - often, they try to control left hand with
 right hand. - P. 30 diff. avoided with present till the check button down - appeared
 in each hand, subjects aware from simultaneously and dependent, as they
 appeared in each hemisphere. - (Eccles studies mirror drawing, where - right -
 mirror like a coin with upright characters. P. 31) - Y. Temporal to probability of
 awareness. - experimental control of left hand mirror involvement in subject. - Right
 hand always interferes with right hemisphere of left hand, for which it doesn't
 know the situation. - mirror hemisphere does stimulus recognition left of it even. -
 Spontaneous mirror h. over characters, but no language; Eccles: No communication!