THE RIGHT HEMISPHERE: PATHWAY TO PSI AND CREATIVITY

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The trail blazing split-brain researches of Sperry, Gazzaniga, Bogen, and their associates had an unexpected spin-off in the field of parapsychology. Experimental studies by Braud and Braud, Broughton and others, provided at least presumptive evidence of the part played by the right hemisphere in processing psi phenomena. On the other hand, clinical observations in patients with injuries in the left parieto-occipital region, including an older case of my own (1931), showed a striking similarity between the drawings of such patients, and the telepathic drawings obtained by Warcollier, Upton Sinclair and many others in normal subjects. The world of the patient suffering from optical agnosia and, one may add, from constructive apraxia, closely resembles the telepathic or clairvoyant percipient's impression of his target. Here, too, I stated, the impressions gained are distorted and disorganized, subject to displacement or "scatter" in the coordinates of both time and space. This apparently is the best the undamaged right hemisphere can do on its own. Thus clinical observations of this order lend added support to the conclusion that psi phenomena, lacking, as they do, the precise spatio-temporal ordering and organizing qualities characteristic of the dominant hemisphere, are processed in the "other", the right side of the brain.

Similar considerations apply to PK, the motor counterpart of telepathy, clairvoyance and related afferent psi functions. PK effects, even in the best of subjects, are not amenable to deliberate volition. They are poorly coordinated, like the associated movements of a newborn infant. On watching the films made of Nina Kulagina, Ted Serios or Uri Geller at work, one is struck by the similarity of their efforts with a paralyzed patient's attempts to move an afflicted limb. Here, too, it appears that the PK subject is lacking the fine-tuned motor controls provided by the left hemisphere, to say nothing of the modulating effects of the cerebellum and its corticothalamic and subcortical feedback loops.

However, there is another characteristic of right-hemispheric functioning that has been largely overlooked by modern neurophysiologists. It is illustrated by the tendency of left-sided hemiplegics to develop symptoms of *anosognosia* or Anton's syndrome, that is, imperception of the defect involving the paralyzed or anesthetic side of the body. In many cases the syndrome includes the loss of the sense of reality of the patient's left side, a condition that I, somewhat loosely, described as *hemi-depersonalization*.

Yet it should also be noted that hemi-depersonalization is, in effect, the mirror image of the over-cathexis and exaggerated attention and sense of reality attached to hallucinations or somatic delusions that are associated with electric stimulation or other types of excitation of right-hemispheric secondary projection areas. There is reason to believe that it is the right side of the brain's poor ability at reality testing which accounts for the apodictic certainty and unshakable conviction that is usually attached to hallucinatory or delusional experiences. More recently, Julian Jaynes has gone so far as to attribute man's invention of gods to the right side of the brain: "The language of men was involved with only one [the left] hemisphere in order to leave the other free for the language of gods." On a more modest scale, Boyce Bennett and myself suggested that the ecstatic experiences of the prophets of the Old Testament were largely due to similar right-hemispheric promptings and admonitions.

However, an important qualification has to be made at this point. The arguments, both experimental and clinical, adduced so far in support of a right-hemispheric processing of psi, have one basic flaw. As pointed out in earlier publications, they apply only to one category of psi incidents: to spontaneous, macropsychological, emotionally charged phenomena. Even the telepathic drawing tests mentioned above are predicated on specific, psychodynamically meaningful interpersonal configurations. This is still more true for psi incidents in crises, dreams, trance conditions, in mother-child symbiosis, or in the psychoanalytic situation, duplicating as it does the early symbiotic relationship between parent and offspring. It is psi phenomena of this order which Gardner Murphy referred to in his article "Extrasensory Perception and Human Needs." The numinous quality of some such incidents has been specifically emphasized by C. G. Jung. Broadly speaking, most spontaneous phenomena can indeed be described as *need-determined*.

This group has to be contrasted with the experimental, micropsychological card-calling tests of the Duke type. In their original form, they were made to order in the parapsychological laboratory, using

such trivial, emotionally neutral target materials as a plus sign, a circle or a wavy line. They lacked any appreciable emotional charge or psychodynamic significance, to say nothing of Jung's numinous quality; nor do they have any apparent survival advantage.

Why, then, one may ask, should they attract the attention of a would-be participant? The fact is that, as a general rule, they do not. Our whole neurophysiological organization seems to be geared to excluding such irrelevant bits of information. And it does so for obvious reasons: the indiscriminate and unlimited influx into consciousness of impressions, both sensory and extrasensory, is wholly incompatible with the organisms' adaptation to its habitual environment. Our channels of communication would be clogged by such sensory as well as extrasensory overload; they would be deafened by noise; overwhelmed by the ceaseless barrage of inchoate messages from the past, present and future, from the here-and-now and from the far-away. F. W. H. Myers postulated the existence of a diaphragm separating the "supraliminal" from the "subliminal," designed to protect personality from what he called the "uprush from the subliminal"—including telepathy and related phenomena. In a similar vein, Henri Bergson, in an untitled Presidential Address to the English Society for Psychical Research, suggested that one of the foremost tasks of the organism is to prevent just such a contingency. Borrowing a term from modern information theory, the neural structures involved in this function have been described as the Bergsonian filter.

Today we can perhaps be more specific than were Myers or Bergson and point to four vertically organized lines of defense that are concerned with such screening functions: 1) the perceptual defenses described by such clinical psychologists as Bruner and Postman, R. W. Payne, Eysenck and many others. Payne suggests that "there is a filter mechanism which cuts out those stimuli, both internal and external, which are irrelevant to the task in hand, to allow the most efficient processing of incoming information." 2) Magoun's reticular formation in the brain stem, made up in part of efferent or descending tracts that exert a deactivating, inhibiting influence on afferent stimuli. Hernandez Peón found evidence that electric stimulation of these structures has "important inhibiting influences on incoming stimuli." 3) Békessy specifically hinted at the principle of lateral inhibition on the cortical level. More recently, Karl Pribram stressed the inhibitory potential of virtually every cortical neuron. Pribram, Dixon and others also suggested that limbic and callosal structures as well as the frontal and temporal lobes may likewise be involved in reducing excessive stimulation. 4) Sir John Eccles has noted, furthermore, that "efferent

pathways from the sensory-motor cortex . . . relay and excite both post-synaptic and pre-synaptic inhibitory neurons in the cuneate nucleus" of the thalamus. Like Pribram, he too emphasized that clusters of cortical neurons in many modules of the sensory cortex are in themselves poised to inhibit the influx of stimuli which have passed the lower relay stations of the Myersian or Bergsonian filter.

I submit that it is random flaws or irregularities in the firing of such clusters of neurons which are responsible for the equally random, capricious intrusion into consciousness of ESP of the standard, card-calling type of experiments. If so, they are then processed in the right hemisphere only, but fail to be registered in the left hemisphere, the site of what Popper and Eccles dubbed that "self-conscious mind." This is why *flaw-determined* incidents usually pass unnoticed by the experimental subject. The same is true for the subliminal perceptions or sub-ceptions studied by Lazarus and MacLeary, Norman Dixon and others. By the same token, I hinted that need-determined phenomena that happen to pass through the filter show all the ambiguity and lack of precise structural organization characteristic of right-hemispheric functioning. Obviously, the left side of the brain is too busy with the serious business of adapting to the here-and-now of Euclidean or Newtonian reality to have "time" and "space" for psi.

Yet, I don't have to remind you at this point that the division of labor between the two hemispheres is by no means confined to the left brain ignoring, denying or repressing psi, while the right side is doing its best to register, process and decipher it. The left hemisphere also gives free reign to the right side to engage in dreaming, hallucinating, falling into trances and the making of myths and metaphors. We know today that it is also the source of creative expression and, above all, of musical ability, as shown by Sperry, Geschwind and Levitzky, Eccles, and their associates. The list is incomplete and still growing. It includes visuospatial analysis, holistic perception of objects, studies of prosody and gesture.

Reverting to parapsychological aspects, as early as 1903, F. W. H. Myers, and more recently, Gardner Murphy, Moriarti and Murphy, Osis and Krippner have pointed to the similarity between the predisposing and conditioning factors of psi phenomena on the one hand, and creativeness on the other. Both the artist and the psychic use the brain as an "open" system; both approach their task with positive motivation, relaxation and a tendency to mental dissociation or altered states of consciousness; and both seem to need the contributions of the left hemisphere to decode, organize or refine the material transmitted from the other side.

Indeed, creative artists have turned out to be poor card guessers. Ingo Swann, the gifted sensitive, expressionistic painter and science fiction writer, took to headlong flight from the dreary routine of statistical card-calling tests. He is credited with an IQ of 147 on the Stanford-Binet scale, but would have scored low on a Psi Q test, as it were. Mrs. Eileen Garrett submitted reluctantly to Rhine's ESP experiments. Compared with her spectacular performance as a psychic, author and all-around creative personality, her test scores were unimpressive. Moriarti and Murphy studied the relationship between creativity and ESP in normal children. Creativity ratings in those children showed no positive correlation with extrachance scores. There are more observations in the parapsychological literature pointing in the same direction.

In view of the flaw-determined origin of ESP responses of the card-calling type, such negative results can only be expected. This is also borne out by the fact that in the heroic days of the Duke experiments, Rhine's champion guessers, A. J. Linzmeyer and Hubert Pierce, showed no evidence of artistic or otherwise creative endowment. The same is true for Basil Shackleton, the champion guesser of the still controversial Soal-Goldney experiments.

On the other end of the scale are G. Schmeidler's ESP tests with brain-injured patients, or E. Shields' series with mongoloid or otherwise defective children who produced significantly higher scores than matching controls. Three mentally retarded children and adolescents to whom I called attention in previous publications belong in the same category. Little Bo and the Cambridge Boy were dyslectic, but could "read" when their mothers tried to function vicariously in their behalf. They combined a specific perceptual handicap with telepathic abilities. Ilga K., a retarded girl of nine, showed the same tendency under well-controlled experimental conditions. Though severely dyslectic, she could "read" any text which her mother was perusing while sitting in another room. Put in a capsule, in these cases, a low I.Q. was associated with a high Psi Q., as it were.

Cases of this order suggest once more that an intact right hemisphere is capable of making up, in a more or less specific way, for "minus functions" existing in corresponding areas of the left hemisphere. Idiot savants and certain child prodigies are extreme examples of the same principle.

Perhaps the most striking illustration of the right hemisphere's tendency to compensation—or to eclipsing its senior partner—is the case of Ludwig van Beethoven. On studying samples of his handwriting, I found occasional tendencies to scrambling, reversal, transposition and omission of letters or numerals, reminiscent of the writing and

spelling mistakes seen in dyslectic children. He spelled *Heiglstadt* instead of *Heiligenstadt* in his celebrated *Heiligenstadt Testament*. He misspelled *mahoni* instead of *mahogony*, *alego* instead of *allegro*, and so on and so forth. The impression of dyslectic-agraphic disturbances was reinforced by the fact that the composer, one of the most creative minds of his century, was unable to do more than elementary additions and subtractions. He never learned to carry out simple divisions and multiplications. At the same time, we learn from his biographers that he was awkward and clumsy in his movements, had poor coordination and never learned to dance. He could not sharpen his pencils or cut his quills and had to call on friends to do it for him.

An irreverent neurologist may be tempted to diagnose this picture as a syndrome of subclinical dyslexia, acalculia and agraphia with a hint of constructive apraxia due to minimal brain damage in the left hemisphere. But he would be well-advised to realize that clinical appearances may be deceptive. Beethoven's functional deficits are more likely to be of developmental than neurological origin. I submit that they resulted from the rigorous training of the four- or five-year-old, grooming him to become a child prodigy, with an attending overdevelopment of the right cerebral hemisphere. Such a development testifies once more to its plasticity, its spectacular growth potential and virtually unlimited creative resources. By the same token, Beethoven's difficulties with the three R's and other shortcomings may have been due to a corresponding developmental block or arrest of the left parieto-occipital region. In short, the key toward a better understanding of his genius is not the paltry shortcomings of his left hemisphere, but the triumph of the right, conceivably aided by the intellectual discipline and the "unlimited capacity for taking pains" contributed by the left side. Eccles and Popper specifically stress the part played by the cooperation of the two hemispheres in musical expression and experience. Thus, while they concur that the primary foothold of musical ability is located in the right side of the brain, they suggest that "the left side" may be able to "sneak" over to the minor hemisphere and, with the aid of the corpus callosum, "have a look there, where the really subtle integrational, operational aspects" of musical ability are going on.

It would be tempting to speculate at this point to what extent the composer's personality problems, the cleavage between Beethoven the Hero and Beethoven the Antihero, were conditioned by the conflicting influences emanating from the two unequally endowed hemispheres. The fact is that his recurrent shifts from creativeness to dissipation; from the inspirations of genius to the fumblings of a social misfit, closely resemble what I described as *existential shifts*, associated with

corresponding shifts from left hemispheric to right hemispheric functioning, and vice-versa. More recently, I also discussed the psychoanalytic aspects of Beethoven's apparent ego split; its wider implications for analytic ego psychology, for a presumed neural foothold of the autonomous Ego postulated by the Freudians, and its relation to the "self-conscious mind" by Popper and Eccles.

It would also be tempting to contrast Beethoven's right hemispheric genius with the wholly amusic, uncompromisingly pragmatic military genius of his erstwhile idol, Napoleon; or with what I described as the mediumistically inclined "mythophilic" temper of C. G. Jung, versus the distinctly "mythophobic," rationalistic temper of his great adversary, Sigmund Freud. The four could also bear comparison with the surpassing genius of Einstein, saddled as he reportedly was with relatively inferior mathematical and linguistic skills. One could point, furthermore, to Leonardo da Vinci, the Super-Jack of all trades and ambidextrous *uomo universale* of the Renaissance, who combined unmatched artistic and musical abilities with spectacular mathematical and scientific gifts. Yet while Jung went on record with detailed accounts of his mediumistic exploits and accomplishments as a charismatic healer; and while Freud made at least grudging concessions to his role as an involuntary telepathic agent, we know nothing about a genuine psi factor being involved in Beethoven's or Einstein's or Leonardo's psychohistory.

Reluctantly, one may also add to this list Adolf Hitler's evil genius, with his unmistakable psychic abilities and flashes of intuition. They, too, carry the imprints of an unusually endowed right hemisphere. But in Chapter 16 of my recent book, *The ESP Experience*, dealing with his personality, I emphasized the poor survival value, for both the individual and the group, of a mentality that has come under the exclusive sway of a right hemisphere gone berserk. The associated global breakdown of the Bergsonian filter may lead to an untrammeled "subliminal uprush" of the demonic forces in man, from trance states and ecstasies to possession and schizophrenia: "That way madness lies." It may be followed by suicide or mass suicide.

The right hemisphere, it could be stated, may well be the fount and origin of myths, dreams and metaphors; of poetry, artistic creativeness, of musical ability; it may serve as the pathway and processor of psi phenomena. But it is in dire need of the braking and balancing powers of the left side of the brain in order to keep their demonic counterparts under control. Indeed, contrary to the advocates of the esoteric, the faddist or the irrational, it is one of the paramount lessons taught by recent history that the survival of western civilization is dependent on the dispassionate reality testing and disciplined decision-making

functions of the left hemisphere—and, preferably, on the harmonious cooperation between the two.

DISCUSSION

PRIBRAM: There are certain inconsistencies in this otherwise very delightful paper. The moment you say "left and right brain," everything seems to go to pieces in what you're saying. For instance, you said "left lesions of the parieto-occipital region give a psi-like picture, an optic agnosia." Well, the right hemisphere is supposed to be the hemisphere that gives us the really good spatial relationships not only two-dimensional, but three-dimensional. In other words, there is an agnosia of the picture kind with right-sided lesions whereas lesions of the left hemisphere usually give rise to alexia or some other verbal deficiency. Brenda Milner here in Montreal has documented this repeatedly with very careful testing. Her and my clinical experience and yours don't match in this one respect.

Now, you go to "paralyzed subjects act like PK subjects or patients" and try to say again that the left hemisphere lesioned patient is worse off than the right. Again, I don't know of anything in the literature or in my own experience that supports this. Left-side lesions produce right paralysis and vice versa, and there isn't much difference in the amount of skill remaining, except that of course people who are right-handed have much more skill in the right hand in the first place.

With regard to hemi-depersonalization: Norman Geschwind's recent studies show that if the parietal lesions are deep enough to invade the cingulate cortex, then depersonalization ensues. He has demonstrated the opposite to occur—a syndrome of "hyperpersonalization" from lesions of the medial structures of the temporal lobe. Now, those are lesions of limbic structures so this points to a dichotomy between the effects of lesions of the convexity and those of limbic structures.

EHRENWALD: There is a vast statistical amount of observations which show hemi-personalization—Anton's Syndrome. Imperception of defect is invariably more frequent in left-sided hemiplegia than right-sided hemiplegia. These are observations which go back forty or fifty years and include papers by my teacher, Pötzl, by French neurologists and others. More recently, some doubts have been expressed saying it is more a psychological or psychodynamic disturbance, but it is invariably associated with a physical defect, and the weight of evidence speaks

in favor of a greater frequency of left-sided hemiplegia than right-sided hemiplegia.

PRIBRAM: You're saying that the sense of person is left-brained.

EHRENWALD: Yes, the left side of the brain is closer to the ego—that's my point, and I learned that from my personal, clinical experience. I also learned that recently from Eccles and Popper, who specifically look for the "self-conscious mind" in the left hemisphere.

PRIBRAM: I think we agree, then, on that point—that whatever is giving rise to this feeling of self comes at the same time as language. I'm convinced that what you're saying now is something different from what I was trying to say. The depersonalization that I was talking about has nothing to do with the self. When Geschwind says depersonalization, he means when you ignore an arm or a segment of the body, whereas what you're talking about is some kind of awareness of self as self. There's no question that the self-awareness is better articulated by the left hemisphere.

KELLY: In the first place, I'd like to underline the importance of something you mentioned earlier in your paper, and that is the importance of looking at systematic errors in these ESP processes. It's particularly in the case of errors that we gain the ability to see something of the mechanisms that underlie a performance. Beyond that, I would like to say that, in my opinion, the characteristics of errors in the case of free response situations, have not been clearly outlined. I think we've got to carry the thing beyond the level of looking at some ESP responses and looking at some brain injury drawings and perceiving similarities between them. I think we've got to do something more systematic than that, although I don't have any very concrete proposal right at the moment for how we might do it. And I would also like to point out that it is possible to do analogous things in a forced choice environment. For example, we succeeded in doing that with Bill Delmore, where we were able to show not only that he made systematic errors, but that they were like the systematic errors he made in an analogous visual task, where he was looking at slides of the target materials under bad viewing conditions. From that, we are inclined to infer that at least part of the mechanism underlying that performance was that the information was at some stage being encoded in the form of visual imagery which was rather degenerate in quality—fleeting, indistinct—so that he would make errors of identification at the secondary stage. That finding is also vaguely consistent with your left-right business. However, I also agree with Dr. Pribram that parapsycholo-

gists have so far been all too eager to jump on to this bandwagon. I think the work that we have done so far is very sketchy and indirect. One thing I think we could do to make a much more direct approach to the problem would be to do various kinds of psychophysiological studies and I think they may give us much more direct insight into these laterality matters.

The last point I'd like to make is that I don't quite understand why you make such a sharp dichotomy between the need-determined and flaw-determined. It seems to me that it would be very unlikely there would be two separate sets of mechanisms underlying these performances. I think I would be more interested in a version of your theory which would soften that distinction a good deal.

EHRENWALD: The reason why I made this distinction is in order to conceptualize two distinct possibilities, two extreme types, and, of course, in the experimental situation extreme types don't occur anymore. Originally, in the Duke experiments, there was nothing but a rigid Zener card set. But even there, it is not exclusively a merely random break through the Bergsonian filter because, even there, unbeknown to the experimenter and the subject, there was an emotional situation which caused the experimenter to get a result, even with so trivial a target as a wavy line or a cross. Even there, an emotional factor did sneak in, although originally that was not taken into account. I remember I made a few informal experiments when I let a child look at a plus sign and asked, "What do you see here?" She said, "Kisses in a letter." It shows that here, unbeknown to the experimenter, an emotional element was subliminally involved.

Nevertheless, I believe that the distinction is necessary because we have to realize that much in our mental organization is conducive to flaw-determined experiences. I don't agree, for instance, with the rigid Freudian position that in dreams every element in the manifest dream is psychodynamically determined. Some elements in a given dream cannot be resolved safely in psychodynamic terms. Some are flaw-determined due to random structure or functional inadequacies. An extreme example is an aphasic reaction. It is flaw-determined, due to an organic lesion. But at the same time, personality factors may likewise enter the clinical picture.

BELOFF: Regarding your interesting hypothesis that Beethoven's stunted development of his left hemisphere capacities might be due to his upbringing as a *Wunderkind*—I wondered whether you had found any confirmation of this in the careers of other such *Wunderkind*; particularly, one thinks of Mozart.

EHRENWALD: I wrote a paper about Mozart many years ago in which I focused on psychodynamic aspects. Yet I did not discover any indication of a specific role of the right hemisphere in his mental organization. What I found is that he had a lively correspondence with a girl cousin and that his letters to her were full of puns and scatological references. To me they seem to reflect his rebellion against his beloved, but rather straightlaced, father. Maybe musicologists could shed more light on this problem.

PRIBRAM: Scatological inhibition is usually conceived of as being frontal lobe rather than right or left hemisphere. Regarding musical ability, it is not necessarily a right hemisphere function. Composers and conductors use their left hemisphere for music as has been shown by EEG studies.

HONORTON: Your general conclusion that creativity ratings show no positive correlation with the card-guessing type of task is in conflict with the literature. The two most extensive studies of this type—one by Gertrude Schmeidler and one by myself which involved over three hundred subjects, showed significant positive relationships in card-calling tests.

EHRENWALD: Of course, I can use my argument both ways. If there is a very powerful motivation, a very successful experimenter such as you or Schmeidler, you may get emotional responses even with such trivial material as Zener cards.

HONORTON: I don't think you can have it both ways. I understand that you're a psychoanalyst, and that that is an occupational hazard.

EHRENWALD: Nature has it both ways invariably, because things are not cut and dried one way or another; as Emilio would say, "a little more and a little less of anything."

HONORTON: I think that you might want to modify that conclusion somewhat on that basis. Another point, briefly, when you refer to the work with Ilga K.—you may be more familiar with this than I am—my understanding is that she was completely unable to perform under conditions in which sensory cues were ruled out. Do you have a more complete description of those experiments?

EHRENWALD: Yes. Hans Bender repeated the experiments with Ilga K., a few years later, and found that she performed remarkably well with the mother sitting in another room or curtained off from the child, but what struck Bender was that the child seemed to perform this

telepathic highwire act by mumbling the syllables synchronically, the same time that the mother was reading to herself.

HONORTON: But the curtain would not eliminate auditory cues.

EHRENWALD: The mother was not giving auditory cues. She was reading, and she moved her lips inaudibly. To my mind, this simultaneity only indicates that when the mother was reading to herself, she unconsciously pulled the strings, so to speak, telepathically or "telekinetically" in the child's mind. Thus, instead of invalidating or weakening the evidence, this is actually fortifying the statement that telepathy is ideally a simultaneous response. It is a co-sensory rather than extra-sensory response.

HONORTON: I just don't think that you should attempt to draw conclusions about psi from experiments that do not completely rule out the possibility of sensory leakage.