Chapter 13 On being in two minds

Conflict is the product of duality. And since duality exists throughout nature, the opportunities for conflict are infinite—as are the opportunities for peace. For dissonance and harmony, opposition and concordance, balance and imbalance are conceivable only in the presence of polarity. Destruction, like creation, arises from the juxtaposition of opposing forces, and so basic are these contrapuntal oppositions to the fabric of our universe that consciousness and life itself would be inconceivable without them. Deprived of the co-ordinates—vertical and horizontal, north and south, east and west, above and below, left and right, back and forth, past and future—who could achieve orientation in space and time? And how could the Self, that dynamic mandala at the core of the human soul, ever become incarnate?

Since duality is indispensable to our world, it would be surprising were it not reflected in the structure and function of our bodies, and, not least, of our brains. If you take a human brain in your hands and examine it, the first thing that will strike you is that the greater portion of it is divided into two parts. These are the cerebral hemispheres, humanity's main claim to fame (Figure 13.1). For many centuries this arrangement stimulated curiosity and raised the question whether these two parts, so much larger in relation to body size in human beings than in other primates, perform different functions. The first indication that they do was noted by the ancient Egyptians, who observed that brain injury on one side can result in limb paralysis on the other. This intriguing 'cross over' of function was confirmed by neurologists in the nineteenth century both by clinical observation and by experiment: thus, Eduard Hitzig demonstrated that stimulation of cerebral hemispheric tissues just in front of the fissure of Rolando (Figure 13.2) caused patients to move muscles on the opposite side of the body. Similarly, stimulation of tissues just behind the fissure caused unanaesthetized patients (brain tissues feel no pain) to report sensory experiences in parts of the body opposite to the side of stimulation.

It is well established, therefore, that both cerebral hemispheres are concerned with contralateral movements and sensations. But what of psychic functions? Could there be any differences in mental functioning between the left and right sides of the brain?

Before examining the attempts of neurology to answer this question, it might be interesting to approach it from the cross-cultural standpoint and ask, as Jung might have done, what meanings human beings have universally attributed to the two sides: what is the archetypal symbolism of left and right? How do people, irrespective of culture, distinguish between the attributes of leftness and rightness, and are there any ubiquitous features in the distinctions which they make?

In fact, examination of the anthropological data reveals a remarkable degree of agreement (Russell 1979). Indeed, the qualities attributed to left and right turn out to be so generally applicable as to warrant their summary in Table 13.1. It is apparent that many of these distinctions correspond to those of Taoist philosophy, where yang, the creative and firm, is equated with the right and yin, the receptive and yielding, with the left. Similarly, the alchemists associated the right with Mars and the King, the left with Venus and the Queen. In Islamic societies, and many others, the right hand is used for eating and in making religious offering while the left is reserved for cleaning the anus after defecation. In Christian theology, Christ sits on the right hand of God and at Calvary it was the good thief who was crucified on Jesus' right. The Bagobo people of Malaysia believe that everyone has

two souls, a left and a right, which are subject to projection like the positive and negative aspects of Jung's 'Shadow'. According to Ruth Benedict: 'The right-hand soul, known in Bagobo terminology as the Gimokud Takawanan is the so-called "good soul" that manifests itself as the shadow on the righthand of one's path. The left-hand soul called Gimokud Tebang is said to be a "bad soul" and shows itself as the shadow on the left side of the path' (quoted by Bogen 1969).

The universal distinctions between left and right are further implicit in the connotations which these words carry in different languages. In English 'right' also means 'correct', to have justice on one's side. In French 'droit' means not only 'right' but 'straight' and 'untwisted'. The Italian word for right 'destro' also means 'the right moment'. 'Sinister' is Latin for left; it also means 'unlucky', 'bad', 'awkward', 'wrong' and 'perverse'. The Greek word for left, a??ste???, also means 'clumsy', 'erring' and 'crazy'; in classical times, to go mad was 'to turn off to the leftward of one's mind'. In Russian 'na levo', literally 'on the left', means 'on the side', 'under the counter', i.e. something obtained on the black market. The apparent universality of the meanings attached to left and right is remarkable. But it becomes even more impressive when considered in the light of modern discoveries about the activity of the two sides of the brain. For when one bears in mind the essential oppositeness of cerebral functioning, the correspondence between the cross-cultural and the neurological evidence is quite extraordinary. It is as if we as a species have collectively projected the functions of our two cerebral hemispheres out on to opposite sides of the Umwelt, the left cerebral functions on to the right and the right cerebral functions on to the left.

Neurophysiological understanding of the brain has advanced through the use of six principal techniques, the first two of which are the oldest and have already been mentioned. They are:

1 investigation of people who have suffered brain damage of various kinds;
2 electrical stimulation of specific areas of the brain;
3 investigation of patients who have had their corpus callosum (the bundle of fibres connecting both cerebral hemispheres) severed surgically as a treatment for severe epilepsy;
4 studies using the electroencephalogram (EEG);
5 investigation of the consequences of injecting anaesthetics into the left or right carotid arteries which supply their respective cerebral hemispheres;
6 the use of non-invasive techniques (which do not require surgical exposure of the brain to observe and record its activity) such as positron emission tomography (PET, which requires the injection of a radioactive isotope into the bloodstream), and nuclear magnetic resonance (NMR) and magnetoencephalography (MEG), both of which measure the magnetic field generated when certain areas of the brain become active.

The first of these techniques yielded a wealth of information during and after the First World War, when tragically large numbers of soldiers on both sides sustained injuries of varying degrees of severity in different parts of the brain. When this evidence was collated it established beyond doubt that a number of functions were primarily represented on different sides of the brain: damage to the left side resulted in dysphasia (impairment of speech), dyslexia (difficulties with reading) and deterioration in the ability to do mental arithmetic and use logical thought, while damage to the right side caused a deficit in visuo-spatial capacities such as those required to dress oneself, find one's way round a hospital ward, and recognize patterns. On the whole, damage to the left cerebral hemisphere appeared to cause more serious incapacity than damage to the right, and this led to

the conclusion that the left hemisphere is normally 'dominant' over the right 'subdominant' hemisphere. This assumption fitted well with the observation that the majority of people are right-handed (and probably have been since protohominid times) and the demonstration by Paul Broca and Carl Wernicke in the nineteenth century that the cortical areas concerned with the expression and comprehension of language are situated on the left.

Scientific interest in the bridge of nerve fibres connecting the two hemispheres—the so-called cerebral commissure or corpus callosum remained dormant until comparatively recently. In the early 1940s it was found that surgical severance of these fibres (there are about two hundred million of them) dramatically reduced the incidence and severity of epileptic seizures in patients who were previously having intolerably frequent attacks, presumably because electrical activity generated in each hemisphere had been augmenting activity in the other via the cerebral commissure by some kind of 'positive feedback.' What surprised the surgeons who performed these early operations (known as commissurotomy) was that they appeared to result in no ill-effects: this led to a decline in the reputation of the corpus callosum, some arguing that it had no function other than to hold the two sides of the brain together— a facile assumption that Warren McCulloch countered by observing that it was unlikely that such a large bundle of fibres had been brought into existence for the sole purpose of transmitting epileptic fits from one side of the body to the other! (Taylor 1979).

The true importance of the corpus callosum did not begin to dawn on people until the 1950s and 1960s when Roger Sperry embarked on his classic studies of commissurotomized patients first at the University of Chicago and later at the California Institute of Technology. Sperry's work led him to the conclusion that in fact we possess 'two minds', one localized in the left hemisphere and the other in the right; cutting the communications between them prevents their normal integration into a phenomenological unity and makes possible the demonstration of their separate, though complementary, functions. Sperry was able to establish that the left hemisphere is indeed primarily concerned with the use of language and with abstract, analytic thought, while the right hemisphere is more involved in synthesizing sensory data into percepts. When, for example, a patient whose corpus callosum has been cut is blindfolded and given a glass tumbler to hold in his right hand (served by the left hemisphere) he is able to tell you exactly what it is; however, when the object is held in his left hand (served by the right hemisphere) he is quite unable to name it or describe it, but can nevertheless identify it if, when the blindfold is removed, you show him a variety of objects—with a glass tumbler amongst them—to choose from. Moreover, such a patient can write with his right hand (which is only to be expected since the left hemisphere mediates the use of language) but he cannot draw with it; with his left hand, however, he can draw but he cannot write.

These and many other tests demonstrate that while the left hemisphere is better at using language and making logical deductions, the right hemisphere is superior at perceptual and construction tasks such as mapreading, block design and picture comprehension. In particular the right hemisphere appears to be accomplished at Gestalt or holistic perception of the kind which one uses in recognizing a face: it specializes in synthesizing fragments of sensory information into whole percepts. The left hemisphere, on the other hand, is more astute at analyzing and breaking down information into temporal sequences. This sequential processing of the left hemisphere was contrasted by the Russian neurophysiologist, Luria, with the simultaneous perceptual processing of the right.

People seem to differ considerably as to the degree which the left 'mind' has come to dominate over the right, and this is reflected in the relative inclination of different individuals to use analytic as opposed to synthetic modes of thought: while some people tend to confine their attention to specific details, showing greater interest in how things differ from one another (like a botanist who specializes in classifying different varieties of grass), others prefer to seek universal characteristics, the common denominators underlying specific differences (like a Jungian collecting archetypal motifs from different mythologies and fairy tales). These two modes of approach are often referred to as 'convergent' and 'divergent' and may well depend on left and right hemispheric functioning respectively. Moreover, the 'obsessional' or 'compulsive' type of personality, with its meticulous attention to detail, could be associated with an exaggerated preponderance of left hemispheric activity.

Musical appreciation, which relies on Gestalt perception rather than logical analysis (unless one is a musicologist) is linked with the right hemisphere. Patients who have had their right hemispheres removed or who have suffered damage to the right temporal lobe show impaired musical abilities, while their use of language and reason remain intact. While they may be unable to recognize or recall tunes, however, they can nevertheless continue to read music when it is put in front of them.

The findings of Sperry's 'split brain' studies were confirmed by workers using EEG and anaesthetic techniques. When a subject is relaxed and not making use of his cognitive or perceptual abilities, his EEG record shows an increase of alpha rhythm (brain waves of 8 to 10 cycles per second); when, on the other hand, he is asked to concentrate on a task his alpha rhythm is suppressed. A localized disappearance of alpha rhythm is, therefore, an index of activity in that part of the brain, and this provided researchers with a useful tool for studying the different functions of the two hemispheres. Using this technique, it was demonstrated that subjects required to do mental arithmetic or serial or analytic tasks showed suppression of alpha rhythm in the left hemisphere, while those asked to match coloured patterns, listen to music, or do synthetic tasks showed alpha suppression on the right. More-sensitive studies of these hemispheric differences have been made possible by the development of PET, MNR and MEG neuroimaging techniques.

Similarly, the injection of anaesthetic into the carotid artery supplying the left hemisphere markedly impairs rational and linguistic abilities: subjects can still use language but their vocabulary and ability to construct grammatical, logical sentences is badly affected.

Fundamental distinctions between left and right hemispherical functioning have, therefore, been well defined and established. A number of workers have sought to establish generalizations defining the essential functions of the two sides. Thus, Arthur Deikman, of the Austen Riggs Medical Centre, characterized the left and right hemispheres as 'active' and 'receptive' respectively. The left side is concerned with doing, with manipulating the environment and 'making a dent'. The 'receptive mode' characteristic of the right is concerned with monitoring events as they happen, with perceiving the world as it is rather than subjecting it to some purpose or design. While the left hemisphere commits itself to science, technology and exploitation of the world's diminishing resources, the right follows the Wu-Wei of the Taoists, flowing along with the rivers of change rather than struggling against them. The Californian psychologist Robert Ornstein made a comparable distinction between the 'rational' functions of the left hemisphere and the 'intuitive' functions of the right, and argued that the thought processes characteristic of Western

culture (i.e. logical, analytic, directed thinking) predominantly make use of the left hemisphere while Eastern thought (which is more diffuse, synthetic and tolerant of paradoxes) is more dependent on the right.

Ornstein's suggestion was analogous to the belief advanced by other workers that human beings think simultaneously in two different ways, which can be described in computer terminology as digital codification (discursive, verbal and logical) and analogic codification (non-discursive, non-verbal and eidetic). Quoting this work with approval, Joseph Bogen (1969) wrote: 'where propositional thought is typically lateralized to one hemisphere, the other hemisphere evidently specializes in a different mode of thought, which may be called appositional.' He was deliberately vague about what 'appositional' actually means, arguing that since the right hemisphere 'excels in capacities as yet unknown to us', the full meaning of 'appositional' would only emerge 'as these capacities are further studied and understood'. He equated this distinction to that traditionally made in everyday speech between 'reason' and 'emotion', the 'head' and the 'heart', evidently agreeing with Pascal's dictum that 'Le coeur a ses raisons que la raison ne connaît point'.

There are interesting parallels here with Freud's view that there are two modes of thought, which he termed 'primary process' and 'secondary process' thinking. Whereas secondary process thinking is logical and develops with the acquisition of language, primary process thinking is 'relatively unorganized, primitive, magical, undifferentiated, based on common motor reactions, ruled by emotions, full of wishful or fearful misconceptions, archaic, vague, regressive, primal' (Fenichel 1946).

Moreover, most of Jung's work is compatible with the neurophysiological formulations which have achieved currency since his death. As we shall see, his therapeutic emphasis on the necessity for balance and integration between conscious and unconscious processes accords well with a theoretical neurophysiological 'mandala' of horizontal integration between left and right hemispheres and vertical integration between the phylogenetically old and recent brains. Throughout his life Jung stood as the champion of 'intuitive', 'receptive' modes of apprehension, insisting that they were no less valid than the rational and abstract. He maintained that the rationalism of modern life, with its depreciation of everything nonrational, had 'precipitated the function of the irrational into the unconscious' (CW 7, para. 150). In his published works it is uncanny how often Jung uses the 'sided' concepts which have subsequently become common in modern n-europhysiology: 'The same psychic system which, on one side, is based on the concu-piscence of the instincts, rests on the other side on an opposing will which is at least as strong as the biological urge' (CW 5, para. 222). Again and again he returns to the theme of the opposites and the need for their reconciliation if the goal of individuation is to be approached: 'Conflict or comparison between incommensurables is impossible. The only possible attitude is one of mutual toleration, for neither can deprive the other of its validity' (CW 14, para. 150). 'Individuation means becoming a single homogeneous being' (CW 7, para. 266). The goal is only important as an idea; the essential thing is the opus which, leads to the goal: that is the goal of a lifetime. In its attainment "left and right" are united, and conscious and unconscious work in harmony' (CW 16, para. 400). Jung would have shared Bogen's respect for the 'appositional' and applauded his insistence that it be given equal weight with the 'propositional'. 'The two opposing "realities", the world of the conscious and the world of the unconscious, do not quarrel for supremacy, but each makes the other relative' (CW 7, para. 354).

The question arises as to why it is that the two hemispheres should have specialized in different, but complementary, functions in the course of evolution. There have been a number of suggestions. Washburn and Hamburg (1968), for example, argued that it reflects the novel demands made on a new right-handed, tool-making, weapon-using, talking animal—the left hemisphere evolving as the locus of the manipulatory, linguistic and logical skills necessary for survival, while the right hemisphere became the repository of visuo-spatial abilities. Jerre Levy (1974) saw the relationship between the two hemispheres as essentially symbiotic, each hemisphere performing functions that the other finds difficult, the symbiosis being consummated, as it were, across the corpus callosum. Bogen (1969) believed that the dual system increased the chances of finding an innovative solution to novel problems, but that it had the inherent drawback of increasing the likelihood of internal conflict. It is presumably in order to deal with this conflict that one hemisphere has come to dominate the other. Discipline is, after all, preferable to anarchy, not least among brain cells.

Cerebral imperialism: dominance and inhibition

Cerebral dominance, like all biologically determined human characteristics, is susceptible to environmental influences. It is probable that in all cultures the left hemisphere of individual men and women, with few exceptions, dominates over the right; but it is equally likely that in some cultures it is more dominant than in others. Our own culture is a case in point: ever since the Renaissance, stress has increasingly been laid on the need to develop left hemispheric functions at the expense of the right. Encouragement of the left hemisphere begins early in life with the emphasis placed in all Western primary schools on the need for proficiency in the three Rs (writing, reading and arithmetic). Although right hemispheric activities such as art, drama, dancing and music are given a place in the curriculum, fewer resources and fewer hours are allocated to them than to left-sided disciplines such as mathematics, languages, physics and chemistry; and at times of economic retrenchment it is invariably the right-sided activities which are pruned or curtailed.

Education reflects the ruling obsessions of society; and a culture such as ours which stresses the importance of rational, analytic processes rather than aesthetic, synthetic ones, and which places a higher value on material achievement than on symbolic expression, inevitably promotes a form of left hemispheric 'imperialism'. This intracranial imperialism proceeding within the microcosm of the skull has been mirrored by a macrocosmic imperialism on a global scale, where a right-wing, 'left hemispheric' oligarchy imposed its will on the increasingly left-wing 'subdominant' peoples of the world. Just as there has been bitter conflict between these opposing interests on the political level, so there is reason to believe that conflict occurs between the dominant and subdominant sides of the brain. As we noted in the last chapter, the psychodynamic techniques for dealing with inner conflicts have been elucidated by psychoanalysis. Recent advances in neurophysiology have tempted some workers to locate these 'ego-defence mechanisms' (e.g. repression, dissociation, denial, etc.) in the hemispheric nuclei linked by the tracts of the corpus callosum.

In the course of studying the relative responsiveness of the two hemispheres of commissurotomized patients, Gazzaniga (1973) tried presenting the picture of a nude woman first to the left hemisphere and then to the right:

When the picture was flashed to the left hemisphere of a female patient, she laughed and

verbally identified the picture as a nude. When it was later presented to the right hemisphere, she said in reply to a question that she saw nothing, but almost immediately a sly smile spread over her face and she began to chuckle. Asked what she was laughing at, she said: 'I don't know…nothing…oh that funny machine.'

This much-quoted example has been variously interpreted as illustrating the mechanisms of repression and denial . Moreover, dissociation was noted by Sperry (1968): it seems that much of the time the left hemisphere is grandly indifferent to the activities of the right and is quite capable of disowning them. Thus, one of Sperry's commissurotomized patients, who had made an impulsive response with her left hand, exclaimed, 'Now I know it wasn't me who did that!'

Denial can be observed in patients who have suffered extensive lesions of the right hemisphere resulting in paralysis of the left side of the body: such patients tend to deny that there is anything wrong with them and seem to adopt an attitude of cold indifference to their often severe disabilities. (This corresponds to the 'belle indifference' to their symptoms shown by neurotic patients who develop hysterical paralysis or hysterical blindness— so-called 'conversion symptoms'—when the condition has no organic basis but is psychically induced as a means of escaping conflict.) Patients who have suffered left cerebral lesions, on the other hand, are usually profoundly affected by them.

Dr David Galin of the Langley Porter Research Institute, San Francisco, suggested that the way in which the intact left hemisphere characteristically copes with a lesion in the right by denying its existence is due to 'an inhibition of information transfer across the corpus callosum for the damaged right side' (Galin 1974). Galin argued that such inhibition of neuronal transmission through the corpus callosum could occur in all people—not just those with right hemispheric lesions—and that it had the effect of functionally disconnecting ('dissociating') the right hemisphere from the left. If this was so, then it would permit the investigation of the neurophysiological mechanisms underlying the psychoanalytic phenomenon of repression. Galin maintained that activity in the disconnected right hemisphere did not cease but persisted, much in the same way as Freud believed that repressed unconscious contents continued to be charged with energy and persisted with a life of their own, their existence being betrayed by neurotic symptomatology or slips of the tongue. The personal unconscious, it would seem, resides—if it can be said to reside anywhere— in the right cerebral hemisphere.

The location of the personal unconscious, visual imagery and primary process thinking in the right hemisphere would also indicate that this hemisphere should be predominant in the activities of dreaming, fantasizing and active imagination. Such indeed seems to be the case. Thus, EEG records demonstrated greater activity in the right hemisphere than in the left both during dream sleep and during active sexual fantasy just prior to orgasm (Bakan 1976). Wilder Penfield was able to induce dreams and visual hallucinations in patients having brain surgery under local anaesthetic by stimulating areas of the right, but not the left, cerebral cortex. Moreover, several patients who had experienced frequent, vivid dreams before having their commissures cut reported that they no longer had dreams after the operation—presumably because the dream material was no longer available to the speech centres of the left hemisphere and hence could not be verbally formulated (Bogen 1969).

The intellectual bias of the left hemisphere and its somewhat condescending attitude to the activities of the right goes some way to explain the dismissive views commonly

expressed in our culture concerning the value of dreams and fantasies; yet, as Dr Ernest Rossi, a Jungian analyst from Malibu, California, argued in a seminal paper (Rossi 1977, The cerebral hemispheres in analytic psychology'), 'since ancient times, dreams have been continually rediscovered as sources of higher, intuitive or more synthetic patterns of psychological growth and understanding'. He commented that the dichotomy between the synthetic approach of the right hemisphere and the analytic approach of the left directly reflects the psychotherapeutic distinction which emerged historically between the 'synthetic or constructive method' of Jung and the 'analytical (causal-reductive) method' of Freud. As Jung observed: The intellect has no objection to "analysing" the unconscious as a passive object; on the contrary such an activity would coincide with our rational expectations. But to let the unconscious go its own way and to experience it as a reality is something beyond the courage and capacity of the average European' (CW 12, para. 60). In contrast to the 'imperialist' attitude of Freud, Jung believed that the only way to approach the unconscious was 'to try to attain a conscious attitude which allows the unconscious to cooperate instead of being driven into opposition' (CW 16, para. 366).

The conscious mind allows itself to be trained like a parrot, but the unconscious does not—which is why St Augustine thanked God for not making him responsible for his dreams. The unconscious is a psychic fact; any efforts to drill it are only apparently successful, and moreover harmful to consciousness. It is and remains beyond the reach of subjective arbitrary control, in a realm where nature and her secrets can be neither improved nor perverted, where we can listen but may not meddle. (CW 14, para. 51)

Neurosis, Jung argued, was 'self-division' (CW 7, para. 428), the purpose of therapy was to heal the split. The 'merely conscious' ('left-dominant') man he saw as 'all ego', 'a mere fragment' inasmuch as he exists 'apart from the unconscious' (CW 12, para. 242). Healing is wholeness, and 'conscious wholeness consists in a successful union of ego and Self, so that both preserve their intrinsic qualities' (CW 8, para. 430n).

Disalliance with the unconscious is synonymous with loss of instinct and rootlessness. If we can successfully develop that function which I have called transcendent, the disharmony ceases and we can then enjoy the favourable side of the unconscious. The unconscious then gives us all the encouragement and help that a bountiful nature can shower upon a man. (CW 7, paras 195–6)

He implicitly warns against the dangers of left-hemispheric imperialism: 'the unconscious has an inimical or inconsiderate bearing towards the conscious only when the latter adopts a false or pretentious attitude' (CW 7, para. 346). Unlike Freud, Jung conceived the essence of ego-consciousness as limitation:

...even though it reaches to the farthest nebulae among the stars. All consciousness separates; but in dreams we put on the likeness of that more universal, truer, more eternal man dwelling in the darkness ofprimordial night. There he is still whole, and the whole is in him, indistinguishable from nature and bare of all egohood. (CW 10, para. 304).

Having made his point about the creative potential of the right hemisphere and its importance in 'psychosynthesis' as opposed to the more 'left dominant' procedures of psychoanalysis, Rossi went on to make some further suggestions as to how the metapsychology of Jung might relate to recent advances in neurology.

Possible neurological bases for Jung's concepts

Psychological types

Jung's classification of people into 'introverted' and 'extraverted' attitude types is too well known to require elucidation here, and his four functional types ('thinking', 'feeling', 'sensation' and 'intuition') have already been mentioned in Chapter 5 (pp. 77–8). In the

light of the evidence already presented, it is hard to dissent from the suggestion made by Rossi that the extraverted and introverted attitude types could be related to left and right hemispheric functioning respectively. This attribution would accord with Deikman's distinction between the 'active mode' of the left hemisphere and the 'receptive mode' of the right. When he attempted to assign the functional types between the two hemispheres, however, Rossi was on less certain ground: he believed thinking and feeling to be associated with the left hemisphere and sensation and intuition with the right.

Few, I imagine, would have difficulty in entertaining the notion that thinking is a left-sided activity, and intuition which is concerned with building up an understanding of events from fragmentary information in the form of 'hunches'—a right-sided activity. As Rossi says, the ability 'to synthesize the whole from the part may well be the basic process underlying Jung's definition of intuition as one of the basic functions of the psyche, namely, perception of the possibilities inherent in a situation'. Rossi's suggestion was in complete agreement with Ornstein's view (reported on p. 295 above) that rational functions are performed by the left hemisphere and intuitive functions by the right.

Sensation, too, which is concerned with the perception of reality and with the processing of data about things and people as they are, may reasonably be seen as a right hemispheric function. It was when Rossi allocated feeling to the left hemisphere, however, that one had difficulty in going along with him. The reason he gave in justification of this attribution is Jung's insistence that feeling is a 'rational' function, since it is not just concerned with the conscious appreciation of emotion but with the evaluation of the significance and worth of whatever is perceived or experienced.

But as Rossi himself asserted, feeling is often experienced as an affect . To confine it, therefore, to the left hemisphere would seem mistaken. Instead, it is more likely that it is a bilateral function, the affectual component being primarily localized in the right hemisphere and the evaluative or judgmental component in the left, their integration depending upon two-way traffic across the corpus callosum. This would appear to be reasonable speculation in view of Schwartz's (1975) demonstration of the importance of pathways between the limbic system of the midbrain (see Figure 13.3) and the cortex of the right hemisphere in the experience and expression of emotion. Moreover, there are few ideas which are not emotionally toned, and few emotions without ideational content. Yet with the exception of Jung, psychologists, no less than philosophers, have tended to discuss thoughts and feelings as if they were separate entities. We know from experience, however, that they are not. And the millions of connections which exist between the cerebral hemispheres and the emotional centres of the midbrain afford good neurological reasons why this should be so. Electrical stimulation of tiny areas of the hypothalamus (Figure 13.3) with micro-electrodes give rise to coarse emotions (anxiety, pleasure, fear, etc.) and not to fine or complex feeling states, which are clearly dependent on elaboration in both cerebral cortices.

In summary, therefore, there is reason to suppose that the Jungian attitude and functional types may be subject to cerebral lateralization—the left hemisphere subserving the extraverted attitude and thinking function, the right contributing to the introverted attitude and intuitive and sensation functions, while the feeling function is mediated by both hemispheres acting in conjunction via the corpus callosum.

Ego and consciousness

Rossi followed Galin and others in locating ego-consciousness in the left hemisphere: 'whence comes our sense of self-awareness, identity, and control?' he asked. 'When we say "I know", "I can", "I will", from which side of the brain are we speaking? The very fact that we are speaking means it is coming from our left hemisphere because that is where the speech centres are located. When we say "I know", we usually mean that our left hemisphere knows.' He quoted in his support the remark made by Sperry's commissurotomized patient when her right hemisphere acted impulsively through her left hand— 'Now I know it wasn't me that did that.' While acknowledging that each hemisphere has qualitatively different forms of consciousness, Rossi insisted that 'we typically identify with the rational processes and verbal knowing of our left hemisphere.'

In linking the ego specifically to the left hemisphere Rossi may well have been justified—especially in respect of members of our 'left-dominant' culture—but it would clearly be an error to confine to the left side of the brain consciousness as a whole. Consciousness is not a simple, unitary phenomenon which can be assumed to possess a discrete cerebral location, but a richly complex process dependent upon a vast network of neuronal structures which are probably hierarchically arranged. Thus cortical anaesthesia, ablation or auto-inhibition does not result in the abolition of consciousness, but only in an impairment of its finer, more differentiated functions: the lower levels of neuronal organization remain active together with the less discriminating consciousness associated with them.

Perception is largely a matter of selection and interpretation in the light of archetypal preparation and individual experience, as we argued in Chapter 4; it also depends on the integration of information coming from all sense modalities, with or without the intervention of consciousness. Percepts are assessed in the light of already existing knowledge, loaded with affect, and made potentially available to conscious experience: the perceptual-affectual activities of the right hemisphere and midbrain are combined, via the corpus callosum, with the abstract, analytical, verbal activities of the left. These cerebral processes, functioning as an enormously complex and integrated totality, are evidently the very stuff of consciousness, and are the consequence of brain functioning as a whole rather than of processes occurring in any specific group of neurones (apart from those of the reticular activating system of the brain stem, which seems to be the powerhouse driving the whole complex of systems subserving consciousness). In other words, consciousness consists of 'putting things together', and among other things, it depends on heavy traffic in both directions across the corpus callosum. According to Arthur Blumenthal (1977), consciousness is 'generated' by a complicated process of transformation through which sequence of events (left hemisphere) are turned into simultaneous perceptions (right hemisphere). Commissurotomy certainly does not abolish consciousness—only blocking the activity of the reticular activating system appears to do that—but it impairs consciousness qualitatively because it disrupts the transformation on which Blumenthal set so much store. The corpus callosum thus contributes to the integration of hemispheric functions on which 'higher' consciousness depends, but like all other parts of the brain (except the reticular activating system), it is not indispensable. One cannot but agree with Roger Sperry that consciousness is a property of brain circuitry and brain chemistry working as a whole. And this squares with the Jungian view that individuation, personality development and greater consciousness are dependent upon the psyche functioning as a balanced totality.

To equate the conscious mind with one hemisphere and the unconscious with the other is a gross over-simplification: it savours too much of the 'geographical' view of the brain so beloved of the phrenologists. Consciousness and unconsciousness are not geological strata to be 'mapped,' nor are they like citizens of two states whose political boundaries can be drawn; they are dynamic systems in perpetual flux, interacting with one another, as Jung thought, in a homeostatically controlled manner. 'Conscious' and 'unconscious' events occur in both hemispheres—though the essentially hierarchical organization of the brain means that the dominant hemisphere has the greater claim to be the seat of our conscious executive faculties.

Archetypes and the collective unconscious

Since archetypes typically express themselves in images and symbols, Rossi had no hesitation in locating them in the right hemisphere. This, too, is a misleading oversimplification. Dr J.P.Henry of Los Angeles was critical of Rossi's failure to take subcortical structures into account when discussing the possible neurological substrate of archetypal systems. Henry (1977) shared Rossi's view that ego-functions are represented predominantly in the left hemisphere and personal unconscious contents in the right; he also agreed that both systems were interlinked through the tracts of the corpus callosum, transmission along which can be inhibited ('repressed') in the manner suggested by Galin. Where Henry differed from Rossi—and one cannot but take Henry's side—was in placing the core nuclei of archetypal systems not in the right hemisphere but in the limbic system and the brain stem.

While the cerebral cortex is undoubtedly of the greatest significance for human psychology and neurophysiology, containing as it does no less than 75 per cent of all the 10 or 12 thousand million neurones in the brain, it must not be forgotten that in all primates the phylogenetically much older parts of the brain still exist and still possess their full functional integrity. Yet for the greater part of the twentieth century psychologists did their best to overlook this fact, devoting themselves tirelessly to the study of cognitive and perceptual processes while leaving emotion and instinct to the biologists. This bias has changed, largely through the work of Paul MacLean, the American neuroscientist, who conceived of the brain not as a unity, but as three brains in one, each with a different phylogenetic history, each differing in kind from the other despite the myriad interconnections linking them together, each with 'its own special intelligence, its own special memory, its own sense of time and space, and its own motor functions' (MacLean 1976). Henry, and his colleague Stephens, argued that the dominant hemisphere represents a fourth and phylogenetically most recent system which is peculiar to our species.

In line with these suggestions, it is conceivable that the brain evolved in four stages:

1 The reptilian brain: this is the brain stem, an upward growth of the spinal cord and the most primitive part of the brain, which we share with all vertebrate creatures and which has remained remarkably unchanged by the march of evolution. It contains nuclei which control processes vital to the sustenance of life (i.e. the cardiovascular and respiratory systems) as well as the reticular activating system, which is responsible for alertness and the maintenance of consciousness. At this early evolutionary stage emotions had not emerged, nor had cognitive appreciation of future or past events. Behavioural responses at this level are largely governed by instinct and appear to be automatic. The typically reptilian behaviours of territorial acquisition and defence, as well as dominance striving,

agonistic threat displays, and mating are manifested at this stage of development. Summing up the significance of these structures for human psychology, Kent Bailey (1987) wrote: 'Our drives, inner subjective feelings, fantasies and thoughts are thoroughly conditioned by emanations from the R-complex [the reptilian brain]. The reptilian carry-overs provide the automatic, compulsive urgency to much of human behaviour where freewill steps aside and persons act as they have to act, often despising themselves in the process for their hatreds, prejudices, compulsions, conformity, deceptiveness and guile.' In Jungian terms, the R-complex can be conceived as comprising certain n-europhysiological components of the Shadow archetype.

2 The palaeo-mammalian brain: this is made up of those subcortical structures which comprise the limbic system, including the hypothalamus and the pituitary gland (which controls and integrates the activities of all the endocrine glands in the body). The hypotha-lamic and pituitary systems are homeostatic mechanisms par excellence: they not only maintain a critical and supremely sensitive control of hormone levels but also balance hunger against satiation, sexual desire against gratification, thirst against fluid retention, sleep against wakefulness. By this evolutionary stage, the major emotions fear and anger have emerged (together with their associated behavioural responses of flight or fight) as well as love and attachment.

MacLean particularly stressed three forms of behaviour that most clearly distinguish the evolutionary transition from reptiles to mammals. These are: (1) nursing and maternal care, (2) audiovocal communication for maintaining mother-offspring contact, and (3) play. The most primitive and basic mammalian vocalization is the separation call, which originally served to maintain closeness between the mother and her offspring and which later came to maintain contact between members of a group. Play evolved as a means to promote group harmony and affiliation as well as to practise forms of behaviour crucial to survival as an adult. It is one division of the limbic system (the so-called thalamocingulate) that performs the essential role in these mother-offspring and peer group behaviours, and there is no counterpart of this limbic subdivision in the reptilian brain. It seems probable, therefore, that the neurophysiological centres central to the mother-child archetypal system, bonding and attachment are localized in this area.

Conscious awareness is more in evidence by this stage and behaviour is less rigidly determined by instincts, though these are still very apparent. The areas concerned with these emotions and behaviours lie in the limbic system, which includes the oldest and most primitive part of the newly evolving cerebral cortex—the so-called palaeocortex . In all mammals, including man, the midbrain is a structure of the utmost complexity, controlling the psychophysical economy and many basic responses and attitudes to the environment. An animal, deprived of its cerebral cortex, can still find its way about, feed itself, slake its thirst, and avoid painful stimuli, but it has difficulty in attributing function or 'meaning' to things: a natural predator will be noticed, for example, but not apparently perceived as a threat. Thus, accurate perception and the attribution of meaning evidently requires the presence of the cerebral hemispheres.

3 The neo-mammalian brain: this is the neocortex, which is responsible for cognition and sophisticated perceptual processes as opposed to instinctive and affective behaviour. Behaviour arising in the neocortex is usually described as 'conscious', 'voluntary', and 'rational', reflecting the fact that there is a sense of personal control over such behaviour.

4 The human brain: by this stage cerebral lateralization has occurred, with the develop-ment of the left dominant hemisphere responsible for rational, empirical thinking and the use of language and speech. The most recently evolved structures, the frontal lobes of both cerebral hemispheres are jointly implicated in all 'higher-order' consciousness, the exercise of choices, the assessment of consequences, and the achievement of innovative

solutions. The frontal lobes enable us to have a degree of freedom from genetically encoded behavioural repertoires and reaction patterns not enjoyed by any other mammal or primate. They are, nevertheless, richly connected to the mammalian and reptilian portions of our brains, though they adopt what Elkhonon Goldberg calls 'an aerial view' of them. It is the evolutionary development of the frontal lobes, coupled with the language areas of the left dominant hemisphere, that has made human civilizations possible.

This evolutionary schema of brain functioning accords with the popular distinction made by James Olds between the 'hot' and 'cold' brains. The hot brain (the midbrain) may be readily identified with Freud's id which functions in accordance with the pleasure principle: it is impulsive, incautious and wanton—it demands its own way, and it wants it now.

The cold brain (the neocortex) is more rational and it demonstrates a strong susceptibility to social conditioning: as custodian of the reality principle it is responsible for mediating the passions of the hot brain to the environment, causing them to heed the constraints and exigencies of outer necessity. This is but another example of how the brain works by achieving a balance between opposing systems. However, the neat distinction between hot and cold brains, the emotions and the intellect, the id and the superego, has been complicated by the discovery that emotions are not primitive, chaotic, undisciplined drives but well-crafted adaptations which work in conjunction with cognitive processes in the strategic interests of the organism as a whole.

Attempts to integrate the two disciplines of neurophysiology and ethology have led to a focusing of interest on the hot brain as a possible locus of neuronal systems subserving species-specific patterns of behaviour. MacLean's conclusions, largely derived from animal studies, are to a certain extent applicable to human beings, as the work of Flor-Henry (1976) and Schwartz et al. (1975) would indicate. They demonstrated that human emotional responses are dependent on neuronal pathways linking the limbic system with parietal and frontal areas of the right cerebral hemisphere. Moreover, Flor-Henry made the truly fascinating discovery that this whole complicated right hemispheric/limbic affectional system is under the surveillance and control of the left frontal cortex—thus lending further weight to the conclusion that the left hemisphere can, via the corpus callosum, 'repress' or inhibit the activities, and especially the emotionally toned activities (which are the vital concern of analysts and psychiatrists), of the right. [1]

[1]MacLean's triune concept has come in for criticism since this chapter was originally written. These criticisms will be dealt with in the 'updated' section at the end of this chapter.

While it may well be that psychic processes belonging to the personal Freudian' unconscious proceed in the right hemisphere, it seems probable that Jung was right when he guessed that the archetypal systems, if they could be given a local habitation and a name, must have their neuronal substrate located primarily in the phylogenetically much older parts of the brain. It is not, of course, possible to designate any precise neurological location for any of the archetypes. Inasmuch as one archetypal system can be differentiated from another, each must have an extremely complex and widely ramifying neurological substrate involving millions of neurones in the brain stem and limbic system (the instinctive or biological pole) and both cerebral hemispheres (the psychic or spiritual pole). When one considers which of the two hemispheres is more appropriate to the processing of archetypal components, one can agree with Rossi that it must be the right:

'Jung's concepts of archetype, collective unconscious and symbol are more closely

associated with the use of the imagery, gestalt and visuospatial characteristics of right hemispheric functioning.' Rossi quoted a passage where Jung says,

The archetype is essentially an unconscious content that is altered by becoming conscious and by being perceived, and it takes its colour from the individual consciousness in which it happens to appear. By a symbol I do not mean an allegory or a sign, but an image that describes in the best possible way the dimly discerned nature of the spirit. A symbol does not define or explain; it points beyond itself to a meaning that is darkly divined yet still beyond our grasp, and cannot be adequately expressed in the familiar words of our language.

Rossi commented that although Jung made it clear that the archetype is an imprint or pattern that exists independently of ego-consciousness, it can, nevertheless, achieve expression 'in the form of words, concepts and language of the ego's left hemispheric realm'; but once this happens 'they become only representations that take their "colour from the individual consciousness in which it happens to appear"'. It is precisely because the normal processes of the right hemisphere are not readily translated into the logical, verbal formulations of the left, that the ego perceives them on occasion as 'numinous': the mysterium tremendum et fascinans of archetypal symbols may be due to the left hemisphere's congenital inability fully to comprehend them.[2] Many people, with an extraverted, convergent 'left hemispheric' attitude to life, seem reluctant to expose themselves to the symbolical aspects of experience, and it is probable that they count among their number a high proportion of those who are largely unaware of their dreams, and who have great difficulty in recalling dream events when asked to do so (Austin 1971). Possibly, extraverts and convergent thinkers are more prone to inhibit information passing across the corpus callosum from the right.

[2]As we shall see, the limbic system is also richly implicated in the experience of numinosity.

However, Henry and Stephens (1977) argued that not only can the left hemisphere inhibit communication from the right, but that both hemispheres, in addition, may well be capable of suppressing communications from the limbic system. Moreover, they suggested that psychic health and personality integration depend as much on the maintenance of open communication between limbic system and cortex as on communication between the two hemispheres. Most interesting of all, in the light of Jung's views on the function of dreams, was their suggestion that the neurophysiological purpose of dreaming is to promote integration of processes occurring in the limbic system with those of the cerebral hemispheres. Their hypothesis would square well not only with Jungian clinical experience but with Jouvet's (1975) finding that the low-voltage, high-frequency EEG waves characteristic of dreaming sleep originate in the brain stem and spread upwards through the midbrain to the cortex: 'It has been held that dreams represent information coming from the various "depths" of the unconscious. If Galin (1974) is correct, dreams might represent information coming from the limbic system by way of the right hemisphere during the special state of rapid-eye-movement (REM) sleep' (Henry and Stephens 1977, p. 111).

Concluding his persuasive and highly instructive review of the evidence, Henry declared that the metapsychological foundations built by Carl Jung were proving to be soundly conceived. There is a rapidly growing body of evidence linking our mammalian inheritance of basic brain stem functions with humanity's unique religious, social and cultural achievements. Society has scarcely begun to consider the implications of these discoveries.

The purpose of dreaming

Dreaming is a mammalian characteristic. No REM (rapid eye movement) sleep characteristic of dreaming has been detected in amphibians or reptiles, and only fractional amounts in birds. In mammals, on the other hand, REM sleep begins very early in life, being apparent not only immediately after birth, but in the uterus as well. It seems that REM sleep is necessary for normal activity in the central nervous system of all mammalian species. What can its biological purpose be?

One persuasive view of the phenomenon points out that in the course of development the young mammal has to adapt its old brain of reptilian inheritance to a much more recently acquired repertoire of behaviour patterns made possible by the evolution of the mammalian neocortex. The growth of neurones, and differentiation of the communications between them, continues for some considerable time after birth and Jouvet believes that it is during this crucial early period that dreaming plays an indispensable role in organizing the archetypal biogrammar into the complicated behavioural and psychic sequences involved in mating, hunting, dominance and the defence of territory. Jouvet suggests that the function of dreaming is essentially to activate neurones that are responsible for programming patterns of behaviour characteristic of the species. While these patterns are, of course, related to stimuli arising from the environment, the fundamental processes involved in integrating the archetypal biogrammar inherent in the genetic programme into the developing behavioural repertoire has to occur at night, in Jouvet's view, since it is only during sleep that the 'command neurones' are free from the need to meet the numerous demands of the environment normally encountered during wakefulness.

In line with Jouvet's hypothesis, some findings suggest that deprivation of REM sleep in rats may delay integration of the archetypal programmes for attachment and territorial behaviour with the higher cognitive processes of the cerebral hemispheres (e.g. Smith et al. 1974). Moreover, Lucero (1970) observed that after rats have been doing some hard learning they spend longer periods of the night in REM sleep. What is more, if they are prevented from experiencing REM sleep for two or three hours after they have been learning their learning proves to be less efficient.

Evidence that phylogenetically ancient structures play an important part in the nightly dreams of contemporary human beings can be found in studies which classify the content of dreams without going in any detail into their symbolism. In one statistical study, cited by Carl Sagan (1977), of the common dreams of college students, the following themes were reported in descending order of frequency:

1 falling
2 being pursued or attacked
3 repeated attempts at performing a task
4 experiences connected with academic work
5 sex

It seems likely that all except the fourth category (which is clearly linked with the subjects' everyday preoccupations) are phylogenetically determined. Falling dreams are not surprising in a creature which, in the earlier stages of its evolution, spent its life in trees; nightmares of being attacked and pursued are only to be expected in a species whose primordial conflicts have involved hunting, fighting, and striving for dominance; repeated

attempts to perform tasks would reflect our never-ending preoccupation with the need to master environmental vicissitudes, physical skills, religious rituals, social customs, etc., while the fifth category scarcely requires comment.

One interesting finding of this study was that half the subjects reported dreaming of snakes. While Freudians would doubtless see such dreams as evidence of phallic symbolism they can also be understood as a phylogenetic hangover, a vestigial warning system from our primate past. Freudians will counter that the essentially sexual content of dreams is borne out by sleep laboratory investigations which confirm that in men REM sleep is frequently associated with penile erection, but this is a piece of special pleading which fails to take into account the observation that a large number of physical changes characteristic of midbrain and brain stem activity occur during REM sleep in both sexes: e.g. changes in respiratory rate, pulse rate, body temperature and blood pressure. Dreams also frequently have a powerful affectual component—fear, anxiety, euphoria, despair—by no means obviously sexual. Moreover, anthropological and ethological evidence reveals that penile erection is often associated with archetypal functions other than sexual ones in both human and non-human primates: e.g. threat display, dominance and territorial behaviour. Jung's belief that snakes represent brain stem and spinal cord activities may well be nearer the mark, far-fetched though it sounds. For Jung anticipated by many years MacLean's hypothesis that the brain bears functional regions of ancient phylogeny in the midbrain and brain stem, and he made the surprising suggestion that animals in dreams represent activity in these regions, the 'lower' the animal on the phylogenetic scale the more primitive the region represented: 'with the snake the psychic rapport that can be established with practically all warmblooded animals comes to an end…. As Hippolytus says, the Gnostics identified the serpent with the spinal cord and the medulla. These are synonymous with the reflex functions' (CW 9, pt ii, para. 396).

The lower vertebrates have from earliest times been favourite symbols of the collective psychic substratum (higher vertebrates symbolize mainly affects), which is localized anatomically in the subcortical centres, the cerebellum and the spinal cord. These organs constitute the snake. Snake dreams usually occur, therefore, when the conscious mind is deviating from its instinctual basis. (CW 9, pt 11, para. 282)

Jung's approach to dreams was fundamentally biological. The study of dreams, he believed, 'opens the way to a general comparative psychology from which we may hope to gain the same understanding of the development and structure of the human psyche as comparative anatomy has given us concerning the human body' (CW 8, para. 476). 'A dream, like every element in the human structure, is a product of the total psyche. Hence we may expect to find in dreams everything that has ever been of significance in the life of humanity' (CW 8, para. 527). He rejected Freud's view of the 'dream work' whereby 'latent' wishes are fulfilled through transformation into the 'manifest content' of the dream. 'As against Freud's view that the dream is essentially a wish-fulfilment, I hold…that the dream *is a spontaneous selfportrayal, in symbolic form, of the actual situation in the unconscious '* (CW 8, para. 505, Jung's italics). *' I take the dream for what it is ….* The dream is a natural occurrence, and there is no earthly reason why we should assume that it is a crafty device to lead us astray. It occurs when consciousness and will are to a large extent extinguished' (CW 11, para. 41, Jung's italics). Dreams, Jung believed, are the means by which the psyche maintains its equilibrium.

The psyche is a self-regulating system that maintains its equilibrium just as the body does. Every process that goes too far immediately and inevitably calls forth compensations, and without these there would be neither a normal metabolism nor a normal psyche. In this sense we can take the theory of compensation as a basic law of

psychic behaviour. Too little on one side results in too much on the other. (CW 16, para. 330)

Writing dreams down and bringing them to analytic sessions for discussion and interpretation merely serves to enhance their compensatory effect. But

lack of conscious understanding does not mean that the dream has no effect at all. Even civilized man can occasionally observe that a dream which he cannot remember can slightly alter his mood for better or worse. Dreams can be 'understood' to a certain extent in a subliminal way, and that is mostly how they work. (CW 18, para. 52)

Night after night dreams put us in touch with our phylogenetic past, with the 'unitary soul of humanity', and it is in this extraordinary achievement that their therapeutic importance lies.

The evolutionary stratification of the psyche is more clearly discernible in the dream than in the conscious mind. In the dream, the psyche speaks in images, and gives expression to instincts, which derive from the most primitive levels of nature. Therefore, through the assimilation of unconscious contents, the momentary life of consciousness can once more be brought into harmony with the law of nature from which it all too easily departs, and the patient can be led back to the natural law of his own being. (CW 16, para. 351)

Jung saw his task as a psychotherapist as achieving a reconciliation between his patient and the '2-million-year-old man that is in all of us'. Our difficulties, he argued, 'come from losing contact with our instincts, with the age-old unforgotten wisdom stored up in us. And where do we make contact with this old man in us? In our dreams' (1971, p. 76). [3]

[3]This insight lies at the heart of my books The Two Million-Year-Old Self and Private Myths: Dreams and Dreaming where I have attempted to explore its validity for men and women living at the present time.

Dreams, therefore, are the language used in the life-long dialogue proceeding nightly between the ego and the Self: they are the means by which the individual becomes psychically related to the life-cycle of his species. Jung was the first psychologist to draw attention to the importance of dreamseries in mediating and exemplifying this process. Taken singly, each dream compensation

is a momentary adjustment of one-sidedness or an equalization of disturbed balance. But with deeper insight and experience, these apparently separate acts of compensation arrange themselves into a kind of plan. They seem to hang together and in the deepest sense to be subordinated to a common goal, so that a long dream-series no longer appears as a senseless string of incoherent and isolated happenings, but resembles the successive steps in a planned and orderly process of development. I have called this unconscious process spontaneously expressing itself in the symbolism of a long dream-series the individuation process. (CW 8, para. 550)

Jung's clinical observations are in agreement with the modern evidence that dreaming is associated with a preponderance of right hemispheric cerebral activity: 'It is characteristic that dreams never express themselves in a logical, abstract way but always in the language of parable or simile' (CW 8, para. 474). Written communications and inscriptions are not uncommon in dreams, but it is usually difficult to decipher their meaning, even in the dream; on waking it is often impossible to recall what was written in any detail. Dream time, dream arithmetic, and dream logic are also notoriously unreliable. As Robert Ornstein suggested, it is as if the left and right hemispheres function like the sun and the stars. Although the stars keep their station in the heavens during the hours of daylight, we are unaware of them on account of the brilliance of the sun. But when the sun goes down and we are no longer dazzled by its radiance, the stars come into their own. So it is with dreaming. 'In sleep, fantasy takes the form of dreams. But in waking life, too, we continue to dream beneath the threshold of consciousness' (CW 16, para. 125). In the alert brain

the rational, verbal brilliance of the left hemispheric system 'dazzles' (i.e. inhibits) our awareness of events occurring in the intuitive, symbol-producing right. It is when the sun sets in the left hemisphere that the stars come out in the right hemisphere and assume the form of dreams. Ornstein's metaphor is a pleasing one— not least because the equation of the sun with the 'light of consciousness' is very ancient, as is its setting with the 'night sea journey' of the hero. Every night, the extraordinary adventure is repeated: the onset of sleep heralds the death of one day's measure of the conscious life-span; the heroic ego consigns itself to the deep to hold communion with the ancestral spirits that reside there and, gathering their wisdom and their guidance, prepares for the miraculous birth of another day.