
Paradigms of Consciousness During Sleep

Donald J. DeGracia, Ph.D.

Wayne State University

Detroit, MI

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Introduction

The purpose of this article is to shed light on various frameworks available for understanding the nature of conscious experiences which occur during sleep. More specifically, this article would like to compare the ideas of "lucid dreaming", "out-of-body experiences" (OBEs) and "astral projection" from a historical and scientific perspective. There is a great interest in conscious sleep phenomena, but there also tends to be a confusion of terminology which results from a bewildering array of literatures about the nature of such experiences. This article will discuss the fact that there are presently multiple paradigms in operation which people use indiscriminately and interchangeably to describe conscious sleep experiences. The purpose of this article is to lay these paradigms side by side and compare the features and history of each. This will only be a cursory overview because the history and features of the paradigms to be discussed are very complex. The hope of this article is that such a comparative analysis will help eliminate some of the confusion of terminology and thought which has resulted from mixing incompatible paradigms, and thereby help pave the way for the development of a richer scientific and empirical approach to conscious sleep experiences.

Let us begin by noting that scientific ideas always undergo an evolutionary development. In the early stages of scientific understanding of a phenomena, conceptions of the phenomena are often of a "common sense" nature (Churchland, 1986). In time, common sense approaches are superseded by more empirical and scientific understanding. There may be a stage in the development of understanding in which multiple frameworks for conceptualizing a phenomena exist side by side. Consider, for example, the idea of motion. Our understanding of motion has passed through several stages of development. In the Middle Ages, motion was conceptualized by Aristotle's idea of "natural place", which stated that bodies fall towards the Earth because that is their "natural affinity". Eventually this idea was replaced by Newton's conception of

gravitation as being the attraction between objects which contain mass, as embodied in Newton's three laws of motion. Newton's conceptions held sway for several centuries until Einstein replaced the Newtonian idea of gravity as "action at a distance" with the notion of gravity as the bending of space-time. Today we do not take seriously Aristotle's notions of motion; however, the Newtonian and Einsteinian views do indeed exist side by side. These latter, however, are clearly distinguished, and confusion between their tenets is unlikely.

The evolution of scientific ideas entails the establishment of paradigms, and the transformation of these paradigms through time (Kuhn, 1971). The history of science is a living testimony to this pattern of intellectual evolution. Other examples in the history of science include the evolution of notions such as "heat", "atoms", "electricity", "gene"; all of these notions have undergone substantial paradigm changes through history. We will argue that such is the case with paradigms attempting to conceptualize conscious sleep experiences.

In the above example, there was only one phenomena, that of the motion of natural bodies. However, there were three completely different ways to conceptualize the nature of this phenomena (e.g. Aristotelian, Newtonian and Einsteinian). This is a critical point to make: *there are multiple ways by which to conceptualize a phenomena, and each of these can be considered a paradigm.* This then is our point of departure for considering the various paradigms used to conceptualize conscious experiences during sleep. We can presume that there is one essential phenomena, which I have chosen to term "conscious experiences during sleep". My thesis is that there are currently multiple paradigms used to conceptualize this phenomena. Let us first review what I mean by "conscious experiences during sleep" and then I will lay out the three main paradigms used to conceptualize such experiences.

Forms of Conscious Experience During Sleep

First we must begin by defining what is meant by "conscious". I am not using this term in any metaphysical sense at all but am using it in a purely pragmatic sense. By "conscious" I mean that which fills direct, subjective awareness. This is to be contrasted to unconscious. For example, the operation of neurological reflexes involved in maintaining balance are unconscious aspects of psychological operation. Visual perceptions, and in general, any sensory experience to which we pay attention, are conscious. The contents of conscious awareness can include sensory, emotional and mental components. This view of consciousness is taken directly from that of Baars (Baars, 1988). Hence, when speaking of conscious experiences during sleep, I mean sensory, emotional or mental content which exists in direct subjective awareness during sleep.

The most common conscious sleep experience is dreaming. Dreams are a form of conscious awareness during sleep. When we dream, we are consciously aware of visual, auditory, tactile, kinesthetic and emotional content, as well as thought (both cognitive and metacognitive) and to lesser extents smells, taste and pain. With respect to sensory perceptions during dreams, these are presumably hallucinations, but they are conscious experiences nonetheless. We may or may not remember our dreams upon awakening. Research has shown, in fact, that we do not remember the bulk of our nightly dreams (Hobson, 1988). We tend to remember those dreams that occur prior to awakening, at least fleetingly upon awakening. It has been shown in the sleep lab that waking sleepers directly from REM sleep allows for significant recall of dreams. When we do remember our dreams, it is clear that they are conscious experiences that, in many respects, resemble our waking conscious experiences.

A second type of conscious sleep experience is the phenomena of hypnagogic hallucinations (reviewed in Mavromatis, 1987). Hypnagogic hallucinations tend to occur during stage 2 nonREM (Hobson, 1988), and involve the perception of complex visual imagery that may or may not be realistic in quality. Hypnagogia is distinguished from dreaming in that the former does not contain the rich, multimodal sense of immersion of the

latter. Also, hypnagogia is less structured than dreaming, and does not form an integrated narrative as dreams do. Hypnagogia occurring upon awakening is termed "hypnopompic hallucinations".

A third type of conscious sleep experience is that which has been discovered upon waking sleep subjects from nonREM sleep. This is described as "less dream-like and more thought-like". Unlike dreams, there is generally no sensory component to this form of sleep consciousness and it predominately manifest as thinking. The nature of this thinking activity has been described as "common place...concerned with real life events...banal and repetitive" (Hobson, 1988).

It should be explicitly pointed out that dreams do not occur exclusively during REM sleep but have also been observed during nonREM sleep. The probabilities of obtaining a dream report from REM and nonREM sleep are about 80% and 30%, respectively (Okuma, 1992). This fact has substantially loosened the association of dreaming as a REM state phenomena and many workers in the field no longer accept that there is a causal relation between REM sleep and dreaming (Mancia, 1995).

A fourth type of conscious sleep experience is sleep paralysis. This involves usually the (presumably hallucinatory) perception of the environment in which the person is sleeping accompanied by the inability to move despite intense effort to do so. Sleep paralysis may often be associated with intense feelings of dread or fear. The subject tends to be lucid and may believe that they are awake. The subject in the sleep paralysis state can be awakened simply by touching them (Hobson, 1988).

A fifth recognized state of sleep consciousness is sleep terror. Here there is a feeling of intense terror and dread without any accompanying sensory perceptions or cognitive activity. The subject may awaken drenched in sweat, heart beating rapidly and crying out.

Finally, and most importantly for the following discussion, there is a sixth state of consciousness during sleep. In this state, the subject is dreaming, but is aware of the fact that they are doing so. This state has been termed "lucid dreaming" (LaBerge, 1985) or "conscious dreaming" (Rifat, 1997). I will use the term "lucid dreaming" throughout this article. This state is currently characterized by the notion that the dreamer is aware they are dreaming. However, as I will discuss below, this is not the

most suitable definition of this state, and this definition of lucid dreaming has helped contribute to some degree of confusion in characterizing this state of sleep consciousness. Below, we will address the paradigms used to conceptualize this phenomena of lucid dreaming.

I would also like to add that states of trance and certain states resulting from meditative practices are closely related to conscious sleep experiences. At present, there is no clear characterization of meditative states to allow for a precise description of how exactly these relate to sleep itself, or states of consciousness during sleep. Nonetheless, phenomenological descriptions of subjective awareness during meditative practice are highly reminiscent of sleep conscious states, particularly the hypnagogic state.

In sum, I have described above six forms of conscious sleep experience. Clearly, consciousness during sleep is very complex and can manifest in multiple forms. What all six of these states share in common is that they are indeed manifestations of conscious awareness during sleep. I thus propose the adoption of this general terminology when discussing these states: they are conscious sleep experiences. In the above descriptions, I tried, as best as possible, to describe the empirical facts of these various manifestations of sleep consciousness without interpreting these empirical facts within a specific paradigmatic framework, which, of course, is not completely possible. For example, calling a lucid dream a "lucid dream" implies a specific paradigm, as I will discuss below. I would now like to explicitly turn attention to the paradigms used to describe and interpret these empirical states of sleep consciousness. Again, the general thesis is that there is only one set of phenomena, consciousness during sleep, but that there are multiple ways to conceptualize this phenomena and its complex manifestations.

Paradigms of Consciousness During Sleep.

There are three main paradigms which have evolved to conceptualize consciousness during sleep. These paradigms share predominantly a focus on the phenomena of lucid dreaming, although the other states of sleep consciousness play into these paradigms to some extent or another. These paradigms display the evolutionary development discussed above; the earliest paradigms were based on simple, common sense notions and the latter

paradigms became more refined and were based on more technical and scientific considerations. The three paradigms I will discuss which have served to conceptualize primarily the lucid dream phenomena are (1) the occult paradigm, (2) the parapsychological paradigm, and (3) the scientific paradigm. Each of these paradigms has given a different name to what I will argue is essentially the same phenomena. The names each has used to describe lucid dreaming is (1) astral projecting, (2) out-of-body experiences, and (3) lucid dreaming, respectively. The relation between terminology and its respective paradigm is listed in the following table, as are some of the historical lineages of each paradigm.

Paradigm	Term for "Lucid Dream"	Historical Associations
Occult	Astral Projection	Eastern and Western Occult Traditions (Yoga, Tantra, Theosophy, Hermetics, etc.)
Parapsychology	Out-of-body Experience	Psychical Research, Parapsychology
Scientific	Lucid Dream	Biology, Psychology, Sleep Research

Because of the development of the EEG as a tool in sleep research, which gained widespread usage in the 1960s following the work of Aserinsky and Kleitman (1953), we are now able to define each of the above 6 conscious sleep states in terms of electrophysiological correlates. This in itself is an implicit reliance on scientific paradigms of these states. However, some of these states, particularly the lucid dream and hypnagogic states have been described in Western literature for close to 150 years. Earlier descriptions of these states did not have the luxury of defining EEG correlates and thus, these states were described primarily in subjective, experiential, and phenomenological terms. Some of the earliest workers who described altered states of consciousness which resemble in almost all respects what we now call "lucid dreams" were D' Hervey de Saint-Denis (1867), Charles Leadbeater (1895), Frederik Willems Van Eeden (1913) Oliver Fox [Hu Evert] (1920), and Muldoon and Carrington (1929).

We must forego a detailed review of these and other early authors and only outline the salient features of their interpretations of their experiences.

The Occult Paradigm

Authors such as Leadbeater, Fox and Muldoon form a historical lineage in the occult paradigm. The essence of the occult paradigm is that the world revealed to our senses is but one of several, usually seven, worlds, or *planes* of nature. The general idea that there are other worlds not visible to our senses has a very long history, dating back millennia in ancient Indian thought, vestiges of which can be found in the ancient Greek notion of the "heavenly spheres"; ancient Gnostic traditions also describe the seven aethers. A mosaic of these ancient ideas is to be found in the Theosophical teachings (circa 1900), such as those of Leadbeater, which in turn influenced later authors like Fox and Muldoon.

Within the Theosophical framework, there exists seven planes termed the physical, astral, mental, buddhic, atmic, anupadaka, and adi. Accordingly, each person has a "body" capable of traveling on its respective plane. Hence, the idea of astral projection was that one used their astral body to travel on the astral plane.

First, it can be stated that this notion of seven planes provided a *prescientific* paradigm for conceptualizing human psychology. The physical plane is the world of the physical sensation, the astral plane is the realm of emotion, the mental plane is the realm of thought, the buddhic plane is the realm of the soul, and the higher planes are abstractions reflecting levels of relationship between the individual soul and the universal transcendental essence, roughly translated as God. The occult paradigm *projects* the psychology of the human being into the very structure of the universe. In the premodern era, before our detailed scientific description of natural phenomena, this analogical reasoning dominated intellectual discourse.

It seems reasonable to infer that the idea that there are worlds which exist beyond the ken of our senses derives directly from the experience of lucid dreaming, as well as from meditatively-induced states. That is to say, the simplest and most common sensical interpretation of the lucid dream experience, and similar altered states, is that some non-material, soul-like entity has left the physical body and physical world and has entered into a nonphysical world. It can be easily imagined that,

through premodern history, the few individuals who left records of their lucid dreams, or similar altered states of consciousness, and interpreted them in an occult framework, spawned a whole paradigm/mythology of the nature of these nonphysical planes. This would include notions of the planes, of reincarnation, of nonphysical bodies, and include such terminology as "auras", "chakras" and "kundalini". Most of these notions have their origin in ancient Indian traditions from which Theosophy heavily drew, and many of these notions persist today and are applied to conscious sleep states.

Today there is still confusion between lucid dreams and astral projections. In fact, the techniques for inducing either are identical (compare Rogo, 1986, with LaBerge and Rheingold, 1990), and the content of the experiences are identical, indicating that these are in fact the same state of consciousness. The confusion results because there is not a clear recognition that the terms "astral projection" and "lucid dream" represent different paradigms for conceptualizing the exact same experience. I will discuss the relative validity of these two paradigms below.

The Parapsychological Paradigm

The parapsychological paradigm has its historical roots in the occult paradigm. At the turn of the 20th century, as the notion of "astral projection" and other occult phenomena became more widespread, it attracted attention from those not involved in occult movements. Specifically, nonoccult investigators began to independently investigate the claims of occultists such as Leadbeater. Hence was born in the mid 1800s the British Society for Psychical Research, and later in America, The American Society for Psychical Research. Early psychical researchers were influenced by such movements as Theosophy or Spiritualism, as seen, for example, in the works of Muldoon and Carington (1929). However, in the 1930s, the work of J.B. Rhine in America gave rise to a nonoccult approach to the study of supposed psychical phenomena, later to be termed "psi" events. This approach has come to be known as parapsychology.

In general, parapsychologists abandoned their occult roots and developed their own ways of conceptualizing the psychic phenomena described originally by occultists. Parapsychologists accepted

that such psi events were real and began to investigate them from nonoccult perspectives. This is true of the phenomena of astral projection, which eventually parapsychologists began to term "out-of-body experiences" (OBE). The parapsychologist abandoned the occult idea of the planes and instead began to conceptualize the OBE as some part of the personality literally leaving the body and capable of moving about in the physical world. Several modern authors exemplified this paradigm including Charles Tart, Robert Monroe and Susan Blackmore.

The parapsychological paradigm made the clear prediction that a person undergoing an OBE should be able to acquire information not accessible to that person's physical senses. Many such experiments were performed, none of which produced clear-cut results. It is my opinion that the OBE, as a product of the parapsychological paradigm, was a particular interpretation of certain conscious sleep experiences including lucid dreams, sleep paralysis, hypnagogia and certain trance and meditative states. Furthermore, my reading of the parapsychological literature is that this interpretation has failed the test of scientific verification.

Nonetheless, as there exists confusion regarding the terms "astral projection" and "lucid dream", there is also confusion over the term "OBE". Again, the relative validity of these terms will be discussed below.

The Scientific Paradigm

The scientific paradigms related to sleep states of consciousness have their own long and involved histories involving brain research, psychology, psychoanalysis, dream research and sleep research, all of which occurred relatively independently of the development of occult and parapsychological paradigms discussed above. The history of the scientific study of sleep and dreams can be conveniently divided into the pre-Freudian and post-Freudian eras.

Hervey de Saint-Denis is exemplary of the pre-Freudian study of dreams. Hervey de Saint-Denis was a phenomenologist who very clearly described his subjective dream life. He clearly described his own lucid dreams, although he did not use this term. Interestingly, his emphasis was not on his self-awareness that he was dreaming (which is the current conception of the lucid dream), but instead on his ability to act with volition within his dreams. A similar emphasis can be found with Van Eeden

(1913), who coined the term "lucid dream". With the rise of Freud's approach to dreams in the early part of the 20th century, this pre-Freudian work was lost for several decades and not rediscovered until about the 1960s.

The Freudian approach to dreams, both in terms of the explanation and the meaning of dreams, dominated the Western mind through the first half of the 20th century. Today it is fair to say that few researchers take the Freudian approach seriously and it is now only of historical interest. For readers interested in critiques of the Freudian approach to sleep and dreams, see Hobson, 1988.

The downfall of Freud's influence in dream theorizing came in the middle of the 20th century and was due to the discovery of the sleep cycle by Aserinsky and Kleitman (1953) and its correlation with dreams by Dement and Kleitman (1957). This work spawned what is now called the "psychophysiological" paradigm of dreaming, whose main tenet was that dreams are the result of the physiological changes responsible for generating the sleep cycle. During the psychophysiological era, the idea of lucid dreams was not generally accepted, and dreams were viewed as being a model for waking forms of mental illness and psychosis.

Several factors have contributed to the fall of the psychophysiological paradigm, one of which has already been mentioned. That is, the occurrence of dreams is not exclusively confined to the REM stage of sleep. Thus, the consensus today is that the factors leading to dream formation must be independent to some degree from those responsible for generating the EEG sleep cycle. As well, research based on cognitive psychology paradigms has overturned the notion that dreams are similar to waking psychosis. Cognitive psychology research has revealed that many aspects of dream psychology are essentially identical to normal waking psychology including aspects of sensory perception, and in particular, the use of language in dreams (reviewed in Cavellaro and Foulkes, 1993).

Perhaps the most significant development in 20th century dream research was the laboratory demonstration that a subject can display volition and communicate directly from the dream state with people who are awake. This discovery was made independently circa 1980 by LaBerge et al. (1981) in America and Hearne (1980) in England. Both of these researchers proved unambiguously that the lucid dream state does occur and has highly

reproducible physiological and psychological correlates.

In sum, the scientific view of sleep states of consciousness sees these as events intrinsic to the brain. It is a paradigm firmly grounded in both the biology of the brain and in human psychology. Dreams are internal hallucinatory events generated by the brain, whether these are of the lucid or the nonlucid variety.

Evaluation of the Three Paradigms of Consciousness During Sleep.

I have now described the three common paradigms currently in use for conceptualizing conscious experiences which occur during sleep. It is hoped that the reader can now better see how current ideas of conscious sleep states derive from one or a mixture of these three paradigms. In fact, we live in a historical era of relative confusion about the nature of these states of consciousness because these three paradigms coexist and are used and mixed to varying extents. I would like to now offer my opinion on the relative validity of these paradigms in terms of current scientific knowledge of sleep, dreams, brain function and physics.

First, I truly believe that much confusion can be eliminated by recognizing that we are dealing with one general phenomena - that of conscious sleep experiences - but that there are at least three major ways, and a host of minor variations, for conceptualizing these experiences. We must learn to be careful thinkers and try as hard as possible to not confuse empirical facts with interpretive frameworks. For example, it is common knowledge that one may experience "chills", "tingles" or "vibrations" during the onset of a lucid dream. Some people interpret these "vibrations" as the manifestation of "kundalini", or the activity of "chakras". Such interpretations are grounded in occult paradigms. Other people interpret these vibrations as a consequence of a particular type of brain activation, in which case, the person is using the scientific paradigm to interpret the phenomena. Again, there is only one empirical phenomena, but two different interpretations. It is only by untangling these paradigmatic interpretations that we can go beyond superficial differences in terminology and attempt to scientifically determine the nature of these experiences.

In this regard, the use of Ocam's razor is recommend: thou shall not multiple terms

needlessly. This means that we should not invoke more complex explanations until simpler explanations have been ruled out. Thus, I recommend that the simplest explanation, both experimentally and theoretically is that states of consciousness during sleep are due to changes in the activity of the brain. This is the simplest explanation because we are not invoking anything other than human anatomy and physiology. If, and this is a big if, it can be conclusively demonstrated that this is an insufficient theoretical basis, then, and only then, should we invoke ideas about things "leaving the body" or "chakras", "planes" or "kundalini". However, I believe it is unlikely we will need to invoke such terms as explanatory principles. This is because the human brain is the most complex object known and we are far from understanding the possibilities inherent in our own brains. I believe that the study of conscious sleep states will enlarge our understanding of the functions of the human brain. In the end, I believe we will discover that ancient terms such as "chakra", "kundalini", and the like, are prescientific descriptions of specific states of brain activity.

However, current scientific ideas of lucid dreams have their problems. Specifically, as mentioned above, the idea that a lucid dream is "a dream in which the dreamer knows they are dreaming" is too simple of a definition of this experience. In fact, knowing that one is dreaming during a dream is dependent upon the paradigm a person uses. If the person believes they are astral projecting, then they will not be aware they are dreaming because they do not *think* they are dreaming; they *think* that they are astral projecting. Thus, the current scientific definition of the lucid dream does not take into account the beliefs of the person undergoing the experience.

In fact, the attempt to distinguish what is a lucid dream from what is a nonlucid dream is very difficult to do; presently there is no really good definition that distinguishes lucid and nonlucid dreams. For example, a person could be undergoing a nonlucid dream, but within this nonlucid dream, have the thought in their mind that they are dreaming. This is a very subtle phenomena that is easiest to understand only when it has happened to you first hand. Likewise, one could undergo a lucid dream without once stopping to think to themselves "I am dreaming". Again, this latter depends

completely on how the person conceptualizes the experience in their own mind.

The factor that appears to distinguish lucid dreams from nonlucid dreams is that in a lucid dream, the person has some type of way to recognize that they are not in the usual waking world. Whether the person conceptualizes this as "being in a dream", "being in the astral plane" or "having left their body" is immaterial. What is common to all three viewpoints is that the person realizes they are not in their usual waking life and, most importantly, the person can *act* on this knowledge. This does not happen in nonlucid dreams. Thus, it would appear that in a lucid dream, the brain undergoes some kind of change that gives the dreamer metacognitive access to their waking memories. Hence, it may be that *a lucid dream is a dream in which the dreamer can compare their present condition with their waking life*. It is this *ability to compare* the dream experience to waking experience that really appears to distinguish lucid dreams from nonlucid dreams. Now, this ability to compare one's state during a dream may manifest more or less; which is to say, this ability forms a spectrum of gradations. Thus, dream lucidity is not an all or none feature but can manifest more or less.

When looked at from this perspective, any other supposed distinguishing features between lucid dreams and dreams, or between lucid dreams and either OBEs or astral projections are merely superficial. For example, some people believe that if they are having an experience in which they are in familiar surroundings (such as their bedroom, neighborhood, etc.) and they are lucid (i.e. there is a continuity of memory and thought with the waking mind) that they are then undergoing an OBE. But this is not a justifiable distinction. In fact, the person is having a lucid dream and within that dream they are in familiar surroundings. It is very common to be in familiar surroundings in a nonlucid dream so why should it be unusual to appear in familiar surroundings while lucid in a dream?

One significant factor people use to distinguish lucid dreams from what they label as either OBEs or astral projections is how the experience was induced. If a person is in the midst of a nonlucid dream and suddenly becomes lucid (what LaBerge terms a "dream-induced lucid dream"), they consider the experience a lucid dream. However, if the same person goes directly from being awake to being in a lucid dream by applying some type of trance

technique (what LaBerge calls a "waking-induced lucid dream"), they may consider the experience to be an OBE or astral projection. However, there may be no difference whatsoever in the content of the two experiences. The only difference in this case is how the experience was induced. Is this enough of a distinguishing factor to consider these to be two *different* types of experience? I do not believe so.

In fact, the criteria people use to distinguish lucid dreams from OBEs from astral projections are all artificial. The environment one appears to be in, the method for achieving the experience, how one defines in their own mind what is happening to them have nothing fundamental to do with the experience itself. In all cases it is the same phenomena operating: the person is asleep, the person is conscious, and there is the ability to compare the present state to the waking state. What all the little distinctions point to is that dreams themselves are very complex. Because dreams can occur in familiar or unfamiliar settings, because the dreamer's mind can be more or less continuous with their waking mind, because there is such variety in the onset of dreams, all of this suggests that dream experience may be even more complex than waking experience. Thus, when people try to fit their dream experiences into this category or that category, they are in fact implicitly admitting that dream experiences are complex and can take on a large variety of forms. By trying to pigeon-hole their experiences into this or that category, they are missing the underlying fact that these are all varieties of dream experiences.

Hence, although I advocate a brain-based paradigm to explain conscious sleep states, it is important to recognize that this view is not perfect and is still in need of substantial improvement. A current project I am undertaking is the comparison of the operation of the mind at all of its levels between waking and the variety of dream states. The purpose of this task is to clarify the intrinsic variety clearly present in dream states. The various scientific views of dreams that have come and gone throughout this century have attempted to see dreams as this or that in a mutually exclusive fashion. With the knowledge available today, it should be quite clear that no one view of dreams can capture the inherent complexity of this phenomena. The waking state provides a baseline of psychological function from which we can begin to catalogue the large diversity of psychological

function possible in dream states. Ultimately this approach should provide a foundation by which to classify all of the conscious experiences which occur during sleep.

Comparison of the Occult and Scientific Paradigms

Although Ocam's razor suggests that we do not need to invoke occult notions to explain conscious sleep states, some comment about occult paradigms from a wider perspective is merited. What we today call occultism was in fact the basis from which much of modern science arose. The classical example is the rise of chemistry from alchemy. The history of astronomy is intimately linked to the history of astrology. Even nineteenth century phrenology, which today is found in occult literature, was the precursor of our modern view of the modularity of brain function. Thus, it is not intellectually proper to dismiss all of occultism as irrelevant to the future of our scientific understanding. In fact, there are two domains of knowledge in which occultism is relevant: physics and psychology.

We live in an age dominated and enamored by the scientific method and the knowledge this method has created. Because we are so enamored by science, we fail to see its shortcomings. Some of these become obvious when one compares occultism to science. At a philosophical level, science is highly specialized and fragmented, whereas occultism provides a unified view of Humanity and the Cosmos. Science itself grew out of a Renaissance reaction to the rigid dogma of the Catholic Church. Hence, science, from its very roots, rejected spiritual considerations, and, in effect, it threw the baby out with the bath water. The typical Western scientist has no conception of the possibility that spirituality can be studied with the same intellectual rigor as the natural world. A study of the methods and philosophy underlying Yoga shows that indeed spirituality itself can be approached with the highest intellectual regard. The realm of psychology bleeds imperceptibly into the realm of the spiritual, and here in the West this has only been recognized by a few unique scientists such as Carl Jung or Abraham Maslow. One value to the study of occult ideas is that it provides an intellectual model of a unifying intellectual approach, something dreadfully lacking in modern Western science. When we speak of uncovering the

deepest aspects of the human brain, this implies rediscovering spiritual truths well explicated in ancient philosophies, which today survive in numerous occult doctrines.

A second level where occultism may be relevant in the future is the link between physics and psychology. Today, from a scientific perspective, this link is the brain itself. The brain embodies principles of physics: diffusion, membrane electrical conduction, principles of chemical reactivity, principles of information processing only now emerging from detailed analyses of neural anatomy at the synaptic level. Likewise, the brain is the basis of psychology; it is the seat of reflex, perception, emotion, thought, consciousness, creativity and imagination. How these two seemingly vastly different levels meet is currently not understood. There is optimism that it is all a matter of detail and that soon, the wiring diagram of the human brain will reveal the mysteries of human psychology. One is best to remember that before Einstein, LaPlace declared to the world that physics had solved the problems of the universe and that the end of physics was in sight, in which all the basic problems of physics were to be solved. It was only within several decades that LaPlace's claim was seen to be the naive fiction that it was with the advent of Relativity Theory and Quantum Mechanics. The same pattern can be seen in the history of mathematics in the lineage from David Hilbert to Kurt Gödel (Kline, 1980). The moral is that optimism is not always correct and that Nature has a way of showing our simple minded notions of her to be very wrong.

Hence, when physicists are today speaking of 26-dimensional universes underlying the space-time we perceive as 4-dimensional (Davies and Brown, 1988), the occult notion of the planes does not sound all that far from possible truth. When physicists speak of "dark matter" - invisible matter that interacts only with gravity but none of the other forces - this is not very far off from notions occultists described circa 1900 [cf Powel, (1969)] . It is perhaps wise to re-evaluate occult claims and descriptions of altered states of consciousness recognizing that they also may have glimpsed some truth that will only take us a little longer to get to using the scientific methods at our disposal. This is not to say that occult claims will be correct as they are stated presently. What I am implying however is that the future of intellectual understanding may in

fact be a more or less recognizable hybrid of what we today call "science" and "occultism". Scientists of today are deeply immersed in the day-to-day social role of what our culture presently defines as "science", and they tend not to see beyond this into the greater cultural and historical patterns in which they are immersed. The study of history shows that it is quite indifferent to the fashions of any particular era; an apt warning for the seeker of truth.

Conclusion

In conclusion, it is hoped that this abbreviated history lesson has helped inform the reader of the historical threads pertinent to understanding conscious sleep states. There have been three main lineages of thought. We need to untangle these three threads and get beyond superficial differences in terminology. We need to recognize the vast potential implicit in the study of consciousness during sleep for revealing some of the deepest secrets of the human brain, and perhaps for rediscovering ancient wisdom in a new form.

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