DREAM IMAGES:
A Call to Mental Arms

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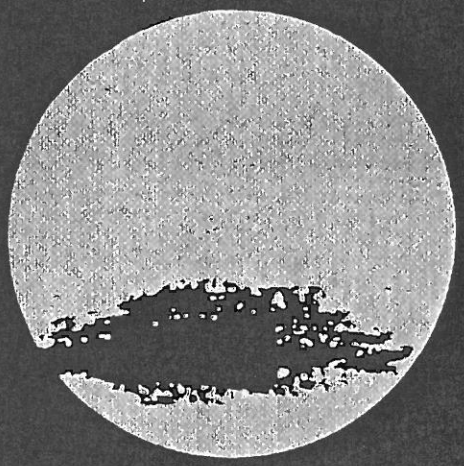

CHAPTER 16

A Developmental Model of Consciousness in Sleep: From Sleep Consciousness to Pure Consciousness

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In this chapter I will argue that the form of consciousness in sleep we have come to identify as lucid dreaming is but a starting point, or perhaps only a bridge to what has been called higher states of consciousness. This bridge leads from the formal operational dreams of adults to post-formal operational sleep and dream experiences.

Foulkes argues that the development of mentation in sleep parallels that during waking so that dreams of young children reflect preoperational thinking whereas those of adults reflect concrete to formal operations [1]. Furthermore, cognitive models of sleep mentation stress the continuity of waking type mentation into sleep [2]. But adult dreams differ in degrees of self-awareness with its full emergence in lucidity. This is illustrated by a 9-point scale culminating in lucidity designed by Moffitt and colleagues [3]. At it's lowest level on their Self-Reflectiveness Scale the dreamer is not in the dream. This moves to level 3 where the dreamer is completely involved in the dream then at level 5 the dreamer thinks over an idea. At level 7 the dreamer has multiple levels of awareness simultaneously participating and observing. Finally, at level 9 the dreamer consciously reflects on the fact that he is dreaming. However, several scholars, including myself, have argued [4] that lucidity is only the beginning and that consciousness in sleep, when it arises as part of the natural growth cycle, is both psychologically and biologically a developmentally advanced form of dreaming.

The concept of post-formal operational functioning is not new among developmental psychologists [5], but most such theories focus on qualitative advances in adulthood. In other words, typically it is thought that physiological growth stabilizes in late adolescence or early adulthood and significant movement after that

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point is lateral, infrequently observed and a variation on operational thought [6]. Many such models postulate the integration of the intellect with the emotions as an advanced developmental state in a maturely functioning adult. However, these models of development keep experience within the capacity to represent, if in an increasing abstract form. A few recent theories move past representation to post-representation. These use consciousness as the focus or driving force for development.

Although most post-formal operational approaches continue to emphasize all of development as a function of the dynamic interaction between biology and environment, Kagan has recently hinted at the domain of consciousness as a third potentially important domain [7]. When considering a developmental perspective on lucid dreaming the role of consciousness in development becomes paramount. After all lucid dreaming is, at its simplest, the emergence of consciousness in "unconsciousness." Thus post-formal operational models which focus on the role of consciousness are the most appropriate for our purposes.

Recent theorists in both developmental [6] as well as transpersonal psychology [8] have postulated stages of development beyond the traditional Piagetian endpoint of formal operations which focus on the role of consciousness and especially higher states of consciousness. They see the next major shift in development as post-representational. According to developmental psychologist Charles Alexander, such a level of processing would not only fulfill Flavell's five criteria for major developmental changes: inevitable, momentous, directional, uniform, and irreversible [9], but would in addition show other criteria. These include neurophysiological maturation and differentiation from and hierarchical integration with the representation level. Alexander and colleagues argue that such post-representational stages of development can be empirically verified along more than twenty psychophysiological parameters and numerous psychological variables [6].

Such post-representational models characterize consciousness in sleep as an illustration of "the Self becoming de-embedded from and hierarchically integrated ("[that is] witnessing") all previous, representational levels of mind" [6, p. 33], including dreaming. In other words, consciousness in sleep, or in this case the lucid dream, is an early manifestation of postformal operational functioning in sleep. During the lucid dream the representational capacity is still dominant even though there seems to be a de-embedding from the normal orientation of the dream ego. After all although we know it is a dream, the dreamt representation remains and in fact the awareness of dreaming does not hinder the "felt reality" or "otherness" of the dream experience. Only when the focus of awareness in sleep de-embeds even further, that is, full differentiation yet integration from the representational level, do we see a true experience of higher states of consciousness and thus the post-representational stage of development.

But what is meant by post-representational stages of development. At its simplest the phenomenal experience of such higher states of consciousness is that

the "self" transcends the limits of representing its lived world experience to the source of being, or that point of contentless consciousness. Here awareness is turned back on itself and is aware only of itself. This state has been called pure consciousness and Alexander has characterized the major task of the post-representational stages of development as "subject permanence." Furthermore, just as one needs the mental technology of language to move from pre-representational thought—i.e., sensory-motor to representational thought—such as operational, so too Alexander argues that in order to reliably move from representational to post-representational thought one also needs a mental technology. One technology, but by no means the only, is meditation.

To return again to our concern with sleep, Meirsman has argued that the effect of meditation on REM sleep is the same as its effect on waking activities [10], that is an enhancement of both physiological and psychological functioning. The phenomenal experience of an enhanced REM sleep moves one past the self-reflective continuum identified by Moffitt et al. to post-formal operational levels of consciousness as evidenced by awareness of dreaming while dreaming. This psychological and biological enhancement of REM is especially evident with the further de-embedding from lucid dreaming to the sleep consciousness of "witnessing," where the silent, blissful experience of pure consciousness is experienced.

A CONTINUUM OF CONSCIOUSNESS IN SLEEP

I am going to begin my argument that lucid dreaming is but the first stage in post-formal operational development on a descriptive level of analysis. From interviews I have conducted with several long-term meditators, a sequence of qualities of consciousness in sleep has emerged [4]. An especially clear meditator identified five basic stages in the movement from lucidity to witnessing. These stages are further illuminated by comments from a meditating petroleum engineer and a Sanscript scholar. The first two practice transcendental meditation (TM) while the third does not. In order to understand these stages one must think of the progression, at least initially, as the dreamer shifts from being an "actor" in the dream to the "observer" of it.

Stage One

Initially in lucid dreaming, the actor is dominant. The only role the observer plays is to recognize, however briefly, that the self is dreaming. Despite this recognition, the feeling is still that the dream is "out there" and that the self is "in here" with clear representation of each. As the dreamer becomes more familiar with lucidity, it may occur to him/her that he/she can manipulate the dream. The clear TM meditator believes that in this form of lucid dreaming one is, "trying to

manipulate the dream in some way, so there is a greater degree of wakefulness inside but still one is tied to the figures of the dream. It's a matter of accent . . . it's more that you're an object in the dream and less so that you are a witness to that dream."

Stage Two

At some point it may occur to the dreamer that what is "out there" is actually "in here." At this point two paths seem open to the dreamer: The dreamer may either become actively engaged in the dream events all the while recognizing that it is the self as well as the dream ego that is involved; or, shift his/her attention to the "inside" I, allowing the "outside I"—the dream scene—to fade. The meditator comments, "the predominance is on the observer, [whereas] the action, [or] the observation I don't really much care about. . . ."

The petroleum engineer from Canada remarks that during these preliminary stages one flips easily back and forth between witnessing the dream with a quiet detachment to being lucid in the dream. In the latter case still aware of the dream but also caught up in its activity. A graduate student in Sanscript, writes, "There is little in lucidity itself that will disrupt the production of dream images and sense effects. But because I know I am dreaming, I can proceed to do things that I would not do in ordinary dreams, and it is these actions or non-actions that disrupt the dreaming process. My interaction with the dream keeps it going normally. If I become passive, by stopping to watch what happens, or just to try to think of something, the activity in the dream environment diminishes or stops altogether."

Stage Three

Lucid dreams in this stage tend to be short. The clear meditator describes it as a thought that arises which you take note of and then let go of. "The action of the dream," he says, "is not dominant. It does not grip you so that you are identified with it as opposed to the first step in which the focus was more on the active [participation]. In this case it's just a state of inner awareness that's really dominant. Awareness is there very strongly. The dream is a little dust flying about, so to speak." This is, he says, analogous to when "I'm just sitting while awake and doing nothing and thoughts pop up, like an involuntary knee jerk. I'm not caught up in that so [consequently] the dreams do not have much significance . . . I never tried to hold onto them. The state of awareness is more satisfying. Since you don't get caught up [in the dream] there isn't much intensity to them." The Sanscript scholar explains that the meditator in sleep, "knows that he is not to interact with or be tempted by anything that may happen phenomenally. He is not to desire or anticipate anything." I should qualify this by saying that the "intellectual" knowing is not the source of the detachment. It is experienced at a deeper almost "reflexive" level of experience. The final two stages are, according to the clear meditator, experientially distinct but perhaps not so from the point of view of

those who have never "been there." These last two stages might be said to be dreamless sleep with awareness or as the Sanscript scholar notes:

> When all waking and dream imagery and all mental content are eliminated, there is dreamless sleep. Each night, I, the dreamer, move into dreamless sleep. Here I desire no desire and see no dream. There is only an ocean of objectless consciousness. The inner Self still sees, because the Self is imperishable, but there is nothing distinct from it to see. Likewise there is no second thing from the Self for the Self to smell, taste, speak, hear, think, touch, or discern. The Self is conscious of nothing within or without. This is the home base from which the Self moves out into dream and waking image and thought, the home to which the Self, like a tired bird, returns from waking and dream experience to rest.

Stage Four

In this stage an "inner wakefulness" dominates. "You don't have dreams or in any case you don't remember having dreams," says the meditator. You are absorbed not in dreams, but in the witness. This sort of sleep awareness can be so continuous that one may go for months without recalling a dream and one loses awareness even of the passage of time. The clear meditator differentiates yet one more stage.

Stage Five

Once the dreamer has moved into this transcendental state or pure consciousness, she/he moves into the experience. Now the "dream" will characteristically take symbolic forms not generally found in nonlucid or lucid dreams of an earlier stage: They will be much more abstract and have no sensory aspects to them, no mental images, no emotional feelings, no sense of body or space. There is a quality of unboundedness to them. The professor explains, "One experiences oneself to be a part of a tremendous composite of relationships." These are not social or conceptual or intellectual relationships, only "a web of relationships. I am aware of the relationship between entities without the entities being there." He says there is "a sense of motion yet there are no relative things to gage motion by, it's just expansiveness. There are no objects to measure it. The expansiveness is one of light—like the light of awareness."

The vocabulary for expressing this kind of experience is limited. When the meditator used the phrase "light of awareness" it was, he says, because "of anything I could refer to in the sensory or mental worlds that word would be it." But, he explains, it is not like light in a room, it's "visual but not visual, more like light in an ocean; an intimate experience of the light." Gillespie has referred to this as "the fullness of light" [11] and interestingly well-known philosopher and metaphysician Eliade details the role of "the light" in many of today's spiritual traditions [12]. He notes, "considered as a whole, the different experiences and appraisals of the interior Light advanced in India and in Indo-Tibetan Buddhism

an be integrated into a perfectly consistent system. Experience of the Light ignifies primarily a meeting with ultimate reality [12, p. 29]. It should be pointed ut that control in the state of pure consciousness is a moot point. "The body does ot exist," the clear meditator explains, "There is no awareness of the body, no wareness of anything sensory."

Savolainen points out that the smooth sequence taking one from lucidity to vitnessing may not be true for everyone [13]. In her experience she had to let go f lucidity and move through nonlucidity before she developed the witness set in leep. This points out that although there may be a relationship between these tates of consciousness in sleep, the exact nature of it may vary considerably from ndividual to individual. I suspect that the different sequence of Savolainen's may ccur if one becomes too "embedded" or "attached" to lucidity, especially to the ctive, controlling aspect of self awareness in sleep. Such an attachment would equire a "letting go" of that self representation in sleep in order to de-emb to the ext higher stage of witnessing. In fact, I wonder if this new generation of ccomplished lucid dreamers may not face the same problem.

But why, you might ask, should we want to track lucidity to pure consciousness? As Wallace explains [14, p. 76]:

> Contemporary physiology over the last three hundred years has come to the basic understanding that life and consciousness evolved from matter and energy. The property of consciousness, in particular, is considered by many to be an epiphenomenon of living systems—that is, a property which occurs as a by-product of the functioning of a complex nervous system. In the Vedic perspective on physiology . . . the understanding and experience are quite the opposite. Consciousness is not an epiphenomenon; rather consciousness is the primary reality from which matter and life emerge.

In other words, by going to pure consciousness we go to the source of all being, of all experience whether ordinary or extraordinary. The development of these capacities of consciousness lies at the root of many meditative traditions. Not surprisingly, some traditions view lucid dreaming as a form of sleeping meditation, a necessary precursor to the development of the witness. Hunt points out that in Tibetan Buddhism once a disciple has "attained a relatively stable dream lucidity, he/she may practice confronting fearsome deities or use the opportunity to deepen his/her meditative absorption in preparation for 'lucidity' during Bardo [death] [19, p. 260]." But now that I've described a potential sequence of stages I am going to back track and examine supportive data. I will start by examining the lucid dreaming-meditation link.

LUCIDITY-MEDITATION LINK

Hunt warns that lucid dreams are not reducible to only a mental waking up unique to the sleep state [15]. First the "conscious" faculties brought forth are only partial. Second although spontaneously occurring lucid dreams in normal

populations are quite realistic relative to nonlucid dreams, in more sophisticated experients, such as long-term meditators, bizarreness reasserts in unique ways. According to Hunt, "lucid dreaming is not merely (or even primarily) the intellectual awareness that one is dreaming ('Am I? Oh well, I guess so. Isn't that quaint?" [15, p. 37]. The "realism" often spoken of as associated with lucidity is not only of the real, true to life type but also "real, clear and somehow present" reminiscent, according to Hunt, of the peak experiences described by Maslow [16].

The faculty for self-reflectiveness, of recognizing self in the midst of a dream says Hunt, is strikingly similar to the development of self-reflective consciousness in "mindfulness" or "insight" meditative traditions such as Zen, Theravada and Tibetan Buddhism [15]. Furthermore, according to Alexander it is developmentally prior to obtaining the witness set sought in Transcendental Meditation [17]. In especially meditation and lucid dreaming once a detached but receptive attitude has been integrated into the waking or dreaming consciousness strong feelings of exhilaration, freedom and release occur. There is, Hunt explains, ". . . an unusually broad sense of context and perspective, a 'balance' of normally contradictory attitudes, and the felt sense of one's own existence (that special 'I am' or 'being' experience . . .)" [15, p. 11].

Without this heightened sense most of us become consumed by everyday living, untouched by the "awe" of life and the stark inevitability of death. This, explains Hunt, is ". . . the full human context to which on rare occasions we spontaneously 'wake up'." In the same way we remain unaware that we are dreaming, until the moment we turn lucid. Both moments of awareness "can have quite an impact," Hunt says. But both are also frequently short-lived.

This association of lucid dreaming to the practice of meditation was first identified by Hunt [15] and has recently been further developed by myself and Bosveld [4]. From virtually every level of analysis parallels, and in some cases potential causal agents, can be identified supporting the association of dream lucidity to the practice of meditation and thus on to the experience of pure consciousness. There are also now several studies of meditators and lucid dreamers which reveal important psychological and physiological parallels.

PSYCHOLOGICAL PARALLELS

Two points in examining the psychological parallels should be noted. First, the "Eye of the Beholder" phenomenon is apparent when analyzing these phenomenon. That is, overall dreamers reliably evaluate their lucid dreams as quite distinct from nonlucid ones whereas independent judges do not [18]. Secondly, there is some indication that the characteristics typically follow a developmental relationship with high impact occurring in both novice and sophisticated lucid dreamers and moderate to no impact in the midranges. With bizarreness, Hunt and McLeod [19; and see Hunt's chapter] have argued that the nature

of bizarreness in the lucid dreams of long-term meditators is qualitatively quite distinct from bizarreness apparent in prelucid episodes of nonmeditators [19, and Chapter 17 in this book]. This qualitative distinction is true with some but not all content categories [4].

Regarding the visual nature of lucidity, more advanced practitioners as well as those who have had an initial exposure to lucidity report a rich visual quality that seems to standout and sparkle [15, 20]. As with bizarreness, and consistent with the meditation model being proposed, this visual richness habituates with some exposure to lucidity, thus the lack of a difference in visual quality reported by Gackenbach [18], yet with long-term exposure this same quality may reemerge in unique ways particularly when associated with dream experiences of a transpersonal natural. Gillespie phenomenologically examined the range of experiences of light while lucid in dreams [11]. He pointed out that light moves from ordinary dream light which has the same visual quality as ordinary dreams through unique experiences of light, like disks or patterns of light such as "versions of lattices, lines, dots and colors constantly changing" to the "fullness of light." This latter he notes is overwhelming in its brilliance and transpersonal in his felt interpretation. "The fullness of light is accompanied by intense spontaneous feelings of joy and devotion" [11, p. 75].

Some of the individual difference variables associated with the practice of meditation have also been found to be true of individuals who frequently dream lucidly while controlling for dream recall frequency. These include *field independence* (lucidity [21]; meditation [22, 23]), *creativity* (lucidity [24]; meditation [25]); *lower anxiety* (lucidity [24]; meditation [26]); *absorption* (lucidity [27]; meditation [26, 28]); and *private self-consciousness* (lucidity [24]; meditation [29]). (The meditation findings are reviewed in [30] while the lucid dreaming findings are reviewed in [31]). A strong finding in both the lucidity (for review see [31]) and meditation [32, 33] literatures is that both are associated with enhanced dream recall despite decreases in REM time as the result of meditation [10, 34, 35].

Finally, and particularly noteworthy, is that the waking practice of meditation is associated with the frequent experiences of lucidity in dreams [19, 32, 36] even when dream recall differences are controlled [27, 37]. Further, reports of consciousness during deep sleep are related to clear experiences of transcending during meditation (reported in [30]) as well as to breath suspension during meditation, the latter is thought to be a key physiological indicate of the experience of "pure" consciousness [38].

PHYSIOLOGICAL PARALLELS

Physiological parallel's between lucidity and meditation also exist. Except that the individual is awake, depth of somatic arousal during meditation has been characterized as equivalent to or deeper than that of light sleep [38] but is not the same as light sleep [39]. However, REM sleep shows increases in

oxygen consumption and heart rate over stages 1 and 2 NREM and lucid REM is significantly higher on these dimensions than nonlucid REM [40-42]. This lucid somatic arousal would seem to argue against the lucid dreaming-meditation parallel. LaBerge (personal communication, June 1987) has pointed out that the continued somatic arousal after the eye movement signal which he has found could be an artifact of demand characteristics. That is, his subjects are typically told to signal when they know they are dreaming and then to do a predesigned task; active engagement in a dream task with consciousness could keep the system somatically aroused.

A study of ours sheds some light on this apparent discrepancy [43]. We had a long-term meditator who during meditation showed physiological signs of transcending correlating with his self reports. This individual claimed that he was conscious of his true state throughout his sleep cycle. That is, he knew he was sleeping and sometimes dreaming during the entire night. He characterized his ability as witnessing sleep which it will be recalled is a way of describing the experience of pure consciousness. This ability and its stabilization is said to be a result of the regular practice of meditation [44]. In the sleep laboratory this meditator was able to signal with prearranged eye movements that he knew he was dreaming/sleeping during REM, Stage 1 and Stage 2 sleep. Interestingly, and in line with the present hypothesis, he showed physiological arousal around the eye movement signal but, contrary to the data of LaBerge et al. [40], he rapidly returned to quiet somatic levels shortly thereafter. With at least this one subject signaling was somatically arousing but his self-reported continued consciousness in sleep was not. This study suggests that as lucid dreaming unfolds to witnessing dreaming somatic arousal decreases and the equation of consciousness in sleep to states desired by the practice of meditation becomes firmer.

Further supporting the meditation-lucidity link is a finding with the Hoffman or H-reflex, an electrically evoked monosynaptic spinal reflex which has been viewed as an indicate of the flexibility of central nervous system response. Brylowski found greater H-reflex suppression associated with lucid REM sleep than with nonlucid REM sleep [45]. H-reflex *suppression* is thought to be a key indicate of the presence of the REM state of sleep as one is paralyzed from the neck down. This body paralyses does not occur during any other time of the sleep cycle nor while awake. This finding is conceptually in line with studies by Dillbeck, Orme-Johnson, and Wallace [46] and Haynes, Hebert, Reber and Orme-Johnson [47]. Dillbeck et al. found greater H-reflex *recovery* indirectly associated with an advanced form of meditation practice while Haynes et al. note positive correlations between H-reflex recovery and clarity of experience of the transcendental state while meditating. Enhanced H-reflex suppression in REM and recovery in waking both indicate a nervous system which is functioning maximally in accord with the needs of the state of the organism.

The EEG work with dream lucidity is unfortunately fairly limited at this point with the bulk having been done by Ogilvie, Hunt and associates [48-52]. In this

series of studies they sought to demonstrate the lucidity-meditation connection by examining alpha waves in lucid and nonlucid REM. Reviews of the EEG and meditation literature have fairly consistently pointed to the association of alpha with meditation [14, 39, 53]. The Ogilvie and Hunt group found, consistent with the meditation literature, variations in alpha as a function of stage of lucidity. Specifically, they found increased alpha in prelucid REM periods and early in lucidity and have likened this to the access phases of waking meditation. Similarly, West [39] and Tanelil and Krahne [53] have summarized the EEG and meditation literature for power measures and note changes as a function of stage of meditation. Both reviewers agree that at the beginning and at the end of meditation increases in alpha are observed. Theta also occurs, often intermixed with alpha.

West has pointed out that a more sophisticated examination of EEG changes in meditation should include the investigation of EEG coherence (COH) [39]. The relationship of the variable to meditation has been most extensively investigated in the Transcendental Meditation research literature (for a review see [14, 54]) and offers a unique potential for identifying EEG associations to types of consciousness during sleep.

In a review of the coherence literature, French and Beaumont concluded that TM has been shown to increase COH especially in the alpha and theta bands relative to eyes closed, resting conditions [55]. This work has been carried further to examine the relationship of COH to specific meditation experiences. Farrow and Herbert [56] reported that experiences of "transcending" during TM were associated with alpha, theta and beta global COH while Orme-Johnson and Haynes found total alpha EEG coherence related to experiences of transcending during meditation [25]. The bulk of the variance for these findings was from frontal leads.

In a recent paper I have argued that in terms of frontal leads, REM is interhemispherically coherent in the theta range relative to NREM, thus making it the state in which meditation like experiences (lucidity) would be most likely to occur [57]. Several investigators have shown that lucidity primarily emerges out of REM (see [42] for a review). Furthermore, Armitage, Hoffman and Moffitt report that high dream recallers show a greater continuity for a measure conceptually similar to EEG coherence in transition from sleep to waking [58]. Thus individuals who frequently remember their dreams are accessing information from a coherent state of brain functioning by remaining in some sense in that state. One of the most robust findings in the individual difference literature on dream lucidity [31] is the association of high dream recall to lucidity frequency. Lucid dreamers in general are high dream recallers so they should show more COH at the state transition to waking.

But will lucid dreams themselves be higher in COH? In my work with self evaluations of the recallability of lucid versus nonlucid dreams, the former have been continually perceived as significantly easier to remember [18]. Although one

might argue that the phasic nature of lucid dreams might be responsible for their increased recallability, Pivik points out that dreams recalled from phasic versus tonic REM do not differ in recall [59]. Indeed the "tonic" consciousness of the dreams reported by the witnessing TM meditator in the study just reported [27] were rated as highly recallable by the subject if phenomenologically quiet [60].

More directly, in pilot data, LaBerge looked at EEG coherence twice. In his dissertation he had only central EEG leads and found no COH differences as a function of lucidity [61]. More recently (LaBerge, personal communication, June, 1988) he compared a five minute lucid dream during REM to the fifteen minutes of REM prior to the onset of dream consciousness in one subject. Looking at interhemispheric EEG coherence measured at the parietal lobes, he found an increase in COH during the lucid phase of REM for the alpha frequency. Although these findings are highly preliminary they are in the direction expected. That he found increased COH from the parietal leads is interesting as the central role of visual-spatial functioning, associated with this area of the brain, has been strongly implicated in our work for both lucid dreamers [31] and lucid dreams [18]. Further, this was the location of interhemispheric alpha COH reported by O'Connor and Shaw for field independent individuals [62], a perceptual style characteristic of high dream recallers, lucid dreamers, and meditators.

Clearly on several levels of analyses dream lucidity parallels waking meditation. Although lucidity can and does emerge spontaneously in nonmeditating populations, the average frequency of such experiences is considerably less than that in meditating adults [27, 37].

WHAT IS MEDITATION? A TECHNIQUE TO ACCESS PURE CONSCIOUSNESS

Prior to considering further stages of consciousness in sleep we must at this point stop for a moment and ask, "What is meditation?", due to the relationship of lucidity to meditation just delineated. For the past two decades western scientists have been addressing the question of meditation and several models have emerged. Most frequently cited is meditation as a stress reducing mechanism, but, also pointed to, is meditation as a form of psychotherapy or as enhanced self awareness or a finely held hypnagogic state or a form of self hypnosis. More recent models focus on meditation as an attention training procedure. (For a recent review of the meditation literature see Murphy and Donavan, [63].)

But these models do not answer the "what is meditation" question. They only describe what it does; that is, what the potential products of its practice are. All of these "takes" on meditation really miss the essential point. Meditation is a procedure, a technology, a method and as such it is not causal; rather it facilitates outcomes, such as stress reduction and consciousness during sleep. These outcomes are a natural part of the biological and psychological systems but the

application of the "technology" of meditation increases the likelihood of attaining them.

These perspectives on meditation are reductionistic. Such reductionism to the common denominator is the meat of the scientific method but it can also strike a death toll for complex, wholistic procedures designed to work with the entire self system. As Deikman recently noted [64, p. 40]:

> Ironically, although the power of meditation to affect physiological and psychological functions has been substantiated in many different laboratories, we have paid little attention to what the originators of meditation have said about its intended purpose and the requirements for its appropriate use. . . . Focusing primarily on the experiences and bodily effects of meditation is like collecting oyster shells and discarding the pearls. Such 'spiritual materialism' inevitably interferes with the real potential of meditation.

If meditation is somehow more than its component parts or products, what is it? Virtually all systems of meditation contextualize the procedure in some way as part of a spiritual path—a seeking—for union with the higher self—God—nature. Here, I will focus on one of these systems because it is not only comprehensive but is the most empirically supported theoretical position. It comes from the founder of the largest meditation group in the west, the Maharishi Mahesh Yogi.

The Maharishi conceptualizes meditation as a tool or mental technology, for the development of consciousness. In other words meditation, in this case Transcendental Meditation, is a technique which serves to enliven an individual's experience of the common denominator of being, pure consciousness. Pure consciousness, according to Alexander, Chandler, and Boyer, is "described as a silent state of inner wakefulness with no object of thought or perception" [65, p. 19]. Furthermore, they note that ". . . pure consciousness is conditioned not by cultural or intellectual conditions, but by fundamental psychophysiological conditions which are universally available across cultures" [65, p. 19].

Alexander et al. offer several descriptions of pure consciousness. For instance [65, p. 10]:

> After about two years, my experience of the transcendent started to become clearer. At that time, I would settle down, it would be very quiet . . . and then I would transcend, and there would just be a sort of complete silence, void of content. The whole awareness would turn in, and there would be no thought, no activity, and no perception, yet it was somehow comforting. It was just there and I could know when I was in it. There wasn't a great 'oh I am experiencing this,' it was very natural and innocent. But I did not yet identify myself with this silent content free inner-space. It was a self-contained entity that I transcended to and experienced.

Alexander et al. reviewed the empirical correlates of the experience of pure consciousness. Physiological correlates of this "subjective" experience during meditation are numerous but two physiological variables are markers of

experiencing pure consciousness according to these authors, breath suspension and EEG coherence surges. These two, these scientists explain, "were the immediate correlates of specific subperiods of reported experience of pure consciousness indicated by button press, and were greater than those occurring during the remainder of TM practice" [65, p. 20] and during eyes-closed rest.

As for behavioral effects they note that ". . . exhaustive meta-analyses of over 100 separate studies indicate that repeated experience of pure consciousness during TM produces significantly greater reductions in trait anxiety, depression, hostility and other symptoms of mental stress than simple or stylized forms of relaxation" [65, p. 21]. Further "regular experience of pure consciousness during TM is associated with development of personal identity as operationalized by improvement on such measures as self-actualization, self-concept, self-esteem and field independence [65, p. 21] including ego development. They summarize, "Whereas deep sleep is characterized by physiologic rest and ordinary wakefulness by alertness, pure consciousness is characterized by both co-existing in a simple unified state" [65, p. 29].

By way of methodological refinement Alexander et al. point out that "although experience of pure consciousness occurs with far less frequency in the general population, our research (and that of other researchers) indicates that its behavioral correlates are similar even among subjects who have received no exposure to meditation or the concept of pure consciousness" [65, p. 28]. They conclude, "This enables us to go beyond the prevailing understanding of pure consciousness as an inaccessible, ineffable or "mystical" experience. Rather, we come to realize that the experience of pure consciousness is a natural consequence of unfolding the latent potential of human consciousness to fully know itself, that has profound utility for improving the quality of human life [65, p. 31].

Access to pure consciousness due to the purification of the nervous system in response to the regular practice of meditation is exemplified in the development of the witness, a silently observing part of the self that witnesses all other states of consciousness (waking, sleeping, and dreaming) without trying to change them. In an interview, a male long-term TM meditator describes witnessing dreamless sleep:

> It is a feeling of infinite expansion and bliss and nothing else. Then I become aware that I exist but there is no individual personality then I become aware that I am individual but no details of who, where, what, when etc. Eventually these details fill in and I might come awake.
> or
> How do you describe an unmanifest experience? It has only happened a half dozen times in fifteen years, but when it occurs, its crystal clear. [It is] like an amplifier turned on, but no sound. The experience fades as boundaries of dreams or waking state gather, gain definition and overshadow.

While witnessing dreaming sleep is described, "I watch it as it is going on separate from me. . . . There are parts, me and the dream, two different realities."

LUCIDITY—WITNESSING RELATIONSHIP: PHYSIOLOGY

I shall now consider on a physiological level of analysis the relationship of lucidity to witnessing. Meirsman studied six advanced TM meditators (TM-Sidhi techniques) who reported witnessing sleep on the average of half the night [10]. He argued that the practice of the TM-Sidhi's results in the ". . . maintenance of . . . alertness even during the inertia of deep night sleep" and that further " 'witnessing' of one's own sleep during the night seems to be the subjective experience of a physiologically more efficient (REM) sleep [10, p. 19]. Meirsman examined the incidence of an eye movement ratio (high frequency REM's/low frequency REM's (HF/LF]) from uninterrupted REM sleep. That is, no prearranged eye movement signals were required. This ratio had been shown to be, "associated with cerebral maturation (age, intelligence, learning ability) and endocrinological maturation (age, second half of ovulatory cycle, second half of pregnancy)" [10, p. 5]. Meirsman points out that this measure can be ". . . defined as the capacity of the brain to structure 'order' from the 'noisy stream' of information [10, p. 4]. This researcher found that the REM sleep of the meditators who were conscious during it was more order-creating (higher HF/LF ratios) than that of the "unconscious" nonmeditators. He describes this as "a reflection of the higher intensity of the assimilation of information in the brain during REM sleep [10, p. 20]. This finding was further supported by the shorter REM sleep time among the meditators in his study when compared to his controls.

Unfortunately meditation practice in this study is confounded with reports of witnessing. According to the teachings of this meditation practice, a result of the practice will be sleep consciousness. Although spontaneous occurrences at this frequency (half the night) may occur, they are so rare as to be virtually nonexistent. Whereas my colleagues and I have shown on five samples that such high rates are not infrequent in groups of TM meditators [27, 37]. Thus it may be nearly impossible to separate sleep consciousness at this rate from the practice of meditation.

I will now fold the Meirsman study back onto the physiological analysis of lucid dreaming reviewed earlier. The most reliable physiological finding in the lucid dreaming literature is the association of high REM density to the lucid state in REM. Likewise, Meirsman reported that the total REM density, regardless of frequency, was also significantly higher for the TM-Sidhi group when compared to controls. LaBerge (personal communication, March, 1989) compared the REM density of twelve lucid dreamers to that of Meirsman's six meditators. Although the means were about the same the variability among the lucid dreamers was quite high whereas it was virtually nonexistent among the meditators. In other words,

although both lucidity and witnessing (as a product of meditation) evidence the same average increase in REM density the meditators were more stable, as a group, on a physiological level of analysis, in their experience.

Further, in terms of the work of the Ogilvie and Hunt group who reported alpha in prelucid and early lucid episodes, so too Meirsman reports a large amplitude and lower frequency of alpha activity as associated with a higher HF/LF ratio and thus witnessing sleep. And more recently in pilot data on a long-term TM meditator who reported witnessing, sleep alpha was also observed. In fact it was commented by the EEG expert in this study that the EEG sleep record of this meditator looked like one of the meditator while transcending in waking meditation (Charles Alexander, personal communication, July, 1989). LaBerge [41] failed to find this alpha presence as did Ogilvie et al. [51]. However, in both cases the failure was associated with the disruption of REM sleep by the eye movement signal. There is some indication that when no signal was demanded or before a signal occurred alpha is associated with consciousness in sleep of both the lucid and witnessing varieties.

I cannot say if the Meirsman subjects also evidenced more somatic arousal, such as respiration and heart rate, as has been shown with LaBerge's lucid dreaming subjects. The single witnessing and signalling subject of Gackenbach et al provides mixed data. On the one hand he was somatically less aroused but on the other hand his overall eye movement density was significantly less than two lucid dreamers who did not signal in the lab. Furthermore, when his heart rate, respiration and eye movement density were compared for pre and post eye movement signal differences, we found no significant pre-post signal differences for any of these variables from stages 2 or REM. However, for stage 1 eye movement and respiration showed significant pre-post signal differences. Eye movement density went up after the signal while respiration went down which together indicate of the classic restful alertness claimed to occur as a result of the practice of TM.

Work on physiological associations of these states of consciousness in sleep is just beginning, but early data show some physiological similarities and thus delineating the association of lucidity to witnessing consciousness in sleep becomes important. Some understanding of this relationship can be found on psychological and phenomenological levels of analysis.

PSYCHOLOGICAL ANALYSIS OF THE LUCIDITY-WITNESSING RELATIONSHIP

In conjunction with Cranson and Alexander [27, 37] I have conducted several studies examining the relationship of dream lucidity to pure consciousness. The latter as expressed in the witness set during dreaming or dreamless

sleep. We described each state to the subjects not by labels but by descriptive sentences:

- Lucid dreaming was described as a dream in which you are actively thinking about the fact that you are dreaming.
- Witnessing dreaming was described as a dream in which you experience a quiet, peaceful, inner awareness of wakefulness completely separate from the dream.
- Witnessing in deep sleep was described as dreamless sleep in which you experience a quiet, peaceful, inner state of awareness or wakefulness.

Here are descriptors from the TM meditators of the three states of awareness:

> Lucid Dreaming: "During a dream I will become aware of the dream as separate, then aware that I am dreaming. Then I begin to manipulate the story and the characters to create whatever situation I desire. At times, in unpleasant situations, I'll think as the dreamer 'I don't have to put up with this' and I change the dream or at least 'back out' of the involvement."
>
> Witnessing Dreaming: "Sometimes, whatever the content of the dream is, I feel an inner tranquility of awareness that is removed from the dream. Sometimes, I may even be caught up in the dream but the inner awareness of peace remains."
>
> Witnessing Deep Sleep: "It is a feeling of infinite expansion and bliss and nothing else. Then I become aware that I exist but there is no individual personality. Gradually, I become aware that I am an individual but there are no details of who, where, what, when, etc. Eventually, these details fill in and I might awaken."

We found that although meditators reported experiencing more of all three types of sleep consciousness experiences, across samples lucid dreams were experienced more frequently than either witnessing dreams or witnessing deep sleep. This finding favoring the higher incidence of lucidity relative to witnessing also held across level of dream recall and supports the notion that lucid dreams are easier to access no matter what ones training or personal skills and therefore may represent a developmentally prior state of sleep consciousness leading eventually to the experience of pure consciousness.

As reported by Alexander [66] in order to examine the differences between these three forms of sleep consciousness we did content analyses on these sleep experience reports collected from sixty-six males who were very advanced in their TM meditation and have devoted their lives to their meditation practice. These were selected because it was believed that their training better equipped them as a group to be able to distinguish these subtle states of mind in sleep. Some validation for this assumption was gained when it was determined that only 17 percent of the sixty-six subjects' lucid dreaming reports could not be used because they were either blank or questionable. This is compared to a loss of about 50 percent of nonmeditating subjects for the same reasons reported in my work with nonmediators (for a review see Snyder and Gackenbach [31]).

Nine content categories were then developed based on a reading of the reports with the first seven scored for presence or absence of the quality in the description. They were: 1) sleep/wake/dream state transition, 2) references to real physical body, 3) dream body flying, 4) dream body running, 5) "lightness" of experience, 6) control of the experience, 7) sense of a feeling of separateness, 8) emotions (rated as extreme positive, positive, negative, no reference) and 9) trigger for consciousness (rated as none mentioned, just knew, oddity, and anxiety).

The fifty-five lucid dreaming descriptions, forty-one witnessing dreaming descriptions, and forty-seven witnessing deep sleep descriptions were characterized in the main by different components although a continuity between states could also be seen. Most revealing of these categories was the one on feelings of separateness. In lucid dreaming only 7 percent of the cases were those in which people reported feeling separateness. Whereas in the witnessing dream experience, 73 percent of the cases reported in their dream description that the dream went on, but they were separate from it. These reports are consistent with Alexander and colleagues conceptual descriptions of witnessing as involving the complete differentiation of pure consciousness from the dream state, in other words the silent witness functions as completely distinct from or outside of the dreaming state.

Another category which is interesting is that of emotion. There were positive emotions associated with all three states, but extremely positive emotions, described most often as "bliss," was reported more frequently for witnessing dreaming and witnessing deep sleep as were feelings of "lightness."

On the other hand, dream control was much more frequent during lucid dreaming (47%) than witnessing dreams (5%). This is consistent with the claims that dream lucidity typically involves active information processes and manipulation of dream content. The "will" or volitional capacity of the individual ego can act on its thoughts and desires. This is in contrast to the experience of pure consciousness which is said to be one of complete inner fulfillment or contentment. The Self does not act, but silently observes the changes occurring within waking, dreaming, and sleep.

Also over half the time lucid dreaming was triggered by mental events in the dreams that appeared to stimulate or awaken intellectual or discriminative processes typical of the waking state. On the other hand, witnessing dreaming and sleep were virtually never triggered by such mental events. The most unambiguous criterion of witnessing is maintenance of pure consciousness even during deep sleep. Because lucidity involves active thinking and deep sleep is often, although not always, without mentation, it is not surprising that lucidity (as typically experienced) drops out during deep sleep. However, after long-term practice, TM practitioners gradually begin to report experiences of "witnessing," or maintenance of pure consciousness, even during dreamless sleep.

Although each form of sleep consciousness was largely differentially characterized there were some characteristics which weren't so individual. For instance,

s mentioned all were emotionally positive. Also in both lucid dreaming (11%) nd witnessing dreaming (12%) experiences of the dream body flying were eported. Likewise state transitions were mentioned in both lucidity (20%) and witnessing deep sleep (55%) but not witnessing dreaming (2%). Finally, although t was rare (7%), feelings of separation were on occasion mentioned in the lucid dreaming reports of this group of elite TM meditators.

Our work supports the notion that these three states of consciousness in sleep are qualitatively as well as quantitatively distinct but none-the-less probably exist along a developmental continuum with lucid dreaming emerging prior to witnessing dreaming or deep sleep. In fact, 19 percent of these elite TM meditators spontaneously mentioned the developmental relationship between lucidity and witnessing dreaming with comments such as witnessing dreaming, "is a clearer experience of . . . [lucid dreaming]. The sense of self is more full and transcends the dream completely. It is large Self."

Alexander explains that, ". . . the significance of the experience of pure consciousness is that it provides the foundation for the development of stable higher stages of consciousness or 'enlightenment.' Witnessing of deep sleep indicates that the inner wakefulness of pure consciousness is now beginning to be maintained even during the most extreme conditions of mental inertia—dreamless sleep. Indeed . . . the first stable higher stage of consciousness termed 'cosmic consciousness'—is defined as the maintenance of pure consciousness throughout the 24-hour cycle of waking, dreaming, and deep sleep" [66, p. 42].

SUMMARY

In this chapter I have shown that the experience of lucid dreaming and lucid dreamers show many parallels to the waking practice of meditation. Further I have argued that lucid dreaming is but a bridge or entry point to higher states of consciousness sought in the eastern meditative traditions. Specifically, the relationship of lucid dreaming to witnessing sleep was detailed arguing that the former is an early manifestation of the latter.

REFERENCES

1. D. Foulkes, *Children's Dreams: Longitudinal Studies,* John Wiley, New York, 1982.
2. D. Foulkes, *Dreaming: A Cognitive-Psychological Analysis,* Erlbaum, Hillsdale, New Jersey, 1985.
3. A Moffitt, S. Purcell, R. Hoffman, R. Pigeau, and R. Wells, Dream Psychology: Operating in the Dark, *Lucidity Letter,* 5:1, pp. 180-196, 1986.
4. J. I. Gackenbach and J. Bosveld, *Control Your Dreams,* Harper and Row, New York, 1989.
5. C. N. Alexander and E. Langer (eds.), *Higher Stages of Human Development: Adult Growth Beyond Formal Operations,* Oxford University Press, New York, in press.

6. C. N. Alexander, J. L. Davies, C. A. Dixon, M. C. Dillbeck, R. M. Oetzel, J. M. Muehlman, and D. W. Orme-Johnson, Higher Stages of Consciousness beyond Formal Operations: The Vedic Psychology of Human Development, in *Higher Stages of Human Development: Adult Growth beyond Formal Operations,* C. N. Alexander and E. J. Langer (eds.), Oxford University Press, New York, in press.
7. J. Kagan, *The Nature of the Child,* Basic Books, New York, 1984.
8. K. Wilber, The Spectrum Model, in *Spiritual Choices,* D. Anthony, B. Ecker, and K. Wilber (eds.), Paragon, New York, 1987.
9. J. H. Favell, Cognitive Changes in Adulthood, in *Life-Span Developmental Psychology: Research and Theory,* Academic Press, New York, 1970.
10. J. Meirsman, *Neurophysiological Order in the REM Sleep of Participants of the Transcendental Meditation Programme,* Paper presented at the annual meeting of the Association for the Study of Dreams, London, England, 1989.
11. G. Gillespie, Dream Light: Categories of Visual Experience during Lucid Dreaming, *Lucidity Letter, 6*:1, pp. 73-79, 1987.
12. M. Eliade, *The Two and the One,* J. M. Cohen (trans.), The University of Chicago Press, 1962.
13. Anja Savolaines, Beyond Lucidity? Healing through Nonlucid Dreams. A Personal Report, *Lucidity Letter, 8*:1, pp. 16-24, 1989.
14. R. K. Wallace, *The Maharishi Technology of the Unified Field: The Neurophysiology of Enlightenment,* Maharishi International University Press, Fairfield, Iowa, 1986.
15. H. Hunt, *The Multiplicity of Dreams: A Cognitive Psychological Perspective,* Yale University Press, Connecticut, 1989.
16. A. Maslow, *Towards a Psychology of Being,* Van Nostrand, Princeton, 1962.
17. C. N. Alexander, Dream Lucidity and Dream Witnessing: A Developmental Model Based on the Practice of Transcendental Meditation, *Lucidity Letter, 6*:2, pp. 113-124, 1987.
18. J. I. Gackenbach, The Psychological Content of Lucid Dreams, in *Conscious Mind, Sleeping Brain: Perspectives on Lucid Dreaming,* J. I. Gackenbach and S. L. LaBerge (eds.), Plenum, New York, 1988.
19. H. Hunt and B. McLeod, *Lucid Dreaming as a Meditative State: Some Evidence from Long-Term Meditators in Relation to the Cognitive-Psychological Bases of Transpersonal Phenomena,* Paper presented at the annual meeting of the Eastern Psychological Association, Baltimore, Maryland, 1984.
20. C. Green, *Lucid Dreams,* Hamish, London, 1968.
21. J. I. Gackenbach, N. Heilman, S. Boyt, and S. LaBerge, The Relationship between Field Independence and Lucid Dreaming Ability, *Journal of Mental Imagery, 9*:1, pp. 9-20, 1985.
22. K. R. Pelletier, Influence of Transcendental Meditation upon Autokinetic Perception, *Perceptual and Motor Skills, 39,* pp. 1031-1034, 1974.
23. A. Jedrczak, The Transcendental Meditation and TM-Sidhi Programme and Field Independence, *Perceptual and Motor Skills,* 1984.
24. J. I. Gackenbach, R. Curren, S. LaBerge, D. Davidson, and P. Maxwell, *Intelligence, Creativity, and Personality Differences between Individuals Who Vary in Self-Reported Lucid Dreaming Frequency,* Paper presented at the annual meeting of the American Association for the Study of Mental Imagery, Vancouver, 1983.
25. D. W. Orme-Johnson and C. T. Haynes, EEG Phase Coherence, Pure Consciousness, Creativity, and TM-Sidhi Experiences, *Neuroscience, 13,* pp. 211-217, 1981.
26. C. N. Alexander, *Ego Development, Personality and Behavioral Change in Inmates Practicing the Transcendental Meditation Technique or Participating in Other Programs: A Cross-Sectional and Longitudinal Study,* Doctoral dissertation, Dept. of Psychology and Social Relations, Harvard University, Cambridge, 1982.

J. I. Gackenbach, R. Cranson, and C. N. Alexander, Lucid Dreaming, Witnessing Dreaming, and the Transcendental Meditation Technique: A Developmental Relationship, *Lucidity Letter, 5*:2, pp. 34-40, 1986.

C. N. Alexander, *A Literature Review of the Individual Differences Approach to Mystical States of Consciousness and a Proposed Alternative Perspective,*. Unpublished manuscript, Harvard University, Dept. of Psychology and Social Relations, Cambridge, 1978.

M. A. West, Meditation and Self-Awareness: Physiological and Phenomenological Approaches, in *Aspects of Consciousness: Vol. 3: Awareness and Self-Awareness,* G. Underwood (ed.), Academic Press, New York, 1982.

C. N. Alexander, R. Boyer, and V. Alexander, Higher States of Consciousness in the Vedic Psychology of Maharishi Mahesh Yogi: A Theoretical Introduction and Research Review, *Modern Science and Vedic Science, 1*:1, pp. 89-126, 1987.

T. J. Snyder and J. I. Gackenbach, Individual Differences Associated with Lucid Dreaming, in *Conscious Mind, Sleeping Brain: Perspectives on Lucid Dreaming,* J. I. Gackenbach and S. LaBerge (eds.), Plenum, New York, 1988.

H. Reed, Improved Dream Recall Associated with Meditation, *Journal of Clinical Psychology, 34,* pp. 150-156, 1978.

P. A. Faber, G. S. Saayman, and S. W. Touyz, Meditation and Archetypal Content of Nocturnal Dreams, *The Journal of Analytical Psychology, 23,* pp. 1-21, 1978.

J. P. Banquet and M. Sailhan, Quantified EEG Spectral Analysis of Sleep and Transcendental Meditation, in *Scientific Research on the Transcendental Meditation Program: Collected Papers, 1,* D. W. Orme-Johnson and J. T. Farrow (eds.), MERU Press, West Germany, pp. 182-186, 1976.

M. Becker and G. Herter, Effect of Meditation upon SREM, *Sleep Research, 2,* p. 90, 1973.

G. S. Sparrow, Effects of Meditation on Dreams, *Sundance Community Dream Journal, 1*:1, pp. 48-49, 1976.

J. I. Gackenbach, R. Cranson, and C. N. Alexander, *The Relationship of Lucid Dreaming to Witnessing Dreaming,* unpublished manuscript, 1988.

J. Kesterson, *Respiratory Control during Transcendental Meditation,* Doctoral dissertation, Dept. of Neuroscience of Human Consciousness, Maharishi International University, Fairfield, Iowa, 1985.

M. A. West, Meditation and the EEG, *Psychological Medicine, 10,* pp. 369-375, 1980.

S. LaBerge, L. Levitan, and W. C. Dement, Lucid Dreaming: Physiological Correlates of Consciousness during REM Sleep, *Journal of Mind and Behavior, 7,* pp. 251-258, 1986.

S. LaBerge, *Lucid Dreaming,* Ballentine, New York, 1985.

S. LaBerge, The Psychophysiology of Lucid Dreaming, in *Conscious Mind, Sleeping Brain: Perspectives on Lucid Dreaming,* J. I. Gackenbach and S. L. LaBerge (eds.), Plenum, New York, 1988.

J. I. Gackenbach, W. Moorecroft, C. N. Alexander, and S. LaBerge, Physiological Correlates of "Consciousness" during Sleep in a Single TM Practitioner, *Sleep Research, 16,* p. 230, 1987.

C. N. Alexander, R. Boyer, and D. Orme-Johnson, Distinguishing between Transcendental Consciousness and Lucidity, *Lucidity Letter, 4*:2, pp. 68-85, 1985.

A. Brylowski, H-Reflex in Lucid Dreams, *Lucidity Letter, 5*:1, pp. 116-118, 1986.

M. C. Dillbeck, D. W. Orme-Johnson, and R. K. Wallace, Frontal EEG Coherence, H-Reflex Recovery, Concept Learning, and the TM-Sidhi Program, *International Journal of Neuroscience, 15,* pp. 151-157, 1981.

47. C. T. Haynes, J. R. Herbert, W. Reber, and D. W. Orme-Johnson, The Psychophysiology in Advanced Participants in the Transcendental Meditation Program: Correlations of EEG Coherence, Creativity, H-Reflex Recovery, and Experience of Transcendental Consciousness, in *Scientific Research on the Transcendental Meditation Program: Collected Papers, 1,* D. W. Orme-Johnson and J. T. Farrow (eds.), pp. 208-212, MERU Press, West Germany, pp. 208-212 1976.
48. R. D. Ogilvie, H. T. Hunt, C. Sawicki, and K. McGowan, Searching for Lucid Dreams, *Sleep Research, 7,* p. 165, 1978.
49. R. D. Ogilvie, H. T. Hunt, P. D. Tyson, M. L. Lucescu, and D. B. Jenkins, Lucid Dreaming and Alpha Activity: A Preliminary Report, *Perceptual and Motor Skills, 55,* pp. 795-808, 1982.
50. R. D. Ogilvie, K. P. Vieira, and R. J. Small, *EEG Activity during Signaled Lucid Dreams,* Paper presented at the annual meeting of the Association for the Study of Dreams, Santa Cruz, California, 1988.
51. P. Tyson, R. Ogilvie, and H. Hunt, Lucid, Prelucid, and Nonlucid Dreams Related to the Amount of EEG Alpha Activity during REM Sleep, *Psychophysiology, 21,* pp. 442-451, 1984.
52. H. Hunt and R. Ogilvie, Lucid Dreams in Their Natural Series: Phenomenological and Psychophysiological Findings in Relation to Meditative States, in *Conscious Mind, Sleeping Brain: Perspectives on Lucid Dreaming,* J. I. Gackenbach and S. L. LaBerge (eds.), Plenum, New York, 1988.
53. B. Taneli and W. Krahne, EEG Changes of Transcendental Meditation Practitioners, *Advances in Biological Psychiatry, 16,* pp. 41-71, 1987.
54. D. Orme-Johnson, R. K. Wallace, M. Dillbeck, C. N. Alexander, and O. E. Ball, The Functional Organization of the Brain and the Maharishi Technology of the Unified Field as Indicated by Changes in EEG Coherence and Its Cognitive Correlates: A Proposed Model of Higher States of Consciousness, in *Scientific Research on the Transcendental Meditation and TM-Sidhi Programme: Collected Papers, 4,* R. Chalmers, G. Clements, H. Schenkluhn, and M. Weinless (eds.), MIU Press, Vlodrop, The Netherlands, in press.
55. C. C. French and J. G. Beaumont, A Critical Review of EEG Coherence Studies of Hemisphere Function, *International Journal of Psychophysiology, 1,* pp. 241-254, 1984.
56. J. T. Farrow and J. R. Herbert, Breath Suspension during the Transcendental Meditation Technique, *Psychosomatic Medicine, 44*:2, pp. 133-153, 1982.
57. J. I. Gackenbach, Interhemispheric EEG Coherence in REM Sleep and Meditation: The Lucid Dreaming Connection, in *The Mind in Sleep, Volume 2,* J. Antrobus (ed.), in press.
58. R. Armitage, R. Hoffmann, and A. Moffitt, Interhemispheric EEG Activity in Sleep and Wakefulness: Individual Differences in the Basic Rest-Activity Cycle (BRAC), in *The Mind in Sleep, Volume 2,* J. Antrobus (ed.), in press.
59. R. T. Pivik, Tonic States and Phasic Events in Relation to Sleep Mentation, in *The Mind in Sleep: Psychology and Psychophysiology,* A. M. Arkin, J. S. Antrobus, and S. J. Ellman (eds.), Erlbaum, Hillsdale, New Jersey, 1978.
60. J. I. Gackenbach and W. Moorecroft, Psychological Content of "Consciousness" during Sleep in a TM Subject, *Lucidity Letter, 6*:1, pp. 29-36, 1987.
61. S. LaBerge, *Lucid Dreaming: An Exploratory Study of Consciousness during Sleep,* Unpublished doctoral dissertation, Stanford University, California, 1980.
62. K. P. O'Connor and J. C. Shaw, Comment on Zoccolotti's 'Field Dependence, Laterality and the EEG: A Reanalysis of O'Connor and Shaw,' *Biological Psychology, 15,* pp. 209-213, 1982.

M. Murphy and S. Donovan, *The Physical and Psychological Effects of Meditation,* Esalen Institute, San Rafael, California, 1988.
A. Deikman, *The Observing Self,* Beacon Press, Boston, 1982.
C. N. Alexander, K. Chandler, and R. W. Boyer, *Experience and Understanding of Pure Consciousness in the Vedic Science of Maharishi Mahesh Yogi,* Unpublished Manuscript.
C. N. Alexander, A Conceptual and Phenomenological Analysis of Pure Consciousness during Sleep, *Lucidity Letter,* 7:2, pp. 39-43, 1988.