Out-of-the-Body Experiences

Implications for a Theory of Psychosis

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Chapter 4

Out-of-the-body experiences in the laboratory

In this chapter I will discuss a number of experiments previous to my own which attempted to investigate the electrophysiology of out-of-the-body experiences in the laboratory, and in particular will discuss what light they might shed on the model of OBEs proposed above.

All except one of these experiments involved the longitudinal study of a single subject. All appear to have been looking for correlates of an event (the OBE) rather than aiming to shed light on the underlying state which may predispose a subject to such an experience, which was the aim of my own experiment.

Nevertheless some data emerged from these earlier experiments which may be seen as bearing on my proposal that OBEs are a phenomenon of Stage 1 sleep, and which therefore make them worthy of discussion here.

Charles Tart's studies

Chronologically the first study was that of Tart (1968). His subject, Miss Z, was a young woman in her early twenties, who had apparently been having OBEs several times weekly all her life. They would occur during the night, when she would seem to wake, and find herself apparently floating near the ceiling. The experience would last for a few seconds to half a minute, and then she would fall asleep again. She had never made any attempt to control her experiences.

The subject spent four non-consecutive nights in Tart's sleep laboratory over a period of approximately two months, and reported out-of-the-body experiences on all but the first night.

It was not possible to correlate the reported OBEs very precisely with the EEG record, because the subject did not signal while they were going on, but only reported them as they ended. Tart writes: 'My general impression of the EEG correlates [...] of Miss Z's floating and OBE experiences is they occurred during a rather poorly developed Stage One [sleep] pattern which was dominated by alphoid activity and often mixed with transitory periods of wakefulness.' The 'alphoid' activity was 1-1.5 Hertz slower than her normal alpha rhythm[1]. No rapid eye movements (REMs) appeared to accompany these experiences.

Tart's remarks on this subject's EEG are of interest in light of the theory of OBEs I am proposing. They appear to support the idea of OBEs belonging to Stage 1 sleep, whether this sleep occurs because of the subject slipping into a state of de-afferentation and low arousal, such as accompanies the onset of normal, nocturnal sleep, or because the sleep has been triggered as a reaction to extreme stress. Clearly the sleep manifested by Tart's subject would appear to fall in the former, 'normal' category. In addition, the absence of rapid eye movements remarked on by Tart supports the idea of Stage 1, rather than REM sleep.

Experiments with Robert Monroe

Tart's second study (Tart 1967) was with Mr Robert Monroe as subject. Mr Monroe later became well-known as the author of a popular book entitled *Journeys Out of the Body* (Monroe 1974).

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[1] 8-11 Hertz (cycles per second) is generally regarded as the normal range.

Mr Monroe was older than Tart's first subject, a married man with children, and with a successful career in business. He spent nine sessions in Tart's laboratory over a period of about eight months, generally from about 9 p.m. to midnight or later. In one respect the experiments were less successful than those with Miss Z, inasmuch as Monroe reported OBEs on only one of the nine nights (the last but one). As with Miss Z, there was uncertainty in relating the temporal location of the two OBE episodes to the polygraph record, as the subject only indicated when the second episode had ended. However, Tart concluded that Monroe's two OBEs 'seemed to have occurred in conjunction with a stage-one dream state.'

If this was the case, then Mr Monroe's experiences, at least in the laboratory setting, would, like those of Miss Z, appear to be consistent with the hypothesis put forward earlier, that OBEs are phenomena of sleep, with the sleep being either of the Stage 1 descending type, or sleep as a response to extreme stress and hyperarousal.

Despite the disappointingly small number of OBEs occurring in Tart's study of Monroe, one finding on the level of individual differences was reported which is of particular interest in the present context. This was the overall lability of Monroe's EEG. Tart writes:

> A general characteristic of all the experimental sessions was the finding that [Monroe's] EEG showed such a variety of changes that it was quite difficult or impossible to classify it in the conventional waking or sleep patterns on many occasions. His EEG was highly variable in both frequency and voltage. For example, he showed alpha rhythm frequencies ranging from 8 to 13 cps[2] – a an unusually large range – with voltages ranging from 40 to 100 microvolts. His sleep spindles ranged in frequency from 14 to 17 cps, 30 to 100 microvolts; almost every other subject I have

[2] cycles per second, i.e. Hertz.

> seen in the laboratory has shown sleep spindles that were at 14 cps, and 14 cps only. Frequently, the theta[3] waves in his sleep patterns showed bursts of three to eight theta waves which had amplitudes of 150 to 200 microvolts; I have never seen theta activity in other subjects exceed about 50 microvolts. Finally, although [Monroe] frequently fell asleep, I found no instances of clearly developed delta[4] waves in any of the EEG patterns, whereas one generally sees delta waves within half-an-hour of falling asleep in all subjects. (Tart 1967)

One possible explanation of this last finding might be that the experimental sessions were so spaced out over the eight months that Monroe never habituated to the laboratory situation and continued to show the 'first night effect' of not reaching the deeper stages of sleep. Nevertheless the general finding of extreme lability is of interest in the context of the theoretical position we are putting forward in relation to proneness to experience OBEs. I am suggesting that hyperarousal leading to the intrusion of Stage 1 sleep processes into waking life may be due, either to the individual having a tonically elevated level of arousal, or to his or her nervous system being characterized by a lability of arousal which makes the individual prone to phasic episodes of hyperarousal.

Distortions of the sense of time in the OBE state

It is interesting to note that Monroe later reported to Tart that his OBEs in the experimental situation seemed to last for only about thirty seconds each, whereas the EEG episodes with which Tart identified them had each lasted for three minutes. This may be because Tart had identified the state in which the OBEs occurred rather than any discrete event, or sequence of events, uniquely

[3] 3.5 - 7.5 Hertz.
[4] Slow waves of under 3.5 Hertz.

associated with them. However, it is also possible that Monroe's subjective impression of the duration of his experiences was erroneous, and that his OBEs had indeed lasted for more like three minutes than the thirty seconds he estimated.

Green (1968b), in a questionnaire study of people who had experienced spontaneous OBEs, found evidence that the sense of time may be distorted in the OBE state. 17% of those who had had only one OBE reported some distortion of their sense of the passage of time in association with the experience, and among those who had experienced more than one OBE the proportion rose to 37%, possibly because they had had more than one opportunity to observe such a distortion.

The following is a case reported to me in which the correspondent spontaneously commented on the distortion of her sense of time in association with the ecsomatic state.

> I have had an out of the body experience when I was ten or eleven. I don't know where my family was at the time, but when I walked into the kitchen to get something to eat or drink, I can't remember which. I took a few steps into the kitchen when I felt cold and very strange, soon after my spirit left my body. Rose up to the ceiling as if I was dead. I remember looking around the room, watching my body moving, soon after I became very anxious and frightened. I thought I wasn't going to return to my body. My arms reached out to try to grab my body. I felt myself saying I want to come down, let me down. My spirit soon returned to my body. During this experience I seemed to have lost track of the time as if it stopped altogether.

It is also interesting to note that one of the subjects in my own experiment on the voluntary induction of OBEs, to be described in the next chapter, showed a striking distortion in her sense of time. This was Mrs RH, one of the five

people who endorsed the question devised by John Palmer as a criterion of an OBE.[5] The wording of this question is as follows:

> 'Did you at any time during the experiment have the feeling that you were literally outside of your physical body?'

I shall refer to this question as the 'Outside' question. Mrs RH described having experienced 'a wonderful floating sensation' during what I will refer to as 'the sound phase' of the experiment. This was a phase of ten minutes during which the participant, who was lying on a garden lounger and had previously listened to a 20-minute relaxation tape, heard 'pink noise' with a beating sine wave superimposed on it, over headphones, while trying to imagine that he or she was floating up to the ceiling of the laboratory.

What is of interest in the present context is that Mrs RH estimated that this sound phase had lasted a mere thirty seconds and 'couldn't believe it' when assured that it had in fact lasted ten minutes. In this case, unlike in the case of Monroe's experiences, we have a more objective indication of the distortion of the time sense, since the subject was estimating a duration which was externally determined (i.e. the length of the sound phase).

It is also interesting to note that Mrs RH's EEG showed two surges in delta amplitude during the course of the experiment, one during a control period prior to the start of the experiment, and an even larger one during the sound phase. She was adamant that she had not fallen asleep at any point during the sound phase. However, she described herself as feeling 'overrelaxed', as if she could have gone to sleep if she had wanted to, during the control period, and possibly 'a bit sleepy, very briefly' during the sound phase.

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[5] Palmer and Vassar, 1974; Palmer 1975; Palmer and Lieberman, 1976

I suggest that these various indications of distortions of the time-sense in connection with OBEs support the idea that they are a phenomenon of Stage 1 sleep.

Certainly distortion of the time sense would appear to be one possible explanation of Maury's guillotine dream, quoted and discussed in Chapter 8 below. It could be argued that the apparently lengthy sequence of events within the dream which 'rationalised' the sensations of execution in fact occupied much less time than they seemed to the dreamer to have occupied while he was asleep.

It is also of interest that J.D. Parkes reports that there may be 'distortion or absence of time sense' during episodes of what is called *sleep paralysis*.[6] Such episodes are characteristically associated with the hypnagogic or hypnopompic states.

Further experiments with Robert Monroe

Another study of Robert Monroe was carried out, in a different laboratory, and reported in less detail than that of Tart. This consisted of a single session with Monroe conducted by Stuart Twemlow and Fowler Jones of the University of Kansas Medical Centre (Gabbard and Twemlow 1984). On this occasion, Monroe's EEG was monitored with left and right occipital electrodes. Monroe reported a single OBE during this session, which he signalled after his 'return'.

The most interesting finding from the present point of view was, as the authors report: 'At that time [i.e. at the time they estimate the OBE occurred] his EEG showed a shift in high amplitude patterns to the right hemisphere with a low amplitude to the left occipital level.' The authors add: 'There seemed to be no significant frequency differences between hemispheres although the

[6] Parkes 1985, p.203.

amplitude differences were obvious.' The part of this remark concerning frequency differences is somewhat unclear, but it might be taken to mean that the overall shape of the power spectrum remained unchanged in the right hemisphere, i.e. the proportion of power in each band remained the same, but the total power increased. It would appear reasonable to conclude that there was differential activation of the two hemispheres, and that this may have been in the direction of greater activation of the right.

As we shall see in the next chapter, the main finding of my own experiment was a relative activation of the right hemisphere in those subjects who achieved some degree of success in self-inducing OBEs in a laboratory situation. We will be suggesting that a tendency to this kind of dissociation of arousal between different subsystems of the central nervous system is a characteristic of the way certain people's central nervous system functions, and one which can predispose to hyperarousal, and thence to episodes in which sleep processes intrude into waking life.

The other main finding of the Twemlow and Jones study was that: 'When in his out-of-body state there is a frequency slowing, with an interesting shift in power to a 4-5 Hertz range, the theta-delta transitional zone.' There was apparently very little activity above 10 Hertz. We interpret this to mean that there was a downward shift in the median frequency of the amplitude spectrum during Monroe's OBE, which would be consistent with Tart's observation that Monroe's experiences in his laboratory occurred in a descending Stage 1 sleep state.

Experiments with Ingo Swann

Osis and Mitchell (1977) carried out a prolonged study of Mr Ingo Swann, an artist and writer in his forties.

Swann reported having had spontaneous out-of-the-body experiences since early childhood, claiming that the first had occurred at the age of three during a tonsillectomy, and that he had subsequently trained himself to 'leave his body' at will. Unlike Monroe and Miss Z, Swann induced his OBE states while sitting up and ostensibly fully awake.

Altogether there were 39 experimental sessions over a period of more than six months. Swann would signal whenever he felt he had just experienced an OBE. Electrodes were attached to the left and right occiput.[7] One-minute periods prior to the subject's signals (presumed to coincide with the OBE condition) were compared with one-minute control periods.

The main findings were a decrease in both alpha amplitude and percentage alpha (over time) during the OBE as compared with the non-OBE periods.

The reduction in alpha amplitude was more marked in the right hemisphere than the left; however, the reduction in percent alpha time was greater in the left hemisphere than the right. The authors also report that there was in general no significant positive correlation between overall EEG amplitude and alpha activity.

In interpreting these results there is the difficulty of knowing whether the reduction in both alpha amplitude and percent alpha time represent increased or decreased activation. Both flattening of the EEG (reduction in amplitude) and blocking of the alpha rhythm could be due either to increased arousal or a near approach to sleep (Oswald 1962). Osis and Mitchell mention that on a few occasions the EEG activity of the subject's parietal lobes were explored and that 'there was some increase in theta activity noted', which would appear to support the latter, near-to-sleep hypothesis in this case.

[7] The back of the head.

Their general characterisation of Swann's EEG during OBE periods is as 'a low-voltage mixed activity pattern.'

Despite the ambiguity of the data, one can at least say that there is nothing in this experiment to contradict the hypothesis that the OBE experience is one that occurs in, or while one is approaching, sleep. There is also the interesting indication of a dissociation or uncoupling of the activity in the two hemispheres, which, as with the Robert Monroe data just discussed, would fit with the hypothesis to be discussed in the next three chapters, that dissociation of arousal between different subsystems within the central nervous system is one possible characteristic of the OBE-prone individual.

Experiments with Blue Harary

In the same paper, Osis and Mitchell (1977) also report briefly on some experiments with a Duke University student, Blue Harary. Mr Harary had apparently been having OBEs since the age of fourteen (Blackmore 1983). His data were limited to ten instances of OBE periods, but they showed a similar decrease in alpha amplitude and percent alpha time to Mr Ingo Swann. In Harary's case, however, the decrease in alpha was more marked in the left hemisphere for both measures.

Morris et al (1978) also studied Harary. Physiological data were gathered on thirteen evenings over a period of about three months. The measures used were alpha frequency and percent time spent in alpha. Interhemispheric comparisons were also made. The authors report that there were no statistically significant differences on either of the EEG measures when comparisons were made between OBE stages and preliminary relaxation stages.

However, it is interesting to note from the table of data they give that the mean percent time spent in alpha in the right hemisphere is lower for the OBE

periods (41.9%) than it is for the control periods (48.3%). This might be taken as indicating relative activation of the right hemisphere if the higher percentage of alpha blocking was due to relatively greater arousal rather than greater proximity to sleep.

There was a further physiological finding of interest in relation to the hypothesis that dissociation of different arousal systems outside of the central nervous system may be one of the mechanisms underlying proneness to OBEs. This concerned Harary's skin conductance level and heart rate, both of which are under the control of the autonomic (rather than the central) nervous system. It was found that during the OBE phases Harary's skin conductance fell (which would normally indicate decreased arousal), while his respiration and heart rate increased (normally indicators of increased arousal). Here we have a possible indication of dissociation of arousal between different sub-systems within the *autonomic*, as opposed to the central, nervous system.

Conclusions

Despite the small number of studies reviewed in this chapter several interesting points have emerged. First, two of the four individual subjects studied, namely Miss Z and Robert Monroe, appear to have been in a state of unambiguously low cortical arousal at the time of their OBE episodes. In fact Tart considered them both to be in a state of descending Stage 1 sleep. This would fit directly with the hypothesis being put forward in this book, that OBEs are a phenomenon of either *hyperarousal*, as in accidents and emergencies, or *hypoarousal*, as in the hypnogogic state.

Secondly, there are suggestions in Osis and Mitchell's studies with both Ingo Swan and Blue Harary, in which contralateral[8] electrode placements were used,

[8] I.e. one on each side of the head, placed symmetrically.

that imbalances in hemispheric activation occurred. It is also possible to see an asymmetry in hemispheric activation during the OBE state in Morris's study of the latter subject. As we shall see in Chapter 6, differential activation of the two hemispheres during OBEs in these studies is congruent with the findings of my own experiment, which involved 20 OBE subjects and 20 controls (i.e. persons with no experience of OBEs).

Finally, the abnormal lability of Monroe's EEG is of interest in the light of the model of the OBE-prone nervous system discussed in previous chapters. In this model, lability of arousal is suggested as one possible factor predisposing individuals to a state of hyperarousal, and thence to sleep as a provoked reaction.