

## VII: Extraordinary Conditions

Not every REM dream is a 'typical dream', that is, makes an extraordinary impression on the dreamer. Therefore, McCarley & Hoffman reflected on the possibility that 'variations in the degree of intensity ... and an attentional factor' (1981, p. 910) may be significant. Later, Hunt (1989, p. 133) assumed that 'features of especially intensified and driven REM physiology' might cause dreams that make an impact on the dreamer. Antrobus (1991) focussed on high levels of late morning REM activation as a source of odd perceptions. Nielsen (1991), struck by the somato-sensory aspects of dreams with a heightened sense of reality ('reality dreams'), explicitly returned to the classical view that high-impact somatic sensations could be the origin of both dream intensity and dream motifs such as flying, paralysis, an other's presence, and sex.

The concept that illusionary perceptions of bodily sensations are the source of some dreams corresponds well with the circumstances of a specially activated REM physiology: Intensity of peripheral stimuli (e.g. reafference of twitches of legs and arms) or central simulations of sensory afferences as well as an 'attentional factor' (even with regard to a lack of afferences) can be viewed as possible consequences of extraordinary central activation. In the case of lucid dreams, empirical evidence from the sleep lab indeed suggests a correlation of extraordinary REM physiology and dreams characterized by a highly aroused mind and outstanding sensations (LaBerge *et al.*, 1986).

## VIII: REM Sleep, Complex Partial Seizures and Nightmares

In the current debate about the relation of REM sleep and dreaming, Solms claims to demonstrate 'that, although there is an important link between REM sleep and dreaming, they are in fact doubly dissociable states' (2000a, p. 843):<sup>2</sup> REM activation originating in the brain stem, in his view, is just one — even if the most common — trigger for a "'dream-on" mechanism' located in the forebrain. Solms obviously implies that dreams do not reflect the nature of the trigger. Contrary to both traditional theories of nerve and bodily stimuli and 'activation-synthesis', Solms speculates that the arousal of 'instinctual mechanisms' (his label for the dream-as-fulfilment-of-unconscious-wishes of Freudian theory; 2000b, p. 1039) located in the mesocortical/mesolimbic circuits of the forebrain is the source of dream content.

Solms suggests that complex partial seizure activity provides an alternative trigger for the "'dream-on" mechanism' of the forebrain. His implication that such seizure activity would be limited to NREM sleep (1999, p. 214) is

[2] In his original study, Solms (1997) was able to provide clinicoanatomical evidence for the cessation of dreaming in patients with brain lesions in the forebrain or the parietal lobe of the cortex. Here, he merely proved that REM brain stem activation is not sufficient for dreaming — which had never been denied (cf. 'synthesis'). His attempt to prove that REM sleep is not necessary for dreaming, by evidencing cases of patients with brain lesions, was not very successful: He was not able to provide clinicoanatomical evidence for the preservation of dreaming with loss of REM sleep. As for the latter point, Solms was not very clear about it in his book and only reluctantly admitted the lack of evidence some time later (2000b, p. 1036).

counterfactual: Only grand mal seizures and REM sleep seem practically to exclude each other (Quinto & Chokroverty, 2000). Epstein (1995), an author quoted by Solms, was indeed able to demonstrate in the sleep lab that recurrent nightmares in the case of some of his patients were correlated with EEG indicators of seizure activity that were recorded during REM sleep (a finding not mentioned by Solms). Taking into account the parallels of flashes of upstream activation of REM sleep (ponto-geniculate-occipital waves) and seizure pointed to by Hobson and colleagues (Elazar & Hobson, 1985; Hobson *et al.*, 2000), a possible explanation for NREM nightmares in patients with seizures during the wake state might be that, in the case of their susceptible brains, subliminal REM arousal could (cf. Nielsen's, 2000, discussion of 'covert REM sleep') be sufficient to trigger seizure activity (while at the same time limiting it).

By drawing attention to the traditional view (cf. de Sanctis, 1901) that nightmares may be seen as 'epileptic equivalents', Solms contradicts his implicit claim that the content of dreams would not reflect the arousal processes which trigger the "dream-on" mechanism'.

The epileptic patients' nightmares reported by Solms reproduce impressive multisensual phenomena of epileptic auras or complex partial seizures and are characterized by scenes of chase and (the dreamer's own) death — themes of typical dreaming. To what extent nightmares of epileptic patients are correlated with (manifest or latent) REM arousal or whether nightmares in general (most of which occur during REM sleep; cf. Nielsen 2000) might be understood as subclinical forms of seizure activity remains to be answered. At any rate, the nightmares of epileptic patients hint at hyperarousal as the source of the most common of all 'typical dreams' — chase.

### IX. Lucid Dreams — Flashes of Neuronal Discharge

Resemblance to forms of partial seizure activity is not restricted to nightmares. Lucid dreams, often welcomed by dreamers, are, along with nightmares, sometimes compared to experiences with psychedelic drugs (Faraday, 1972; Hunt, 1989); Hunt speaks of an 'excess of energy' in both lucid dreams and nightmares, which, by the way, are often interwoven with each other (cf. Green; 1968). Lucid dreams resemble descriptions of epileptic auras (Janz, 1969) both with regard to the sensory stuff they deliver (cf. Gackenbach, 1988; Worsley, 1988) and in respect of the overall rapture of the experience (epileptic auras, like experiences with psychedelic drugs, are sometimes horrific, sometimes euphoric). In particular, the overwhelming experiences of light reported by lucid dreamers (Moers-Messmer, 1939; LaBerge, 1985; Gillespie, 1992) seem to reveal, quite literally, flashes of excitation; Gillespie mentions that these visions sometimes persist for quite some time after rising from bed.

Similar to the dreams correlated with migraine auras as reported by Sacks (1996), flashes of light within lucid dreaming may 'appear direct and "raw", intruding into an otherwise normal unfolding of a dream' (Sacks, 1996, pp. 212–3),

or they may be integrated with the dream itself (e.g. 'phosphenes of migraine are commonly dreamed of as firework displays', p. 213).

As mentioned previously there is empirical evidence that lucid dreams are correlated with intensified REM physiology. Whether the especially activated paradoxical sleep underlying lucid dreaming is merely similar to epileptic or migraine auras or whether it is a subclinical form of either kind of seizure aura triggered during REM sleep (or, conversely, triggering it) are questions which are still open to debate.

Despite the phenomenological parallels of forms of seizure auras and lucid dreaming, there is little research available concerning this relationship. Irvin (1988) reported that in one study a majority of lucid dreamers had a prehistory of migraines. In combination with anecdotal evidence that tense mental activity often takes place during the day before nights with lucid dreams, Irvin concludes that lucid dreams could be a subclinical migraine seizure. More recently, a clinical case study of Podoll *et al.* (2000) mentions lucid nightmares of a migraine patient.

Even beneath the threshold of lucidity, extraordinary nervous discharge in the brain might explain typical themes relating to visual phenomena such as fire, sparkling coins ('finding money') or cosmic objects. Scherner (1861, p. 183) had already made the assumption that dreams of shooting stars and the like are reflections of the light inherent to nervous discharge ('das den Nerven einwohnende animalisch-magnetische Licht') in the mirror of the perceiving mind's imagination.

Other instances of the impressive sensual aspects of lucid dreaming are sensations of flying which sometimes precede lucidity but are often enacted after the dreamer becomes aware of dreaming (Barrett, 1991). The correlation of lucidity with extraordinarily intense REM arousal corresponds to the view of 'activation-synthesis' that dream flying might be an illusory perception of stimulation of the vestibular nuclei in the brain stem (cf. Leslie & Ogilvie, 1996). This may also be adduced from the fact that some nightmares include flying (Arnold-Forster, 1921; Mallon, 1987; cf. Schönhammer, 2000) and many culminate with the dreamer falling within the dream — and out of sleep. Nevertheless, the aforementioned phenomenological parallels and possible physiological connections of both kinds of high-impact dreaming with forms of seizure activity hint towards a more central locus of the vestibular system (as the sense of balance is labelled in technical terms): the parietal-temporal-occipital junction of the cortex (Stauder, 1934; Epstein, 1995). Even if vestibular stimuli originating in the brain stem may be the source of many dreams of flying and falling (especially when rhythmical change of directions is involved; cf. Hobson, 1988), excessive discharge in the cortical parts of the vestibular system sometimes occurs as an autonomous process. Hypnagogic 'sensory shocks' (Oswald, 1962), for example, and similar phenomena in meditation (Austin, 1999) or exercises of relaxation (Luthe *et al.*, 1965) are probably due to 'local' excessive cortical discharge unleashed by reduction of peripheral sensual afferences (functional deafferentiation). The resulting flashes of excitation in their turn potentially

startle the subject, that is, cause upstream brainstem arousal comparable to highly activated REM sleep (cf. Bowker & Morrison, 1976; Glenn, 1985). Furthermore, the illusion of soaring might simply mirror awaking attention (cf. Antrobus, 1991) with regard to a lack of somatic afferences (cf. Newberg *et al.*, 2001).

Blackouts form part of the phenomenology of lucid and other high-impact dreams (as a complement to the impressive experiences of light) (Moers-Messmer, 1939). It is, for example, quite common that dreamers fall through darkness seeing either nothing or just spots of light here and there. Dreams of flying or falling through cosmic scenery are probably mental elaborations of optical noise caused by excessive discharge in the parietal-temporal-occipital junction of the cortex. Eisinger & Schilder (1929) found similar visual impressions in the context of vestibular sensations in the dreams of patients with illnesses of the middle ear. Hoff & Pötzl (1937) experimentally provoked comparable hallucinations in hypnotized or narcotized subjects during and after spinning on a swivel-chair. Glonig & Sternbach (1953) were able to elicit more hallucinations of flying and falling in their drugged subjects when they applied caloric stimulation in the ear; at the same time this stimulation of the vestibular apparatus (i.e. the organ of equilibrium) reduced visualizations and — in one case — provoked the experience of flying through cosmic space.

It seems that, as suggested by Antrobus (1991; 2000; cf. Seligman & Yellen, 1987), in moments of extraordinarily activated sleep a rather perceptual mode of the mind reverses the ‘backward projection’ of memories (to the parietal-temporal-occipital junction of the cortex) that underlies, if not all dreaming as Solms (1997) assumes, at least most all-day/mundane dreaming. The dream-experiences in such moments are not just a reflection or illustration of ‘long-term personal preoccupations and life-themes’ as observed for ‘normative dreaming’ (Hunt, 1989, p. 96) but are due to actual perceptions. Hence, these moments of dreaming seem to be beyond the reach of the ‘continuity hypothesis’ (Domhoff, 1996)<sup>3</sup> even if, of course, the resulting illusions are culturally and individually coloured.

Thus, besides ~~representing~~ cosmic flights, also dreams of tornados, earthquakes or tidal waves may ~~also~~ be viewed as making sense of strong and at the same time chaotic vestibular and visual stimulation. Such stimulation might well occur in the brains of people having suffered trauma. Even after reduced flashbacks to their original scenes of trauma, these people are very susceptible to startling exogenous or endogenous stimuli (Hartmann, 1998). Hartmann’s observations concerning the dream biographies of trauma sufferers thus do not necessarily betray an act of ‘dream-healing’ by means of symbolisation, as implied by this author’s concept of ‘contextualising metaphors’.

[3] For exceptions, see Section XIV.

## X: Sleep Paralysis and Dreams of Pursuit

Sleep paralysis, which is a kind of ‘accident’ occurring at the transitions between wakefulness and sleep, is common in narcoleptic patients (Hishikawa, 1976) and seems to have been experienced at least once by about a third of the population (Fukuda *et al.*, 1998). Conceived as a ‘dissociated state’, part wake, part REM sleep (Mahowald & Schenk, 1999), it is a further key to typical dreaming.

‘Vividly sensing, but not necessarily seeing or hearing, a presence in the room’ is an item listed within the ‘55 Typical Dreams Questionnaire’ that often received an affirmative response (Zadra & Nielsen, 1997; Nielsen *et al.*, 2003). It describes a hallucination that is also often reported in cases of sleep paralysis, that is, in situations perceived as wakefulness (Cheyne, 2003). Another item listed in the aforementioned questionnaire addresses an explicit characteristic of sleep paralysis (‘being half awake and paralysed in bed’) and thus goes beyond the exploration of dream themes. ‘Being frozen with fright’, also a typical aspect of explicit sleep paralysis, was already a relatively prominent theme in the intercultural study of typical dreams conducted by Griffith *et al.* (1958) and maintained a high rank in more recent samples (Zadra & Nielsen, 1997; Nielsen *et al.*, 2003). Nielsen *et al.* (2003) explicitly label these (and other) items as ‘sleep paralysis subscale’.

A certain ambiguity with regards to whether sleep paralysis is a waking experience or a dream seems to be a rule for some subjects both in natural settings (Parker & Blackmore, 2002) and in the laboratory (Takeuchi *et al.*, 1992). Thus, it is probable that typical dreaming themes similar to hallucinations of sleep paralysis differ in their respective degrees of reflective awareness but not in respect to the stuff they are made of — odd perceptions between sleep and wakefulness.

Recent quantitative studies carried out by Cheyne (2003) and colleagues (Cheyne *et al.*, 1999) have examined the well-known subjective qualities of sleep paralysis (Liddon, 1967). They suggest an arrangement of the subjective aspects of the syndrome into three categories:<sup>4</sup> ‘Incubus’ (including items regarding sensations of pressure, pain, choking, difficulty in breathing and death thoughts), ‘intruder’ (items concerning felt presence, visual, auditory and touch sensations as well as ‘covers’) and a ‘vestibular/motor’ factor (floating, flying, falling, out-of-body-experiences, autoscopia and movement inhibition); incubus and intruder both being more strongly correlated with fear, intruder and vestibular/motor factor with erotic feelings and bliss.

Cheyne and colleagues theorize that the awareness of a presence in the room is an illusory perception of peripheral REM physiology during a state of ‘threat activated vigilance’ caused by REM activation of the amygdala. The vestibular/motor factor is not integrated in this model of the experience of an uncanny presence. In contrast to this concept there is some evidence for an explanation of

[4] ‘It appears that these three factors rather exhaustively and meaningfully capture the range of hypnagogic and hypnopompic experiences during sleep paralysis. (...) It must be noted, however, that virtually all of the correlations generated among hallucination subtypes are positive and that even a one-factor model generated reasonable goodness-of-fit indices’ (Cheyne, 2003, p. 174).

feelings of a strange presence that focuses on odd kinaesthetic perceptions contained in the latter factor.

In surveying clinical case studies and describing their own cases of autoscopy and a sensed presence in the context of epilepsy, other illnesses of the brain or extraordinary stressful situations, Brugger and colleagues (1996; 1997) argued that felt presence of another, according to the theory proposed by Menninger-Lerchenthal (1935), can be conceived as an 'invisible double': 'Two of the most remarkable features of the FOP' ('feeling of a presence'; R. Sch.) 'are that (a) in spite of any visual support, the spatial localization of the 'presence' is quite distinct (as a rule a specific distance from one's own body is mentioned spontaneously by subjects); and (b) the impression is subjectively absolutely convincing ...' (Brugger *et al.*, 1996, p. 115).

Such an awareness of an uncanny presence may be understood as just one variation of alienation of the bodily self (cf. Brugger, 2002).<sup>5</sup> This concept of 'felt presence' as an externalization of the body schema throws light on the universal dream experience of chase.

I suggest that dreams of being pursued ought to be conceived as an illusory perception of a kind of detached shadow of one's own bodily self that is caused by a (startling) mismatch of impulse and feedback in the sensorimotor circle, a perception which may take place during untimely arousal. This is in keeping with a recent neurocognitive explanation of schizophrenic delusions of control (Frith 1992; Blakemore *et al.*, 2002; cf. parallels of dreaming and Multiple Personality Disorder; Barrett, 1994).

The phenomenology of chase dreams (cf. Schönhammer, 2004) — e.g. the common experience that precursors stay in close proximity without catching the dreamer even if he, unable to run fast enough, takes to the air — tends to support more the notion of a 'haunting shadow of the bodily self' rather than Revonsuo's (2000) recent suggestion that dreaming of chase should be understood as a kind of evolutionarily installed mental training.<sup>6</sup> This would also seem to be supported by the fact that sometimes precursors, even if invisible, are perceived as doubles. The finding that experimental stimulation of bodily sensations causes additional dream characters or experiences of 'felt presence' (Koulack 1969; Nielsen 1991; 1993) corroborates the view that feelings of uncanny presence of others during dreaming could be due to enhanced attention to the sensorimotor state of sleep.

A possible route to empirically test this explanation of the most prominent motif of typical dreaming would be to systematically check existing and future

[5] The bodily self probably is based on a 'neuro-matrix' (Melzack, 1990; cf. Metzinger, 1997) with an important local base in the tissue of the parietal-temporal-occipital junction of the cortex (Brugger *et al.*, 1996; 1997; cf. Persinger, 1987).

[6] In the debate about Revonsuo's rehearsal hypothesis, some authors (Schredl, 2000; Domhoff, 2000; Clancey, 2000) doubted whether, after taking into account the omnipresence of threats in our ancestors' world, a simulation of dangerous situations in dreams would be of any use. In the light of the present hypothesis, one might argue that the flight pattern indeed seems to be as effectively 'built in' that it is readily elicited by an invisible 'shadow' of one's own body perceived in extraordinary moments of sleep.

samples of dreams containing chase or pursuit for a coincidence with vestibular sensations (e.g. flying, falling, vertigo), which are well-known correlates (or better: symptoms) of disturbances of the bodily self (cf. Brugger *et al.*, 1996; 1997; Persinger, 1987).

### XI: Sleep Paralysis and the Spectrum of Intense Dreams

The hallucinations and affects dealt with in the aforementioned study of sleep paralysis (Cheyne, 2003) betray not only parallels to nightmares, ‘waking-nightmares’ as Cheyne (2003) puts it, but also to forms of extraordinary euphoric dreaming, such as the empirical based cluster of ‘transcendent dreams’ (Kuiken & Sikora, 1993; Kuiken, 1995; Busink & Kuiken, 1996). Vestibular sensations combined with overwhelming positive affect (described as joyful or delighted, ecstasy or awe) dominate these dream ‘trips’, in which alienation of the bodily self may also take place (‘own actions strange’, ‘external self observation’, ‘shift in dreamer’s perspective’); further symptoms of excessive nervous discharge, including ‘feelings of energy and vitality’, ‘sensations of spreading warmth’ as well as visions of ‘bright flashing light’, capture the dreamer’s attention (cf. IX.).

The third cluster (that is, besides ‘transcendent dreams’ and ‘anxiety dreams’) of ‘impactful dreams’, which were defined by Kuiken and colleagues and are termed ‘existential dreams’ or ‘dreams of agony and separation’, also has strong parallels with aspects of sleep paralysis. With these dreams, the sensation of ‘bodily felt ineffectuality’ is accompanied by intense depressive affect, notable sensations (e.g. ‘vivid sounds’ and ‘contrast of light and dark’) as well as an alienated bodily self (‘own actions strange’, ‘external self-observation’).

Thus, the ability to differentiate between clusters of high-impact dreaming does not contradict the view that these are simply different facets of irritating arousal that all include disturbing awareness of the body. Kuiken & Sikora (1993) made a speculative attempt to relate their clusters to different types of orienting response.

At any rate, the parallels between sleep paralysis and all forms of ‘impactful dreams’ confirm the view that the latter are results of extraordinary arousal; providing, at the same time, extremely vivid attention and unusual perceptions of the body (cf. Hunt’s, 1989, suggestion that intense dreams, occurring at whichever phase of sleep, are due to orienting/startle response;<sup>7</sup> he thus postulated a common source of dreams at sleep onset, night terrors of slow wave sleep, i.e. ‘disorders of arousal’, Broughton, 1968, and REM dreaming).

It is not surprising that, after finally waking up from all forms of high-impact dreaming, subjects are impressed by the realness of what has happened in their dream, and sometimes are certain of having experienced the very essence of life<sup>8</sup>

[7] The higher frequency and prevalence of nightmares and negatively-toned typical dream themes in women (Nielsen *et al.*, 2003) might — at least in part — be due to a gender difference in susceptibility to being startled (Swerdlow & Geyer, 1999).

[8] ‘In existential dreams ... the bodily felt sense of limitation is successively transformed in a manner that moves toward non-negotiable human limitations...’ (Kuiken, 1995).

or having encountered the sublime; hence, the ambivalence of some nightmare sufferers towards a chance to rid themselves of their cause for complaint (cf. Zadra, 2002).

## XII: Mirroring the Sleep Situation and the State of Mind

Silberer (1988/1911) saw dreams of (the dreamer's own) death as a 'functional autometaphor' for the transition from sleep to wakefulness: Waking up, he argued, is aptly symbolized this way because sleep 'dies' in this moment. According to the perspective discussed in the preceding paragraphs, a more direct explanation of one's own dream death is that approaching wakefulness involves perception of the body as flesh out of control ('sleep as a deathlike state', as Rank has put it in his later writings, 1950/1930). In Silberer's terms, this aspect of typical dreaming seems more like a 'somatic autometaphor' conceived by the activated mind.<sup>9</sup>

The plainest possible 'functional autometaphor' for the transition to wakefulness is a dream of waking up. And indeed 'false awakenings' are common precursors of sleep paralysis (Takeuchi *et al.*, 1992; Parker & Blackmore, 2002) and lucid dreams (Green, 1968; Green & McCreery, 1994; Barrett, 1991).

Instead of anticipating the very moment of waking up, we sometimes just dream of sleep and the sleep situation, e.g. dreams of lying in bed. Vold (1912, p. 807) once dreamed he was standing, dressed merely in a shirt, on a stage beside a bed; all the while he was trying, but with little success, to render a speech after attending (also in his dream) a theatre play with which he was not pleased. It is probable that both the situation of sleep and the state of mind, that is, dreaming, are reflected in this scene.

Dreaming of sleep has not yet been adequately represented in the questionnaires on typical dreams although this theme was mentioned in the older anthropological research (Lincoln, 1935). Barrett (1991) found that subjects who have lucid dreams tended to dream of sleep as well. Piaget (1975) noted scenes of sleeping in the first dreams reported by his own children and Foulkes (1982), in his longitudinal study on children's dreams, found dreams of sleep to be prevalent in the preschool age when imagination is still very restricted. Dreaming of sleeping is obviously a straightforward 'metaphor' of emerging awareness of the subject's actual situation, just as dreaming of waking up is.

Vold's dream hints that dreaming of being naked or inappropriately dressed, notorious 'typical dreams', can well be understood in the context of the emerging awareness of the situation of sleep. As for dreaming of theatre or the stage, Vold seems to become aware of the (passive) quality of his mental activity. Nowadays, dreaming of watching TV seems to mirror such awareness (cf. Antrobus, 1991; 2000). Dreaming of theatre, film and the like may reasonably be labelled as an indicator of a 'prelucid' state of the dreaming mind (Barrett, 1991). After noting that in his own dreams he never detected 'any recognition that they are

[9] Silberer himself supposed that dreams of various modes of death could be caused by the actual perception of the body, e.g. dreams of drowning caused by difficulties in breathing.



dreams’ (p. 65), Ellis (1911) wrote that the ‘only approach to a recognition of dreaming as dreaming’ that he experienced took place in a dream in which he played a role in a drama.

Dreaming, as the object of rudimentary reflection, is a mental state which, compared to wake goal-directed thought, is in many ways disoriented or weird (cf. Schwartz & Maquet, 2002). Therefore, it would not be surprising if situations of embarrassing or desperate lack of knowledge, such as examinations or futile search, were encountered by the dreaming mind when it approaches the threshold between sleep and wakefulness. Desperate struggle with the movement inhibition of the REM-state, which is probably echoed in dreams of ‘Trying again and again to do something’ or ‘Arriving too late, e.g. missing a train’, may additionally contribute to dream themes of disorientation and mental overload. The emerging awareness of sleep and dreaming can thus account for some of the themes subsumed by Hobson *et al.* (2000, p. 825) into the category of ‘incomplete arrangements’, which they relate solely to the predominance of anxiety in dreams caused by activation of the amygdala in the ‘limbic system’ of the brain during REM sleep.

### XIII: Typical Bodily Sensations

‘Being unable to find, or embarrassed about using, a toilette’ (Zadra & Nielsen, 1997) is a relatively restricted way of referring to the dream theme of urinating. Recollections of scenes in which the dreamer urinates (or tries to urinate) often occur in the context of a ‘natural experiment’, that is, when sleepers wake up with a full bladder. Dreamers, including nineteenth-century theorists such as Scherner (1861), were long struck by even (slightly) less obvious dream elaborations of this bodily stimulus: cascades of water and the like.

If the bodily stimulus ‘urge to urinate’ is responsible for an aroused state of mind or if it is perceived in a moment of heightened vigilance caused in another fashion, these dreams should also contain other themes of typical dreaming. As shown elsewhere (Schönhammer, 2004), dream examples in the older dream literature (e.g. Volkelt, 1875; Weygandt, 1893) confirm this assumption. The systematic search for such coincidences in future research would provide the opportunity to test the present hypothesis empirically.

Analogue combinations can be found in other dreams that can be traced to ‘classical’ bodily stimuli, e.g. dreams of ‘insects or spiders’ (touch) or ‘teeth falling out’. In the case of the latter theme, more recent case reports by Epstein (1995) document the involvement of vestibular and sexual mentation as well as reflections regarding the sleep situation. Again, sensations of touch (due, for example, to ischemia) or of the teeth (due, for instance, to a face down sleep position or nocturnal teeth grinding, which is probably a form of REM sleep without atonia; Tachibana *et al.*, 1994) may trigger arousal (orienting/startle response) or be detected in moments of otherwise heightened vigilance. Alternatively, both kinds of sensations may be forms of ‘paraesthesias’, that is, projections of