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Background Object of Primary Identification

see Dream screen.

Backmasking

see Backward masking.

Backward Masking and Illusions

Backward masking is also known as backwards masking and backmasking. All three terms are used in the popular music industry to denote a recording technique in which an auditory message is encrypted by recording it in reverse order onto a track. As a consequence, the encrypted message can only be retrieved by playing the track backwards. The backward masking technique was popularized during the 1960s by The Beatles, and has since been imitated by numerous bands. The urge to retrieve so-called backward messages in popular songs has yielded a number of 'messages' that do not originate from words or sentences recorded backwards, but from regular words or sentences that merely sound like intelligible language when played backwards. These 'messages' are attributed to a *cognitive illusion called *auditory pareidolia. Some examples of auditory pareidolia on the basis of back-

ward masking can be found in the pop songs *Another one bites the dust* by Queen (where the reversed sentence "Another one bites the dust" is rendered as "I decide to smoke marihuana"), *Revolution nine* by the Beatles (where the reversed words "Number nine" are rendered as "Turn me on, deadman"), and *Eldorado overture* by the Electric Light Orchestra (where the chanted word "Hallelujah" remains the same when played backwards). The latter phenomenon, where a phoneme remains the same when it is heard in reverse order, is called a phonetic palindrome.

Reference

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Bagel Vision

Also known as doughnut vision and donut vision. The term bagel vision is indebted to the Yiddish verb *beigen* (to bend, to twist). It is used to denote the visual perception of a punched-out or doughnut-shaped image, caused by a central, *bilateral scotoma. Due to a loss of central vision, and a retention of peripheral vision, faces, for instance, may be perceived in instances of bagel vision as a ring of flesh surrounding a black hole or a void. Bagel vision has been described in relatively rare cases of *visual aura occurring in the context of migraine. In the literature the terms bagel vision, doughnut vision, and donut vision



Fig. 1 Bagel vision. Illustration by JDB

are also used to denote a ring-shaped *scotoma with intact areas of central and peripheral vision.

Reference

Sacks, O. (1992). *Migraine. Revised and expanded*. New York, NY: Vintage Books.

Bananadine and Hallucinations

The neologism bananadine is indebted to the noun banana. It was introduced in 1967 in an article by Max Scherr, editor of the US underground newspaper *Berkeley Barb*, to denote a fictional alkaloid with hallucinogenic properties allegedly present in the inside of banana peels (*Musa x sapientum*). However, biochemical analyses show that banana peels contain no significant amounts of any known psychoactive substances other than serotonin (or its precursor, tryptophan), which is considered inactive when ingested orally or via the lungs. During the late 1960s the news from the *Berkeley Barb* article was amplified through numerous additional publications in the popular media, and through the attention generated by the US Food and Drug Administration's initiative to determine whether bananas should be classified as illicit drugs. Eventually the bananadine story was unmasked as a hoax, but the myth that the smoking or oral ingestion of dried or

baked banana peels can produce hallucinations persisted in certain circles, and continues to resurface from time to time.

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Belladonna Delirium

A term used to denote an anticholinergic *delirium due to intoxication with compounds of the plant *Atropa belladonna*. See the entry *Atropa belladonna* and hallucinations.

Belladonna-Induced Hallucination

see *Atropa belladonna* and hallucinations.

Benham's Disk

see Benham's top.

Benham's Top

Also known as Benham's disk, Benham's wheel, and artificial spectrum top. The eponym Benham's top refers to the British amateur scientist and toymaker Charles Edwin Benham (1860–1929), who in 1894 published an account in *Nature* describing a device which he called the artificial spectrum top, with the aid of which illusory colours can be created out of flickering monochromatic light. The device consists of a disc which is half black and half white, and bears three patterns of black concentric lines of increasing size. When the disc is rotated at a speed of around 5–10 revolutions/s, four concentric rings of colour appear. When the disc revolves clockwise, the colours red, green, pale blue, and dark purple can be discerned, running from the centre towards the periphery. When it revolves counter-clockwise, the colours appear

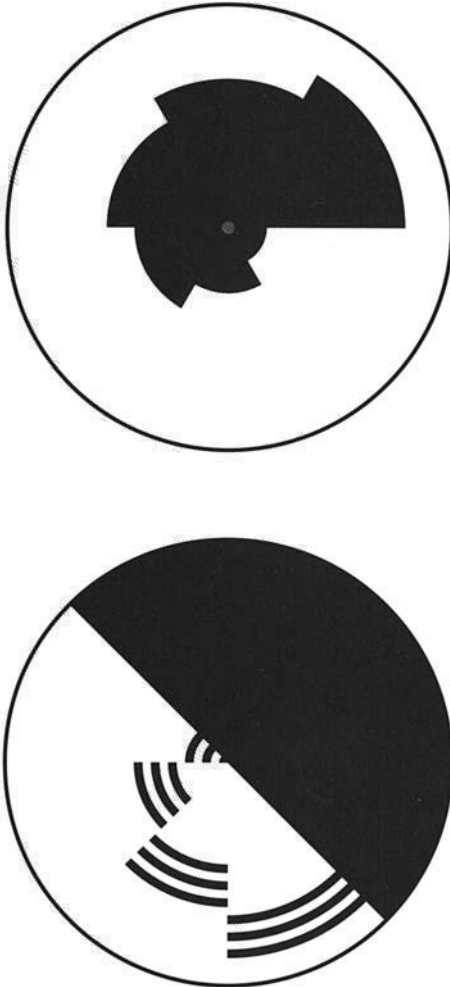


Fig. 2 Benham's top. Sources: Benham, C.E. (1894). The artificial spectrum top. *Nature*, 51, 113–114; and: Fechner, G.T. (1838). *Ueber eine Scheibe zur Erzeugung subjectiver Farben*. In: *Annalen der Physik und Chemie*. Edited by Poggendorff, J.C. Leipzig: Verlag von Johann Ambrosius Barth

in reverse order. The resulting illusory colours are referred to as pattern-induced flicker colours (PFICs). The underlying effect is known as the Prévost–Fechner–Benham effect. The neurophysiological correlates of this effect are not entirely understood, but it is believed that both the retina

and the primary visual cortex play an active part in its mediation. Benham's top was marketed as a toy for children. A variant of the device, of which Benham was apparently unaware, was described in 1838 by the German psychologist Gustav Theodor Fechner (1801–1887). The illusory colours created by the two devices are therefore generally known as *Fechner's colours. This phenomenon is classified as a *physiological illusion.

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- Kenyon, G.T., Hill, D., Theiler, J., George, J.S., Marshak, D.W. (2004). A theory of the Benham top based on center-surround interactions in the parvocellular pathway. *Neural Networks*, 17, 773–786.

Benham's Wheel

see Benham's top.

Benign Hallucination

Also referred to as non-morbid hallucination. The term benign hallucination is indebted to the Latin words *bene* (good) and *gignere* (to entail, to bring forth). It was introduced in 1960 by the American psychiatrist Gordon Forrer to denote a hallucination occurring outside the context of illness or pathology. Forrer uses the term benign hallucination in opposition to the term *malignant hallucination (i.e. a hallucination characterized by persistence, and associated with pathology, as in individuals with a clinical diagnosis of *schizophrenia). As Forrer maintains, "Hallucinations are surprisingly commonplace occurrences. They may be brief and benign as in the mundane auditory hallucination of 'hearing' one's name when one is quite alone. Or they may be persistent and malignant as in the auditory hallucination of paranoid schizophrenia repeatedly accusing the subject of aberrant

practices. In the benign hallucinatory experiences of everyday life only the fact of the experience is usually recalled. In the malignant hallucination of psychosis, preoccupation with the subjective sensory experience becomes intense. . . . Benign hallucinations terminate by more or less complete repression of the experience. Malignant hallucinations, on the other hand, spawn delusions, oftentimes themselves ceasing to exist in a manner analogous to plants which, in sprouting, replace the seeds from which they grew." In clinical practice, the term benign hallucination is used to denote hallucinatory phenomena such as *bereavement hallucinations, *simple misperceptions, *visual hallucinations occurring in the context of *Charles Bonnet syndrome, *musical hallucinations occurring in the elderly, and *deathbed visions.

Reference

Forrer, G.R. (1960). Benign auditory and visual hallucinations. *Archives of General Psychiatry*, 3, 95–98.

Bentall and Slade's Definition of Hallucinations

In 1988 the British psychologists Richard P. Bentall (b. 1956) and Peter D. Slade defined hallucinations as follows. "Any percept-like experience which (a) occurs in the absence of an appropriate stimulus, (b) has the full force or impact of the corresponding actual (real) perception, and (c) is not amenable to direct and voluntary control by the experiencer."

Reference

Slade, P.D., Bentall, R.P. (1988). *Sensory deception. A scientific analysis of hallucination*. London: Johns Hopkins University Press.

Benzodiazepine-Induced Hallucination

The benzodiazepines (or 'benzos' for short) are formally known as CNS active 1,4-benzodiazepines. These substances constitute a group of CNS depressants whose major action is attributed to the potentiation of the gamma

aminobutyric acid (GABA) system via the benzodiazepine receptors present in the CNS. The name benzodiazepine refers to the benzene and diazepine ring systems constituting the core chemical structure of classic benzodiazepine substances. Some examples of classic benzodiazepines are chlordiazepoxide, diazepam, lorazepam, and oxazepam. Historically, chlordiazepoxide was the first of the centrally acting 1,4-benzodiazepine derivatives. It was developed during the 1950s by the group headed by the Polish-Jewish-American chemist Leo Henryk Sternbach (1908–2005), and introduced for clinical use in 1960. Diazepam followed in 1963, with other benzodiazepines patented by Sternbach (and others) following successively. In biomedicine the benzodiazepines are prescribed for a wide variety of purposes, including the treatment of insomnia, epileptic seizures, anxiety, depression, agitation, aggression, and acute alcohol withdrawal. Because of their sedative and anxiolytic properties, the benzodiazepines are also widely misused. Their consumption may lead to dependency, as well as to a multitude of adverse effects. *Nightmares and vivid *dreaming have been reported during benzodiazepine use, as well as alterations in the qualitative character of dream images. Reports of benzodiazepine-induced hallucinations are less common. In 1968 the American psychiatrist Davis S. Viscott published a report on seven cases of apparent hallucinatory activity following the first-time use of chlordiazepoxide. However, it is unclear from Viscott's report whether the hallucinatory phenomena at hand were de novo hallucinations, or pre-existent hallucinations which the affected individuals had apparently never talked about until they came to do so under the influence of chlordiazepoxide. Benzodiazepine withdrawal, on the other hand, is notorious for its many perceptual rebound effects. These include *sensory deceptions and distortions such as *hyperaesthesia, *metamorphopsias, *visual hallucinations, *auditory hallucinations, *formication, and *body schema illusions. Although the effects of benzodiazepine use in individuals with a clinical diagnosis of *schizophrenia have been studied extensively throughout the years, its influence upon hallucinations and other psychotic symptoms remains somewhat unclear. Some studies indicate that the benzodiazepines may have a potentiating effect on antipsychotic substances, while others fail to record such an effect, or even report a decrease

in the effectiveness of antipsychotic agents under benzodiazepine co-medication.

References

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Bereavement Hallucination

Also known as post-bereavement hallucination and grief hallucination. All three terms are used to denote a heterogeneous group of *sensory deceptions occurring in the context of grief over the loss of a spouse or other loved one. As to their content, bereavement hallucinations typically involve the deceased person's physical characteristics. Due to their *xenopathic character, bereavement hallucinations often have a highly realistic appearance. However, individuals in possession of proper reality monitoring skills tend to recognize these quite easily as non-sensory percepts. The prevalence of bereavement hallucinations in widowed individuals has been found to lie between 30% and 60%. In a classic study by the British physician W. Dewi Rees among 363 widowed persons, almost 50% reported having had one or more episodes of bereavement hallucination. Among these, *sensed presence (which is usually classified as a *hallucinoid experience not a *hallucination proper) was the most prevalent sensory deception, followed by *visual hallucinations, *auditory hallucinations, *tactile hallucinations, and *compound hallucinations. Recurrent hallucinatory episodes were most prevalent during the first decade of widowhood. Their mean duration varied from several years to decades in individuals above 40 years of age. The incidence of bereavement hallucinations among individuals under the age of 40 was significantly lower, as was the incidence among childless widowed persons, and among those who reported having had an unhappy marriage. Bereavement hallucinations are often described as being beneficial in nature, hence the tendency to classify them as *benign hallucinations. However, they can also be a source of considerable distress. The term pathological grief reaction has been proposed to denote the occurrence of halluci-

natory symptoms that have no bearing on the deceased individual. The American psychiatrist Lloyd A. Wells describes two individuals with a pathological grief reaction who reported visual hallucinations reminiscent of *autosopic phenomena. As to the pathophysiology of bereavement hallucinations it has been suggested that these may fall into either the class of *perceptual release phenomena, or the class of *reperceptions. As a footnote to the literature on bereavement hallucinations, it is worth mentioning that the American-Canadian neuropsychologist Michael A. Persinger (b. 1945) found a positive correlation between corpuscular radiation from the Sun (i.e. solar wind), and the incidence of bereavement hallucinations. Persinger interpreted this remarkable finding as circumstantial evidence for the involvement of temporal magnetic-mediated microseizures in their mediation. Conceptually as well as phenomenologically (and perhaps pathophysiological as well), bereavement hallucinations would seem to display some overlap with hallucinations occurring in *Charles Bonnet syndrome (CBS). In parapsychology, as well as in various religions, it is not uncommon to designate bereavement hallucinations as a form of communication with deceased individuals or *apparitions. They are therefore referred to as post-bereavement apparitions. To suspend judgement on the issue of whether such apparitions exist or not, the neutral term *idionecrophany has been proposed to denote any sensory experience involving an alleged contact with the dead.

References

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Berrios's Definition of Hallucinations

In 2005, the British psychiatrist and historian of psychiatry German E. Berrios defined hallucinations as follows. "Hallucination is the generic name for a class of utterances reporting subjective experiences (putatively) perceptual in nature which occur in the (arguably) absence of an adequate external stimulus. The said reports may implicate all sensory modalities giving rise to so-called hallucinations of vision, audition, touch, olfaction, taste and coenesthesia."

Reference

Berrios, G.E. (2005). On the fantastic apparitions of vision by Johannes Müller. *History of Psychiatry*, 16, 229–246.

in the treatment of individuals with a clinical diagnosis of *schizophrenia. Beta-blocker therapy did not live up to this expectation, but the claim that these substances are more than occasionally associated with hallucinatory activity would seem to be ill founded. Insomnia, lively *dreams, and *nightmares, on the other hand, have been reported quite frequently by users of beta-blockers.

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Beta-Blockers and Hallucinations

Beta-blockers are also referred to as β -blockers, beta-adrenergic blockers, beta-antagonists, beta-adrenergic antagonists, beta-adrenergic blocking drugs, and beta-adrenoceptor antagonists. All these names are used to denote a group of chemical substances that have the capacity to modulate the activity of the sympathetic nervous system by blocking the action of endogenous catecholamines such as adrenaline and noradrenaline upon beta-adrenergic receptors. In biomedicine, beta-blockers are prescribed for a broad range of indications, including glaucoma, cardiovascular conditions such as congestive heart failure, cardiac arrhythmia, and mitral valve prolapse, as well as such CNS conditions as migraine, tremor, and akathisia. Although hallucinations have for decades been reported as a possible adverse effect occurring in individuals using beta-blockers – more specifically, the group of lipophilic beta-blockers – the results from empirical studies are ambiguous in this respect. While it is true that case reports involving *visual hallucinations, *formicative hallucinations, *verbal auditory hallucinations, *musical hallucinations, and other *sensory deceptions in association with the use of beta-blockers have been published, it should be borne in mind that propranolol, historically the first beta-blocker available in the United States, was at one time considered an alternative for the use of antipsychotic agents

Bicameral Mind Theory

The expression bicameral mind is indebted to the Latin words *bi* (two) and *camera* (room). It refers to the purported existence of two virtual rooms or compartments within the mind. The bicameral mind theory was formulated during the 1960s, and subsequently published in book form in 1976 by the American psychologist Julian Jaynes (1920–1997). It involves the hypothesis that ontogenetically, modern human consciousness might well originate from the breakdown of a primitive bicameral 'mind-space', and that hallucinations can therefore be interpreted as a sign of regression to that prior evolutionary stage. Jaynes speculates that the pre-conscious mentality characteristic of individuals in ancient cultures was consciously aware of endogenously mediated percepts, but not of their being mediated by the mind's own 'second chamber'. In this sense, Jaynes' theory may be seen as a conceptual precursor of today's *inner speech models of hallucinatory experience, notably the *defective corollary discharge model, which seeks to explain the misattribution of endogenous linguistic signals in individuals with *verbal auditory hallucinations (VAH) in terms of a failure in corollary discharge (or 'feedforward') signal that normally allows the brain's speech perception areas to recognize an incoming signal as 'its own'. Jaynes illustrates his bicameral mind thesis with numerous references

to Homer (c. 750–c. 700 BC), who depicted the heroes of the *Iliad* as individuals devoid of self-awareness as we know it today. As a consequence, according to Jaynes, these individuals seldom referred to themselves, and seemed to lack the linguistic tools to express their own strivings and emotions. As Jaynes maintains, “In distinction to our own subjective conscious minds, we can call the mentality of the Myceneans a *bicameral mind*. Volition, planning, initiative is organized with no consciousness whatever and then ‘told’ to the individual in his familiar language, sometimes with the visual aura of a familiar friend or authority figure or ‘god’, or sometimes as a voice alone. The individual obeyed these hallucinated voices because he could not ‘see’ what to do by himself.” Jaynes interprets Homer’s narrative style as a sign that the mind of the Myceneans was radically different from ours, i.e. that it lacked our present introspective, self-reflective nature, rendering it incapable of unmasking hallucinations as phenomena from within. As Jaynes suggests, “What triggered these hallucinations? I suggest it was even the slight stress of making a decision in a novel circumstance, whereas in ourselves in modern times the stress threshold for such triggering of a verbal hallucination is much higher. The reason they are so prevalent in all cultures today, in the hospital patients and homeless. . . , in children and speechless quadriplegics, is because they were once the genetic basis of this ancient mentality, and the genes for this potentiality are still with us today. Verbal hallucinations, we think, evolved along with the evolution of language during the late Pleistocene as the response part of the brain register of all admonitory information. Its survival value at first was simply to direct an individual in various long-term tasks, which cued their occurrence. By 9000 BC, such voices were called what we call gods. The bicameral mind produced a new kind of social control that allowed agricultural civilizations to begin.” Jaynes’ bicameral mind hypothesis has been discarded and defended for many different reasons, but scientific interest in his work has been re-awakened by the consistent findings of right-sided activation patterns in the brain, as retrieved with the aid of neuroimaging studies in individuals with verbal auditory hallucinations.

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Sommer, I.E.C., Aleman, A., Kahn, R.S. (2003). Left with the voices or hearing right? Later-alization of auditory verbal hallucinations in schizophrenia. *Journal of Psychiatry and Neuroscience*, 28, 17–18.

Bidwell’s Ghost

Also referred to as *Purkinje afterimage. The eponym Bidwell’s ghost refers to the British physicist Shelford Bidwell (1848–1909). It is used to denote a *negative afterimage that appears second in a temporal sequence of *afterimages resulting from exposure to a brief light stimulus. Like other negative afterimages, Bidwell’s ghost takes on a hue complementary to that of the original optical stimulus. Bidwell’s ghost is commonly classified as a *physiological illusion.

Reference

Brown, J.L. (1965). *Afterimages*. In: *Vision and visual perception*. Edited by Graham, C.H. New York, NY: Wiley.

Bilateral Auditory Hallucination

see Bilateral hallucination.

Bilateral Hallucination

Also known as bilateral auditory hallucination. Both expressions are indebted to the Latin words *bi* (two) and *latus* (side). The term bilateral hallucination translates roughly as ‘two-sided hallucination’. The term is used mainly with refer-

ence to hallucinations occurring in the auditory modality. In a loose sense, it is used to denote an *auditory hallucination subjectively localized as coming either from both sides of the head, or from an indefinite location. In a more restricted sense, the term bilateral hallucination has been used since the late 19th century to denote an auditory hallucination that has a different quality and/or content for each side of the head. Thus the affected individual may hear pleasurable and encouraging voices in the right ear, and abusive, threatening voices in the left ear. Or the affected individual may hear a female voice in the right ear, and a male voice in the left. The French alienist Jacques Joseph-Valentin Magnan (1835–1916) considers bilateral hallucinations in the restricted sense as indicative of the dual nature and functional independence of the cerebral hemispheres. On the basis of four individuals he studied, Magnan speculates that bilateral hallucinations may not be dependent upon peripheral lesions of the auditory apparatus, but rather upon the involvement of “the cortical sensorial centres”. The term bilateral hallucination is used in opposition to the term *unilateral hallucination.

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Bilateral Scotoma

see Bilateral spectrum.

Bilateral Spectrum

Also known as bilateral scotoma. The term bilateral spectrum comes from the Latin words *bi* (two), *latus* (side), and *spectrum* (image, *apparition). It is used to denote a relatively rare *fortification spectrum (i.e. a *scintillating scotoma), occurring in the context of a *migraine aura, whose development is exactly synchronized in the two hemifields. As a result, the bilateral spectrum may present in the form of a single

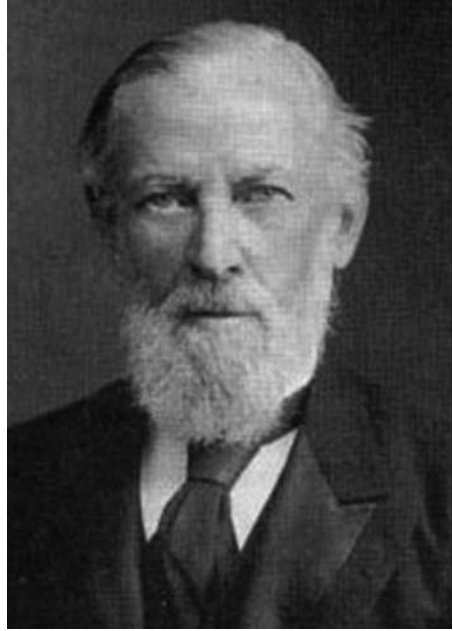


Fig. 3 Sir William Richard Gowers

central or pericentral spectrum. Various types of bilateral spectra (including the *rainbow spectrum) were described in 1904 by the British neurologist Sir William Richard Gowers (1845–1915). Bilateral negative scotomata (i.e. regions of loss of vision) occasionally develop into transient *blindness. In those rare cases where the tactile cortex is affected as well, a total loss of body-sense (i.e. *acnesthesia) may be experienced. As the involvement of both hemifields in fortification spectra is extremely rare, and cannot be explained with recourse to current hypotheses involving the mediation of these phenomena in a single cerebral hemisphere, the British neurologist Oliver Wolf Sacks (b. 1933) notes that “The existence of such scotomata poses very difficult problems to those who postulate a local, unilateral process as the basis of migraine auras.”

References

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- Sacks, O. (1992). *Migraine. Revised and expanded*. New York, NY: Vintage Books.

Binasal Hemianopia

see Hemianopia.

Binocular Diplopia

see Diplopia.

Binocular Illusion

The term binocular illusion is indebted to the Latin words *bi* (twice) and *oculus* (eye). It is used to denote an *illusion that depends for its mediation on a coordinated effort of the two eyes. Two examples of binocular illusions are the *hole-in-the-hand and the *floating-finger illusion.

Reference

Gurney, R.W. (1938). A binocular illusion. *Nature*, 141, 1060.

Binswanger and Siemerling's Definition of Hallucinations

In 1907 the German psychiatrists Otto Binswanger (1852–1929) and Ernst Siemerling (1857–1931) defined hallucinations as follows. "We designate hallucinations as sense perceptions which, without stimulation of the sense organ involved by an external object, occur as a mere consequence of internal stimuli."

Reference

Binswanger, O., Siemerling, E. (1907). *Lehrbuch der Psychiatrie. Zweite vermehrte Auflage*. Jena: Verlag von Gustav Fischer.

Bio-Introscopy

see Eyeless vision.

Bipartition Fantasy

see Sensed presence.

Bipolar Disorder and Hallucinations

see Mood disorder and hallucinations.

Birgitta Birgersdotter

see Bridget of Sweden.

Birgitta of Vadstena

see Bridget of Sweden.

Bistable Figure

see Ambiguous illusion.

Bitemporal Hemianopia

see Hemianopia.

Black Hemianopia

see Hemianopia.

Black Patch Delirium

Also known as black patch psychosis, black patch syndrome, black patch disease, and cataract delirium. The term black patch delirium was introduced in 1958 by the American philosopher, psychiatrist, and thanatologist Avery D. Weisman (b. 1914?), and his colleague Thomas Paul Hackett, Jr. (1928–1988) to denote an acute confusional state dominated by *complex visual hallucinations in individuals wearing a bilateral eye patch following cataract surgery. Although different in name, similar hallucinatory and delirious states occurring after cataract surgery have been described since around 1900. As far as the visual hallucinations are concerned, black patch delirium appears to display a certain phenomenological overlap with *Charles Bonnet syndrome.

However, the two syndromes would seem to differ with respect to the presence of additional psychotic or delirious symptoms concomitant to black patch delirium, and the absence of any such additional signs or symptoms in Charles Bonnet syndrome. Pathophysiologically, the hallucinations occurring in the context of black patch delirium tend to be regarded as *deafferentiation phenomena or *perceptual release phenomena comparable to the hallucinations occurring in the context of *sensory deprivation. Etiologically, ample attention has also been drawn to the possible influence of toxic substances such as anaesthetics, therapeutics, illicit drugs, and alcohol, to co-morbid disorders, and to psychological mechanisms such as homesickness, feelings of distress, and feelings of vulnerability. The nosological status of black patch delirium has been contested by some authors on the grounds that, in a phenomenological and pathophysiological sense, it does not seem to differ from *delirium proper or from senile forms of *psychosis. Today the term black patch delirium is used only infrequently in the literature. As today's state-of-the-art postoperative care of cataract patients is directed at the prevention of delirium, it may well be that the true incidence of disorders formerly designated as black patch delirium is also somewhat on the wane.

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Black Patch Disease

see Black patch delirium.

Black Patch Psychosis

see Black patch delirium.

Black Patch Syndrome

see Black patch delirium.

Blake, William (1757–1827)

A British poet, painter, and printmaker who from childhood onwards experienced *dreams and *visions depicting *apparitions and metaphysical scenes. At the age of 4, he claimed to have seen the face of God “put his head to the window”, and at the age of around 10 he saw “a tree filled with angels, bright angelic wings bespanning every bough like stars”. The visions recurred throughout his life, along with *verbal auditory hallucinations which he attributed to his deceased brother (with whom he continued to converse daily), and to angels, Archangels, etc. who dictated poems to him, and infused the themes of his visual art. Retrospective diagnosis is a deli-



Fig. 4 William Blake. Engraving (1808) by Luigi Schiavonetti, after a portrait (1807) by Thomas Phillips. Source: Collection of G.E. Bentley, Jr



Fig. 5 Ezekiel's Wheels (c. 1803–1805). Watercolour by William Blake. Source: Museum of Fine Arts, Boston

cate issue, but it has been suggested that Blake may have suffered from bipolar disorder or from *ecstatic auras occurring in the context of temporal lobe epilepsy.

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Blank Hallucination

The term blank hallucination was introduced in or shortly before 1961 by the German-American psychoanalyst Max M. Stern (1895–1982) to denote a collection of simple hallucinatory phenomena such as the sense that one is floating in space, changes in equilibrium, perceived changes in body size (i.e. *macro- and *microsomatognosia), hazy blurrings of perception, and so-called cloudlike phenomena, as well as some types of *formed hallucinations. In Stern's own words, "Blank hallucinations are stereotyped sensory perceptions without appropriate external stimuli. Lacking any content related to persons, objects, or events, they are close to elementary hallucinations as which we designate such unformed perceptions as sparks, lightning streaks, cloudlike phenomena, etc. They differ in intensity, frequency, and duration, ranging from *formes frustes* like hazy blurring of perception, to full hallucinations. They may last a few seconds, or minutes, hours, or months." In conformity with the psychoanalytic theory, Stern suggests that blank hallucinations often make their first appearance in childhood, primarily around the oedipal phase. Moreover, he maintains that blank hallucinations can recur throughout the individual's life in response to stress or frustration, either as an accompanying symptom of emotional states such as anger or rage, or as a *hypnagogic phenomenon before falling asleep. Stern conceptualizes blank hallucinations as a collection of early defense mechanisms that mimic the soothing experience of suckling at the breast. The term blank hallucination is sometimes used in a wider sense to include the *Isakower phenomenon, the *dream screen, and abstract perceptions.

References

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Bleuler, Paul Eugen (1857–1939)

A Swiss psychiatrist, well known for his innovative work in general psychiatry, and, more specifically, for his conceptualization of *schizophrenia. Bleuler's life-long devotion to psychiatric care and research was probably inspired in great part by his sister, who suffered from a chronic psychotic disorder with catatonic features, and who resided at the Burghölzli Hospital in Zollikon with Bleuler and his family. Bleuler himself experienced *synaesthesias of the phoneme-colour type (i.e. hallucinated colours in association with spoken words).

Reference

- Bleuler, E., Lehmann, K. (1881). *Zwangsmässige Lichtempfindungen durch Schall und verwandte Erscheinungen auf dem Gebiet der anderen Sinnesempfindungen*. Leipzig: Fues's Verlag.

Bleuler's Definition of Hallucinations

In his classic textbook of psychiatry, the Swiss psychiatrist Paul Eugen Bleuler (1857–1939) defines hallucinations as follows. "*Hallucinations* are perceptions without a corresponding stimulus externally: everything that one perceives can also become a hallucination, in such a way, that the various elements can be combined freely; a hallucinated lion can have wings, a human figure can be composed out of the properties of various persons. Moreover, pathological brain functions evidently evoke internal perceptions that were not available before."

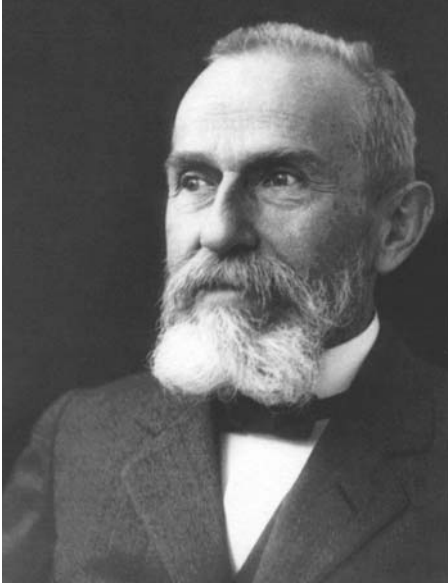


Fig. 6 Eugen Bleuler

Reference

Bleuler, E. (1923). *Lehrbuch der Psychiatrie. Vierte Auflage*. Berlin: Verlag von Julius Springer.

Bleuler's Definition of Illusions

In his classic textbook of psychiatry, the Swiss psychiatrist Paul Eugen Bleuler (1857–1939) defines *illusions as follows. “*Illusions* are morbidly altered genuine perceptions: The striking of the hour is perceived as a term of abuse, or as a promise; the clutched hand is rejected as a cold ‘death hand’; people are seen as standing on their heads, instead of the white colour of a face a black one is seen, instead of a nurse a waitress.”

Reference

Bleuler, E. (1923). *Lehrbuch der Psychiatrie. Vierte Auflage*. Berlin: Verlag von Julius Springer.

Blindness and Hallucinations

Visual hallucinations occurring in individuals with impaired vision have been reported since ancient times. Perhaps the best-known historical example is the description of Charles Lullin's *visual hallucinations, as rendered by his grandson Charles Bonnet (1720–1792), and thereafter commonly referred to as the *Charles Bonnet syndrome. Visual hallucinations are also known to occur, albeit less frequently, in partial visual field defects such as *hemianopia (resulting in so-called *hemianopic hallucinations), *quadrantanopsia, central scotoma, and *amblyopia. See also the entries Ictal blindness, Hypnotic blindness, Hysterical blindness, Change blindness, Inattentional blindness, and Negative hallucination.

Reference

Freiman, Th.M., Surges, R., Vougioukas, V.I., Hubbe, U., Talazko, J., Zentner, J., Honegger, J., Schulze-Bonhage, A. (2004). Complex visual hallucinations (Charles Bonnet syndrome) in visual field defects following cerebral surgery. Report of four cases. *Journal of Neurosurgery*, 101, 846–853.

Blindsight

A term introduced in 1974 by the British neuropsychologists Lawrence Weiskrantz (b. 1926) et al. to denote residual vision in cases of cortical blindness, especially when there is a corresponding lack of awareness of the visual capacity on the part of the affected individual. Cortical blindness is attributed to lesions of the primary visual cortex (also referred to as V1, area 17, area OC, and striate cortex). The resulting *scotomata, varying in size from a relatively minor area to the entire hemifield (as in *hemianopia) are perceived within the visual field contralateral to the CNS lesion at hand. Individuals with lesions to V1 are not consciously aware of any visual stimuli presented within the scotomatous region. However, during the 1970s Weiskrantz et al. demonstrated that some perceptual information may nevertheless be detected by individuals suffering from cortical blindness. The geniculostriate pathway, projecting from the retina towards V1, is the largest

route into striate cortex. But it is not the only one. Empirical research has indicated that there are at least six other branches of the optic nerve that take a different route into striate cortex, and that some routes may even project into the extrastriate cortex. The residual perception of visual stimuli by individuals with blindsight is attributed to these latter pathways, i.e. the pathways projecting into the extrastriate and remaining striate cortex while bypassing the geniculo-striate system.

Reference

Weiskrantz, L. (1986). *Blindsight. A case study and implications*. Oxford: Clarendon Press.

Blind Spot

Also known as Mariotte's spot, physiological scotoma, physiological blind spot, and punctum caecum. All five terms are used to denote the physiological 'hole' existing in each monocular field of vision that corresponds morphologically with the optic disc, i.e. the region of the retina where the optic nerve ending is located, and where, as a consequence, no photoreceptors are present. Although humans and other vertebrates are blind to objects and visual stimuli in this part of the visual field, the missing perceptual information is automatically compensated for by the other eye in binocular vision, and 'filled in' by the brain (or mind, in a dualist reading) in monocular vision. The eponym Mariotte's spot refers to the French physicist and priest Edme Mariotte (c. 1620–1684), who in 1666 was the first to document the existence of the blind spot. In a broader reading, the term blind spot is used to denote any scotomatous region existing within the visual field. The so-called 'filling-in' of the blind spot is classified as a *fiction illusion.

References

Gregory, R.L. (1991). Putting illusions in their place. *Perception*, 20, 1–4.
 Mariotte, E. (1717). *Oeuvres de Mr. Mariotte, de l'Académie Royale des Sciences; divisées en deux tomes. Seconde tome*. Leide: Pierre Vander Aa.

Blue-Field Entoptic Phenomenon

Also known as Scheerer's phenomenon, after the German ophthalmologist Richard Scheerer. Both terms refer to an *entoptic phenomenon characterized by tiny bright dots moving quickly and semi-randomly across the visual field, especially when viewed against a background of bright blue light. The blue-field entoptic phenomenon is a physiological effect attributed to the movement of lymphocytes (or erythrocytes, in a different reading) within the capillaries overlying the retina. The sudden acceleration of these bright dots is considered synchronous with the systole. Although the phenomenon had been described by at least a dozen authors, it was Scheerer who in 1924 first drew clinical attention to it. The blue-field entoptic phenomenon should not be confused with *muscae volitantes.

References

Priestly, B.S., Foree, K. (1955). Clinical significance of some entoptic phenomena. *Archives of Ophthalmology*, 53, 390–397.
 Scheerer, R. (1924). Die entoptische Sichtbarkeit der Blutbewegung im Auge und ihre klinische Bedeutung. *Klinisches Monatsblatt für Augenheilkunde*, 73, 67–107.
 Sinclair, S.H., Azar-Cavanaugh, M., Soper, K.A., Tuma, R.F., Mayrovitz, H.N. (1989). Investigation of the source of the blue field entoptic phenomenon. *Investigative Ophthalmology and Visual Science*, 4, 668–673

Blue Vision

see Cyanopsia.

Bodily Hallucinated Smell

see Intrinsic olfactory hallucination.

Bodily Hallucination

Also known as body sensation hallucination. Both terms are used interchangeably as umbrella terms for the notions of *tactile hallucination

and *somatic hallucination. In other words, both terms refer to a hallucination experienced in the somatosensory modality that may appear to stem either from an extracorporeal or an intracorporeal source. The 1982 *Manual for the Assessment and Documentation of Psychopathology* (AMDP) defines bodily hallucinations as “unfounded tactile and somatic perceptions including touch, kinesthetic, pain, pressure, and thermic phenomena.” As the authors of the AMDP maintain, “Many such hallucinations have the character of being produced by external forces, e.g. the patient has the feeling of being abused sexually or by electricity or ‘rays.’” Somewhat unusually, the AMDP employs the term *coenesthetic hallucination as a synonym for the term bodily hallucination.

Reference

Guy, W., Ban, T.A., eds. (1982). *The AMDP-system: Manual for the assessment and documentation of psychopathology*. Berlin: Springer.

Body Dysmorphic Disorder (BDD) and Hallucinations

The term body dysmorphic disorder was introduced in 1994 in the American Psychiatric Association’s *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV) to denote a disorder characterized by an imagined defect in appearance, or excessive concern or preoccupation with a slight physical defect. Although in clinical practice BDD can be diagnosed in the absence of any overt illusory or hallucinatory symptoms, in some cases an organic somatosensorial disturbance can be found to exist. It has been suggested that this disturbance may arise as a consequence of aberrant neurophysiological activity in the parieto-occipital regions representing the body schema. Such somatosensorial disturbances may entail *body schema illusions such as *microsomatognosia, *macro-somatognosia, *kinaesthetic hallucinations, and *proprioceptive hallucinations. In diagnostic classifications such as the DSM, BDD is classified as a somatoform disorder. A conceptual precursor of BDD was described in 1886 by the Italian psychiatrist Enrico Morselli (1852–1929). He called this nosological category dysmorphophobia.

References

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- Yaryura-Tobias, J.A., Neziroglu, F., Torres-Gallegos, M. (2002). Neuroanatomical correlates and somatosensorial disturbances in body dysmorphic disorder. *CNS Spectrum*, 7, 432–434.

Body Photism

A term used to denote a type of *photism (i.e. a hallucinated patch of light) consisting of a light emanating from one’s own body. Body photism has occasionally been reported in association with *out-of-body experiences. It should not be confused with the parapsychological notion of the *luminous phenomenon.

Reference

- Arzy, S., Idel, M., Landis, Th., Blanke, O. (2005). Speaking with one’s self. Autoscopical phenomena in writings from the Ecstatic Kabbalah. *Journal of Consciousness Studies*, 12, 4–30.

Body Schema Disturbance

see Body schema illusion.

Body Schema Illusion

Also known as body schema disturbance, **somato-éidolie*, *disorder of corporeal awareness, illusion of corporeal transformation, and illusion of corporeal displacement. All six terms are used to denote an illusory change in the size, relation, position, and/or movement of one’s own body parts. Some examples of body schema illusions are *kinaesthetic hallucinations, *proprioceptive hallucinations, *microsomatognosia, *macro-somatognosia, *splitting of the body image, *aschematia, the

*rubber hand illusion, the *illusory displacement of limbs, the *illusory arm extension, the *Pinocchio illusion, *Aristotle's illusion, and the *floating finger illusion. In clinical practice, the majority of the body schema illusions affect only a part (or various parts) of the body. Rare instances where the whole body is involved are referred to as whole body schema illusion. Pathophysiologically, body schema illusions are associated primarily with lesions affecting those parts of the parietal lobe or parieto-occipital region involved with bodily representations and/or representations of movement. Etiologically, they are associated primarily with paroxysmal neurological disorders such as migraine and epilepsy. It has been speculated that the topological distribution of symptoms in body schema illusions reflects the extension of the representation of body parts in the brain's sensory maps. As noted by the British neurologist Macdonald Critchley (1900–1997), these sensory maps would seem to extend far beyond the parietal lobe. As Critchley maintains, "Positive and negative modifications of corporeal awareness may be met with in lesions at all levels of the neuraxis, but the parietal lobes occupy a special and important role in this problem. More particularly, the parietal region of the *minor hemisphere* is commonly regarded as being of special significance, and there has been a tendency to speak of 'localization' or 'representation' of the body image within this particular region of the brain. This mode of thinking is probably a dangerous oversimplification." In 1963, Critchley proposed the term corporeal awareness as an alternative for the expressions body image and body schema, arguing that these latter terms "fail to indicate the combined properties of a concept and a percept". As a corollary, Critchley designates body schema illusions as 'disorders of corporeal awareness'.

References

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- Podoll, K., Robinson, D. (2000). Macrosomatognosia and microsomatognosia in migraine

art. *Acta Neurologica Scandinavica*, 101, 413–416.

Body Sensation Hallucination

see Bodily hallucination.

Bonnet Syndrome

see Charles Bonnet syndrome (CBS).

Border

see Corona phenomenon.

Borderline Personality Disorder (BPD) and Hallucinations

Borderline personality disorder (BPD) is also known as emotional regulation disorder (ERD), emotional intensity disorder (EID), and unstable personality disorder (UPD). The expression borderline personality disorder evolved out of the term borderline neurosis, which was introduced in 1938 by the American neurologist and psychiatrist Adolph Stern (1878–1958), the first American psychoanalyst who was analyzed by Sigmund Freud (1856–1939) himself. Stern introduced the expression borderline neurosis to designate a diagnostic category characterized by neurotic personality traits as well as psychotic symptoms such as delusions and – infrequently occurring – hallucinations. Thus the name borderline neurosis used to refer to the conceptual middle ground between the categories neurosis and *psychosis. Today the name BPD refers to a personality disorder characterized by a long-standing pattern of instability in various areas, including mood, interpersonal relationships, and self-image. Clinically, BPD is associated with extreme distress, harmful behaviour, and social and/or occupational dysfunctioning. The point prevalence of BPD has been reported as lying around 2% in the community population. In 1980, the diagnostic category BPD made its debut in the third edition of the American Psychiatric Association's *Diagnostic and Statistical Manual of Men-*

tal Disorders (DSM-III). As the DSM-III states, "During periods of extreme stress transient psychotic symptoms of insufficient severity or duration to warrant an additional diagnosis may occur". As a consequence, longer-lasting hallucinatory states occurring in individuals with a clinical diagnosis of BPD have often been referred to with somewhat ambiguous terms like *quasi-hallucination, *pseudohallucination, *dissociative phenomenon, and micropsychotic episode. As the Australian psychiatrists Leslie Yee et al. point out, this practice has for a long time obscured the regular occurrence of *hallucinations proper – as well as the occasional occurrence of *persistent hallucinosis – in individuals with a clinical diagnosis of BPD. Yee et al. draw attention to the growing literature on *auditory, *visual, and *olfactory hallucinations in association with BPD, suggesting that a significant proportion of the individuals with BPD may experience hallucinations that are not transient but ongoing, not circumscribed but pervasive, and phenomenologically indistinguishable from those in individuals diagnosed with one of the major psychotic disorders.

References

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- Stern, A. (1938). Psychoanalytic investigation of and therapy in the borderline group of neuroses. *Psychoanalytic Quarterly*, 7, 467–489.
- Yee, L., Korner, A.J., McSwiggan, S., Meares, R.A., Stevenson, J. (2005). Persistent hallucinosis in borderline personality disorder. *Comprehensive Psychiatry*, 46, 147–154.

Bottom-Up Hypothesis

A generic name for a group of hypotheses that attribute the mediation of hallucinations primarily to a disorder of the *data-driven* processing of perceptual information, such as may occur in the context of *deafness, *blindness (i.e. the *Charles Bonnet syndrome), *sensory deprivation, or dysfunction of the primary sensory cortex. The term bottom-up hypothesis is used in opposition to the term *top-down hypothesis. The latter term refers to a group of hypotheses that attribute the

mediation of hallucinations primarily to a disorder of the *conceptual* processing of perceptual information.

Reference

- Aleman, A., Laroi, F. (2008). *Hallucinations. The science of idiosyncratic perception*. New York, NY: American Psychological Association.

Bouguer's Halo

see Ulloa circle.

Bouncing Vision

see Oscillopsia.

Braille Hallucination

see Hallucination in braille.

Brain-Damage-Induced Synaesthesia

A term used to denote a type of *synaesthesia falling into the class of the *non-idiopathic synaesthesias. Etiologically, brain-damage-induced synaesthesias are associated primarily with lesions affecting the optic nerve, anterior portions of the brain, or the brainstem.

Reference

- Cytowic, R.E. (2002). *Synesthesia. A union of the senses. Second edition*. Cambridge, MA: MIT Press.

Brain Light

see *Eigengrau*.

Brainstem Auditory Hallucinosi

A term used to denote a hallucinatory state characterized by *auditory hallucinations which are

attributed to aberrant neurophysiological activity in the brainstem. The concept of brainstem auditory hallucinosis is analogous to that of *peduncular hallucinosis, except for the fact that peduncular hallucinations are believed to be mainly visual in nature. Both concepts envisage the top of the brainstem and its surrounding structures as the primary source for certain types of hallucinations. Although relatively scarce, speculations about the involvement of the brainstem in the mediation of auditory hallucinations can be found in the literature from the late 19th century onwards. The first empirical study providing empirical corroboration for this thesis was published in 1986 by the American neurologists George D. Cascino and Raymond D. Adams. Cascino and Adams reported on three individuals suffering from *nonverbal auditory hallucinations in the form of buzzing, clanging, machine noises, the sound of bells chiming, organ tones, and so on, who showed clinical, radiologic (CT), and in one case pathologic signs of lesions of the tegmentum of the pons and lower midbrain, but no signs of structural lesions in any other part of the auditory system. In all three cases the hallucinations were continuous in nature, and associated with hearing loss due to central lesions. As the authors speculate, these findings suggest that the hallucinations at hand might perhaps be best regarded as *release phenomena. As a nosological category, brainstem auditory hallucinosis is classified as a specific type of *hallucinosis syndrome. Because of its emphasis on the involvement of a specific brain structure (i.e. the pedunculus cerebri or one of its surrounding midbrain structures) it can also be classified as a *topological model of hallucinatory activity.

Reference

Cascino, G.D., Adams, R.D. (1986). Brainstem auditory hallucinosis. *Neurology*, 36, 1042–1047.

Brainstem Hallucination

A term suggested in 1991 by the American neurologist C. Miller Fisher (b. 1910) to replace the older term *peduncular hallucination. More specifically, Miller proposes to use the term brainstem hallucination as an umbrella term for a category comprising the group of peduncular hallucinations and hallucinations attributed to CNS

structures in the vicinity of the pedunculus cerebri. Fisher motivates this proposal as follows. “Although peduncular hallucinations are a well recognized type it might be preferable to include them in a broader category – *brain stem hallucinations* that would encompass not only peduncular cases proper but also cases in which visual hallucinations are associated with pontine haemorrhage, thalamic haemorrhage, and thalamic infarction.”

Reference

Fisher, C.M. (1991). Visual hallucinations on eye closure associated with atropine toxicity. A neurological analysis and comparison with other visual hallucinations. *Canadian Journal of Neurological Sciences*, 18, 18–27.

Bridget of Sweden (1303–1373)

Born as Birgitta Birgersdotter; also known as Saint Birgitta, Santa Brigida, St. Bridgid of Sweden, and Birgitta of Vadstena. A Swedish nun, mystic, and founder of the Bridgettine Order, who from childhood onwards experienced *visions of celestial and purgatory scenes. When she was 7 years old, Bridget had a nocturnal vision of a woman in shining clothes sitting on an altar-table, who gave her a crown. She continued to have visions until she was 10. During her forties the visions returned, accompanied by voices which she attributed to God, the devil, or specific individuals. While experiencing these visions she was unaware of herself and her surroundings, suggesting that she may have experienced *trance states or absences. Occasionally these episodes were preceded by *cacosmia or *agathosmia, interpreted by some as *olfactory auras. Possibly she also experienced *abdominal auras. While the making of a retrospective diagnosis is always a delicate undertaking, Bridget's experiences may well have been *ecstatic auras (occurring in the context of temporal lobe epilepsy) or *postictal religious experiences. It has been suggested that in Bridget's case the epileptic seizures were caused by a meningioma. Circumstantial evidence for this hypothesis stems from the presence of an interior indentation, the size of a hazelnut, inside the skull thought to have belonged to Bridget. According to the Swedish anatomist Carl-Herman Hjortsjö (1914–1978), this indentation

may have been caused by a tumour, possibly a convexity meningioma.

Reference

Landtblom, A.M. (2004). Did St Birgitta suffer from epilepsy? A neuropathography. *Seizure*, 13, 161–167.

Brierre de Boismont's Definition of Hallucinations and Illusions

In 1845 the French alienist Alexandre Jacques François Brierre de Boismont (1797–1881) defined hallucinations and illusions as follows. “We define a *hallucination* as the perception of the sensible signs of the idea; and an *illusion* as the false appreciation of real sensations.”

Reference

Brierre de Boismont, A. (1859). *On hallucinations. A history and explanation of apparitions, visions, dreams, ecstasy, magnetism, and somnambulism*. Translated by Hulme, R.T. London: Henry Renshaw.

Brobdignagian Hallucination

Also known in the literature in the (misspelled) variants brobdignagian hallucination and brodnigagian hallucination. The term brobdignagian hallucination is indebted to *Brobdignag*, the name of a fictitious country inhabited by huge people, featuring in the novel *Gulliver's Travels* by the Irish poet and author Jonathan Swift (1667–1745). It is used as a synonym for the term *gulliverian hallucination, i.e. a *visual hallucination in which disproportionately large human figures are perceived, either in isolation, or against a background of regular proportions. For a more detailed account of this type of hallucination, see the entry Gulliverian hallucination.

References

Ey, H. (2004). *Traité des hallucinations. Tome 1*. Paris: Claude Tchou pour la Bibliothèque des Introuvables.
 Swift, J. (1726). *Gulliver's travels*. London: B. Motte.

Brobdignagian Vision

Also known in the literature in the (misspelled) variants brobdignagian vision and brodnigagian vision. The term brobdignagian vision is indebted to *Brobdignag*, the name of a fictitious country inhabited by huge people, featuring in the novel *Gulliver's Travels* by the Irish poet and author Jonathan Swift (1667–1745). It is used as a synonym for the term *macropsia, i.e. a *visual illusion in which objects and stimuli in the extracorporeal world are perceived as disproportionately large. For a more detailed account of this type of *illusion, see the entry Macropsia.

References

Sacks, O. (1992). *Migraine. Revised and expanded*. New York, NY: Vintage Books.
 Swift, J. (1726). *Gulliver's travels*. London: B. Motte.

Brocken Bow

The name Brocken bow refers to the Brocken, a peak in the Harz mountains in Germany. It is used as a synonym for the terms glory and *Ulloa's bow, provided that the latter phenomenon is accompanied by a *Brocken spectre.

Reference

Lynch, D.K., Livingston, W. (1995). *Color and light in nature*. Cambridge: Cambridge University Press.

Brocken Spectre

Also known as Spectre of the Brocken and mountain spectre. The name Brocken spectre, or *Brockengespenst* in German, refers to the Brocken, a peak in the Harz mountains in Germany. It is used to denote a *physical illusion consisting of the observer's disproportionately large shadow projected upon the surfaces of clouds at the horizon facing the rising or setting Sun. The person credited with documenting the phenomenon for the first time, in 1780, is the German theologian and natural scientist Johann Esaias Silberschlag (1721–1791). As noted by Silberschlag and numerous observers after him, both near the



Fig. 7 Brocken spectre. Source: Flammarion, C. (1873). *The Atmosphere*. Translated by Pitman, C.B. Edited by Glaisher, J. London: Sampson Low, Marston, Low, & Searle

Brocken peak and in other mountainous regions, Brocken spectres typically arise when a low-lying Sun projects a large shadow into a bank of mist or fog in the distance. The resulting shadow figure may appear to be moving, and strike one as being three-dimensional in shape because of the extent to which the shadow is projected into the fog, and because of the relative movements of separate fog banks. Lending the phenomenon an even more impressive appearance, Brocken spectres can be accompanied by coloured concentric arches or circles, called glories or *Brocken bows, and a pale outer arch or circle which is called a white rainbow or *Ulloa circle. These *halo figures are explained by reference to the interaction of sunlight and droplets of water suspended in the air.

References

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- Lynch, D.K., Livingston, W. (1995). *Color and light in nature*. Cambridge: Cambridge University Press.

Buddha's Halo

Also known as Buddha's light. Both eponyms refer to the corona of light traditionally depicted in images of Siddhārta Gautama, also known as Gautama Buddha (c. 566–486 BC), the founder of Buddhism. The terms Buddha's halo and Buddha's light are used to denote a *physical illusion consisting of multicoloured, concentric rings of light that can sometimes be seen against a cloud or fog bank in mountainous regions, at a position opposite the Sun (i.e. the antisolar point). Two locations in China famous for the appearance of Buddha's halo are Kanas Lake in Xinjiang Province and Huangshan Mountain in Anhui Province. Buddha's halo is typically described as a colourful circle of light appearing over (or against) a sea of clouds. Because of the sunlight coming from behind, observers can see their own shadow, as well as the shadows of nearby objects and persons, projected upon the cloud. Since they always see their own shadow in the centre of the halo, there is a certain tendency to interpret this as a sign of their own enlightenment. Meteorologists tend to explain atmospheric phenomena

such as Buddha's halo by reference to the interaction of sunlight and droplets of water suspended in the air, having a size smaller than 25 μm radius. Because of its lack of a tangible substratum in the extracorporeal world, Buddha's halo is also classified as a *fiction illusion. Phenomenologically as well as genetically, Buddha's halo is related to the *Ulloa circle and *Ulloa's bow. It should not be confused with *heiligschein and the aureole effect.

References

- Lynch, D.K., Livingston, W. (1995). *Color and light in nature*. Cambridge: Cambridge University Press.
- Strassberg, R.E. (1994). *Inscribed landscapes: Travel writing from Imperial China*. Berkeley, CA: University of California Press.

Buddha's Light

see Buddha's halo.

Bufotenine and Hallucinations

Bufotenine is also known as bufotenin, dimethyl serotonin, 5-OH-dimethyltryptamine (5-OH-DMT), *N,N*-dimethyl-5-hydroxytryptamine, and mappine. The name bufotenine was suggested in 1893 by the French scientists Césaire Auguste Phisalix (1852–1906) and Gabriel Bertrand (1867–1962), and officially introduced in 1920 by the Austrian chemist Hans Handovsky (1888–1959) as the name of a chemical substance isolated by him from toadskin. The name derives from the *Bufo* genus of toads, various species of which secrete a complex mixture of psychoactive substances that includes bufotenine. Bufotenine also occurs in the eggs of toads such as *Bufo alvarius* and *Bufo marinus*, as well as in the Amazonian-Antillean narcotic snuff *Anadenanthera peregrina*, and in some mushrooms, higher plants, and animals. Because of their psychoactive excrements, animals such as *B. alvarius* and *B. marinus* are referred to as *psychoactive fauna. Although bufotenine was not isolated until 1920, toad secretion has been used as an *entheogen by shamans and mystics since ancient times. Its toxicity was recorded as early as the first century AD by the Roman

poet Decimus Junius Juvenal (AD 60–128). Today bufotenine is classified as a hallucinogenic tryptamine from the group of indole alkaloids. Its chemical structure, which is related to that of the *hallucinogens psilocin and dimethyltryptamine (DMT), as well as to that of the neurotransmitter serotonin, was discovered in 1934 by the group of the German chemist and Nobel prize laureate Heinrich Otto Wieland (1877–1957). In 1935–1936 bufotenine was synthesized for the first time by the Japanese chemists Toshio Hoshino and Kenya Shimodaira. Because orally ingested bufotenine is rapidly inactivated by the body's monoamine oxidase (MAO) system, it is usually applied intranasally, intravenously, by inhalation, or in the form of an enema. For recreational use, bufotoxins are also ingested by means of toad licking. For bufotenine to be biologically effective, the latter technique requires the simultaneous use of a MAO-inhibiting substance such as tranlycypromine to prevent a premature inactivation of bufotenine. The hallucinations mediated by bufotenine intoxication are described as predominantly visual in nature.

*Simple and *geometric visual hallucinations, in particular, have been reported, as well as *trailing phenomena and an increased intensity of colours. Intense visual and *auditory hallucinations have been reported as well, however, commencing seconds after inhaling the smoke of dried toad venom, and lingering on for about 5 min. Traditionally comparisons have been made with the effects of other hallucinogens such as LSD and mescaline, although the effects of bufotenine are reported as being milder, and of a shorter duration. Due to the presence of the other toxins in *Bufo* toad venom and eggs, the oral ingestion of these substances may induce various unexpected side effects. Occasionally it may even result in epileptic seizures, coma, and eventually death.

References

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