

**When Our Eyes Are Closed, What, If Anything, Do We Visually Experience?**

Eric Schwitzgebel  
Department of Philosophy  
University of California at Riverside  
Riverside, CA 92521-0201  
eschwitz@ucr.edu

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### Abstract:

The question of what we normally visually experience when our eyes are closed was much discussed by 19<sup>th</sup>- and early 20<sup>th</sup>-century physiologists and psychologists but has not received much serious scholarly attention in the last seventy years. Purkinje (1819/1948) claimed that most people see checkerboards when they directly face the sun with eyes closed, but I have found no published attempts to replicate this result. My own observers' results are mixed. With eyes closed in darkness, early researchers (Goethe, Purkinje, Müller, Helmholtz, Aubert, Scripture) often reported concentric rings or ribbons, but later researchers have generally reported no such thing. Historical reports of visual experience in the dark with eyes closed vary widely from almost utter blackness to neutral gray to fantastic color displays. My own observers have tended to report either some sort of shifting darkness or no visual experience at all (not even of black or neutral gray). Five volunteers wore random beepers while keeping their eyes closed for two hours a day for a few days. Reports were highly variable, and two observers reported almost no sensory visual experience (again, not even of black or neutral gray) under these conditions. I also briefly discuss whether one can see through one's closed eyelids, whether the eyes-closed visual field is dual or 'cyclopean', its spatial properties, and its liability to voluntary control.

## **When Our Eyes Are Closed, What, If Anything, Do We Visually Experience?**

The titular question of this essay has not been systematically explored, as far as I can tell, since the early 20<sup>th</sup> century. Even those early psychologists who addressed it tended to do so only in passing and as though the answer were a settled matter of general consensus. But there was and is no consensus—or rather, the consensus is limited to one matter: that we generally do have some visual experience when our eyes are closed. However, even that claim is open to doubt. Every single issue is wide open. We stand virtually at the beginning.

This essay brings together historical observations, armchair reflections, and the reports of several introspective observers I recruited.

### 1. Purkinje in the sun.

Let's begin with a report from Johann Purkinje (Jan Purkyne), an eminent physiologist of the early 19<sup>th</sup> century and the first scholar to provide detailed phenomenological reports of visual experience with one's eyes closed.

I place myself with closed eyes in bright sunshine, facing perpendicularly toward the sun. Now I move my fingers, somewhat stretched apart, before my eyes, so that my eyes shift between being shaded and lit up. With just the closing of the eyelids, there now appears, on the otherwise evenly gold-red visual field, a beautiful regular figure, which at first is very difficult to fixate on and assess more closely, until one gradually orients

upon it more. When the fingers are removed, this figure grows from a simple one to ever more diverse and fills the entire visual field.

This generally. Now to the individual moments and to closer determination of their conditions. I take as the object of contemplation the figure in my right eye. Later I will mention that of the left.

Generally, I differentiate in the whole figure primary shapes and secondary; the former form the ground of the whole, the second the superstructure.

The primary shapes are larger and smaller little squares [fig. 1] alternating light and shaded, which cover the largest portion of the visual field like a chessboard.

At the border of the little squares form longer and shorter, somewhat lighter, zig-zag lines, which quickly develop and pass away here and there. Downward of the midpoint, which is by the way characterized by a little dark spot with glowing lights, a stretch of larger hexagons is visible to me, outlined in white gray, with white interior. Left and downward from the midpoint of the little squares there form delicate, light semicircles set against each other, the direction of the rows continually changing, which one could compare to a type of tree or a many-leaved rose....

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Insert Figure 1 about here.

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Furthermore, I must mention that the described figures, especially the little squares, were noticed by most individuals with whom I made the experiments, insofar as, without drawings, it was possible to get an imperfect report through words.

They would come, therefore, not merely to particular individuals under quite special organic conditions, but rather would be grounded in general conditions of the organism or even in all subjects due to physical laws (1819/1948, pp. 61-62, 64, my translation; Purkinje's fig. 2 is reproduced here as fig. 1; see also Purkinje 1823/1919).

Is this what you see when you close your eyes and face the sun? Don't trust your memories from the beach. Go try it. (Don't you tell your students to read actively?)

I have faced the sun a number of times now, with Purkinje in mind, and never once have I felt the slightest inclination to report a checkboard-like figure. Rather, it seems to me that I see a bright, relatively uniform field, fluctuating in color from warm hues like red and orange and brilliant scarlet to gray or white, with these changes of hue sometimes occurring without any effort on my part, sometimes seemingly precipitated by moving my eyes or tightening my lids. The irregularities in the field I'm less sure of—like it's churning with a darker color throughout, maybe, and flashing with brightness at the extreme periphery. The field seems broader than it is high, and either flat and a few inches before me or entirely lacking any representation of distance. Unlike Purkinje, I do not associate it with one eye or the other (although like Purkinje the acuity of my two eyes is very different).

I've been reading everything I can find on ordinary visual experience with one's eyes closed, and I can find no published attempt to confirm or disconfirm Purkinje's report of this "general" experience that might even occur "in all subjects due to physical laws". I myself have tried the experiment various ways and never achieved Purkinje's result.

But maybe it's me? Purkinje's skill as an introspective observer was widely praised (as you'll notice in a Helmholtz quote below), whereas my only special introspective talent seems to be that I am more easily baffled than anyone else (see Hurlburt and Schwitzgebel 2007; Schwitzgebel forthcoming)—though maybe if, as I think, we should be baffled by our stream of experience more than we are, an appropriate lack of confidence indeed shows a kind of epistemic ability.

I coaxed two acquaintances—independently and without consulting each other—to spend seven minutes facing the late morning sun with their eyes closed. Each began with his hands before his eyes, fingers splayed slightly apart, as described in the quote above, so his eyes alternated between being shaded and unshaded; after about half a minute each removed his hands. For about three minutes, I asked neutral questions about the visual experience: "Do you see anything?" "What does it look like?" "It is uniform or variable?" "Does it seem to have distance or depth?" "Is there a periphery that is different in any way?" About halfway through I explicitly asked each whether he saw any checkerboard or honeycomb or latticework pattern. I also asked follow-up questions asking them to elaborate the details. Near the end, I asked again about a checkerboard pattern. Also I casually inspected their pupil size before and after the experiment.

My observers' pupils did not dilate during the experiment—if anything, they contracted slightly, relative to the indoor environment from which they had come—suggesting, as one might expect, that a substantial amount of sunlight penetrates the eyelids. More to the point, both observers made very similar reports to my own report above, despite my carefully neutral questions. Both reported bright fields fluctuating in color from red to orange or yellow or white. Both reported the field as pretty uniform, apart from some perturbations (one reported diagonal lines that came and went, the other reported squiggles and lightning-like branching figures). When asked about the periphery, both described it as similar to the center—but whereas I at least sometimes have the impression it is bright with flashes, they both thought it possibly a bit darker than the center. Both explicitly denied any checkerboard, latticework, or honeycomb-like shape.

Two more acquaintances—paid philosophy graduate student researchers, actually—I persuaded to sit facing the sun for an hour or two wearing random beepers. (More about the beeper experiment below.) When the beep went off, each was to report (a la Hurlburt and Heavey 2006; Hurlburt and Schwitzgebel 2007; Schwitzgebel 2007) his last undisturbed moment of experience immediately before the beep, with a particular focus on whether there was any visual experience and if so what it was. One observer (Subject 2 in the larger experiment) collected four such samples and reported Purkinje-like figures in each one, which he described not as much like checkerboards as like honeycombs or a “squashed Bucky-ball”—and like Purkinje, in two samples he reported a glowing light in the center (not quite, it turns out, in the exact direction of the sun, nor small enough to be an afterimage of the sun).

A vindication of Purkinje? First, a note of caution: In the sample immediately prior to the first sample in which he reported such a figure, I had asked him explicitly if he saw any latticework figures and even showed him Purkinje's figure reproduced above. (In that sample, he was outside in the sun, but not directly facing the sun. My thought had been, as with the acquaintances from whom I collected the concurrent reports described above, that by asking the question explicitly like this, a "no" answer would be more convincing.) His immediate reaction was surprise—denying such experience in the sample about which I had been asking, but finding it a startlingly appropriate description of his next sample. His oral communication about this first Purkinje-like sun sample, and all his later communications about direct sunlight samples, embraced the latticework-honeycomb description. But unfortunately, that formulation is not explicit in his handwritten notes taken immediately after the sampled experience (and before any suggestion on my part):

So the gray field remains but now it is inflicted with faint lime-green lines and there is a "ball" of light in the center. It is whitish and diffuse. It is also inflicted. The lightness/brightness radiates and dissipates and then returns to the center with its original form (S2: sample 2.2).

Diagonal or zigzag lines or lightning-like flashes are not uncommon in reports of eyes-closed experience—as, for example, in the two concurrent observers' reports above. They in no way imply any gridlike structure. However, maybe S2's statement that the lines inflicted both the gray field and the ball of light in the center suggests that there were enough of them simultaneously, and broadly enough spread, to make at least an irregular latticework?

The other beeper subject who directly faced the sun (S5) collected two such samples. He reported neither latticework nor a relatively uniform bright field. In one sample (S5: 3.1) he reported that his overall visual field was a dark orange oval becoming bright white near the center, with a horizontal orange band dividing the entirety right in the middle and occasional bright, iridescent spots fading in and out. In the other sample (S5: 3.2) he reported a bright yellowish-white field permeated by whitish-blue vertical stripes and spots, accented with flecks of orange.

So it appears that Purkinje was mistaken in saying that most observers will report checkerboards when facing the sun. But isn't that an odd mistake to make? Shouldn't it be obvious, when you close your eyes, whether you experience anything like what Purkinje describes in Figure 1? Were Purkinje's subjects somehow strangely suggestible? Was he poor enough a scientist, despite his reputation, to coax plainly false answers out of them with loaded questions? Or did 19<sup>th</sup> century Germans really see checkerboards while most 21<sup>st</sup> century Americans do not? Or is the introspective task harder than it appears, and so liable to reporting errors due to possibly subtle cultural influences (cf. Schwitzgebel 2002, 2006a&b)? Latticework, honeycombs, and checkerboards are apparently commonly-reported features of drug-induced visual hallucinations (Klüver 1967; Ermentrout and Cowan 1979).

It will take a while, I think, to straighten this out.

2. Eyes closed in the dark, through 1942, or The Mysterious Disappearance of the *Wandelnde Nebelstreifen*.

Let's turn to another observation by Purkinje, this time of what is sometimes called the "dark field":

If I keep the eye in darkness without any outside light, then sooner or later weak dawning, delicate, hazy objects begin to move; at first unsteady and formless, then gradually forming into something more definite. The general case is that the forms are broad, more or less curved ribbons, with black intervals lying between, either as concentric circles moving toward the center of the visual field, and losing themselves there, or as changing curves breaking against themselves and curving together into themselves, or as bent radii that move around in circles. Their movement is slow, so that for me it usually requires eight seconds for such a ribbon to complete its course and fully disappear. Never is the darkness, even in the beginning of the observation, perfectly pure, always there floats a chaos of weak light. It is remarkable here that the estimation by sight is that the darkness is complete. It is finite, expanding in width that can be measured from the middle, yet one cannot determine the peripheral borders. As the measurement goes more outward, it becomes harder and finally impossible without a visible borderpoint to be found (1819/1948, p. 74, my translation; Purkinje's fig. 17-19 are reproduced here as fig. 2-4).

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Insert Figures 2-4 about here. They may be shrunk and combined into a single figure.

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Purkinje calls these figures wandelnde nebelstreifen—shifting fog ribbons. Goethe, also, somewhat earlier, remarked that “If the eye is pressed only in a slight degree from the inner corner, darker or lighter circles appear. At night, even without pressure, we can sometimes perceive a succession of such circles emerging from, or spreading over, each other” (1810/1967, §96).

Unlike Purkinje’s sunlight observations, his observations of wandelnde nebelstreifen were not ignored. Indeed, a large literature attempted to describe visual experience in the absence of light. Eighteen years after Purkinje, the next great introspective physiologist, Johannes Müller, wrote:

If one observes the visual field with closed eyes, then one sees not only sometimes a certain degree of illumination in it, but also sometimes brighter glows, sometimes spreading circular waves, which develop in the center and disappear in the periphery. Sometimes the glow appears more cloudlike, foggy, spotted, and rarely repeating itself for me in a certain rhythm (1837, vol. 2, p. 391, my translation).

But does this vindicate Purkinje? Though strikingly similar—and Müller mentions Purkinje four times on p. 391, but oddly not on this issue—Müller’s description is more limited, mentioning only circular waves and not the other forms Purkinje reports, and Müller describes them as moving in the opposite direction: not toward the center but rather outward toward the periphery.

Nineteen years later, Hermann von Helmholtz appeared to be of two minds about the typicality of Purkinje’s description, first characterizing the dark field quite differently:

When the eyes are closed, and the dark field is attentively examined, often at first after-images of external objects that were previously visible will still be perceived.... This effect is soon superseded by an irregular feebly illuminated field with numerous fluctuating spots of light, often similar in appearance to the small branches of the blood-vessels or to scattered stems of moss and leaves, which may be transformed into fantastic figures, as is reported by many observers (1856/1909/1962, vol. 2, p. 12),

but then he adds that many people, including Goethe and Purkinje, report wandelnde nebelstreifen. He continues:

The author's experience is that [wandelnde nebelstreifen] generally look like two sets of circular waves gradually blending together towards their centre from both sides of the point of fixation. The position of this centre for each eye seems to correspond to the place of entrance of the optic nerve; and the movement is synchronous with the respiratory movements. One of PURKINJE's eyes being weaker than the other, he could not see those floating clouds except in his right eye. The background of the visual field on which these phenomena are projected is never entirely black; and alternate fluctuations of bright and dark are visible there, frequently occurring in rhythm with the movements of respiration; as observed by both J. MULLER and the writer (1856/1909/1962, vol. 2, pp. 12-13).

In describing two sets of circular waves, Helmholtz departs from both Purkinje and Müller—though he notes that Purkinje's weak left eye may not have permitted him to see the second set of circles. He calls such visual experiences without outside light the

eigenlicht or the “intrinsic light” of the eye. Gustav Fechner [1860/1964, 1860/1966], in contrast, calls what we visually experience without light augenschwarz—literally “eye-black”—reflecting his characterization of the field as one of near (but not quite utter) blackness.

Hermann Aubert (1865), picking up on Purkinje’s “chaos of weak light” calls our visual experience in the absence of light lichtchaos and describes it as “a swarm of spots, lines, and splotches of light, difficult to describe, spread over the entire visual field” (p. 333, my translation), which he differentiates into five forms: (1.) black, but not deepest black, with yellow spots and lines of light like “hovering tow-threads” (schwebenden wergfäden); (2.) colorless wandelnde nebelstreifen in Purkinje’s sense, moving in all directions; (3.) fogballs (nebelballen) in the middle of the visual field, expanding and contracting without much other movement, brighter in the center and fading toward the edges without a distinct boundary, (4.) very bright lights at the far periphery, usually disappearing quickly, and (5.) zigzag lines, like bright lightning, blue or violet in color, moving slowly and disappearing within a few seconds (pp. 333-334). Aubert estimates the brightness of the black background—using now Fechner’s term augenschwarz—as similar to that of a sheet of white paper illuminated by a single candle at 130 meters (p. 64).

Eminent American psychologist George Trumbull Ladd finds even more in the visual field of the light-deprived eye, attributing reports of it as mostly dark to amateurish introspection:

I have found by inquiry that a large proportion of persons unaccustomed to observe themselves for purposes of scientific discovery are entirely

unacquainted with the phenomena of the retinal eigenlicht. Ask them what they customarily see when their eyes are closed in a dark room and they will reply that they see nothing. Ask them to observe more carefully and describe what they see, and they will probably speak of a black mass or wall before their eyes, with a great multitude of yellow spots dancing about on its surface. Some few will finally come to a recognition of the experience with which I have long been familiar in my own case. By far the purest, most brilliant, and most beautiful colours I have ever seen, and the most astonishing artistic combinations of such colours, have appeared with closed eyes in a dark room. I have never been subject to waking visual hallucinations, but I verily believe there is no shape known to me by perception or by fancy, whether of things on the earth or above the earth or in the waters, that has not been schematically represented by the changing retinal images under the influence of intra-organic stimulation (1892, p. 300).

Ewald Hering (1905, 1920/1964), still differently, calls the phenomenon eigengrau ('intrinsic gray'; though in 1878 he still uses Helmholtz's 'eigenlicht'), and the choice here of grau (gray) over schwarz (black) is surely deliberate: In the absence of contrast, especially after a long time, he suggests, we experience not so much blackness as neutral gray:

If we awake at night when it is still completely dark, at first we distinguish no objects at all, but see the whole visual field filled merely by those weak, more or less unsteady, cloudy or spotty colors which one can call the

intrinsic gray (intrinsic brightness or darkness) [eigengrau (eigenhell oder eigendunkel)] (1920/1964, pp. 74-75).

This gray, or these weak colors, are not so much dimmer or darker in Hering's view than what we see with our eyes open, but rather—like afterimages and peripherally seen objects—have less “weight” (gewicht), “the impressiveness or expressiveness that a visual quality or color possesses” which causes us to notice and remember it (pp. 115-116; compare G.E. Müller 1896, pp. 30-33, 1897, pp. 40-46, for a different but related take on neutral gray).

According to these reports then—the best-known and most influential reports on the phenomenon by early psychologists and physiologists—the darkened visual field is normally either black or gray or aswarm with fantastic colors and figures; or it is dominated by foggy ribbons drifting either generally outward or generally inward or in variable fashion or doubled with one for each eye; or it is more typically flecked with yellow spots and lines or branches like blood vessels. My goodness!

Others make passing remarks, equally diverse. For example, Volkmann describes the field as absolute blackness but with a “light dust” that varies between individuals (1846, p. 311). Fick describes the phenomena as “constantly changing, with all kinds of turbulence, in places colored, in places colorless marks, with shape and color steadily changing” (1879, p. 230, my translation). Sanford invites students to consider the “shifting clouds of [idio-retinal] light” in the darkened eye (1892, p. 485). Scripture, who pointedly calls it a “cerebral” rather than a “retinal” light, rejects Helmholtz's idea that people see one figure for each eye, and describes instead a single “spreading violet circle” (1897, p. 138). “Mr H.D.” with an 1896 Yale Ph.D. says that his eigenlicht ordinarily has “the appearance of a dancing mass of vari-colored dust, red predominating” and that is normally round, with

the center of the circle at the bridge of the nose, while “the radius extends to the corner of the eye and sweeps over the forehead to the other eye” (quoted in Ladd 1903, p. 145). Stout describes “the retina’s own light” as “medium grey” with “speck and clouds of color” (1899/1977, p. 151). Titchener describes “hazy or cloud-like patches of dull grey” (1901a, vol. 1, p. 510) and says “we see a grey, ... an ‘intrinsic’ brightness sensation” (1901b, p. 79). Wundt describes “weak subjective light sensations” in the form of “light nebulas and light sparks” (1908, p. 660, my translation). Peddie describes the “self-light” as an “irregularly flecked shimmer” of yellowish white (1922, pp. 44, 84). Allen calls it a “misty dark gray light” (1924, p. 275). Burch writes that with “prolonged resting of the eye in an absolutely dark room, the self light slowly diminishes and finally disappears” (quoted in Allen 1924, p. 277), while Boring remarks in contrast that “the black of complete darkness gets subjectively lighter as it continues” (1942, p. 163). Koninski says “the visual field appears as regular bluish-(ink-)black grains (the grains millet- to lentil-sized) on a yellow background” (1934, p. 362, my translation). Purdy describes the “self light” as “a uniform dim expanse of gray” (1939, p. 531).

Where have the wandelnde nebelstriefen gone?

### 3. In darkness, after 1942.

Phenomenological reporting went out of style in psychology, and thoughtful descriptions of the eigenlicht become harder to find after the 1930s. However, Hurvich and Jameson (1966), apparently summarizing the earlier literature, describe “floating light spots... of many forms peculiar to the individual observer”, sometimes looking “like curved bands with dark intervals between them”, sometimes “cloudlike streamers and ribbons” or

‘circular waves... clouds, specks, ribbons, swirls, and the like’ (pp. 20-21). Horowitz (1970) quotes the following verbal report: ‘When I close my eyes I see darkness but then it lightens to gray. Next I see colored lights and sometimes very complex geometric forms that dance, rotate, or sparkle about’ (p. 11). McCrone (1993) writes:

It is easy to assume that when we shut out [sic] eyes, we should see just blackness. However if we stare into this void, we soon will notice thousands of shimmering points of light. This eigenlicht is thought to be a residue of activity among the millions of nerve cells lining the retina; a restless eddy among nerves which never fully switch off, but which just become more quiet and random in their firing. While this residue of activity is meaningless, it still reaches the higher brain and so is interpreted as seeing something.

If we remain with our eyes shut, the eigenlicht does not fade but in fact becomes more active. Often flashes of colour, like summer lightning, will flare—particularly if we yawn or do something else that puts pressure on our eyeballs and so prods the retinal cells to more vigorous activity through crude mechanical stimulation (pp. 176-177).

Sorenson (2004) describes the experience as initially black, then defaulting to a very dark ‘brain gray’, affected by retinal noise of ‘shifting clouds of floating light spots’ and ‘retinal light swirls’ (p. 476).

In the 1950s, psychologists began to study the effects of days-long ‘sensory deprivation’. Early reports emphasized hallucination (Bexton, Heron, and Scott 1954; Heron 1961), but later investigators often failed to replicate these results (Vernon, Marton,

and Peterson 1961; Zuckerman 1969; Suedfeld 1980). Setting aside the work on (at best occasional) hallucinations, I have found no careful studies of the basic visual phenomena of subjects spending extended periods in absolute darkness (though see Heineman 1970). In any case, the effects of serious, prolonged sensory deprivation is not the topic of this essay. (Still farther off topic is the experience of the “ganzfeld”–often characterized as neutral gray–induced by presenting an unstructured field of light to the eyes.)

Recent brain research might also be thought to cast some light. As McCrone emphasizes, neural tissue is always active, even in absence of stimulation. For example, Kenet, Bibitchkov, Tsodyks, Grinvald, and Arieli (2003), looking at cats, found that “spontaneous activity” (in the dark or looking at a gray screen) in area 18 (associated with selectivity for stimulus orientation) often closely resembled, with somewhat less organization, ordinary area 18 activity in response to actually visually presented gratings. But there is no straightforward inference from neural firing patterns to phenomenology, at least in the current state of neuroscience, and phenomenological studies are lacking. Nir, Hasson, Levy, Yeshurun, and Malach (2006) asked subjects asked to describe any “visual-like percepts that might occur” during two minutes of complete darkness with eyes closed. Five of their seven subjects evidently reported no visual-like percepts whatsoever, while one reported only afterimages in the first few seconds and another reported “visual-like” dots. Nonetheless, using fMRI brain-imaging techniques, Nir et al. found that even among these subjects there was considerable fluctuation in visual cortical activity.

I have attempted the introspections myself, with variable results: A few times it has seemed to me that I’ve seen Purkinje’s nebelstreifen–vaguely circular ribbons converging toward and disappearing at the center (contra Müller 1837 and Scripture 1897

–and single, rather than double, contra Helmholtz 1856/1909/1962). But usually it doesn't seem to me that I see any such things, and the forms are more chaotic, maybe like a blend of random dark gray texture gratings or like the “snow” of old black-and-white televisions, but less sharp and fast-paced, maybe with faint hints or tints of color. I have not, I confess, ever noticed the bright colors of Ladd or McCrone, though I don't rule out Ladd's suggestion that this simply shows lack of introspective expertise. If the phenomena lack ‘weight’ in Hering's (1920/1964) sense, they might go unnoticed despite their brightness, as afterimages so often do (also Helmholtz 1856/1909/1962, vol. 3, p. 6, to be quoted below) –supposing phenomena of consciousness can indeed go unnoticed even when one is looking for them. (I do suppose this, although doing so can create methodological problems: See Schwitzgebel 2004.)

Four of my beeper subjects also had their eyes closed in near darkness. One reports no sensory visual experience at all, not even of blackness, in six separate samples (S1: 1.2, 2.1-2.3, 3.1-3.2). Another reports an “undulating blackness” with small flashes of color (S2: 2.3-2.4). Another reports turbulent blackness on one occasion, like water before a boil (S3: 2.1), but no visual experience at all on a second occasion (S3: 2.2). Another reports grayish, angular wisps of foggy light against a black background in one sample (S5: 2.1) and no sensory visual experience (but a vivid visual image; more on this distinction shortly) in another (S5: 2.2).

#### 4. Variability and error.

Most of these psychologists implicitly or explicitly take their descriptions of the eigenlicht to reflect people's general experience, not simply their own idiosyncratic

phenomenology (Hurvich and Jameson 1966 being an exception). These descriptions cannot be reconciled by positing that everyone is simply intending to describe his own experience only. A number of the investigators ran or participated in introspective laboratories and presumably—hopefully!—consulted with peers or subjects before taking their stand on the general nature of the eigenlicht. I suspect, as with the case of Purkinje in the sun, that what most observers describe turns out to be culturally, or subculturally, or laboratorially, variable (as do reports of eyes-open visual experience [Schwitzgebel 2006] and dream experience [Schwitzgebel 2002; Schwitzgebel, Huang, and Zhou 2006]), even when the laboratory method is good.

The question arises, then, whether the variability in the reports reflects real, perhaps subculturally contingent, variability in the experience, or whether it reflects erroneous or incomplete reporting. Ladd (1892) makes it clear where he stands in the quote above. I hope the reader will also forgive me an extensive quote from Helmholtz:

Another general characteristic property of our sense-perception is, that we are not in the habit of observing our sensations accurately, except as they are useful in enabling us to recognize external objects. On the contrary, we are wont to disregard all those parts of the sensations that are of no importance so far as external objects are concerned. Thus in most cases some special assistance and training are needed in order to observe these latter subjective sensations. It might seem that nothing could be easier than to be conscious of one's own sensations; and yet experience shows that for the discovery of subjective sensations some special talent is needed, such as PURKINJE manifested in the highest degree; or else it is

the result of accident or of theoretical speculation. For instance, the phenomena of the blind spot were discovered by MARIOTTE from theoretical considerations. Similarly, in the domain of hearing, I discovered the existence of those combination tones which I have called summation tones.... It is only when subjective phenomena are so prominent as to interfere with the perception of things, that they attract everybody's attention. Once the phenomena have been discovered, it is generally easier for others to perceive them also, provided the proper precautions are taken for observing them, and the attention is concentrated on them. In many cases, however—for example, in the phenomena of the blind spot, or in the separation of the overtones and combination tones from the fundamental tones of musical sounds, etc.—such an intense concentration of attention is required that, even with the help of convenient external appliances, many persons are unable to perform the experiments. Even the after-images of bright objects are not perceived by most persons at first except under particularly favorable external conditions. It takes much more practice to see the fainter kinds of after-images. A common experience, illustrative of this sort of thing, is for a person who has some ocular trouble that impairs his vision to become suddenly aware of the so-called mouches volantes [i.e., “floaters”] in his visual field, although the causes of this phenomenon have been there in the vitreous humor all his life. Yet now he will be firmly persuaded that these corpuscles have developed as a result of his ocular ailment, although

the truth simply is that, owing to his ailment, the patient has been paying more attention to visual phenomena. No doubt, also there are cases where one eye has gradually become blind, and yet the patient has continued to go about for an indefinite time without noticing it, until he happened one day to close the good eye without closing the other, and so noticed the blindness of that eye.

When a person's attention is directed for the first time to the double images in binocular vision, he is usually greatly astonished to think that he had never noticed them before, especially when he reflects that the only objects he has ever seen single were those few that happened at the moment to be about as far from his eyes as the point of fixation. The great majority of objects, comprising all those that were farther or nearer than this point, were all seen double (Helmholtz 1856/1909/1962, vol. 3, pp. 6-7, emphasis in original).

Wilhelm Wundt, widely regarded as the founder of experimental psychology, was for such reasons reputed not to have admitted data from observers without at least 10,000 trials of practice in introspective report (Boring 1953). E. B. Titchener, the most influential American introspective psychologist after James, wrote a 1600 page introspective training manual intended for students (1901-1905; see Schwitzgebel 2004). It seems easy to test Purkinje—simply close your eyes and report! In a Cartesian (1641/1984) or Price-ian mood (Price: “When I see a tomato there is much that I can doubt.... One thing however, I cannot doubt: that there exists a red patch of a round and somewhat bulgy shape, standing out from a background of other colour-patches, and

having a certain visual depth'; 1932, p. 3), it can seem almost impossible to doubt the correctness of your consequent judgments about your ongoing experience; but the leading figures of introspective psychology had quite the opposite opinion. This skepticism likely arose from their experience of finding people disagreeing radically about their phenomenology, without any plausible physiological or behavioral or environmental differences underlying that disagreement, and of people changing their minds as their theories change, conforming too neatly to expectations, being swayed by the reports and opinions of their friends and advisors, and missing things that seem in retrospect to be obvious. Unless you run an introspective laboratory, such vagaries of opinion may not be obvious to you.

Consider Helmholtz's own examples in this passage. The most familiar example to contemporary readers is the blind spot, which even in monocular vision can be very difficult to notice without aid. The musically or psychoacoustically trained will be familiar with combination tones and overtones, which are accompanying tones different in pitch from the fundamental tones produced by musical instruments. These tones surely add to our musical experience, but they can be very difficult to discern without training (see Schwitzgebel 2005 for further explanation and for a recreation the combination tone training exercises of Titchener 1901-1905). It remains unclear whether Helmholtz is right about there being summation tones in particular (tones produced when sounds of frequency A and B occur together, as though the two tones were accompanied by another characteristic of frequency  $A+B$ )—buttressing his fundamental point. People sometimes notice bright afterimages—those that interfere with ordinary perception, especially, such as after having glanced at the sun—but rarely do they notice faint ones, which one might

(with Helmholtz) think to be more or less a constant phenomenon of vision, or imperfections and floaters in the fluid that fills the eye, even when they're looking for them. But is this imperfection in introspection, as Helmholtz supposes, or is our visual experience normally free of such perturbations? Helmholtz's final example may be the most striking: He suggests that most of the objects in the visual field, most of the time, are seen double, but we fail to notice that. Reid (1764/1997), Müller (1837), Stout (1899/1977), Sanford (1901), Titchener (1910), and others make similar remarks. If you hold your finger near your nose and focus in the distance, the finger may seem to you to double. But is our visual experience of most objects like that? I can't say it seems to me that way as I gaze about the room. But I haven't had 10,000 trials of introspective training yet! Or maybe it's Helmholtz and company who are mistaken (drawn in, perhaps, by too-beautiful a theory of the horopter)? Of course, that only advances Helmholtz's central point about the difficulty of the introspection. Or are we to suppose that Helmholtz and the others saw most things double while the rest of us do not? Besides the physiological and psychological implausibility of that supposition (unless we see appropriate corresponding physiological or psychological differences), it makes nonsense of people's changing their minds....

I close my eyes right now and consider my visual experience. I feel no room for doubt. The field is mainly black, I think, with hints or tintings of color. After contemplating it for ten seconds, I place the palms of my hands gently over my eyes. Ah, wait, I think, now it's black! It wasn't before. When I remove my palms, the field seems more like an intermediate gray—and that seems to me now to be the color it was before, originally, when I thought it was black. What I wrong, then, in my first assessment?

Even such a simple judgment confounds me! Maybe our Cartesian feelings of confidence about our ongoing experience arises not so much from real epistemic security as from the fact that we're never challenged or proven wrong about such things and so—like the dictator or dictatorial professor who never hears his slightest remark contradicted—we never learn modesty. But even dictators and professors are sometimes contradicted by undeniable outward events as the cavalier introspector of his stream of experience is not.

#### 5. Do we normally have any visual experience at all with our eyes closed?

As I mentioned in opening, the one point of consensus among scholars who have discussed the phenomenon is that we normally have some visual experience when our eyes are closed. But that view doesn't sit very well with contemporary "thin" views of consciousness. On thin views, our conscious experience is limited to one or a few topics or modalities or regions at a time, depending on attention (Jaynes 1976; Dennett 1991; Mack and Rock 1998). For example, according to the thin view, we don't consciously feel our feet in our shoes all day long—not even peripherally and secondarily. When we're not thinking about or attending to our feet, we have no conscious experience of them whatsoever. Or if you're driving absent-mindedly, wholly absorbed in other thoughts, you may have no visual experience of the road, despite your responsiveness to routine road situations (Armstrong 1981; Wright 2005). Advocates of the thin view of consciousness would presumably hold that we often have no visual experience when our eyes are closed—since usually when our eyes are closed we're not attending to or thinking about things visual.

Some people say they have no visual experience with their eyes closed, then change their minds when I clarify the difference between experiencing black or gray and having no visual experience whatsoever. The sides of my bookshelves are black. I just walked over and pressed my nose on one, cupping my hands around the outsides of my eyes. I had a visual experience more or less of black (well, there was a bit of a sheen to it, and light at the periphery, and several roundish floating afterimage-like rings), but I had no visual experience of the world behind me—no more than I had any experience of the magnetic fields in the room. I can imagine that blind field behind me wrapping around and the black field shrinking until I truly have no visual experience whatsoever. It seems plausible that people whose main visual centers in the brain have been entirely destroyed lack visual experience in just this way. That's very different from seeing "nothing" in the sense of visually experiencing a uniform field of black or neutral gray.

It's unclear whether the thin view of consciousness is correct. Folk intuition is divided and existing research begs the question (see Schwitzgebel 2007; advocates of 'rich' views include James 1890/1981 and Searle 1992). Friends of the thin view can appeal to the 'refrigerator light' error to explain away the impression some people have that visual experience is constant: Just as the act of checking whether the refrigerator light is on turns it on and so can create (in a naive observer) the impression that it's always on, so also might the act of checking whether we're having visual experience create visual experience, yielding the false impression that visual experience is constant (Dennett 1969; Thomas 1999; O'Regan and Noë 2001; Blackmore 2002). One can perhaps avoid the refrigerator light error by giving people random beepers to wear during everyday activity, asking them, when the beep sounds, to recall to the best of their ability their visual

experience immediately before the beep, when presumably it will not have been disturbed by the act of reflecting on that experience. I did exactly this in an earlier study—but unfortunately the results don't lend themselves to straightforward interpretation with respect to the rich-thin debate (Schwitzgebel 2007).

The refrigerator light problem taints all prior research on the phenomenon. Research about eyes-closed visual experience tends to be based not on retrospective reports but rather on visual experience attended to as it's happening. Even when researchers use retrospective reports, those reports may largely be based on memory of visual experiences noted by the subject as they transpired. But as Comte (1830; the key passage is well translated by James 1890/1981, pp. 187-188, poorly translated in English editions), Brentano (1874/1973), Stout (1899/1977), and many others have emphasized, our experience during the act of self-observation may be very different from our ordinary unattended run of experience. In my own eyes-closed introspections, I am struck by the impression that my visual experience is at least a little different—simpler?—when I've found that my attention has wandered or partly wandered. Accordingly, I have the impression that careful attention to afterimages and the eigenlicht may bring out those phenomena more sharply.

Five volunteers (three philosophy graduate students, an administrative assistant, and a retired economist) borrowed random beepers from me for several days and agreed to keep their eyes closed for at least two hours each day, with the idea of reporting on their visual experience, if any, in the last undisturbed moment before each beep. Although this method has at least some hope of avoiding the refrigerator light problem, it unfortunately brings several other problems in its train—not least, in order for the beep to

catch them by surprise after their minds had wandered to other things, it was necessary to have the beeper set at long intervals. Consequently, they needed to keep their eyes closed for long stretches of waking time, and it's certainly possible that eyes-closed experience during such long stretches is rather unlike eyes-closed experience during ordinary short intervals.<sup>1</sup>

I distinguish sensory visual experience from visual imagery experience. With your eyes open, visually imagine the front of your house as seen from the street. If you can do this, you presumably had a visual imagery experience that was somewhat different in kind—or at least in vividness (Hume 1740/1978; Perky 1910)—from your sensory visual experience as ongoing now. People don't seem usually to have trouble distinguishing imagery experience from sensory experience when their eyes are open, but when their eyes are closed the distinction sometimes appears to become confused. Maybe this is because with eyes closed people cannot depend on the fact that sensory experiences but not imagery experiences normally track known features of the surroundings and are distinctively contingent on eye motion; or maybe the lesser salience or "weight" (Hering 1920/1964) of eyes-closed visual sensations makes them more like visual imagery or easier to confuse with it. Another distinguishing mark (though not easily available to my volunteers, who were working through retrospection) is that visual imagery experience is usually to some extent liable to the direct control of the subject, while sensory experience can usually only be controlled indirectly by such means as moving one's eyes, pressing on one's eyelids, etc. (Berkeley 1710/1965; Sartre 1940/1972; Wittgenstein 1967; McGinn 2004; but see Ladd 1894, 1903; Gordon 1949; and discussion below). I invited my subjects to consider whether the distinction between sensory visual experience and visual

imagery experience made sense to them, and if so to report whether any visual experience they had seemed more sensory or more imagistic. All subjects accepted the distinction and confidently classified each of their visual experiences in one or the other category.

Table 1 shows the number and percentage of reports of visual sensory and visual imagery experience, both by subject and summed across the subjects. Subjects are classified as biased toward a thin view of consciousness or a rich view based on their (sometimes weakly) expressed opinion in the preliminary interview. When a subject reported both sensory and imagery experience, that was a report of two distinct experiences or experience-parts (always one of each), such as a sensory experience of a bright orangish uniform field and simultaneously a visual image of the Google guys dressed in black (S1: 4.1).

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Insert Table 1 about here.  
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Subjects reported sensory visual experience in 32 (58%) of the 55 total samples and visual imagery experience in 14 (25%). Only S2 ever reported being thinking about the experiment or about ongoing visual experience in the moment immediately before the beep. Unfortunately, he reported this in 6 of his 9 samples. (Evidently, he enjoyed contemplating his eyes-closed visual experience.) All other subjects were quickly swept up in radio programs, telephone conversations, and the like. The high rates of reported visual experience without visual attention, if taken at face value, don't accord with the thin view—but neither do the overall results accord with the view that we generally have visual experience with our eyes closed.

Although I urged subjects to set aside their preliminary opinions about the matter for the sake of the study, those coming in leaning toward the rich view reported more sensory visual experience than those leaning toward the thin view. However, the number of respondents is too few to reach any definite conclusions about bias (esp. since in the methodologically similar Schwitzgebel 2007 the relationship between bias and results was weak). The variation between subjects was extreme, as is evident from Table 1 (and statistically significant by Fisher's exact test,  $2 \times 5$ ,  $p < .001$ ).

There are, of course, many reasons to mistrust the accuracy and representativeness of these reports. We might doubt subjects' ability to report experience as it transpired before the beep as opposed to after the beep began. Given especially the high variability between subjects and the tendency of the results to fit with subjects' preconceptions, we might wonder whether subjects' theories are driving the reports more than their actual experiences (although of course their preconceptions might simply be well informed and reflect profound individual differences in their eyes-closed experience). There might be confusions of language, pressures from the experimenter and the experimental situation (for example, to create interesting-seeming reports), failures of memory, unwitting confabulation. I discuss such criticisms of beep-and-interview methods at length in Hurlburt and Schwitzgebel (2007) and Schwitzgebel (2007). I am sympathetic to such criticisms. If you discover a method immune to such doubts, please let me know!

So I think we must regard it as an open question whether people normally have visual experience at all with their eyes closed.

## 6. Seeing through your eyelids?

At least bright sunlight, but plausibly also ordinary indoor illumination, penetrates the eyelids to some degree. (Think of shining a flashlight through your hand in the dark.) So the question arises—can you see through your eyelids?

If I'm in an illuminated room and I wave my hand before my face, I seem to experience motion of some sort—fluctuations in the visual field timed to match the motion of my hand. If I move my hand slowly (taking about one-half to one second) from left to right and back again, I seem to be able to localize the changes in the position of my hand, though I can't make out any hand shape. Am I seeing my hand?

Consider, as an alternative possibility, what I'll call the "caver illusion". Spelunkers will frequently report being able to see the motion of their hands, waving before their faces, deep in lightless caves. And these caves really are lightless, as I understand it, without a single photon to pierce the darkness. The caver's impression of seeing her hand is thus some sort of illusion. This is confirmed by the fact that cavers will generally report no visual impression of a friend's hand waved before her face.

What might cause such visual phenomenology in the absence of visual input? Presumably general knowledge of the position of one's hand could do so, or motor output signals or predecessors of motor output signals feeding back into visual areas of the brain. I think we should also consider the possibility that the cavers are simply mistaken about their phenomenology.

The question then arises: If cavers visually experience or think they visually experience the motion of their hands without receiving any visual input, might the same

sort of thing be happening with me when I seem to see my hand's motion through my closed eyelids?

I cover my eyes with one hand and wave the other. I seem to get little or no visual experience of my hand's motion. But is this a good comparison to the caver phenomenon? Maybe the caver phenomenon depends on the cavers' knowledge that their eyes are open and they should in some sense be seeing their hands. (I wonder if a caver would report the illusion if she closed her eyes before moving her hand?) Maybe when I put my other hand over my eyes input about the position of the eye-covering hand interferes with experiencing input about the position of the other. So I try holding a piece of paper with one hand, about four inches in front of my eyes (with the paper-holding hand itself at chin level), while waving my other hand behind the paper. Again, the impression of motion is very much lessened, though I'm not sure it entirely vanishes. If I then lower the paper a few inches so that the fingertips of the moving hand are not occluded but most of the hand is, the impression of motion returns—but, oddly, not just motion as of my fingertips at the top of the visual field. Rather, it's as though I can again see changes in brightness across my whole visual field, from top to bottom.

Informal experimentation and questioning of acquaintances and loitering undergrads yields one consistent result: People seem able to detect the motion of my hand when the lighting is such that my moving hand casts a shadow across their closed eyelids. Also, people seem somewhat more likely to report seeing their own hands than someone else's. The rest of the results are pretty much chaos.

Although S5 (S5.3.1) and S2 (S2.2.2, S2.2.3) both reported large circles in their visual field when facing the sun with eyes closed, those circles did not seem to be visual

experiences directly of the sun, since the subjects reported that the circles were not in the precise direction of the sun. In my own experience, the visual field does sometimes seem to be a bit brighter in the direction of the sun, but only diffusely so (as also, perhaps reported in sample S2: 2.1).

### 7. Is the field cyclopean?

Purkinje distinguishes what he experiences in his right eye from what he experiences in his left. (Recall, also, that Helmholtz attributes one ring of the wandelnde nebelstreifen to each eye; but contrast H.D. quoted above from Ladd 1903.) Although I can distinguish between the right and left halves of my visual field, I'm not sure there's a phenomenal distinction that I can trace to my eyes. For example, if I close only my right eye, much of what I would have said was the right half of my visual field is still there—but obviously caused by input into my left eye. If I reopen my right eye, should I say that this experience is still left-eye experience, or is it now right eye experience? Maybe the distinction was easier for Purkinje than it is for me because he was nearly blind in his left eye. But my left eye is also very bad without correction: I can't even read the top letter on an eyechart. If I take my glasses off, I can shift my energies from my right eye to my left eye and see the world as blurrier or more distinct; but it still seems to be one field—a 'cyclopean' field, as it's sometimes called (Hering 1920/1964, p. 232, and Julesz 1971 attribute the term to Helmholtz).

With my eyes closed, though, I don't even notice that difference in clarity. I distinguish between a right and left half of the darkness—yes, it still seems like darkness

to me—but I don't feel any impulse to attach this phenomenology to either of my eyes in particular.

If I open my left eye, what happens to the darkness? My first temptation is to say that the darkness disappears entirely. With a little more reflection, though, it starts to seem to me that there is a small margin of darkness, still, on the far right of the visual field—but as though seen from the perspective of the left eye—as though the right side of my visual field is behind my nose. There seems, I'm tempted to say, no visual experience, no visual perspective, phenomenologically associated with my right eye at all, not even darkness. But not everyone will agree with me about this. One participant in my beeper study (S1) said it seemed to him, with one eye closed, as though his closed eye was seeing blackness and his open eye was seeing an ordinary visual scene.

But some new reflections lead me to doubt. It has been well known at least since Hume (1740/1978) that most people who gently press the corner of one eye will see a figure in the opposite corner—often (as in my case) a dark circle with a bright perimeter. Such phosphenes are generally thought to be due to the effects of mechanical stimulation of the retina. To make one's phosphenic phenomenology more salient, one can wiggle one's pressing finger slightly: The phosphene should move in an exactly complementary way. I find it somewhat easier to notice the phosphenes of my dominant left eye. Now if I close my eyes and press the outside corner of my left eye and note the phosphene, I find myself torn between saying that it appears about 2/3 of the way to the right border of a flat, cyclopean dark field and saying that it appears at the far edge of a field specifically associated with my left eye. Furthermore, it seems that to observe the phosphenes of my

right eye, I need, as it were, to shift my energies to that eye and observe the field that eye presents. So maybe Purkinje was right?

With one eye open, I can as it were move my finger so as to push the phosphene deep into my face and notice where it finally disappears. If I then open my other eye, I find it is within the region usually seen in the far periphery of that eye.

#### 8. Breadth and depth.

Recall that Purkinje describes the visual field of his darkened right eye as “finite, expanding in width that can be measured from the middle, yet one cannot determine the peripheral borders. As the measurement goes more outward, it becomes harder and finally impossible without a visible borderpoint to be found” (1819/1948, p. 74). When I close my eyes, whether in darkness or in light, this description seems apt to me: With eyes open, there seems a fairly straightforward (though indistinct) border to my visual field, but not with eyes closed. The darkness feels somehow more enveloping—though it also feels more to be in my forward than in my rear perspective. Does it actually extend over a greater degree of visual arc? Well, I’m not sure I’m ready to say that. When I’ve asked others, informally, about their experience of horizontal extent of the closed-eyes visual field, the reports are diverse—some claiming a distinct border (see also H.D., quoted above), some denying such a border; some saying the field is experienced by them over the same angular extent as the eyes-open visual field, others saying it’s smaller; but none (so far) saying it seems to surround them a full 360 degrees.

Purkinje emphasizes the horizontal dimension, but the same phenomenology seems to me to apply vertically. Eyes open, the visual field seems less tall than wide.

Many of my observers, both formally and informally, have reported that the same is true of their eyes-closed visual field, but I'm not sure whether I'd report that myself. In some way, it seems perhaps easier to contemplate the field horizontally as Purkinje does, but when I deliberately consider the vertical dimension in comparison to the horizontal, I don't find in myself the impulse to say the field has a greater horizontal extent. But maybe that very contemplation of the vertical lengthens it?

Many descriptions of the eyes-closed visual field implicitly treat it as flat. Purkinje's checkerboard shapes, for example, are drawn as though seen square-on, not (say) receding into the distance at some angle. Likewise, he does not portray his ribbons as moving forward and back or twisting in three dimensions: They are spreading circles or arches or S's (figures 2-4), as though on a two dimensional field. Although a number of authors (as well as most of my S1-S5) describe a 'background' (often black or gray or in the sun more brightly colored) against which other figures move, this does not necessarily imply any real depth to the field. None of my subjects ever reported its seeming as though one object in their eyes-closed visual field was in some substantial sense farther-away seeming than another, though I explicitly asked each subject (except S4) a few times with different samples whether the field had depth or distance.

My subjects all denied that it made sense to describe the objects in the field as at any particular distance from them—an inch or a foot or a mile. But I myself must confess to a temptation to describe my afterimages and eigenlicht as about two inches from my subjective center—or right about at the backs of my eyes. Shoot! Is that where my subjective center is? I'm not sure I would have been ready to say that, until just now. It

seems a bit “Cartesian theater” (Dennett 1991) or culturally contingent (Hurlburt and Schwitzgebel 2007, box 7.12).

Koninski is also interesting in this connection: In the passage quoted above, he says “the visual field appears as regular bluish-(ink-)black grains (the grains millet- to lentil-sized) on a yellow background” (1934, p. 362). Seen as millet- to lentil-sized from how far away? If half an inch, the grains must be very large—larger than Koninski probably intends to communicate; if very far away, lentil-sized grains would not be discernible at all. So there’s an implied intermediate distance—probably more than my two inches.

C. E. Ferree writes:

When one sits with lightly closed lids, which must be kept from quivering, before a bright, diffuse light, such as that of a partly clouded sky, and looks deep into the field of vision thus presented, beyond the background as usually observed, one sees about the point of regard, after the field of vision has steadied, slowly moving swirls (1908, 114-115, emphasis added).

E. R. Jaensch is more explicit:

We turn now to the localization of mental images with closed eyes. Beforehand we left the observers with closed eyes to observe and describe their eigenraum. This term was first clearly explained to the observers. Most described the eigenraum as a more or less gray or black “surface” (flächē), others as a gray or black “space” (raum). One of the subjects described her eigenraum as if she had the impression of “whirling dust”,

another indicated it as an “infinity”, in which color and brightness were not at all explicable. Afterwards, we invited them to allow a mental image of any type to form and to close their eyes. We then asked in what relationship the mental image stood to the eigengrau. The results were that with closed eyes the mental image was for some observers clearer, for others less clear, and for some it disappeared. All, however, who could see the mental image with closed eyes put it in a spatial relationship with the eigengrau. Most saw the image drawn in the eigengrau, others saw it ringed around by the eigengrau so that a more or less dark gray shone through it (1923, p 52).

The conclusion of this passage raises the question of the relationship of sensory visual experience—assuming the eigenlicht to be a form of sensory visual experience—and mental imagery. Sartre argues that the two cannot co-occur (1940/1972, p. 138). Hurlburt (1990), in contrast, using a beeper method, describes cases in which subjects report imagery and visual experience co-occurring (esp. Jason, pp. 48-51).

Three of my five beeper subjects reported at least one sample containing both visual sensory experience and visual imagery simultaneously (see Table 1). S1 reported three such occurrences in which—contra both Jaensch and Sartre, and more in accord with Hurlburt—his sensory visual experience (of a bright orange field) neither interacted with nor seemed to be in any spatial relationship of any sort with his visual imagery. S2 likewise said that his imagery, on the one occasion he reported it as co-occurring with sensory visual experience, was “not in the same coordinate space” as his sensory visual experience (of a more or less black field). S5 in his one report of this type, in contrast

with S1 and S2, and in accord with Jaensch, said that the image and the sensory experience (grayish, angular wisps of light against a black background) were “in the same field of space” though “not of a piece”.

### 9. Control of the eigenlicht?

We normally don't think we can directly will sensory experience. In fact, some scholars make passivity a mark by which sensory experience can be distinguished from imagery (Berkeley 1710/1965; Sartre 1940/1972). One cannot form a sensory visual experience of a cross-shape, for example, simply by willing it to be so. This lack of responsiveness to the will is perhaps one reason to think of the eigenlicht as sensory rather than imagistic.

However, in 1894, Ladd asserted that he and his students could form eigenlicht experiences by direct willing.

What they were asked to do was briefly this: to close the eyes, allow the after-images completely to die away, and then persistently and attentively *to will* that the color-mass caused by the eigenlicht should take some particular form, - a cross being the most experimented with.... Of the sixteen persons experimenting with themselves, four only reported no success; nine had a partial success which seemed to increase with practice and which they considered undoubtedly dependent directly upon volition; and with the remaining three the success was marked and really phenomenal. It should be said, however, that of the four who reported 'no

success,' only one appears to have tried the experiment at all persistently (1894, pp. 351-352; see also Ladd 1903).

As far as I'm aware, no one has ever published an attempt to replicate Ladd's experiment. If Ladd is correct, then either ordinary people can directly will certain types of visual sensory experience or the eigenlicht is not sensory in the strictest sense.

Although I have not yet attempted a formal replication of Ladd, several people have reported to me success with Ladd's experiment. Others have reported no success. When I attempt the project, I find myself unable to do it—or maybe unable. In the noise of the eigenlicht, I think sometimes I imagine a cross, or maybe I find myself inclined interpret some of the noise as crossish, hoping for success in Ladd's task. Of course, maybe our interpretations are in a way part of our visual experience—as when, in the night, I confusedly see some clothes draped over a chair as a man watching me?

#### 10. Conclusion.

It seemed so straightforward, when I first thought of it, to assess my visual experience with my eyes closed. But now I'm pretty much totally perplexed. You too, maybe? That perplexity is, I think, a good thing, a healthy thing. We're ready to begin a real inquiry, stripped of our glib confidence.<sup>2</sup>

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Figure 1

From Purkinje 1819/1948: Figure in the closed right eye, in direct sunlight.

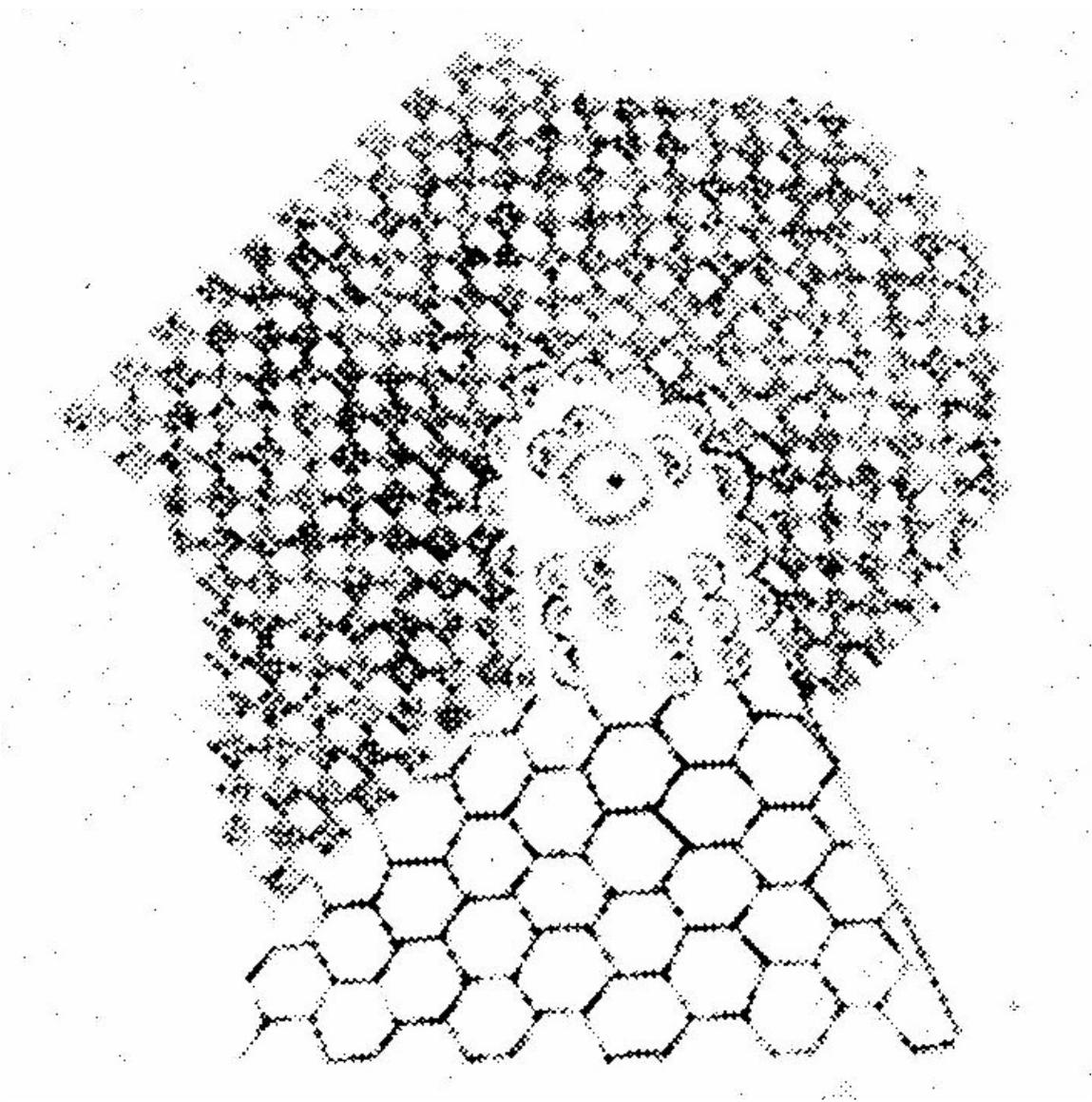


Figure 2

From Purkinje 1819/1948: Figure in the closed right eye in darkness.

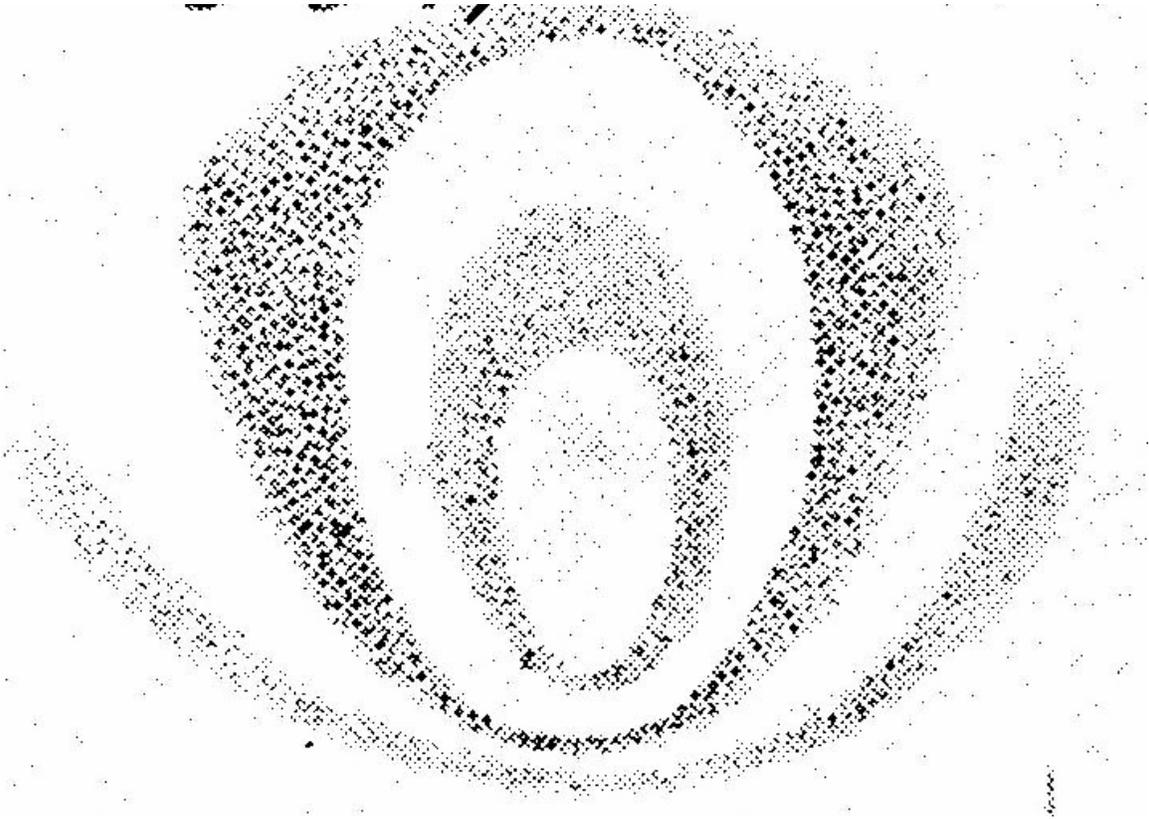


Figure 3

From Purkinje 1819/1948: Figure in the closed right eye in darkness.

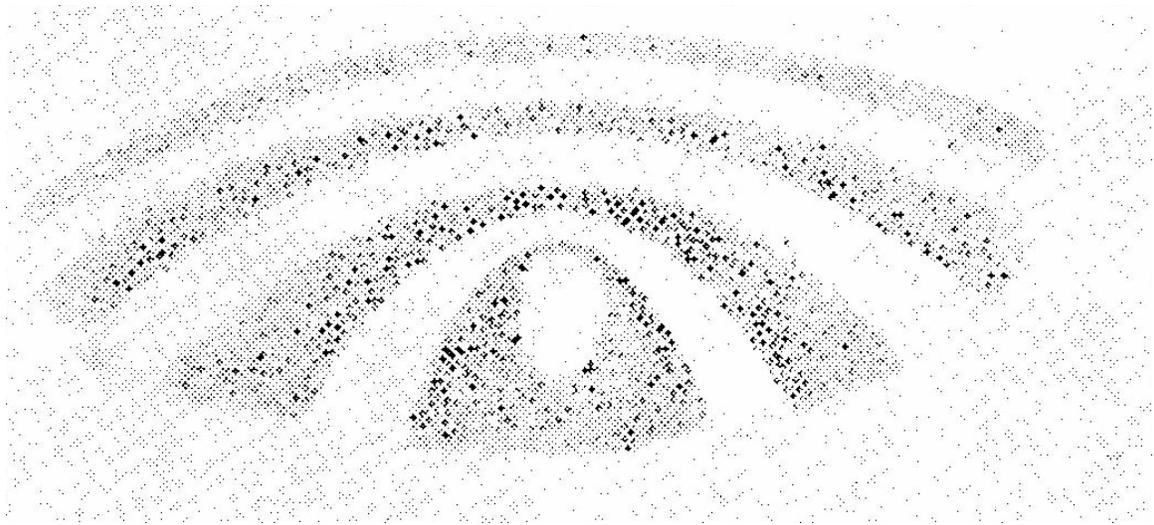


Figure 4

From Purkinje 1819/1948: Figure in the closed right eye in darkness.

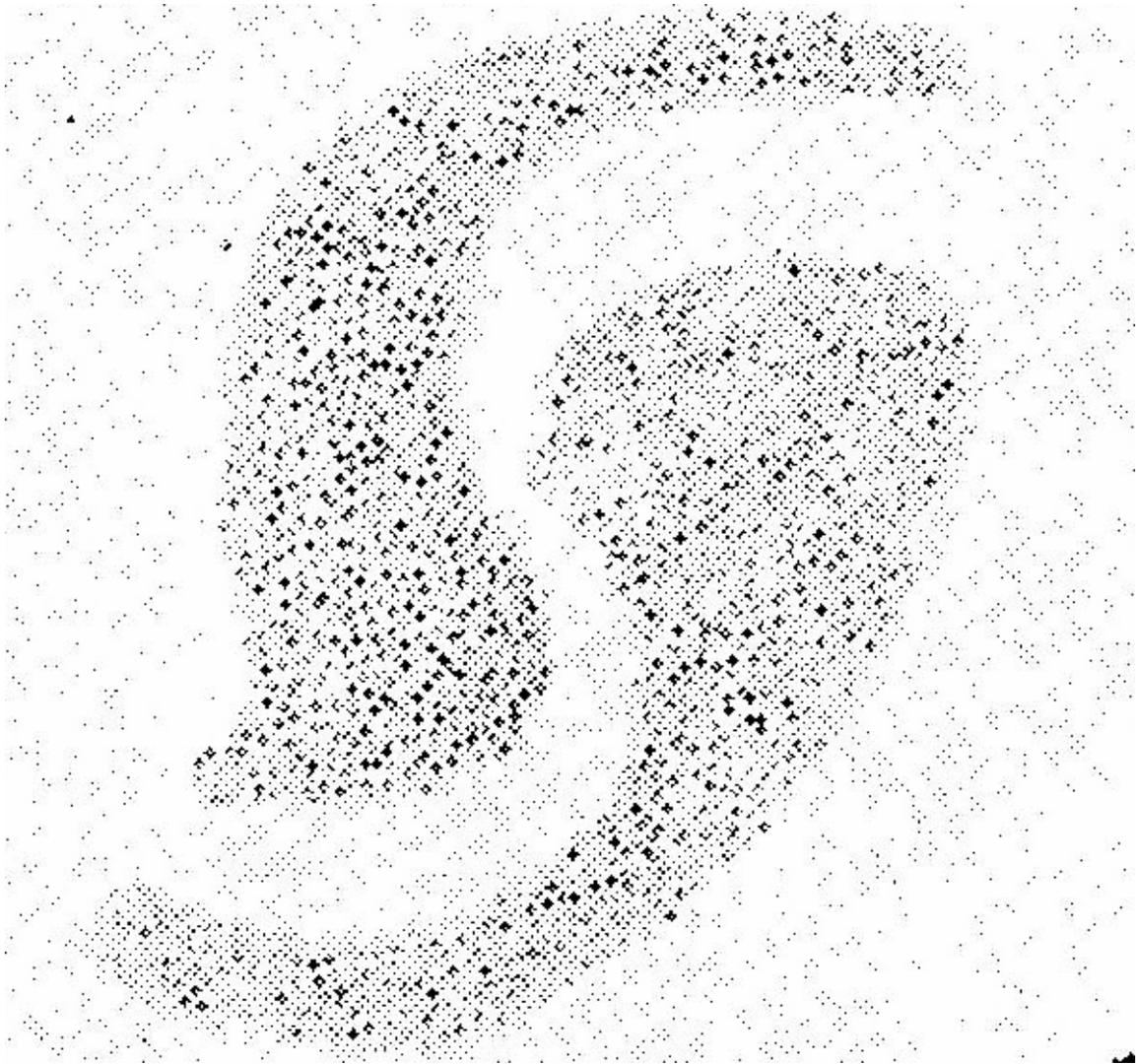


Table 1

Number (and percentage) of sensory visual experience and visual imagery experiences in random sampling with eyes closed

|                 | sensory only | imagery only | both    | neither  |
|-----------------|--------------|--------------|---------|----------|
| S1 (thin bias)  | 1 (7%)       | 8 (57%)      | 3 (21%) | 2 (14%)  |
| S2 (rich bias)  | 9 (90%)      | 0 (0%)       | 1 (10%) | 0 (0%)   |
| S3 (thin bias)  | 9 (75%)      | 0 (0%)       | 0 (0%)  | 3 (25%)  |
| S4 (thin bias)  | 0 (0%)       | 0 (0%)       | 0 (0%)  | 9 (100%) |
| S5 (rich bias?) | 8 (80%)      | 1 (10%)      | 1 (10%) | 0 (0%)   |
| Total           | 27 (49%)     | 9 (16%)      | 5 (9%)  | 14 (25%) |

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<sup>1</sup> Ideally, one could try to capture eyes-closed experience unpremeditatedly in the wild, without special instructions to the subject. I did get two such samples in Schwitzgebel (2007). In one, the subject had her eyes closed in frustration or anxiety. She leaned toward thinking she had no visual experience. In the other, the subject was asleep. He leaned toward thinking he had no phenomenology of any sort at all. Neither subject was very confident.

<sup>2</sup> For helpful comments and discussion thanks to \*\*\*\* [your name could appear here!].