The Multidimensional Spectrum of Imagination: Images, Dreams, Hallucinations, and Active, Imaginative Perception.

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(Draft, February 3, 2010)

Abstract

A comprehensive theory of the structure and cognitive function of the human imagination, and its relationship to perceptual experience, is developed, largely through a critique of the account propounded in Colin McGinn's *Mindsight*. McGinn eschews the highly deflationary (and unilluminating) views of imagination common amongst analytical philosophers, but fails to develop his own account satisfactorily because (owing to a scientifically outmoded understanding of visual perception) he draws an excessively sharp, qualitative distinction between imagination and perception (following Wittgenstein, Sartre, and others), and because of his fatally flawed, empirically ungrounded conception of hallucination. In fact, however, an understanding of perception informed by modern visual science will enable us to unify our accounts of perception, mental imagery, dreaming, hallucination, creativity, and other aspects of imagination within a single coherent theoretical framework.

Imagination is a concept far more frequently invoked than it is analyzed, even by philosophers. Brann (1991) calls it the "missing mystery" of philosophy: it plays a pivotal role in the epistemologies of many, diverse philosophers – from Aristotle to Hume, from Kant to Bachelard and Popper, and in contemporary philosophical movements such as *simulation theory* – but this role is rarely highlighted, and still more rarely satisfactorily explained.

In the wider culture too, "imagination" is a word of power. Indeed, McFarland (1985) suggests that in recent times it has taken over many of the functions once served by "soul". We seem to be forever being told that all good things (from anti-terrorist preparedness to iPhone apps) come from the imagination, and that cultural apocalypse looms if we continue to allow our educational system (or video games, or the internet, or over-scheduling, or whatever) to stunt the imaginations of the coming generation (e.g., Ouellette, 2007). No less a cultural icon than Einstein is often said to have asserted that "imagination is more important than knowledge." On the other hand, parents and teachers warn children not to let their imaginations run away with them, and if people sincerely claim to have had experiences that we find incredible (such as having been abducted by aliens), we dismiss the experiences as mere figments of their imagination. It was because of usages such as this, presumably, that Pascal called imagination "that mistress of error and falsehood," an "arrogant faculty, the enemy of reason" (*Pensées* §2 #82: Lafuma, 1960). Deep cultural ambivalence about imagination has a long history (Kearney, 1988; Brann, 1991); no wonder the Renaissance philosopher Gianfrancesco Pico della

Mirandola was driven to the conclusion that "not only all the good, universally, but also all the bad, can be derived from the imagination" (c.1500).[1]

Deflation or Inflation?

Although the word "imagination" is heard frequently enough, both in scholarly and lay discourse, its meaning, once we pay attention to it, is often far from clear. It seems to be an indispensable psychological concept (it has certainly survived in our folk-psychological vocabulary for a very long time), but it has an air of the unscientific, even the occult, about it that often renders it suspect to those who pride themselves on their rationality. Daston has gone so far as to write of a history of "fear and loathing of the imagination" in scientific circles (1998). On the rare occasions that contemporary scientists have ventured to grapple with this treacherous concept, they have almost invariably wound up focusing on just one, or a very few, idiosyncratically chosen aspects of its seemingly protean, multifaceted nature (Thomas, 2003).

Analytical philosophers often see themselves as being in the business of clarifying concepts, so one might think that they would see a real opportunity to do something useful here. In fact, however, some of the "fear and loathing" of the scientists seems to have rubbed off on them, and few have paid it much serious attention. The limited attention it has received, has come more from aestheticians rather than philosophers of mind or epistemologists. Inasmuch as there is any consensus view of imagination in analytical philosophy circles, it is deeply deflationary. Some think of "imagination" as a polysemous word, nothing but a label we apply indiscriminately to a motley collection of mental capacities that are united by little more than the fact that they are poorly understood (e.g., Ryle, 1949; Flew, 1953; Strawson, 1971; Sparshott, 1990; Stevenson, 2003). For others, the word is just an explanatorily empty way of referring to our ability to conceive of what is conceivable (e.g., Rorty, 1988; White, 1990; Nozick, 1993; Nichols & Stich, 2000). Although one or other of these views is very often taken for granted (and the second has begun to spread, unexamined, into cognitive science (Byrne, 2005)), real arguments in support of either of them are few and far between. Arguments for the polysemy view tend to amount to little more than the listing of a bunch of apparently diverse usages of the verb "to imagine" and, as it were, throwing up the hands in despair; the view that imagination is the faculty of conceiving of the conceivable (i.e., of things that are conceptually possible) is usually simply asserted. White (1990), may be the only philosopher to have published a systematic defense of deflationism. He firmly rejects the polysemy view, but makes a real case for the idea that "imagination" has no conceptual connection whatsoever with mental imagery, and always and everywhere just means the capacity to conceive of conceptual possibilities. Admittedly, this does seem to encompass the *extension* of the wide variety of usages of "imagination" (and related words, such as "imagine" and "imaginative") quite well. However, as when *featherless biped* is offered as a definition of "human being," it leaves the feeling that the essence of the concept has been missed, and thereby insinuates the radically deflationist view

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[1] Gianfrancesco should not be confused with his somewhat better known uncle, also a philosopher, Giovanni Pico della Mirandola.

that imagination has no essence, that it does not really exist. I have rebutted White's arguments, which mostly rest upon his intuitions about correct English usage, in some detail elsewhere (Thomas, 1997), so I will not further address them here.

More than likely, much of the motivation behind deflationism, and behind much of the scientific wariness of imagination too, lies in a delayed reaction against the rhetorical excesses of the Romantic movement. In their own reaction against the "Age of Reason," Romantic thinkers seized upon what had long been considered a necessary but relatively humble (not to say untrustworthy) faculty of the human mind, and, notoriously, virtually deified it. Formerly seen as ancillary and (when functioning properly) subordinate to reason, imagination became the "substance" to which reason is but the "shadow" (Shelley); not only "absolute power/ And clearest insight, amplitude of mind,/ And Reason in her most exalted mood" (Wordsworth), but "the Divine Vision and Fruition / In which Man liveth eternally" (Blake), and "the living power and prime agent of all human perception, . . . a repetition in the finite mind of the eternal act of creation in the infinite I AM" (Coleridge).[2] As this once humble faculty was valorized out of all recognition, it also changed from being something that was merely unexplained, into something that *should not be* explained, something ineffable and sacramentally mysterious. Some two centuries later, this Romantic conception of imagination (or its degenerate descendants) continues to have enormous popular influence. The once striking tropes of Romanticism have become stale clichés, and while some still cling to them, and continue to repeat hyperbolic claims about imagination, those of more meticulous sensibilities may recoil, and begin to regard the very concept as suspect.

McGinn on the Discontinuity of Imagination and Perception

Colin McGinn's recent book on imagination, *Mindsight* (2004),[3] is notable in that it succumbs neither to Romantic obscurantism about the imagination nor to its inverse, scientistic deflationism (although it does not directly confront either tradition). This is surprising in a way, because McGinn is well known for his "mysterianism" about consciousness. Although he believes that consciousness arises from the brain, he holds that how this can be so is likely to remain forever beyond the reach of our understanding (1999). Imagination and consciousness are closely intertwined concepts (Thomas, 2006), and mysterian attitudes towards imagination have long been with us. It was not only Romantic poets who regarded it as ineffable. Even Hume, that most sober of philosophers, called the imagination a "magical faculty," (1739 I.1.vii), and Kant, in similar vein, described it as depending upon "an art concealed in the depths of the human

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[2] The Shelley is from his *A Defense of Poetry* (1821), the Wordsworth is from *The Prelude* (1850, book 14, lines 190-192), the Blake is from his *Milton* (written c.1804-1808 - in Keynes, 1966), and the Coleridge, complete with capitalization, is from chapter 13, "On the Imagination, or Esemplastic Power" of his *Biographia Literaria* (1817).

[3] Henceforth, unless otherwise indicated, page and chapter references will be to this work.

soul, whose real modes of activity nature is hardly likely ever to allow us to discover" (1781-7 A141-B181). However, there is no sign of mysterianism in *Mindsight*. McGinn clearly hopes for, and is seeking a basis for, a rational and scientific understanding of imagination. I do not think he succeeds: I shall argue below that he makes a number of significant false steps. However, his work does open up possibilities for useful discussion. In what follows, I will attempt to build upon McGinn's work, and to correct his more serious mistakes, in order to move forward his project of developing an understanding of the imagination that neither sanctifies nor trivializes it.

Unlike most analytical deflationists, but in common with virtually all pre-twentieth thinkers, including the Romantics (Warnock, 1976; White, 1990 pt. 1; Brann, 1991), McGinn sees mental imagery as central to the concept of imagination, and much of his book is in fact concerned with imagery. In his crucial first chapter, he focuses on the differences between mental images and percepts. Many writers about imagery have held some version of what we might call the "continuum theory". That is, they have regarded images and percepts as being varieties of the same species, differing in degree rather than in kind, and lying at opposite ends of a continuous spectrum with many varieties of imaginatively informed perception, such as *seeing as*, hallucination, and perceptual errors of various sorts, filling in the continuum between them. Some have defended this idea explicitly (e.g., Jastrow, 1899; Savage, 1975; Thomas, 1997); more often it is accepted implicitly, without real argument.

Indeed, the contemporary cognitive science of mental imagery is very largely predicated upon the truth of the continuum theory. Setting aside minor variants, there are currently *three* hotly contending candidate scientific theories of mental imagery (Morris & Hampson, 1983; Thomas, 1999a, 2008, 2009a). According to *quasi-pictorial* theory, visual percepts and visual mental images are both picture-like, two-dimensional patterns of excitation in a "visual buffer" in the brain (Kosslyn, 1994; Kosslyn, Thompson, & Ganis, 2006). According to *description* (or "propositional") theory, percepts and images are both descriptions of visual scenes, couched in the brain's inner "language of thought" (Pylyshyn, 1978, 1981, 2002, 2003). According to *enactive* theory (a.k.a. motor theory, perceptual cycle theory, role taking theory, etc.), the process of perception necessarily involves action (Neisser, 1976; Ballard, 1991; O'Regan & Noë, 2001; Noë, 2004), and both perceptual experiences and mental images are (or supervene upon) equivalent, but abortive and largely covert, perceptual action sequences (Neisser, 1976; Thomas, 1999a, 2009a,b; Bartolomeo, 2002; Blain, 2007).[4] Although these three types of theory are in deep contention with one another in many respects, at both empirical and philosophical levels, all of them regard mental images as fundamentally akin to percepts. (Their differences are rooted in deeper differences over the nature of perception, mental representation, and conscious experience (Thomas, 2008, 2009a).) Thus they all depend upon the continuum theory. I do not know whether a theory of the nature and mechanisms of imagery that does *not* assume the

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[4] *Quasi-pictorial theory* is probably currently the most widely accepted of these theories, but it is worth noting that McGinn (ch. 5) explicitly argues against it, although without committing to either of the extant alternatives.

continuum theory is really a coherent possibility; at any rate, no-one ever seems to have devised one.

McGinn, however, follows philosophers such as Reid (1764 II.5) and Sartre (1940), who reject the continuum theory, and draw a fundamental conceptual (and phenomenological) distinction between images and percepts (and, thus, imagination and perception). This distinction plays a large role throughout *Mindsight*. Although McGinn defends this view in considerably more detail than his predecessors ever did, and although his defense is lucid, insightful, and superficially persuasive, I believe that it fails, and, in fact, that we positively *need* the continuum theory if we not to fall back into mysterianism. It is not clear that we can even get a grip on the concept of mental imagery without recognizing its fundamental kinship with perceptual experience (see Thomas, 2008 §1.1, 2009a), and as we have just seen, without it we have no inkling of a scientific account of imagery. McGinn's arguments, however, are valuable, because, through exploring in detail how they fail, we should be able to deepen out understanding of the real relationship between perception and imagination.

McGinn initially approaches the issue via Hume's well known version of the continuum theory. Hume (1739 I.1.i) held that percepts and images (*impressions* and *ideas*, in his terminology)[5] differ only in their degree of "vivacity" (by which he is generally taken to have meant something like *vividness*). They differ in the "force and liveliness" with which they strike the mind. Like many commentators before him (e.g., Reid, 1764 II.5, VI.24; Savage, 1975; Warnock, 1976), McGinn has no difficulty in showing that this view (on any plausible interpretation of "vivacity") is seriously inadequate. After all (as Hume himself admits), it is perfectly possible, and not even particularly uncommon, for people to experience percepts that are far from being vivid, forceful or lively (think, for example, of a distant cry, barely heard over the noise of some loud hubbub). Likewise, imaginative experiences can occasionally be very vivid, forceful and lively without, thereby, tempting us to mistake them for percepts. Even if we do occasionally make that mistake, furthermore, it remains a mistake. Our imaginings do not *become* percepts just because they are forceful and lively enough to fool us; but Hume's account seems to entail that they should.

Having effectively demolished Hume's version of continuum theory (and thereby, he seems to think, all possible versions), McGinn goes on to list nine (not necessarily independent) respects in which, he thinks, imagery and perception really do differ:
1) Will: We can freely choose to imagine pretty much anything we want, at any time, but we can perceive only what is actually now before us (p. 12ff);
2) Observation: Perception can bring us new information about out current environment, but imagination cannot (p. 17ff);

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[5] Yolton (1996) argues against the generally accepted view that Hume understands his *ideas* to be mental images. His position, however, is vulnerable both on conceptual and textual grounds (Thomas, 2008 §2.3.3).

3) Visual field: Our eyes can only take in things within a physiologically fixed angular field of view, and the things we see must always appear at some particular location in this visual field. Imagination, by contrast, suffers from no such limitations.(pp. 22ff);

4) Saturation: McGinn is aware of the fallacy of the hoary argument that mental images can be indeterminate in a way that percepts cannot.[6] However, he defends the related view that perceptual experiences are always "saturated" (i.e., some quality is always manifested at every point in the visual field), whereas images are typically unsaturated or "gappy": an object, such as a face, may be visualized without every detail, every shade of color at every point, being specified (p. 25f);

5) Attention: "I can pay attention to what I am seeing or I can fail to pay attention to it; but I do not have this choice in the case of images: here I must pay attention in order to be imaging at all. . . . [I]mages necessarily involve attentive intentionality . . . . [O]ne has to attend to the *object* of the image in order for the image to exist" (p. 26ff);

6) Absence: If we say that we perceive something, this implies that the something is really there in the world, present to our senses. By contrast, if we say that we imagine something, this implies that it is *not* there, *not* present to our senses (p. 29f);

7) Recognition: One knows the identity of the object of one's imagining simply in virtue of the fact that one has chosen to imagine that thing. No further act of recognition is needed in order to identify it. By contrast, perceiving what something is *does* require an act of recognition, because the identity of the object is determined not by the will, but by how the world is (p. 30f);

8) Thought: Although you can perfectly well be seeing X and, simultaneously be thinking of Y, you cannot be imagining X and simultaneously be thinking of Y. (p. 32);

9) Occlusion: Unlike real things, imaginary things do not block or occlude the visual scene. If there is a tree in front of us, we will not be able to see whatever might be hiding behind it, but if we imagine a tree in front of us, however vivid it may be it will not hide anything that is really there (p. 32f f).

I think most of what McGinn says about imagery here, and some of what he says about perception, is true. Imagery and perception do differ in most of these ways. I shall argue, however, that, like Hume's "vivacity," these differences are all best construed as differences of degree (or consequences of underlying differences of degree). Thus, the failure of Hume's simplistic, one-dimensional, "vivacity" based version of the continuum view is no ground for rejecting the view out of hand.

Nevertheless, McGinn's analysis does suggest that there are several distinct ways in which imagery and perception differ, and although not all these ways are necessarily independent of one another, this still implies that our continuum, or spectrum, is likely to be a multidimensional one. (And with that acknowledged, there will no harm in throwing vividness

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[6] In fact this argument has more often been used to distinguish mental images from pictures, but the issues are much the same in either case. See Thomas (2008 note 31) for a brief bibliography of versions and refutations of the indeterminacy argument.

or vivacity back into the mix, as one of these dimensions, so long as we are not tempted, like Hume, to privilege it over the others.) As McGinn himself points out, there is a whole range of types of experience (he classifies most of them as forms of "imaginative seeing") that are like perception in some ways and like imagery in others. If any particular such experience happens to fall well towards the perception end of the spectrum on a majority of these dimensions of difference, and only towards the imagery end, or towards the middle, on a lesser number, we might be inclined to classify it as a somewhat atypical case of perception. If the reverse is true we might be inclined to think of it a slightly aberrant example of imagination. Other more mixed cases may call for other terms: illusion, hallucination, pseudohallucination, phantasm, daydream, figment, fancy, visual ambiguity, misrecognition, pareidolia, hypnagogic image, etc. Both ordinary and technical language provide a rich, but unsystematic, vocabulary for talking about such things. One of the attractions of the multidimensional spectrum view is that it might provide the basis for a more systematic way of organizing our understanding of them. We might hope ultimately to be able to map the various types of imaginative and perceptual phenomena as regions within a unified multi-dimensional phase space.[7] Before that project can begin, however, it must be shown that what McGinn thinks are absolute differences in kind, qualitative differences, are all (or are all reducible to) quantitative differences of degree.

Reestablishing Continuity: 1. The Will

Because of the ways in which the issues are interrelated, in what follows I will not deal with McGinn's points of difference strictly in the order in which he introduces them (i.e., as listed above). Instead, each time I touch on one of these points, I will mention it in **bold type**, using the name it has been given in the bolded headings of the above list (which correspond quite closely to McGinn's own section headings).

Nevertheless, we may conveniently begin at the beginning, by considering **will**. On the one hand, this may be the criterion most likely to resonate with other philosophers, because far more influential philosophers than McGinn, notably Sartre (1940 p. 18) and Wittgenstein (1967 §§629, 633), have made similar points before. On the other hand, it is not difficult to make a *prima facie* case that it marks a difference of degree rather than kind. Although it is true that we do typically have considerable voluntary control over our imagery, this is by no means absolute, and varies in degree from case to case: we may want to imagine some familiar person's face, but be quite unable to call it to mind, and even when we can form an image of something, it is often very difficult either to visualize much detail, or to maintain the image in consciousness for more than a fleeting moment. By the same token, most people have had the experience of some apparently random image popping unbidden into consciousness, or of being unable to dismiss some annoying or disturbing image (perhaps of some gruesome or disgusting sight) from their

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[7] As we shall see in what follows, it may be that just three dimensions will be enough. If so, such a map should be relatively and easy to visualize and to grasp intuitively. Anything beyond very rough quantification along the dimensions may prove difficult, however.

mind. This does not just apply to visual images, either: most of us know what it is get a song or a snatch of music stuck, infuriatingly, in our heads.

Hallucinations might also very plausibly be taken to be examples of mental images that have thoroughly escaped the control of the will, and, as we will see later on, they have been so taken by many of the clinicians and scientists who have studied them. (This does not accord with McGinn's conception of hallucination, but, as we shall also see, that conception is badly confused.)

Perception, in turn, is not so far beyond voluntary control as McGinn wants to imply. Although the content of visual experience is, at any one time, certainly strongly constrained by what is within range of the eyes, we nevertheless have a considerable degree of voluntary control over what we actually see. Something may be there in front of you, but, if you don't want to see it, it is easy enough to shut your eyes, or turn them away; or if you *do* want to see what is not *quite* in front of you, it usually takes no great effort to turn your eyes or move your body toward it.

Ichikawa has recently attempted to defend McGinn's view about **will** from objections of this sort. He concedes that we cannot always control our imagery as well as we would like. However, he insists (rightly, I think), that, whether we succeed or no, we can always *try* to control our imagery, try to form a particular image, or to banish one from consciousness. By contrast, he thinks, it does not even make sense to *try* to exert an equivalent sort of control over perception: "The instruction, 'stop having the auditory experience of my voice, ' or 'start having the visual experience as of a red square' is a confused one" (Ichikawa, 2009 p. 107).

Those instructions, however, do not, in fact, leave me confused. It seems to me that not only could I try to follow them, but very often I could quite easily succeed. If I want to stop experiencing someone's voice, can I not stick my fingers in my ears and hum, or perhaps leave the room? As for seeing a red square, I believe I have a square red box around here somewhere that used to hold floppy discs. . . . Let me just take a moment to find it . . . and hold it up to look at. . . . There! Done!

Of course, these performances will not satisfy Ichikawa. He has already (albeit offhandedly) dismissed the suggestion that we can voluntarily change what we see by redirecting our attention elsewhere by saying that this only amounts to "indirect" control over our perceptual experience (2009 p. 107). Presumably this is meant to contrast with the direct (though imperfect) control we apparently have over our imagery, and, if merely shifting attention is sufficient for indirectness, presumably he would think that performances like leaving the room or finding and holding up a red box are profoundly indirect ways of affecting one's perceptual experience.

What, however, is the basis for this direct/indirect distinction? Ichikawa does not say, but so far as I can see, the only plausible surmise is that (for him – and perhaps implicitly for McGinn, Sartre, and Wittgenstein too) direct control of our experience is that which can be

accomplished through purely mental acts, whereas when such control involves actual bodily movements (even small ones, like turning the eyes in their sockets, or lowering their lids) then it is merely indirect.

There are at least two sorts of good reasons to reject this distinction (or, rather, to reject the idea that it is a difference in kind rather than of degree). First of all, unless we are to embrace metaphysical mind-body dualism (I doubt that Ichikawa wants to do that, and I know McGinn does not), it is not at all clear that any sharp and principled distinction can be drawn between mental acts and bodily acts. On the one hand, both, being acts, bear intentionality, so that will not serve to distinguish between them. On the other hand, from a materialistic point of view, why should we draw a sharp, ontologically significant distinction between those movements of ions and molecules through and around membranes that constitute neural activity in the brain, and the very similar electrochemical processes that constitute both signals in the peripheral motor nerves and the events within the muscle fibers that cause them to contract? Perhaps bodily acts (if we take them to consist of the relevant muscle contractions *plus* the central and peripheral neural activity that brings them about) typically use up more energy than purely mental acts, but that is a quantitative and not a qualitative difference.

Quite apart from this, however, Ichikawa seems to be assuming that changing what you see always depends upon actual bodily movement (such as turning the eyes or the head), whereas changing what you imagine never does. He is mistaken on both counts.

First of all, we can, to a degree, shift the direction of our visual attention without moving our bodies (or our eyes) in any relevant way (Posner, 1980). There is some reason to believe that such "fixation shifts," as they are called, could be enough to make an object appear or disappear from visual consciousness (Mack & Rock, 1998); certainly they can have profound effects on what it is that we think we are seeing (Tsal & Kolbet, 1985).

Even more significantly, however, there is now a considerable amount of evidence, from a range of experiments, to show that unconscious eye movements are directly involved in mental imagery. A variety of experiments have revealed that, when people form a visual mental image, they spontaneously tend to move their eyes in a spatiotemporal pattern that parallels the distinctive eye-movement pattern that they would have used in actually viewing the object or scene being imagined (Brandt & Stark, 1997; Spivey & Geng, 2001; Johansson *et al.*, 2006). If they deliberately refrain from making such movements, their imagery is degraded (Laeng & Teodorescu, 2002). Thus (in many, and perhaps most, cases), if someone wants to change what they are visually imagining, they will have to change the way they are moving their eyes. Indeed, although Ichikawa talks of banishing a mental image as if it were an effortless, purely mental act, probably the easiest way to actually get rid of an intrusive, unwanted image is to move the

eyes about deliberately, so as to disrupt the spontaneous but unconscious eye movement pattern that is sustaining it (Antrobus *et al.*, 1964; Andrade *et al.*, 1997; Barrowcliff *et al.*, 2004).[8]

All in all, then, Ichikawa's sharp, qualitative distinction between direct and indirect control over one's own experience cannot be sustained, and thus he and McGinn fail in their attempt to establish that the criterion of susceptibility to the **will** marks a *qualitative* difference between imagery and perception. I am not denying that it may usually be noticeably easier to control what we imagine than to control what we see, or even that, sometimes, we might use our sense of how, and to what degree, we are controlling an experience to ascertain whether it is real or imaginary (as Hume apparently thought we might use degrees of vividness), but this is not the sharp difference in kind that McGinn (and Ichikawa, and Sartre, and perhaps Wittgenstein) wants.

Of Passive Perception, Visual Impressions, Retinal Images, and Eye Movements

The points I have made about changing your perceptual experience through bodily movement, through turning your eyes in a different direction, banal though they may seem, touch, I think, on what may be the real foundation for the belief that imagination is fundamentally different from perception. Those who hold this view – certainly those whose defense of it we are considering here: Sartre, McGinn, Ichikawa – believe that imagination is inherently active, that imagining is something we *do*. That much is fairly uncontroversial, and I certainly have no quarrel with it. However, they think of perception, and visual perception in particular, as in its deepest essence *passive*.

Sartre, indeed, makes this point quite explicit (1940 ch. 1 §5), and Ichikawa (2009 p. 107) quotes the relevant passage approvingly, so we may take it that he agrees. McGinn is less direct, but, once one is on the alert to the issue, his passive view of perception is obvious enough, perhaps most clearly when he discusses how he thinks imagination and perception can be differentiated in terms of their relationships with **attention** and **thought** (matters to which we shall return). In effect, all these authors rest their arguments upon the assumption that we do not really need to *do* anything in order to see: that if something is illuminated and before our opened eyes, if it projects an optical image onto the retina (and the relevant nerve pathways are intact, etc.), then *we see it*, quite regardless of whether we look at it, or attend to it. From this perspective, turning the eyes is not really part of the process of seeing at all; it is something that intervenes between actual instances of seeing. Real seeing occurs when the eye is still enough to receive a nice, steady image on the retina.

An alternative, radically *active* conception of vision (and perception in general) has recently been strongly advocated by Noë and others (2004; O'Regan & Noë, 2001; Thomas, 1999a). However, I do not believe my current argument depends upon a full acceptance of this

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[8] For further supporting evidence, and further discussion of the relevance of these eye movement studies to our understanding of imagery, see Thomas (2009b §1).

viewpoint. For present purposes, I only need to establish that eye movements play an essential, rather than merely incidental, role in the normal process of seeing, and that the radically *passive* conception of vision, even though implicit acceptance of it is so widespread, is not a conceptual or empirical inevitability. It is neither the inevitable verdict of science, nor a deliverance of some timeless philosophical intuition. Rather, it has become entrenched in modern educated common sense for quite contingent historical reasons.

One source of this passive conception of vision, is the tempting analogy that has often been drawn between the process of seeing and the process of making an impression in wax. This analogy was perhaps first used by Democritus (Stratton, 1917 p. 111), and Aristotle took it up in order to explain how it might be possible for the soul to receive the form of a visible object without its actual matter entering into us (*De Anima* 424a 17ff). The soft wax, of course, represents the mind as it waits, passively, to be imprinted by the incoming sensory form.[9] As a metaphor for perception, the word "impression" is still very much with us, having been revived in the 17th century by Hobbes, amongst others, and then becoming central to Hume's philosophy. The fact that not only Hume himself, but most of his readers, even today, seem to regard this as an entirely innocuous, untendentious metaphor, is an index of how deeply the passive view of perception in general, and vision in particular, has become embedded in modern, educated common sense.

But the prevalence of the passive conception of vision in modern thought is by no means entirely due to the influence of Aristotle and the *impression* metaphor. It is also bound up with one of the emblematic discoveries of the scientific revolution, that lies at the very roots of modern science and modern philosophy. The theory of the retinal image, and the optics of its formation, was first worked out in the early 17th century by Johannes Kepler (Lindberg, 1976), even better known, of course, for his major contribution toward our modern understanding of the solar system, and thus one of the leading hero-figures in our mythos of the Scientific Revolution. Before long, Kepler's retinal image theory was being confirmed experimentally, most notably, perhaps, by Descartes (not only "the father of modern philosophy ," but himself a key figure in the Scientific Revolution). In his *Optics* (*discourse V*: p. 166 in Cottingham *et al.*, 1985)

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[9] This last remark does not apply to Democritus, who appears to have held that the impression was made upon the air between the perceiver and the perceived object, and only subsequently entered the eye. Aristotle, however, clearly thinks of the impression as being formed inside the subject, as does Plato, when he mentions the wax impression analogy in the context of a discussion of memory formation (*Theatetus* 191c,d). Aristotle also uses the wax impression analogy to explain memory (*De Memoria* 450a 30f). However, as Aristotle clearly regarded memories as mental images, there is little reason to think that he would have differentiated between impressions produced during perception (*De Anima* 424a 17ff) and ones laid down as memories.

Descartes describes how to prepare and set up an eyeball taken from a recently deceased person or animal, in order to see for yourself the retinal image formed within it.[10]

The fact that this to be is done with a dead eye, dissected out of the body of which it was once a part, serves to make it very clear that retinal image formation is a purely passive matter, driven not by the agency of a living animal or person, but entirely by the incoming light. Descartes built the rest of his theory of visual perception (and, to a considerable degree, his epistemology too) upon the foundation of this important scientific discovery. The optics of the retinal image became the basis for speculations about visual cognition that went far beyond the available empirical evidence. Nerve pathways from the retina, he suggested, terminate near the surface of the pineal gland, in the center of the brain, and are so arranged that they cause another image, isomorphic to the retinal image, to be projected there. The images from each retina are projected to the same place, to form a single, combined, internal image on the surface of this gland, which was, of course, notoriously, the place where he believed that the physical processes of the body managed, in some mysterious, unexplained fashion, to interact with the immaterial, conscious soul.[11] Thus, it is not our retinal images, and still less the external world, that are the direct cause of our visual experiences, but the images formed in this mysterious, hidden, inner place. It is these images that we (our true selves, our souls) experience, rather than the world. Note also, however, that it is only at this last stage, as the soul is affected by the imaginal representation inside the brain, that anything possessing agency even enters the story. Everything leading up to it, in the eye and in the brain, are things our bodies passively suffer as a result of the impact of light.[12]

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[10] Descartes was not the first to describe such an experiment. He was anticipated by some seven years by the Jesuit scholar Christoph Scheiner (Wade & Tatler, 2005).

[11] This physiological theory remains in the background of the more "philosophical" works of Descartes, such as the *Meditations*, for which he is best known today, but are spelled out in detail in his now lesser known "scientific" works, such as the *Optics* and, especially, the *Treatise on Man* (both abridged in Cottingham, Stoothoff, & Murdoch, 1985). In their time, these works were widely read and very influential. Although the *Treatise on Man* was written relatively early in Descartes' career, and was not published during his lifetime, there is ample evidence in late material such as the *Passions of the Soul* and the *Conversation with Burman* (Cottingham, Stoothoff, & Murdoch, 1985; Cottingham, 1976), that the ideas therein continued to shape his thinking to the end.

[12] This very brief account simplifies both physiological and philosophical aspects of Descartes' theory of vision, but not, I think, in such a way as to be misleading in the present context. As has frequently been noted, Descartes insists that it is not important that the visual representation in the brain (i.e., the image on the pineal surface) resemble what it represents *(Optics* IV & VII, in Cottingham *et al.*, 1985); what is important is merely that it affect the soul in the appropriate way. Thus, although the image on the pineal gland happens to resemble its object, *that* is not what makes it a representation of that object. It is a representation because of

The fact that seeing involves the formation of a retinal image does not, in fact, *entail* that seeing is fundamentally passive. Nobody has ever seriously believed, after all, that retinal image formation is the whole of the story. However, if it is the *one big fact* that you know about vision, the crucial, new, exciting discovery that has made your understanding of vision modern and scientific (as heliocentrism made astronomy and cosmology modern and scientific) then it is understandable that you might want to try to build the rest of your visual theory in its image. This was indeed the situation for Descartes, and for his successors, for quite a long time afterwards.

Very few philosophers or cognitive scientists today believe in the Cartesian immaterial soul, and almost every detail of Descartes' speculative neurophysiology has been superseded as brain science has advanced since his time. Nevertheless, although every brick in the original edifice has been replaced, the basic architecture of the Cartesian model of vision – the idea that the essence of seeing is the passive reception of an image by the eyes, followed by the projection (and, in modern versions, processing) of the visual information contained in that image back, deep into the brain, until it eventually becomes *experience* – continues to shape popular and introductory, and even not-so-introductory, accounts of visual science (e.g., Pringle, 2000; Boothe, 2002; Marr, 1982).[13] Most of us are well socialized into believing that any other way of thinking about how we see is not only repugnant to common sense, but also thoroughly unscientific, and the findings of modern neuroscience are still, more often than not (and insofar as it is possible), interpreted in the light of this theoretical framework.

It is worth noting, however, that people who do not know about retinal images, do not necessarily find the idea that visual perception occurs passively particularly intuitively compelling. This is evidenced by the fact that theories depicting vision very much as dependent upon the active agency of the seeing organism, as a process of reaching into the visual world

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the causal role it plays withing the cognitive system. In this respect, then, Descartes' view is closer to modern functionalism than it might superficially appear to be. By the same token, of course, contemporary functionalist versions of the passive theory of vision are more Cartesian than might otherwise be realized.

[13] Pringle's *Explore your Senses: Sight* (2000) is one of a series of five children's books, each dealing with the basic science of one of the traditional five senses. Each of them unequivocally informs its readers that science tells us that perceptual experience "actually" occurs in the brain. The sense organs are treated as mere transducers or data input devices sending information in towards the Cartesian center. I do not cite Pringle's work because I think it is bad, but, quite the contrary, because it is a typical and competent example of its genre. For generations now, works like this have taught budding young scientists (and philosophers) that this is the only "scientific" way to think about perceptual experience. That is not true. It is not true even though some perceptual scientists may continue to think so. Boothe (2002) is an undergraduate textbook on the science of vision. Marr (1982) is (still) a massively influential research monograph. All continue to perpetuate the Cartesian vision of vision.

rather than passively waiting to be affected by it, flourished mightily in the ancient world (and in early medieval Islamic culture). For many centuries such theories seem to have dominated (though they did not entirely monopolize) the learned understanding of vision, and they were developed with considerable philosophical and mathematical detail and sophistication that, in fact, did much to pave the way for modern scientific optics (Lindberg, 1976; Smith, 1981). It is true that we now know that these theories were founded upon some fundamental misconceptions about the natures of both light and the eye. No "rays" emerge from the eyes, as the ancient theorists believed. Nevertheless, even in contemporary America, many children, and even many adults who have not yet had the fundamentals of retinal optics (and the accompanying ideology of Cartesian passivism) sufficiently dinned into them, apparently find it more intuitive to think of vision much as these ancients did, as fundamentally active rather than passive (Winer *et al.*, 2002).

Perhaps these untutored intuitions have something to be said for them. Thanks to the sophisticated techniques and instruments now available to optical scientists, the optics of retinal image formation by no means remains (as it was in the 17th century) the only well-established, hard scientific fact that we have about the workings of our eyes. We know quite a lot of other things now, and although these newer facts cannot match the fame or luster that still attaches to retinal image optics, they are just as factual, and, I want to suggest, when given their due weight they point towards an understanding of the visual process as a whole that is really quite at odds with traditional Cartesian-style passivism.

In particular, recent visual science has now made it quite clear that the continual and purposeful movements of our eyes play a central and ineliminable role in vision. The fact that we turn our eyes every so often, in order to look in a different direction, is only the tip of the iceberg; "*most* human behaviors are eye movements" (Bridgeman, 1992 p. 76).[14] If our eyes did not move, we would, quite literally, be unable to see.[15] In order to extract the useful information from the light that surrounds us, our eyes (directed, for the most part, by sub-personal, unconscious brain processes) constantly flit about in large and small motions. There are several distinctive types of eye movement, but the best studied (and probably the most important) are the rapid, irregular "flicks" known as *saccades*. These normally occur several times per second, and are absolutely integral to human vision. Despite this, and despite that fact that a large

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[14] Emphasis added. Of course, this raises questions about how to count behaviors, but the mere fact that the claim has *prima facie* plausibility brings home the fact that we do make an awful lot of eye movements, and suggests that there must be some good reasons for them.

[15] If the optical image is kept artificially stable on the retina for more than a more than a very short period of time (something that is quite difficult, technically, to achieve) then, due to the fatiguing of the retinal receptor cells, the visual experience fades away and the subject ceases to see anything (Martinez-Conde *et al.*, 2004; Coppola & Purves, 1996). (It does not follow, however, that the avoidance of receptor fatigue is the only, or even main, function of eye movements.)

saccade will very radically alter the optical image falling one's retina, we are normally unaware of their occurrence, and not just their frequency but their very existence came as some surprise to the late 19th century visual scientists who first formally described them (Wade & Tatler, 2005).

More recent technological advances have made the accurate measurement and recording of eye movements possible in the laboratory, and have revealed that, despite the fact that we are largely unaware of making them, they are nevertheless under purposeful cognitive control. The pattern of saccadic movement is complex and irregular, but it is far from random. It depends both on the detailed structure of the visual scene that a person is looking at, and on the larger purpose behind the looking: on what information we hope to discover, and on what we need to know in order successfully to pursue our ongoing behavioral goals (Stark & Ellis, 1981; Hayhoe & Ballard, 2005; Martinez-Conde & Macknik, 2007; Rothkopf *et al.*, 2007).

The passive, Cartesian theory of vision is very often combined with the "snapshot conception of visual experience" that has recently been very effectively criticized by Noë (2004). The passive theory, and the understanding of the optics of the eye that is at its heart, opens up a conceptual space in which the seductive analogy between seeing and photography can take root. Thus we arrive at the idea (explicitly embraced by, for instance, Bergson (1907)) that it is appropriate to conceive of visual experience as consisting of a succession of essentially static images of what is before our eyes at a particular instant, like a sequence of still photographs, or the individual frames of a movie. After all, although optical images (such as retinal images, or those in a *camera obscura*) do not *have* to be static, they are, to all intents, formed instantaneously.[16] If the eye is regarded (in the 17th century fashion) as preeminently a device for retinal image formation (setting aside the muscles that jerk it around in a way that no photographer would tolerate, and the complex structure of the retina, with, its unevenly distributed photoreceptors), and if retinal image formation is seen as the heart and soul of visual perception, it is tempting to think that once such an image has, in an instant, been formed, an act of seeing has been accomplished, and we are ready to move on to the next, and, a moment later, to the next, and so on.

Back in the 1960s, Neisser (1967) explicitly employed the metaphor of the "visual snapshot" in an attempt to reconcile the "information processing" theory of vision, a modernized version of Cartesian passivism, with what was then understood about saccadic eye movements:

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[16] Historically, of course, the 17th century understanding of the optics of the eye was formed upon the analogy of the *camera obscura*. However, through most of the 19th and 20th centuries the cameras (both still and movie) with which most people were overwhelmingly most familiar were those that rely upon a shutter mechanism to briefly expose a photosensitive film to focused light, and to freeze motion. This is the technology from which the *snapshot* concept derives. Now that this sort of camera has largely been displaced by digital video and still cameras, the snapshot metaphor may no longer be quite as tempting as it once was, but I fear it has already wormed its way deeply into popular conceptions of human vision.

that the eyes move in quick saccades, interspersed with brief moments of relative immobility (*fixations*). He drew an explicit analogy between a fixation and the snapping of a photograph. Even then, however, Neisser clearly recognized both that this was at odds with the subjective experience of vision (which seems, surely, to be continuous), and that it would be very difficult to give a satisfactory account of how such snapshots might be integrated into a coherent and cognitively useful representation of the visible world. Later he firmly repudiated not only the snapshot metaphor, but the whole passivist, information-processing framework that had motivated it (Neisser, 1976).

In fact, modern research shows that the eyes are not stationary, even during the periods of apparent fixation. Not only are there the large, relatively easily observable saccades, through which we turn our eyes to look at different parts of the scene before us, and over which we can exert at least a limited degree of voluntary control, there are also *microsaccades* which continue to occur, well below the threshold of consciousness, even during the periods of so-called "fixation" between larger saccades, when we seem, subjectively, to be holding our eyes still. Even in the intervals between microsaccades, the eyes continue to move, making slower movements of comparable amplitude known as *drifts*. Superimposed on all these other movements, a low amplitude, high frequency *tremor* carries on continually.[17] As already noted, although most of them are not made by conscious volition, saccades are clearly under cognitive control, and serve important visual functions. The evidence is, as yet, less clear concerning drift and tremor, but there are good reasons to think that the same is true of them (Spauschus *et al.*, 1999; Hennig *et al.*, 2002; Martinez-Conde *et al.*, 2004; Kagan *et al.*, 2008). Indeed, counterintuitive as it may seem, "fixation eye movements" in general (microsaccades and/or drift, and possibly tremor too) seem to be necessary in order for us to discern fine levels of visual detail. Much as we need to move our fingers over a surface in order to feel its texture, we need to move the retinal image over the receptor cells in the retina in order to sense the fine details of its optical structure (Rucci & Desbordes, 2003; Martinez-Conde *et al.*, 2004; Rucci *et al.*, 2007; Martinez-Conde & Macknik, 2007; Kagan *et al.*, 2008).

In addition to direct evidence of this sort there are more general considerations, arising from the anatomical structure of the human visual system, that point towards the crucial importance of eye movements to ordinary visual experience. Because of the structure of the human retina, at any one instant our eyes can only take in fine detail and rich color in a very small, central region of our visual field, corresponding to the *fovea*, the central region of the retina, where most of the color sensitive cone cells are located, and where these receptor cells are packed together most closely. The fovea comprises only about 1% of the total area of the light sensitive retina, and it takes in information from a visual angle of only about $2°$, "about the size of a thumbnail at arm's length", as compared to about $200°$ for the eye (and retina) as a

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[17] There are also a number of other types of largely involuntary, eye movements. These include the *smooth pursuit* or *tracking* movements by which our eyes follow the path of a moving object, and the *vergence* movements whereby the two eyes converge to fixate objects at different distances (Hallett, 1986 §2.1.1).

whole (Richardson & Spivey, 2004). Moving away from the fovea towards those parts of the retina that subserve the peripheral visual field, we find that the light sensitive cells are progressively spaced further and further apart, and that a decreasing proportion of them are color sensitive cone cells. Most of the cone cells are in or fairly close to the fovea, and the peripheral retina consists mostly of rod cells, which do not register color at all, but only discriminate light or dark, and even these are widely spaced compared to the densely packed fovea (Conway, 2009; Roorda & Williams, 1999; Curcio *et al.*, 1991). The few scattered cones that do occur in the far periphery of the visual field do not seem to subserve color vision there (Wooten & Wald, 1973). Thus our capacity for color vision and for discriminating fine detail falls off sharply away from the central 2° of our visual field, and in the far periphery we can do little more than sense the mere presence or motion of some indefinite thing, and we must turn our eyes to bring it into foveal vision if we want to know what it is.[18] Our normal impression that there is a richly detailed and colored visual world all around us is sustained only because of the way our eyes effortlessly and constantly turn in their sockets, rapidly moving this searchlight beam of detailed, foveal color vision from one spot to another. We do not normally notice that our peripheral vision is uncolored, but that is just one more token of the fact that eye movements are an integral and automatic (and so largely unnoticed) part of normal seeing.

I do not, however, mean to imply that the dependence of vision upon eye movement is entirely a consequence of the specific type of retinal anatomy possessed by humans. Most species of animal do not have a foveally structured retina, but most species that have a more than rudimentary visual capacity (including many invertebrates) *do* make saccade-like eye movements (Land, 1999).[19] Even visual systems very different from (and much simpler than) ours have been shown to rely upon movements of the receptor cells relative to the source of their illumination. Insect eyes are very different from ours, and cannot be moved independently of the head. Nevertheless insect vision appears to depend very largely on the changes in visual stimulation that arise as the insect moves its head, or its whole body, relative to the things around it (Horridge, 1996). Even the visual capacity of simple plankton animals (whose "eyes"

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[18] If you doubt it, you can demonstrate the lack of color and detail vision in the periphery to yourself by trying the following experiment, suggested by Dennett (1991, 53-54). Stare straight ahead, keeping your eyes as still as possible, and, without looking, select a playing card randomly from a deck. Hold the card up to your side, and gradually bring it into range of your peripheral vision, and then slowly further in towards the center of your gaze. (You do not have to use a playing card, but is important not to know the color of whattever you use beforehand, because otherwise you may "imagine" you can sense its color long before you really can.) You should be able to tell that *something* is there long before you can say either what color it is, or what its value or suit is (or even whether or not it is a face card). Even when you can first detect the color, it will probably not seem nearly as vibrant as it does when it is right in front of you, fully foveated.

[19] It seems likely that a pre-existing saccadic eye movement system made the evolution of a foveal retina possible, as opposed to having evolved to meet the needs of a foveal retina.

contain just a single light-sensitive cell, with no apparatus for forming an image whatsoever) has recently been shown to depend upon their self-movement. They can tell when they are moving in the right direction (toward the light) only if they rotate their bodies (thereby turning their eyes) as they swim (Jékely *et al.,* 2008).

From within the still dominant conceptual framework of the passive, Cartesian theory of vision, eye movements, if they are considered at all, appear to be extraneous to the real processes of vision. According to Findlay & Gilchrist, "Many [college level] texts on vision do not even mention that the eyes can move" (2003 p. 1). Worse still, when they *are* discussed eye movements are often treated as if they are a "problem" that our visual system must somehow overcome (e.g., Ross *et al.*, 2001): our brains must have developed elaborate ways to "compensate " for the movements of our eyes, so that the things we are experiencing do not seem to jump about wildly as the optical image on the retina (and the corresponding neural representation in the visual cortex: the modern counterpart of Descartes' image on the surface of the pineal gland) wobbles and jitters about with each little movement.[20] Seeing, it seems, would be so much easier if only we were able to hold our eyes still, so as to produce a nice steady retinal image for the inner homunculus to analyze at its leisure!

As others have noted (O'Regan, 1992; Bridgeman *et al.,* 1994; Noë, 2004), something is very wrong with that picture. Not only have we somehow failed to evolve the capacity to hold our eyes still, we have evolved an elaborate systems of muscles (and brain regions controlling those muscles) that actively keep them in constant and irregular motion. We do not need a stable retinal image in order to be able to see a stable world, nor do we need a stable representation in visual cortex, because we experience neither the image nor the representation, but the world itself (which, thankfully, is normally fairly stable). What we need in order to see it properly, it turns out, is an image that gets moved, in a suitable way, across the retina, thereby inducing an informative pattern of *change* in the firing rates of the receptor cells, and a corresponding pattern of change in the cortical representations. Eye movements are not a bug, they are a feature. Far from being unnecessary, extraneous, or problematic, they play an essential and integral role in normal vision. Gilchrist *et al.* (1998) describe the case of a young woman whose eye muscles are paralyzed by disease. In order to be able to see (relatively) normally, she has had to learn to make constant small jerky movements of her head, mimicking, as best she can, the movements of healthy eyes.

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[20] It is true that there is a neural mechanism known as *saccadic suppression* that appears to suppress aspects of visual processing during the saccade itself (Vallines & Greenlee, 2006). The issue of concern, however, is not what happens *during* saccades, but the fact that from one saccade to the next the images of each feature of the visual scene will have changed position on the retina. Also, of course, during the brief periods of (relative) fixation between saccades, when this suppression is lifted, other forms of eye movement such as drift and tremor are continuing.

Reestablishing Continuity: 2. Recognition

Now that we are armed with an understanding of vision that is rooted in 21st rather than 17th century science, let us return to the consideration of the relationship between imagination and perception. Ichikawa (2009) apparently thinks that the criterion of **will** is quite sufficient to establish that there is a sharp distinction in kind between them. Sartre and Wittgenstein may have thought so too. McGinn, however, seems not to be so sanguine, and, as we have seen, offers us *eight* further criteria to do the same job. We are now ready to consider the rest of them.

In fact, however, McGinn justifies his claim about **recognition** as a corollary of his views about the **will**: if everything we imagine is something we have chosen to imagine, he suggests, we do not need to recognize it to know what it is. On the other hand, we *do* need to recognize the things we perceive, because they are not chosen but, as it were, imposed on us by the external world. As we saw earlier, however, our voluntary control over our imagery is far from absolute. If an image comes to mind unbidden, it may indeed take an effort of recognition to realize what it represents. Sometimes, an image of a face of someone from our past might drift into consciousness, and it might not be at all easy to put a name to it, or even remember the circumstances from which we recall it. Likewise, perhaps the most infuriating of the tunes that gets stuck in your head are the ones that you cannot readily identify. Even deliberately formed mental images are not always the images we want. Surely I am not alone in having had the experience of trying to recall the appearance of some particular place or person from my past, and thinking I had succeeded, only to realize later on that the image I had called to mind could not possibly be of what I had intended, and to recognize it as a memory of somewhere or someone else (or perhaps, even, from a dream).

Conversely, I am less than convinced that seeing something *always* calls for an act of recognition. Just as I can choose to imagine something, cannot I also sometimes choose to see something, by simply, once again, turning my eyes towards it? If I already knew what and where the thing was before I looked toward it, do I really actually need to recognize it when it comes into view? When I look at myself in the bathroom mirror in the morning, do I really need to recognize myself in order to know I am seeing me?

It is probably true that perceiving calls for recognizing much more often than imagining does, but perception may not always call for recognition, and imagining sometimes does have a place for it. The difference is one of degree, not kind.

Reestablishing Continuity: 3. Attention

I have no quarrel with McGinn's contention that imagery necessarily involves **attention**, or what he calls "attentive intentionality." Indeed, I myself have elsewhere proposed a theory that could reasonably be nutshelled by saying that mental images are, in a sense, *made of*

attention (Thomas, 1999a, 2008 §4.5, 2009a,b),[21] and although not all imagery theorists go quite so far as that, they nevertheless give attentional processes an important role in their account (Kosslyn, Thompson & Ganis, 2006).

McGinn is mistaken, however, in denying that attention is also necessary for seeing. The Cartesian, passivist conception of vision may tempt us into thinking that if something is, right now, *potentially* visible to us (i.e., we are awake, it is before our opened eyes, it is illuminated, nerve pathways are intact, etc.) then we *ipso facto* see it. In fact, however, passive reception of energies by the sense receptors, even if followed by transmission to the brain, is insufficient for perception in general, and for seeing in particular. Experimental studies have shown that, if our attention is sufficiently tied up with some other task, we may well have no conscious awareness whatsoever of even downright conspicuous objects or events that appear or occur right in front of us (Mack & Rock, 1998; Simons & Chabris, 1999). This counterintuitive but well established phenomenon is known as "inattentional blindness." Conscious visual experience depends upon the active, purposeful, attentive seeking out of environmental information, and this attentional activity plays a constitutive, and not merely incidental, role in vision.

It is important to remember that eye movements are far from being the *only* means by which we direct our attention. There are also numerous acts of directed attention that are carried out entirely within the brain, and at multiple levels of the visual processing hierarchy. Furthermore, visual attention is not just a matter of spatial direction or location. There are brain mechanisms that enable us to pay attention selectively to particular objects rather than just spatial locations, and even to particular aspects or features of an object, such as its shape, its color, or its motion (Reynolds & Chelazzi, 2004; Li *et al.,* 2004; Bressler *et al.,* 2008; McAlonan *et al.,* 2008).[22]

It is true that things to which we are inattentionally blind can nevertheless have some subtle effects on our behavior or behavioral dispositions (Mack & Rock, 1998; Bressan & Pizzighello, 2008). Clearly our brains are affected by them, via our eyes, and perhaps this deserves to be called seeing in some attenuated sense. That does not help the case of those who want to draw a sharp distinction between imagery and perception, however. Clearly the contrast they are trying to draw is not one between imagery and some sort of partial, automatic, subliminal registration of visual stimuli. They want to distinguish two modes of consciousness: imagination, and seeing in the full, everyday, conscious sense of the word, and *that* requires attention.

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[21] To put it just a little less gnomically, I hold that mental imagery is (or supervenes upon) the (generally covert and partial) enactment of those specific acts of directed attention that would be necessary for the perceiving of the imagined object, if it were actually present to the senses.

[22] For further supporting citations, see Thomas (2009b §3b).

Attention may be all there is to imagery. It is certainly not all there is to seeing: At the very least, seeing also depends upon the appropriate stimulation of the visual receptors in the eyes. Nevertheless, attention is necessary both to imagery *and* to seeing, so McGinn is simply wrong to think that he can draw a sharp distinction between them on the basis of its involvement.

Reestablishing Continuity: 4. The Visual Field

On the face of things, McGinn's claim that the **visual field** of imagery is unrestricted has been directly refuted by experimental studies. Kosslyn (1978) reports experiments by which he claims to have actually measured "the visual angle of the mind's eye," and to have found it to be not very different from that of the bodily eyes. This is not, however, a straightforward case of the armchair philosopher being proved wrong by the experimental scientist, but, rather, a matter of dueling preconceptions. The experiments in question in fact depend upon people being asked to imagine themselves staring fixedly ahead at some scene, not turning their eyes, heads, or bodies as they normally would, and then being asked about what they can "see" in their mental image of the scene under those circumstances. The outcome is unsurprising. They "see" only as much as they would see if they were staring fixedly ahead.[23] McGinn is clearly right to think that when the imagination is not deliberately and unnaturally constrained in this way, what it can "see" is not noticeably restricted by visual angle, or even by position: the mind's eye can quickly and easily skip around to new vantage points.

The trouble is that if the eyes are not subjected to similar unnatural restrictions, they too can easily skip around to new vantage points. Of course, if a physiologist wants to measure the visual field (i.e., the visual angle) of your eyes, then they must be held still while the measurement is made, and McGinn is certainly right to think that *while* the eyes themselves are thus held nearly still (or if we consider only what they could see during one very brief "snapshot" instant) their anatomically determined visual angle restricts what can be seen. However, he is not entitled to treat the imagination and the eyes asymmetrically, comparing what the imagination

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[23] Other, related experiments have found similar results (Finke & Kosslyn, 1980; Finke & Kurtzman, 1981), but are vulnerable to essentially same objection. The theoretical preconceptions of the experimenters – in particular, the notion that the mind's eye should have some reasonably well defined visual angle – are built into the very structure of the experiment and the instructions given to the subjects. More generally, experiments of this sort, that rely crucially upon introspective reports that cannot be independently checked, are particularly likely to be vulnerable to having their results distorted by what psychologists call *experimental demand characteristics* (Orne, 1962; Intons-Peterson, 1983; Thomas, 2008 §4.3 sup. 2), a serious pitfall of many forms of psychological experimentation on humans. Demand characteristics are formal and informal features of the experimental design, situation, and context that may enable the subjects to infer something about the experimenters' preconceptions, intentions, and expectations, and to adjust their performance accordingly (usually by doing their best to give the experimenters the results the subject thinks they want).

can encompass in its normal, free condition, over time,[24] with what the eyes can see only while they are held carefully immobile (or only during an instant). If our standard for vision is the constrained, (relatively) immobile eye – the Cartesian, passive eye – then it deserves to be compared with an equivalently constrained imagination, as in the experiments of Kosslyn and his colleagues; if our point of comparison is to be the unconstrained imagination, then we should be comparing it with the unconstrained eye, whose physiological "visual angle," once it is set free from external constraints, places few if any limitations upon what can be seen. The eyes can flit freely about from viewpoint to viewpoint very nearly as easily as the imagination can. It is *very* easy to move the eyes in their sockets (indeed, much easier than it is to hold them even somewhat still), fairly easy to turn the head, and far from impossible to move the whole body. We constantly do all these things in order to bring new vistas into view. Even though it takes a lot less effort for me to imagine Timbuktu than it does for me to go and see the city, going there is by no means beyond my powers. The difference (given that no-one, I think, holds that imagination is completely effortless) is, once again, one of degree.

If it did happen to be quite impossible, in practice, for me to get to Timbuktu, that would be for merely contingent and nomological reasons, quite unsuitable for underwriting any sort of principled or conceptual distinction between imagination and perception. Although I can imagine being on Mars, I cannot get there to see it for myself, but that is only because no suitable spacecraft has yet been built. Whatever the basis for our distinction between perception and imagination may be, it isn't rocket science.

The difference in degree between imagination and perception with respect to **visual field** may be regarded as a consequence of the fact that the body, being subject to the laws of physics and the facts of geography, is generally more recalcitrant to the **will** than is the imagination. (Perhaps the mind is subject to the laws of physics too, but it certainly takes much less effort just to fire off a few action potentials than it does even to turn the head, let alone travel to Timbuktu.) We have already seen that the difference between imagination and perception with respect to **will** is a difference of degree rather than kind, so, of course, we should not be surprised to have found that this corollary, the difference with respect to **visual field,** is likewise.

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[24] I doubt whether it is even possible to get a clear sense of the contents of one's imaginative experience at an instantaneous "snapshot" moment (the story that Mozart could imaginatively grasp a whole symphony in an atemporal moment is a myth (Kivy, 1983)). I also doubt whether, if I actually *could* isolate such an imaginative snapshot, it would prove to have an unrestricted visual field. If vision truly consisted of visual snapshots, and if mental images were like reproductions of such snapshots, then we would surely find that the visual field of an image would be at least as restricted as that of the fixated eyes. This, indeed, is what Kosslyn *did* find when he built such assumptions about the nature of vision and imagery into the demand structure of his experiments. McGinn's claim about the spatially unrestricted field of the imagination is plausible only if we take it (as we naturally do) as a claim about what we are capable of imagining over some interval of time.

Reestablishing Continuity: 5. Absence and its Consequences

I will return to McGinn's point about **absence**, but let us grant it, provisionally. The things we perceive are really there, whereas the things we imagine are not. I think this apparently conceptual truth is actually what underpins several of his other suggested criteria of differentiation between perception and imagery: **saturation**, **occlusion**, **thought**, and **observation**. These four, at least inasmuch as they appear to be differences in kind rather than of degree, are consequences of the more fundamental fact of the **absence** of the imagined object.

Let us begin with **saturation**. McGinn's view, to recap, is that visual perceptual experience is "saturated" in the sense that "every point of the visual field is such that some quality manifest there, whereas this is not true of the [mental] image" (p. 25). It does indeed seem to be the case that imagery is not saturated in this sense. My mental image of a Jackson Pollock painting (for example), no matter how vivid it is and how well I know the work, almost certainly does not specify what color appears at every single point on the canvas, and it does not need to do so in order to be a recognizable and serviceable image of the painting.

However, my visual experience in front of an actual Pollock canvas differs, in the relevant regard, not because of any fact about my instantaneous visual experience, but because of the fact that as soon as I want to know the color at any arbitrary point, I can quickly turn my attention there and find it. It is the physical world that is saturated with qualities (colors in particular), not my instantaneous perceptual experience of it.

If I were to stand far enough back, I could get an optical image of the whole canvas on my retina, but I would still not thereby be experiencing the color at every point simultaneously. As we have seen, the peripheral parts of the retina has very few color sensitive cone cells, and does not seem to be capable of differentiating colors at all. I would have to stand *very* far away from a typically large Pollock if I wanted to get an image of the whole canvas on my *fovea*. Remember, foveal vision, whereby we see rich color and fine detail, comprises only about 2° of visual angle. Clearly nobody could make out much of the intricate detail of Pollock's paint splatters if the painting were far enough away to look "about the size of a thumbnail [held] at arm's length" (Richardson & Spivey, 2004). If I were close enough to the canvas to discriminate all the artistically relevant detail, its retinal image would greatly overflow my fovea, and it would be physiologically impossible for me to take in information about the color at every point on the canvas without moving my eyes to foveate (i.e., point my fovea directly at) different areas in turn. We do not normally notice that we are getting no color information from the peripheral visual field, but that is because we normally move our eyes so frequently and automatically.

Of course, the visible world, the external, physical world around us, *does* seem to be saturated, colored all over, but that is because it *is* colored all over. Some color quality is indeed

manifested at every visible point[25] (or else it would not be visible), and, as soon as I turn my eyes to foveate any of those points, I *cannot avoid* seeing the color there (even if I have no particular interest in it at that moment, and am currently much more concerned with, say, shape). Our visual perceptual experience seems saturated with qualities because the world we are experiencing is itself saturated (in the relevant sense). When we are merely imagining, by contrast, there is no (relevant) external world there to force us to experience color in this way, and it becomes possible to shift our attentional viewpoint around an imagined object or scene, paying attention, perhaps, to shapes or spatial relationships, without taking the trouble to imagine what color would manifest itself at every point. The apparently complete saturation of perceptual experience, then, arises from the physical *presence* of whatever is being perceived, and imagery can be, and often is, experienced as unsaturated because the physical **absence** of whatever is being imagined allows it to be.

Imagery's lack of the power of **occlusion** also seems to be a fairly straightforward consequence of the **absence** of imagined objects. Things we perceive are really there, where we see them to be, so of course they block the light that would otherwise come to us from whatever is behind them. Imaginary things are not there at all, so they do not block any light.

There is a little more that should be said, however, because imagery does have *some* power to cause us to fail to see things that we would otherwise see. There may even be rare individuals who sometimes experience imagery as partially or even fully occlusive.[26] Be that as it may, even the rest of us, if we are devoting some of our attentional effort to maintaining an image in consciousness, are likely to miss seeing things that we might otherwise have seen. Keeping a visual image in mind generally reduces people's ability to detect and discriminate visual stimuli (Segal & Fusella, 1970; Craver-Lemley & Reeves, 1992; Craver-Lemley & Arterberry, 2001). No doubt this is not actual occlusion – no light is being blocked; rather, the effect is probably closely related to the *inattentional blindness* we discussed earlier – but the difference between a mental image and an opaque object, in respect of their powers to prevent us from seeing things, is not quite as absolute as we might at first be tempted to think.

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[25] I incline toward a physicalist view of color, in which colors are identified with spectral reflectance properties of object surfaces (Byrne & Hilbert, 2003). However, the present argument does not depend upon that controversial theory. If you have some objection to my saying that some *color quality* is manifested at every visible point in the external world, please feel free to substitute "some property disposed to cause a certain sort of color experience in normally sighted humans," or whatever your preferred theory of color would dictate. Of course, I am using "color" in the broad sense that includes black, white, and greys.

[26] Schatzman (1980) claims to have discovered a woman with fully occlusive imagery. He describes experiments in which her vivid mental images appeared to completely block the visual cortex's response to real stimuli that were "behind" them. However, after studying the same individual, Harris & Gregory (1981) were skeptical.

The **absence** of imagined objects also explains McGinn's observations about **thought**. Yes, if we have an image in mind but then start to think about some other, unrelated topic, the image is likely to go away. As McGinn rightly sees, mental images are only sustained in consciousness by an effortful, ongoing act of attention, and our attention has, *ex hypothesis*, turned elsewhere. But images are not unique in this regard. If we become sufficiently engrossed in some train of thought we may equally well cease to pay attention to what is before our open eyes, and thus cease to be conscious of it (inattentionally blind). It may well be true that it takes a greater degree of absorption in our thoughts to make the world go away than it does to make a mental image go away, but this is clearly a difference of degree, quite consistent with the continuum view. The sense of a more absolute, qualitative difference between the perceptual and imaginal effects of being absorbed in thought arises, I think, because when we eventually turn our attention back to the visible world, we immediately see that the same world is still there (still present, not **absent**), constraining us to have much the same sorts of visual experiences as we were having before. This (reinforced, perhaps, by the knowledge that the light has been pouring into our eyes all along, and that that, from the Cartesian, passivist point of view, ought to be sufficient for seeing) invites the questionable inference that we have been seeing the scene in front of us all along, even when we were not actually aware of it. By contrast, any mental image we may have had before becoming otherwise engrossed will be utterly gone, and can be recalled only with effort, if at all. There is thus not the same temptation to think that we might somehow have been unconsciously experiencing it the whole time.

McGinn's claim about **observation** is also, I think, a consequence of the fact that the objects of perception are materially present to us, whilst the objects of imagination are **absent** or non-existent. Sartre and Wittgenstein both argued that we can never learn anything new from our imagery, because an image contains nothing but what the imager put there, which must already have been in their mind (Sartre, 1940 ch. 1; Wittgenstein, 1967 §§627, 632). This is misleading, however. It is as if one were to say that if someone knows all the axioms and definitions of Euclidean geometry, they automatically know all of its theorems. In fact, of course, the theorems must be inferred, and this is not trivial. Kosslyn (1980, 1994) and Taylor (1981), have independently pointed out that imagery can sustain a form of inference: the information about the appearances of things that is stored in one's memory may entail facts of which one is unaware, and, in many cases, these facts can best be discovered by forming and examining a mental image. One of Kosslyn's favorite examples is the question "What shape are a German Shepherd dog's ears?" He has provided persuasive experimental evidence that people confronted with a question like this will often answer it by recalling a mental image of a German Shepherd, and "seeing" the shape of the ears in their image (Kosslyn, 1976a,b, 1980).

McGinn concedes this point to Kosslyn, but nonetheless insists that Sartre's and Wittgenstein's argument still points to an important truth. Drawing out fresh implications from what we already know is, after all, only one of the ways, and not the most important or fundamental way, in which we increase our knowledge. Through the use of my senses, through **observing** the world around me, I constantly get to know things that could not possibly have been inferred from what was already in my head. I find out, for instance, the color of a berry on a

bush – whether it is unripe and green, or ripe and reddish – by looking at it. Somehow, through perception, new information comes *from the berry itself* into my mind. This sort of knowledge gain can never come through mere imagination, because, of course, when I merely imagine a berry there *is* no berry to draw any information from. Although we can imagine something in its **absence**, we can only perceive something, and thereby draw new information from it, if it is actually there.

So is **absence** (and the differences with respect to **saturation**, **occlusion, thought**, and **observation** that flow from it) the true criterion of demarcation between imagery and perception? To say that we *perceive* something is normally to imply that it is present to be perceived. Imagery, by contrast, has often been *defined* (by me, amongst others) as quasi-perceptual experience of something in the absence of that something (McKellar, 1957; Richardson, 1969; Finke, 1989; Thomas, 2008, 2009a). This is a genuine difference between imagination and perception, but, despite appearances, it is, once again, really a difference of degree. It only appears otherwise when we fix our attention firmly on the far opposite ends of the continuum of perceptual/imaginative experience: "plain as day" veridical perception at one end, and "pure," totally stimulus-independent imagery at the other. As McGinn recognizes (he devotes a whole chapter to the matter), there is a whole range of forms of "imaginative perception" in between: mistaking a bush for a bear in the darkness; seeing the shapes of animals or angels in the clouds; mistakenly recognizing a stranger as an acquaintance; seeing an ambiguous drawing as depicting a duck (or a rabbit); recognizing the politician in the caricature; seeing paint on canvas as a portrait of Napoleon; and so on and on. These are all cases of seeing something *as* something else: *something* is present to the senses, but it is not quite what we take (or deliberately fancy) it to be. (Although even veridical seeing is *seeing as*: seeing something as what it in fact is.) The imagination, here, is not entirely free, but is constrained, to a greater or lesser degree, by what is present to the senses. We are not going to mistake that bush for a giraffe, or take the duck-rabbit figure to depict a motorcycle, and although that cloud might equally well be seen as very like a whale, a weasel or a camel, it is certainly nothing like a hollyhock.

Although he knows it is real and important, McGinn can't quite understand imaginative perception. Because he thinks that percepts and images are radically disparate things, he is forced to say that, in imaginative perception, a percept and a distinct mental image somehow become blended together, or overlain on one another. He recognizes that this is unsatisfactory, but tries to brazen it out:

> This joining of imagistic and perceptual space is particularly perplexing . . . . The intentional object of the image fuses with the object located by the percept, as if the objects of imagination have come down to earth temporarily – jumped spaces, as it were. (I know this is very obscure, but someone has to say it.) (p. 172 n.7)

Someone does *not* have to say it! The various types and examples of imaginative perception clearly differ in the degree to which the intentional content of the experience is constrained by what is present to the senses (I do not say this is the only dimension along which they differ). That being so, normal, veridical perception, and imagery, readily find their respective places at

the opposite ends of this continuum of constraint, as limit cases of imaginative perception. At one end, reliable perception (seeing things as just what they are) occurs when good seeing conditions and an intent not to be deceived converge to ensure that our experience is maximally constrained by what is present (although, even here, philosophers as diverse as Aristotle, Hume, and Kant have held that imagination still plays a vital role, interpretatively transforming raw sensory stimulation into meaningful perceptual experience (Strawson, 1971; Thomas, 1997, 1999b, 2006)). At the other end of the spectrum, when we choose to set aside the constraints of the current deliverances of our senses almost entirely, our imagination is free to construct what imagery it will. Imagery is still a form of *seeing as*, but it is unconstrained *seeing as*: it is seeing *nothing* (which, being nothing, imposes no constraints) as whatever we want it to appear to be (Thomas, 1999a).

Dreams and the Spectrum of Imagination

Having now gone through McGinn's entire list of differences between imagery and perception, I believe I have shown that his nine items can actually be reduced to just two or three. The differences with respect to **saturation**, **occlusion**, **thought**, and **observation** are all consequences of the **absence** of the imagined object (together with some facts about the role of **attention** in perception and imagery). The differences with respect to **recognition** and **visual field**, inasmuch as they are real, are consequences of the difference with respect to **will** (again, when taken together with some of the facts about **attention**). But the genuine differences that McGinn labels as **absence** and **will**, I have argued, are both best understood as differences of degree rather than of kind. The way that **attention** interacts with the voluntary control (**will**) dimension, and especially with the **absence**-presence dimension, to give rise to the other effects, may be what gives the impression that perception and imagery differ in their degree of dependence on **attention**. In fact, however, there is *no* real difference in this regard. Despite what the Cartesian, passive theory of perception might seem to imply, perceptual experience depends upon active **attention** quite as much as imaginal experience does.

Not only does McGinn fail to make his case for a distinction in kind between imagination and perception, but his insistence on it leads him into many needless difficulties (quite besides those he has with imaginative perception). For example, he devotes over twenty closely argued pages to the defense of the thoroughly unsurprising claim that dreams are products of the imagination. Ichikawa (2009) spills yet more ink in this direction. Why do they feel the need to tilt so hard at this windmill? Because (lucid dreams aside) we seem to have very little voluntary control over our dreams, and, for them both, voluntary controllability (**will**) is an essential characteristic of imagery, demarcating it from perception. Dreams thus look like a significant counterexample to the dichotomy that has been set up between imagery and perception, and McGinn must work hard to persuade us that, all appearances to the contrary, they really are under the control of the will.

He is also much concerned to reject the quite plausible notion that dream experiences are akin to that other form of quasi-perceptual experience that escapes voluntary control,

hallucination. This is because he has committed himself to the view that hallucinations are a type of percept, and thus, by his lights, not imaginative products at all. In order to keep dreams within the fold of imagination he must go to elaborate lengths to distinguish them from hallucinations, and to explain why we can't usually control them even though he thinks that they consist of inherently voluntaristic imagery.

From the continuum perspective the problem situation looks very different (and, dare I say, more interesting): percepts, dreams, hallucinations, and waking mental images, as well as all the various types of imaginative perception, are all products of the imagination, and our task is not to sort them all into two Procrustean boxes, nor to assimilate any one to any other, or banish any from the fold, but rather to map the space of imagination and the various dimensions along which imaginative experiences may differ from one another. Our analysis of McGinn's ideas has, I think, left us with three such dimensions: **absence-presence** (which might more perspicuously be called *stimulus constrainedness*), **will** (or *amenability to voluntary control*), and the old Humean dimension of "vivacity" or *vividness*. (There may also, perhaps, be others that neither Hume, McGinn, nor I have thought of.) Non-lucid dreams, presumably, score low, far from imagery and close to percepts, on the *amenability to voluntary control* scale, and also very low on the dimension of *stimulus constrainedness*, in this case being far from percepts but close to waking imagery. (*Vividness*, inasmuch as something so subjective can be quantified in a meaningful way (Thomas, 2009a), may well vary markedly from dream to dream and from person to person, as seems to be the case with waking imagery (Marks, 1999).)

Hallucinations

The philosophy of perception has long been much concerned with hallucinations, but this interest is usually motivated primarily by epistemological concerns. Can hallucinations be distinguished from veridical percepts, and, if so, how? My focus here, however, like McGinn's in *Mindsight*, is quite different. We are concerned with questions of (philosophical) psychology: with the architecture of the mind, with how, or whether, hallucinations fit in with imaginative phenomena such as mental images and dreams. McGinn does not tell us where his conception of hallucination comes from, but I suspect it is strongly influenced by his knowledge of the epistemological tradition. I shall argue that, as psychology, it is unfounded and unrealistic. I am not sure whether it matters if epistemologists work (as I fear they generally do) with a psychologically unrealistic concept of hallucination, but when one is concerned with understanding the nature and structure of the mind, it matters a great deal.

Even if, for the sake of argument, we were to grant McGinn his sharp imagination/perception distinction, we might still wonder why he so confidently classes hallucination with perception (and why Ichikawa uncritically follows him in this). Is it not at least *prima facie* plausible that hallucinations are imaginative products, mental images that, like dreams, have somehow escaped voluntary control and normal waking "reality monitoring"? It is my impression that views of this type are common, perhaps even standard, amongst those psychologists and clinicians who actually study people who suffer from hallucinations. Some

hold that hallucinations are mental images that tend to get mistaken for percepts (perhaps because they are especially vivid, or particularly recalcitrant to voluntary control, and perhaps because the person's critical judgement is acutely or chronically impaired) (e.g., Mintz & Alpert, 1972; Horowitz, 1975; Brébion *et al.*, 2008). Others prefer to focus on the similarities between hallucinations and dreams (e.g., Hartmann, 1975; Fischman, 1983; Vita *et al.*, 2008). However, if, as is widely believed (and as McGinn, Ichikawa, and I all agree), dreams are products of the imagination, and largely consist of imagery, then this latter view is merely a special case of the former.[27]

It is puzzling, then, that McGinn makes almost no attempt to justify his perceptual view of hallucination. Rather, he treats it more like a self-evident premise in several of his arguments, including some of those intended to bolster the imagination/perception distinction itself. Things become even more puzzling in chapter 8, where we find that, in McGinn's view, psychopathological symptoms such as the voices and visions sometimes experienced by schizophrenics come from the imagination, and thus, by his lights (but contrary to normal usage), do not count as hallucinations at all. What on Earth *are* hallucinations then? He gives two sorts of examples: Once or twice he passingly mentions hallucinations produced by psychedelic drugs, and, rather more often, the experiences of brains in vats.

I am confident that if he had given even minimal attention to the actual phenomenology of psychedelia McGinn would have classed it as a form of imaginative experience, as he does dreams and psychopathological visions, rather than as a form of true (i.e., for him, unimaginative and purely perceptual) hallucination. After all, psychedelic experience has often been understood, by researchers, to be a sort of temporary psychosis, whose hallucinations are akin to those of schizophrenia (Novak, 1997; Fischman, 1983; Marsh, 1979). Certainly, psychedelic experience is *not* like sober, veridical perception except that some of the things that seem plainly to be there really are not. What fun would that be?

In fact, psychedelic drug induced hallucinations seem to take three major (sometimes interacting) forms:[28]

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[27] I also consulted several overviews of the science of hallucination in order to get a sense of the scientific consensus: Slade & Bentall (1988), Assad (1990), Manford & Andermann (1998), and Aleman & Larøi (2008).

[28] This sketch of the phenomenology of psychedelic experience is synthesized from several sources: my own memories of a number of LSD "trips"; anecdotal accounts from drug users, gathered from various informal sources (including the internet); and formally published, first or second hand accounts of the effects of various hallucinogens, mostly from the scientific literature (Klüver, 1926; Huxley, 1956; Savage, 1975; Siegel & Jarvik, 1975; Marsh, 1979; Hofmann, 1980; Fischman, 1983; Siegel, 1992; Shanon, 2003). The systematization, such as it is, is my own, and I make no great claims for the account's comprehensiveness or scientific standing. My aim is merely to show that actual psychedelic experience comes nowhere near

(1) What seems best described as exceptionally intense, colorful and vivid mental imagery. This often has bizarre content (often including abstract patterns), may have synaesthetic elements (music or other sounds may trigger experiences of color and light, for example), and partially escapes voluntary control, but it can be experienced with the eyes closed at least as well as with the eyes open, and subjects are rarely, if ever, tempted to think of it as experience of things actually physically existing out in the environment. It *seems* like mental imagery rather than like perception.

(2) Probably the more salient aspect of most psychedelic experience is a marked change in the *way* that the things that really are out there in the environment are experienced. It is not seeing things that are not there; rather it is a phantasmagoria of imaginative perceiving run amok, with imagination intruding even more on perception than it normally does. Meaningless shapes and patterns may become meaningful. Inanimate objects may seem to pulsate with life, or their shapes may appear distorted. Objects (and people) may take on strong emotional valences that they do not normally have. They may directly appear to be threatening, or benign, or emblematic in one way or another. A house might suddenly seem like a palace or a hovel, for instance; an ordinary pencil might somehow seem terribly important or significant; or a perfectly ordinary woman might appear to be (not be thought of as, or believed to be, but visually appear to be) a fairy princess, or a wicked witch.

(3) Occasionally, reports of psychedelic experience include accounts of what seem to be dreamlike episodes, wherein the subject is transported to another world or another place, or where they believe they are doing things, in their current environment (or something resembling it), that they actually are not. It seems likely (though I am not aware of it having been confirmed scientifically) that, like a sleeping dreamer, people in such states are temporarily largely unaware of what is really going on around them.

The first two of these are entirely at odds with McGinn's view of hallucination as a non-imaginal, non-imaginative subtype of perception; as for the third, we have already seen that he determinedly insists that dreams are not hallucinations.

So it turns out that, for McGinn, the paradigmatic examples of hallucination are the experiences of *brains in vats* – disembodied brains kept alive in vats of nutrient, and electrically stimulated into experiencing themselves as still in bodies, having normal perceptual experiences. But, of course, such things do not exist outside of science fiction stories and the thought experiments of epistemologists and, there are reasons for doubting whether they even *could* exist (Putnam, 1981; Dennett, 1991; Cosmelli & Thompson, in press).[29] The intuition that they should

fitting McGinn's idiosyncratic conception of hallucination.

[29] Putnam's argument is well known, but both its soundness and its significance are controversial (see Brueckner, 2008). As I read it, even if sound, it does not establish that brains in vats cannot exist, but, rather, that the brain-in-a-vat thought experiment fails to provide support for radical scepticism. On that interpretation, Putnam's argument is not relevant to our current concerns. Dennett, however, and Cosmelli & Thompson (in much more detail) make a

be possible, though it often goes unquestioned, may well depend upon the prior assumption, already challenged in this essay, that passive reception of stimuli is sufficient for normal perception. In fact, as we have seen, visual experience depends just as much on the brain's outputs, and the movements of the body, especially the eyes, that these outputs control, as it does upon the inputs into sensory receptors.[30]

If brain-in-vat experiences could and did occur, McGinn is surely right to think that they ought to be classed as percepts rather than as mental images. Not only do the stories *stipulate* that the envatted experiences are subjectively completely indistinguishable from percepts, but their causes (usually something like electrical impulses fed directly into the sensory neurons from a supercomputer) are, like those of percepts, external to the organism, whereas the causes of imagery are, presumably, internal, in the brain somewhere. The actually occurring phenomena that medical professionals and others refer to as "hallucinations," however, are not caused by supercomputers, but arise from inner sources, just as mental images do. If there were a sharp distinction to be drawn here (which, of course, I deny) it would not be between hallucinations and images, but between putative brain-in-vat experiences and actual hallucinations. In terms of our multidimensional continuum, although brain-in-vat experiences and true hallucinations resemble one another in their high recalcitrance to voluntary control, and perhaps in vividness,[31] they fall toward opposite ends of the scale of stimulus constrainedness. Brain-in-vat experiences (if they occurred) would be highly constrained by the stimulation provided by the hypothetical supercomputer, just as normal perceptual experience is constrained by the environment, but "true" hallucinations, like mental images, are free figments of the brain.

Perhaps the actually occurring hallucinations that come closest to what McGinn has in mind (although there is no sign he has ever heard of them) are those of *Charles Bonnet syndrome*. This condition can afflict people whose reason and critical judgement is quite intact, but whose vision is partially impaired. In most cases, damage to either their retina or their visual cortex has left them blind in part of their visual field. Such people may occasionally experience visual hallucinations, often of people, objects or animals (they may also experience "elementary" hallucinations: flashes of colored light and the like). Voluntary control over these hallucinations is limited: they are clearly not deliberately summoned up, and they may be difficult to get rid of. However, the people who suffer from them are not deluded, and usually seem to recognize quite

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quite different, biologically based case for the nomological impossibility of the brain-in-a-vat scenario. If they are right, hallucinations as conceived by McGinn do not and cannot occur.

[30] Although what was said above focused on vision, there are good reasons to believe that all modes of perceptual experience – hearing (Dallos, 1992), touch (Lederman & Klatzky, 1990; Smith *et al.*, 2002), smell (Teghtsoonian *et al.*, 1978; Bensafi *et al.*, 2003), and taste (Halpern, 1983) – similarly depend upon bodily action.

[31] Not all hallucinations are particularly vivid (Slade & Bentall, 1988 p. 121), but then, (as McGinn is aware) neither are all percepts.

quickly and spontaneously that these are not true percepts. Furthermore, as with other types of hallucination, scientific attempts at explanation of Charles Bonnet Syndrome frequently rely upon notions such as mental imagery, dreamlike processes, or imaginative (i.e., interpretive) seeing that has escaped normal voluntary control (e.g., Schultz & Melzack, 1991; Menon *et al.*, 2003; Ashwin & Tsaloumas, 2007). That is to say, those who have clinical or personal experience with Charles Bonnet hallucinations generally regard them as imaginative phenomena.

They could be wrong, of course, but it seems very much more likely that McGinn (who evinces no familiarity whatsoever with the scientific literature on hallucinations) is wrong in thinking that hallucinations are *not* products of the imagination. When philosophers who were engaged in epistemological thought-experiments about brains in vats borrowed the word "hallucination" from the psychiatrists,[32] they actually gave it a quite new meaning. In purely epistemological contexts this may, perhaps, be harmless, but when McGinn tries to impose the new, epistemological meaning back upon the realm of psychology, where "hallucination" already has an established use, only confusion can ensue. By conflating hallucinations with brain-in-vat experiences, McGinn leads his readers (and probably himself) badly astray. His claims apply, at best, only to a non-existent phenomenon, and very likely to one that could not possibly exist. When we turn to the various types of hallucinations that people really do experience, we find that they are almost certainly quite closely related to mental imagery in both their phenomenology and their aetiology, and readily find their place along the multidimensional spectrum of imagination.[33]

Imagining That

Let us turn, now, to the notion of *imagining that*. It raises difficulties for any attempt to produce a unified account of imagination, because, unlike the imaginative phenomena we have been considering up to now – dreams, hallucinations, and all the various forms of imaginative seeing – it is not, in any very obvious way, related to either imagery or perception. It is not absurd, for example, to suggest that someone might be able to imagine that pigs can fly without ever forming a mental image of a flying pig. Indeed, I can *imagine that* certain things might be the case without even being capable of *imagining* them (in the sense of forming imagery that represents them in a non-arbitrary way): for example, I can imagine that *Goldbach's Conjecture*,

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[32] The word appears to have been given its modern meaning in the early 19th century, by the French psychiatrist Esquirol; the Latin root from which it came meant wandering of the mind, or idle, foolish talk and behavior (Sarbin & Juhasz, 1975).

[33] Some phenomena that may occasionally get called hallucinations, such as afterimages, phosphenes and migraine auras (see Grüsser & Landis, 1991), probably owe little or nothing to the imagination, and much more to the anatomy of the visual system. Probably these *should* be classed as percepts. However, these are clearly not at all what McGinn is thinking of.

or, say, *the correspondence theory of truth*, is true, but I find myself quite unable to form images of those situations.

Perhaps a case could be made for locating *imagining that* in the region of our three-dimensional spectrum where *vividness* is at a minimum (indeed, where it has gone to zero), where *stimulus constrainedness* is also very low, but where *amenability to voluntary control* is high. However, it seems more likely that (as I have argued elsewhere: Thomas, 1997), when we talk of *imagining that*, we are actually using the word "imagining" in an extended or metaphorical sense. Philosophers have been aware for a very long time that "imagination" often is used metaphorically: Aristotle, at the very outset of the discussion, explicitly noted the point when he defined *imagination* as "(apart from any metaphorical sense of the word) the process by which we say an image is presented to us" (*De Anima* III.iii 428a).[34] It is easy enough to see how a word with that literal meaning could quickly have come to be used also to mean the capacity that we have for entertaining propositions without regard for their truth value.[35]

After all, the entertaining of imagery and the entertaining of propositions are both ways in which we are able to think about non-actual situations, and in practice we very often use both of them together. If you ask me to imagine that pigs can fly, it is very probable (in my case, at least) that I will not only entertain the proposition, but will also experience, at least dimly and fleetingly, an image of a wingèd pig flapping through the air. Although the image may not be strictly necessary in order for me to have complied with your request, it is psychologically likely. Of course, imagery is very idiosyncratic: perhaps some people have little or no tendency to form such an image when entertaining that proposition, and, very likely, others tend to form much more vivid and sustained images of flying pigs than I do. Furthermore, even for the same person on different occasions, imagery can vary greatly in vividness and copiousness, and different propositions are likely to vary in their tendency to evoke imagery in different people. I have

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[34] Schofield (1978) says that Aristotle may fairly be said to have *invented* the concept of imagination (see also Juhasz, 1971), but, of course it is more accurate to say that he initiated philosophical (and psychological) discussion of it. The very fact that he felt the need to distinguish between literal and metaphorical senses of the term implies that it was already in vernacular use, in both senses, in his time. Of course, Aristotle was not actually discussing the English word "imagination" but the Greek "*phantasia*," and the word translated here as "image" is "*phantasma*." For a defense of this standard, but occasionally questioned, translation, see Thomas (2008 §2.2); for an account of how the Aristotelian *phantasia* developed into the richer Latin concept of *imaginatio*, and eventually into our *imagination*, see Watson (1988) and Cocking (1991).

[35] White (1990 pt. 1) takes some delight in catching out the great philosophers of past centuries writing of "imagining that" this or that, even though their "official" view is that imagination has to do with imagery and perception. For White, this is evidence that their relevant views were incoherent. I would suggest it is no more than evidence that they sometimes employed dead metaphors in their writing (as do we all).

never been to Samarkand, and have only the haziest idea of what the city might be like. If you ask me to imagine that I am in Samarkand, I can certainly entertain the proposition, but any imagery I produce is likely to be very weak, meager and vague, at best. On the other hand, someone who once spent many a happy hour exploring the streets of Samarkand may well produce vivid and copious imagery of it, even if they have very little tendency ever to produce imagery of flying pigs.

Now suppose you, with rich imagery of Samarkand swirling in your head, inform me that you are imagining being in Samarkand. The term "imagining" may seem appropriate to you (more appropriate than, say "thinking about") precisely because of the imagery you are having: to you, at this point, it *means* "having imagery of." But for me, although I can understand perfectly well what it is to entertain the proposition that one is in Samarkand, when I do so it evokes little or no imagery. Might I not carelessly conclude that, as you use the word, "imagine" sometimes means merely to entertain a proposition, and carries no particular implications about imagery? After a few such experiences, might I not come to use the word in this way myself, even perhaps when I am talking about the entertainment of propositions that may have little potential for evoking imagery in anyone. And, of course, more people would soon start to pick up this usage from me. Given the fact that we can never tell, independently of what they say, whether or not people are having imagery, it seems almost inevitable that things like this would happen, and that "imagining," even if originally coined to refer only to episodes of experiencing imagery (or other things along the spectrum), would very quickly extend its meaning to include the mere entertaining of propositions.[36] (There is no reason to expect that this would *displace* the imagery meaning, however, because it is also likely that on many of the occasions when X tells Y that she is imagining that *p*, this *will* evoke p-appropriate imagery for Y, and that might even sometimes happen when X is, in fact, *not* experiencing any relevant imagery, but merely entertaining a proposition.)

I thus find myself in at least partial agreement with those deflationists who hold that the verb "to imagine" is polysemous. It has two distinct, although easily confusable, meanings. I differ from them, however, in thinking that the sense that refers to the multidimensional spectrum of imaginative phenomena – imagery, hallucination, dreaming, interpretive perception, etc. – is conceptually primary, and of considerably more importance and interest. Throughout most of the twentieth century, most analytical philosophers seem to have been much more comfortable with the notion of *imagining that* than they were with mental imagery and its kin. This shift in emphasis has sometimes been presented as though it were a discovery, as if we now know that imagination is "really" a propositional matter, and Aristotle, Descartes, Hume, Kant and the rest were not really talking about what they thought they were talking about when they discussed imagination (White, 1990; Lopes, 2003 p. 208). Far from being a discovery, it is scarcely even a claim: it is an attempt to change the subject. *Imagining that* is a linguistic, or at

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[36] It is also not difficult to see how, in a similar way, the meaning of "imaginary" might come to be extended from "apprehended via imagery" to "apprehended only via imagery" to "not apprehensible via the senses" to "non-existent."

any rate a propositional matter, and, as such, lends itself to explication in terms of the characteristic tools of the analytical philosopher, logical and linguistic analysis. Those tools, however, provide relatively little purchase on something non-propositional like imagery (unless it can somehow be shown to be reducible to a propositional format) or imaginative perception. The upshot has been that most analytical philosophers (with occasional exceptions, such as Price (1953) and McGinn),[37] have preferred either to ignore imagery, or to deprecate its importance to the mental economy (Thomas, 2008 §3.3; Nyíri, 2001).[38] When one is highly skilled with a hammer, things tend to look like nails.

Thus, despite the manifest etymology of the word, and despite the way it was universally understood by earlier philosophers (Brann, 1991; White, 1990 pt.1), in the 20th century *imagination* came to be treated, by most analytically trained philosophers, as primarily a matter of *imagining that*, and only secondarily, if that, as having anything to do with imagery or perception. Implicitly, imagery came to be considered as a sort of mental luxury, serving no real purpose save the inconveniencing of philosophers of mind with the need to explain it away. From that perspective, deflationism became almost inevitable. The capacity to entertain propositions without assenting to them is scarcely a likely candidate for being that from which "not only all the good, universally, but also all the bad, can be derived," let alone "the living power and prime agent of all human perception, . . . a repetition in the finite mind of the eternal act of creation in the infinite I AM" (Pico della Mirandola, c.1500; Coleridge, 1817).[39] From the deflationary perspective, such claims are not just overblown, they are incomprehensible. From the perspective of the multidimensional spectrum, although they remain bombastic, we can make sense of them.

Creativity and Imaginativeness

In this article, I have tried to establish that there can be a cohesive, coherent and scientifically viable concept of a faculty of imagination, a faculty that plays a large and essential role in human cognition, and that can accommodate most of the mental phenomena, from

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[37] In *Mindsight* McGinn devotes much more space (and, I think, care) to imagery and other phenomena of the spectrum than he does to *imagining that*. In the end, however, he follows the analytical herd in ascribing a greater importance to the latter.

[38] For much of the 20th century, this attitude was also validated by (and, no doubt, reciprocally helped to validate) the pervasive "iconophobia" of the Behaviorist movement that dominated scientific psychology (Thomas, 2008 §3.2 sup. 2; Holt, 1964), and I certainly do not mean to imply that the widespread iconophobia of the first half of the 20th century was solely a consequence of the analytical philosophy movement. Indeed, something similar also seems to have taken hold of the "continental philosophy" tradition during roughly the same era (Jay, 1993).

[39] On Pico, see note 1, above.

memory images to dreams, and from hallucination to veridical perception, that have traditionally been ascribed to it.

What, then, of the creative imagination? That, after all, is what calls forth most of the hyperbole, but, like *imagining that,* it seems to fit in no particular place on our multidimensional spectrum. In this case, however, this is not because it is a different, metaphorical meaning of the word, discontinuous with the others, but because to call a particular piece of mental work (or its products, the ideas, actions or artifacts that result) creative is not to classify it psychologically, but to evaluate it in a certain way. It is to say that an idea, or the concrete products or practices to which it gave rise, was both *original* and *effective* in the context of the problem situation (artistic, practical, or whatever) in which it arose and was applied (cf. Barrow, 1988).

By no means all acts of the imagination are creative in this sense. There is nothing particularly original (or, indeed, effective) about seeing the duck-rabbit figure as a duck (or a rabbit), or recalling a mental image of your mother's face, or hallucinating an accusatory voice, or, indeed, having some hackneyed dream of flying, or falling, or being caught naked in public. Some confusion over this point may arise from the fact that the adjective "imaginative" (or phrases such as "shows a lot of imagination") has come to be used to describe people, or thought processes or products, that are deemed to be particularly creative. However, if imagination is essential to all thought and memory (as Aristotle, and many since, have held) and to all interpretive perception, including veridical perception, as I have suggested, then it is a fundamental cognitive function, and if it makes any sense at all to speak of one person having more of it than another (or applying more of it to some particular problem), it is certainly not clear how such vaguely specified quantitative differences might be responsible for the difference between creative successes and failures.

But the association between imagination and creativity is certainly not fortuitous. Although imagination is not always, or even usually, creative (in anything beyond a trivial sense), it may well be the case that creativity, when it does arise, necessarily springs from the imagination. In the central regions of our multi-dimensional spectrum, and thus at the heart of our concept of imagination, where experience is tied to stimulation, but not too strongly, and where our voluntary control over that experience is neither absolute nor entirely lacking, we find the various phenomena of imaginative perception, our capacity for *seeing* (and, more generally, *perceiving) as*. I have argued elsewhere that *this* is what makes creative insight, thinking that is both original and effective, possible (Thomas, 1997, 1999a; see also Blain, 2006). If our thought is not anchored in reality, not stimulus bound at all, or if it is quite out of our voluntary control, it is unlikely to be effective; if it is too closely bound to present actuality, or so much under conscious control that it cannot escape the confines of what we already explicitly believe, then it cannot be original. Imaginative perception, however, *seeing as* in both the literal and metaphorical senses of that expression, opens up the possibility of seeing things in new ways. If we are lucky and alert we may be able to see previously unnoticed aspects and possibilities in our world that open the path to a new understanding of some facet of our natural, social, or intellectual environment. If we also have the requisite skills, we may be able to convey this

insight to others – to shape or bias *their* imagination, so that they are led to notice what we have noticed – through whatever communicative medium is most appropriate to the insight: painting or poem, scientific or philosophical article, or what have you.

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