

***PERCEPTION, CAUSATION AND INFORMATION***

**by**

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This thesis contains no material which has been accepted for the award of any other higher degree or graduate diploma in any tertiary institution, and to the best of my knowledge and belief, it contains no material previously published or written by another person, except when due reference is made in the text.

*Scott Campbell*  
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Scott Campbell.

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*Abstract*

In this work I answer the question, what is it for a perceiver *P* to see a physical object *x* by having a visual experience *E*.

First of all, I consider whether a causal connection between *x* and *E* is necessary, and I conclude that it is. I then consider various causal theories of seeing. The best of these is Michael Tye's 'systematic variation' theory. Tye holds that *P* sees *x* if there is a causal connection between *x* and *E* such that varying certain of *x*'s properties would produce systematic variations in certain of *E*'s properties.

I show that a deeper explanation of seeing can be given in terms of what I call 'significant information'. I propose that *P* sees *x* when *x* causes *P* to have a visual experience *E* which provides significant information about *x* for *P*. *E* provides significant information about *x* for *P* when a perceiver of *P*'s kind can have a sufficient number of determinate true beliefs about *x*'s properties on the basis of *E*.

I then argue that there is no one kind of perceiver that *P* is, and this entails that whether *E* provides significant information about *x* for *P* depends upon what kind of perceiver *P* is being considered as. Thus, whether *P* sees *x* is relative to what kind of perceiver *P* is being considered as.

I then show that the 'systematic variation' intuition underlying Tye's theory is wrong. Rejecting this intuition allows me to overcome David Lewis's 'censor' problem, and what I call the 'idle mechanism' problem, which other causal theories cannot do.

Rejecting this intuition also raises some problems for my analysis. I show that they can be overcome, and in doing so, I show that *E* provides significant information about *x* to *P* only when it is most likely that there is only a small range of properties that an object could have such that it could cause *E* in the circumstances *P* is in, and *x* has such properties.

A problem for all causal theories is that in certain situations they entail that *P* sees *x* when the ordinary person would not hold that *P* sees *x*. Rather than adding conditions to rule out *P* seeing *x* in such situations, as Tye attempts, I argue that we should accept that *P* sees *x* in these cases. I go on to show that we should accept that *P* sees *x* by seeing television pictures of *x* and even photos of *x*.

I also consider various other matters related to seeing, and I provide an account of illusion and hallucination and strong and weak seeing. Finally, I re-evaluate the importance of seeing to epistemology.

## 1. Introduction<sup>1</sup>

In this work I answer the question, what is it for a perceiver  $P$  to visually perceive, that is, see, a physical object. For  $P$  to see a physical object,  $P$  must have a visual experience, because it is a conceptual truth that one cannot see a physical object without having a visual experience. So a full account of seeing will need to explain what a visual experience is. In this work, however, I am not concerned with what a visual experience is. I am concerned with the question of what makes it the case that  $P$  sees a physical object  $x$ <sup>2</sup>, rather than  $y$ , or no object at all, by having a visual experience  $E$ . That is, I will explain what the relation between  $E$  and  $x$  is, such that  $P$ , in having  $E$ , sees  $x$ .<sup>3</sup>

Currently, the most popular theories of visual experience can be put into three convenient categories: mental object theories, adverbial-type theories, and direct realist theories.<sup>4</sup>

Theories of the  $E$ - $x$  relation, that is, theories about what the relation between  $E$  and  $x$  must be in order for  $P$  to see  $x$  by having  $E$ , can be most broadly divided into causal theories, which hold that some sort of causal connection between  $E$  and  $x$  is a necessary condition for  $P$  to see  $x$ <sup>5</sup>, and

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1 I am indebted to my supervisors Prof. W. D. Joske and Paul Simpson for helpful discussions. I have also benefitted from discussing this issue with David Lewis and David Owens.

2 In this work I am concerned with the perception of physical objects. I am not concerned with the perception of non-physical objects, partly because I do not think any exist, and partly because I think that if they did, the correct explanation of what it is to see a non-physical object would be very different to the correct explanation of what it is to see a physical object. Cf. Kim [1977]. (Armstrong holds, in [1979], that this difference constitutes an argument against the existence of non-physical objects).

3 In addition to talking of seeing things, we also talk of seeing *that* a thing has a property, for example, 'I see that the picture is square'. Some philosophers, for example, Armstrong in [1968], ch.10, claim that seeing that  $x$  has some property is more basic than seeing  $x$ . In s.12 I show that seeing things is more basic than seeing that.

4 Some philosophers may not like this classification, but I hold that it avoids the misleading nature of other classifications, especially those that use such categories as sense-datum theories and representative realist theories. Anyway, the classification is for convenience only; nothing hangs on it.

5 Richard J. Hall in Hall [1977] links together the causal theory of seeing and the causal theory of reference, and argues for both. Jaegwon Kim in Kim [1977] also holds that a causal theory of reference is necessary for a causal theory of seeing, but argues that any causal theory of seeing will



non-causal theories, which hold that a causal connection between  $E$  and  $x$  is not necessary for  $P$  to see  $x$ , even if a causal connection always happens to exist between  $E$  and  $x$ .

Causal theories of the  $E$ - $x$  relation are usually conjoined with mental object theories or adverbial-type theories. Non-causal theories can be conjoined with any theory of visual experience, but are often conjoined with direct realist theories. It is possible to conjoin a direct realist theory with a causal theory, although most who hold direct realist theories do not hold a causal theory.

The version of the causal theory I present is intended to be compatible with mental objects theories, adverbial-type theories and direct realist theories.

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fail because no causal theory of reference works. I shall not consider such parallels in this work.

## 2. Theories of Visual Experience

Although I am not concerned in this work with the question of what a visual experience is, some basic knowledge of the different sorts of theories of visual experience will be needed. In this section I shall provide a brief survey of the main theories of visual experience held by philosophers today.

### 2.i. Mental Object Theories

The first class of theories I shall mention are mental object theories. Such theories hold that visual experience consists of awareness of mental, that is, a non-physical, objects. Such objects are often called *sensa* (singular *sensum*).<sup>1</sup> The mental object theorist holds that a visual experience as of a red square object consists of being aware of a red square *sensum*.<sup>2</sup> There is little support for the mental object theory nowadays, with most current philosophers of mind being physicalists.<sup>3</sup>

For the mental object theorist, *P* sees a physical object *x* by having a visual experience in which *P* is aware of a *sensum*, which is related in some way to *x*.<sup>4</sup>

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1 Note that I shall later use '*sensa*' as a convenient term with which to talk about parts of a visual experience, but I will be using it in a neutral way, that is, I will not be supposing that any non-physical mental objects actually exist. Various other names have been given to non-physical mental objects, such as '*sense-data*', a term which Frank Jackson uses in [1977]; note though that '*sense-data*' strictly refers to the immediate objects of visual experience, and are not necessarily non-physical.

2 Note that the mental object theory of visual experience is not the same as '*representative realism*'. The latter theory is a complete theory of seeing, and consists of the conjunction of the mental object theory of visual experience with the claim that *P* sees *x* by experiencing a mental object which '*represents*' *x* in some way; often a causal connection is also held to be necessary as well.

3 The classic statement of the mental object theory is commonly held to be in Locke [1690]. The best defence of the mental object theory that has been given in recent times is Jackson [1977]. Both Locke and Jackson are representative realists. (I have heard that Jackson no longer holds some of the views he expounds in [1977], so my comments about Jackson's view in this work are directed at the Frank Jackson of 1977 only).

4 Of course, some mental object theorists are idealists, and hold that mental objects exist but physical objects do not. I assume in this work that there do exist physical objects, and that we can

## 2.ii. Adverbial-Type Theories

The second class of theories of visual experience I shall look at are adverbial-type theories. The adverbialist holds that a visual experience is a certain sort of act, or state, of sensory awareness that does not, *qua* act or state of sensory awareness, involve awareness of any object, physical or non-physical. While it does seem, the adverbialist acknowledges, that in our visual experiences we are aware of objects, it is a mistake, the adverbialist claims, to assume that therefore there are objects in our visual experiences. The phenomenal properties of visual experience, that is, the properties such as colour, shape and size that objects seem to have in our visual experiences are really properties of the visual experience itself, not of any object, the adverbialist says. Having a visual experience as of a red square object consists of having a red-square-like awareness, or, as some adverbialists put it, 'sensing' in a 'redly-squarely manner'. Because phenomenal predicates such as 'red' and 'square' name properties of an act, or a state, rather than an object, they are operating as adverbs, hence the name 'adverbialism'.<sup>5</sup>

I include in this category all those 'state' theories that hold that *P*'s having a visual experience is a matter of *P* being in a certain sort of objectless state, even when such theories are distinguished from typical adverbial theories.<sup>6</sup>

Adverbialists often contrast themselves with mental object theorists in the following way. The mental object theorist holds that a visual experience statement such as 'Fred is aware of a red square sensation' should be compared to 'Fred swings his graphite tennis racquet'. Just as the latter is about two

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and do see them, and so I assume that idealism is false. I also assume that physical objects exist independently of actual and possible sense-experience. Thus, I also assume that phenomenalism, which holds that this claim is literally meaningless, is false.

5 The adverbial theory was initially developed by C.J. Ducasse in [1942], Roderick Chisholm [1957], ch.10 and Wilfrid Sellars [1968] pp.9-28. The theory was later developed by James Cornman [1971], pp.185-90, and most fully by Michael Tye [1989].

6 The state theory derives from Place's paper of [1956] and Smart's paper of [1959]. Consider the similarity of the adverbialist's claims to Smart's comment on p.63: 'There is, in a sense, no such thing as an after-image or a sense-datum, though there is such a thing as the experience of having an after-image'.

things, Fred and his graphite tennis racquet, and a relation between them, such that Fred swings the racquet, the former is also about two things, Fred and his red square sensation, and the relation between them, such that Fred is aware of the sensation.

The adverbialist, however, says that the first statement should be understood as similar to 'Fred dances a charming waltz'. This statement refers to Fred and his way of dancing, but does not refer to any waltz that is something over and above Fred's way of dancing. Similarly, the adverbialist holds that the first statement does not refer to any red square sensation over and above the manner of Fred's sensing. It can thus be rewritten more clearly as 'Fred senses redly-squarely'.

Adverbialism is intended to be neutral on the mind-body problem. The perceiver's state (or act) of awareness may be either a non-physical or a physical state (or act). With mental objects out of the picture, however, the path to physicalism is much easier, and consequently, most modern adverbialists are physicalists.<sup>7</sup>

For the adverbialist, *P* sees a physical object *x* by having a visual experience, which consist of being in an objectless sensory state, which is related in some way to *x*.

### 2.iii. Direct Realist Theories

The third sort of theories in my classification are direct realist theories. Direct realists hold that having a non-hallucinatory visual experience consists of having direct awareness of a physical object(s). However, what is meant by directly aware of a physical object is often not made clear by direct realists. Some direct realists intend this claim to be an ontological one. Some hold, for instance, that *P* is directly aware of a physical object *x* if there is no other object *y* (physical or non-physical) that *P* is aware of in virtue of which *P* is aware of *x*. On the other hand, some direct realists intend this claim to be an

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<sup>7</sup> One who holds an adverbialist-type theory need not hold that ways of sensing are qualia-like, that is, that they are ineffable, intrinsic, private and/or directly apprehensible to consciousness. Thus, the attacks on qualia that have been made, for instance, by Dennett in [1988], need not be relevant to an adverbial-type theory.

epistemological one, for example, that *P* is directly aware of *x* if and only if *P*'s knowledge of *x* does not depend on any more fundamental beliefs for its justification.<sup>8</sup>

This creates a problem, because if the ontological understanding of direct realism is accepted, then adverbialism will be classed as a direct realist theory, but if the epistemological understanding is accepted, adverbialism will not be a direct realist theory. Some adverbialists will be happy being labelled direct realists (as is Cornman), but some will not be.

To further complicate matters, one might hold that adverbialism should not be classed as a direct realist theory for the following reasons. An essential part of direct realism as many philosophers take it is that the phenomenal properties that *P* is aware of in *P*'s (non-hallucinatory) visual experience are self-same properties of the physical object that *P* sees (allowing, of course, that these properties may be misperceived). They are not properties internal to the visual experience itself. However, adverbialism holds that the phenomenal properties that *P* is aware of in a visual experience are the properties of the visual experience itself, and are not properties of the physical object that *P* sees.

For this reason I do not class adverbialism as a direct realist theory.<sup>9</sup> Those who disagree should note that nothing of importance is threatened by this classification, for I hold that the question of whether adverbialism, or any other theory, 'really is' a direct realist theory is not important. What is important is understanding what each theory holds, and what the ontological and epistemological consequences are. Whether such a theory should then be classed as direct realist or not is simply a matter of labels.

Some philosophers use the term 'direct realism' as if, having said that, no further explanation is needed. However, it is often not clear what a philosopher holds when they claim to be a direct realist. Many direct realists will spend time explaining how the arguments against direct realism, such as the time-gap

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<sup>8</sup> Armstrong was one of the philosophers who confused these two senses in [1961] and [1968], but he later recognized the difference in [1976]. He labelled the first sort of awareness of *x* 'direct' and the second sort 'immediate'.

<sup>9</sup> There are also other reasons for classing adverbialism as an indirect theory of perception. For example, direct realism is often conceived of as holding that hallucinatory visual experiences are different sorts of visual experiences than perceptual visual experiences. But for the adverbialist, this is not necessarily so. For example, the adverbial theory allows that a neuroscientist could electrically stimulate *P*'s brain and cause *P* to have a hallucinatory visual experience which is exactly the same sort of experience that *P* has in non-hallucinatory visual experience.

argument, do not necessarily force one to abandon direct realism,<sup>10</sup> without explaining what it *is* to directly perceive a physical object, and how this fits in with the scientific facts about perception and neurophysiology.<sup>11</sup> In the absence of an adequate explication of such theories, it is not possible to seriously consider them.

I will only, therefore, consider direct realist theories that have adequate explanations. The only such theory seems to be what Jackson calls the multiple relation theory of appearing (the MRTA). Ironically, the only adequate accounts of this theory that I can find in the literature come from those who disagree with it.<sup>12</sup>

The MRTA holds that a non-hallucinatory visual experience consists of an unanalysable relation between *P* and *x* in which *x* appears a certain way to *P*. When *P* has a non-hallucinatory visual experience as of a red square object, there is no red square mental object, nor any sensing redly-squarely taking place. There is simply an unanalysable relation between *x* and *P* such that *x* appears red and square to *P*. (The MRTA does not hold that *x* has to be red and square, as long as it appears red and square). For the MRTA, for *P* to see a physical object *x* there must exist this unanalysable relation between *x* and *P*. Whether there are any other conditions for *P* to see *x* according to the MRTA will be looked at in s.3.v.

The notion that there exists an unanalysable relation between *P* and *x* poses grave difficulties for the MRTA. It is difficult to see how such a relation fits in with the facts about the evolution of the visual system, or, for that matter, with any plausible ontology. And the existence of hallucinatory visual experiences provides a virtual refutation of the MRTA. For one thing, the

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<sup>10</sup> Some philosophers seem to think that there is an enormous burden of proof on non-direct theories, and that direct realism should only be rejected if it can be shown that it involves outright logical inconsistencies, even if it can be shown that direct realism is highly implausible. This seems to be because direct realists think that we should prefer theories of perception that do not face the sort of epistemological difficulties traditionally associated with indirect theories of perception. However, as Jackson has shown in [1977], pp.147-51 any direct realist theory also faces these difficulties. See s.14.

<sup>11</sup> Ordinary language philosophers, such as Austin [1962] are examples. A more recent example of this practice can be found in Dancy [1985].

<sup>12</sup> These are Jackson [1977] pp.88-101, and Chisholm [1950]. Jackson mentions Broad [1923] p.237, who also rejected it. Alston in [1990] promised to publish a paper supporting the MRTA, but I have not come across it.

MRTA has no explanation of hallucinations, as there is no object appearing to *P* in an hallucination. Secondly, it is possible that *P* could have an hallucination and be in exactly the same brain state as *P* is in when *P* perceives an object. If the brain state is the same in the two cases, why not suppose that the visual experience produced in both cases is the same? How does adding an unanalysable relation make any difference? And what need is there to add it when the visual experiences in the two cases can be phenomenologically the same? The MRTA has no satisfactory answers to these questions.<sup>13</sup>

A further theory of visual experience that is often called a direct realist theory is the doxastic theory. Armstrong holds a version of this in Armstrong [1961] and [1968]. This theory holds that having a visual experience is a matter of having certain beliefs. For instance, having a visual experience as of a red square object is explained by Armstrong as believing, or being inclined to believe,<sup>14</sup> that there is a red square object in front of you.<sup>15</sup>

This sort of theory is in many ways the same as the adverbialist's theory. Both hold that having a visual experience is a matter of being in an objectless sensory state.<sup>16</sup> And, it seems, the doxastic theorist must hold that the phenomenal properties that *P* is aware of in visual experience are properties of the experience, and not properties of a physical object. For this reason, I include it in the adverbial-type theory category.

Many doxastic theorists will object to this classification, and insist that their theory is a direct realist theory, even on my definition of direct realism, which requires that the phenomenal properties of (non-hallucinatory) visual experience belong to a physical object. Armstrong, for instance, has made such a claim in many places, such as [1968] ch.12 and [1977] pp.27-31.

However, if we accept these claims, I cannot then see how Armstrong's theory can explain hallucinatory visual experience. In an hallucination there is no

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13 Jackson presents an argument similar to this in [1977] on pp.96-99. He also presents two other arguments against the MRTA on pp.91-6 and 99-100, although I think the MRTA can overcome these objections.

14 There are important qualifications along these lines that Armstrong makes which are relevant to the credibility of his theory.

15 See Armstrong [1961] pp.86-9, 128; [1968] pp.236-7.

16 Some may hold that belief states are not objectless because they have propositions, which are abstract entities, as their objects; however, I am not concerned with abstract objects.

physical object which the phenomenal properties of the experience can belong to. Armstrong cannot escape this problem by saying that the phenomenal similarity of hallucinatory and perceptual visual experiences is explained by the fact that an hallucinatory experience consists of the same sort of belief states as a perceptual experience does, because according to Armstrong, the phenomenal properties are not properties of the belief state.

(Another theory of visual experience is the 'intentional object' theory, put forward by G.E.M. Anscombe in [1965]. She holds that 'seeing' is an intentional verb like 'believing' or 'desiring', and argues that as the objects of intentional verbs do not have to exist, we can see physical objects in virtue of seeing intentional objects which do not exist. Visual experience could therefore consist of the awareness of intentional, non-existent objects.

I agree with Jackson that the claims made here do not constitute a theory or explanation of visual experience, let alone seeing.<sup>17</sup> This theorist may be right in saying that the objects of visual experience do not exist, but merely saying that they do not does nothing to establish this claim).

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<sup>17</sup> See Jackson [1977] pp.111-2.



### 3. The *E-x* Relation

#### 3.i. Conceptual Restrictions

To determine what it is for *P* to see *x* requires working out what it means to say '*P* sees *x*'. Thus, our theory of seeing will be an analysis of the concept of 'see'. It has already been remarked that the concept of seeing requires that one have a visual experience, and in the previous section we looked at different accounts of visual experience. The next step is to work out what relation between *P*'s visual experience *E* and *x* is required by the concept for it to be true that *P* sees *x* by having *E*.

If we are to provide a conceptual analysis of 'sees', as used in '*P* sees *x*', there is an important restriction to be observed. We are analysing the ordinary concept of 'sees', a concept that is used by ordinary people who may have no knowledge of the scientific facts about what takes place when seeing occurs. 'Seeing', that is, is a pre-theoretical concept. The analysis of 'sees', therefore, must not include any scientific facts or claims that the ordinary person may not be aware of, otherwise our analysis will not be an analysis of the ordinary concept of seeing.

This is not to say, however, that the analysis of a concept has to exactly accord with ordinary usage and the claims ordinary people make about the concept. For one thing, there may be conflicts between different users over whether the concept can be applied in some circumstances, and I show that this in fact happens with 'sees'. This conflict arises from the fact that an ordinary person can use a concept correctly in normal circumstances without knowing fully what the meaning of the concept is, and without, therefore, necessarily being able to tell whether it can be applied in unusual circumstances. Obviously, an analysis should resolve this sort of conflict by making clear the meaning of the concept, which will allow us to determine whether the concept can be applied in such circumstances.

Another important point which can be missed by objectors to the causal theory is that an analysis of an ordinary concept may make reference to other concepts which many ordinary users may not consciously realize are part of the

former concept. This occurs with the widely accepted analysis of knowledge as justified true belief. The notion of justification seems to be a part of the concept of knowledge, but many users of the term 'knowledge' may not consciously realize this. Similarly, the ordinary user of 'see' may not consciously realize that a causal connection is part of the concept of 'see', but this does not mean that it is not part of the concept of 'see'. There are three reasons why this sort of situation can arise.

One, as we have noted, the ordinary user has not properly mastered the concept. This person can apply the concept correctly in normal situations, but is unable to in unusual situations. Because such a person is not a master of the concept, one might question the relevance of this example. Surely we are only concerned with the masters of the concept? The point of the example is, though, that not all users of a concept are masters of the concept, and so it is not necessarily a good objection to an analysis to point out that many users of a concept do not hold that the other concept involves the concepts referred to by the analysis.

Two, a person who has mastered the concept may, when thinking about what the concept involves, only consider its application in standard circumstances, and as a result fail to appreciate all the elements of the concept. This person can, though, recognize the involvement of these other elements when they consider the application of the concept in non-standard circumstances.

Three, someone may have a mastery of a concept which is entirely intuitive. They are able to apply it properly in all situations, but they have no conscious, explicit recognition that a certain element of the concept is an element. They do, however, recognize (and have mastery of) this element in some non-conscious, implicit way, because they are able to apply it correctly in all situations.

### 3.ii. The Basic Causal Theory

Following Michael Tye in [1982], in the rest of this paper I will, for convenience, talk of *P* having visual experiences of *sensa*, but I will be using

'sensa' here in a neutral way. I do not mean to imply by saying that *P* is aware of sensa that *P* has visual experiences of non-physical mental objects. I use 'sensa' to refer to the apparent objects of visual experience, and these 'apparent objects' may be non-physical objects, or they may ways of sensing, or they may be actual physical objects looking certain ways to *P*. So talk of *P* having sensa is a mere *façon de parler*: such talk could be translated into talk of ways of sensing or the way an object directly appears to *P*. (Talk of sensa is convenient because it allows me to refer to parts of *P*'s visual experience, rather than the whole experience).

The basic causal theory holds that what it means, in part, for *P* to perceive *x* is that there must be some sort of causal connection between *x* and *P* such that *x* causes *P* to have a visual experience of a sensum *S*, or, given that causal relations hold only between events, that some event involving *x* causes the event of *P*'s having a sensum *S*. That is, for *P* to see *x* by having *S*, it is necessary that *x* be causally connected to *P* in such a way as to cause *S*.<sup>1</sup>

This causal condition is not in itself a sufficient condition for *P* to see *x*, however, as the following shows. I am looking at my computer screen while typing this sentence.<sup>2</sup> Events involving the computer screen cause me to have *S*, and I see the computer screen. But in addition, events involving the light globe behind me, my eyes and my optic nerve are all causally connected to me such that they cause me to have *S*, yet I do not see these things.

So other conditions are required to strengthen the theory in order to rule out such objects as seen by me. Different theories add different conditions to the

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<sup>1</sup> The label 'causal theory of perception' was often used in the past, and sometimes still is, to refer to mental object theories of seeing, such as representative realism, which use causal or neurophysiological arguments to establish the existence of mental objects (and which may or may not hold that a causal connection between *x* and *S* is necessary for seeing *x*). I use the term in its more common current use, to refer only to theories that hold that for *P* to see *x* by having a visual experience, *x* must cause that experience, and such theories, of course, are not limited to theories that hold that a mental object theory of visual experience. (Robert Oakes in [1978] calls the former sort of theory the 'traditional causal theory of perception' to distinguish it from the latter).

<sup>2</sup> In this work, when I say that *P* looks at *x*, I am not implying that *P* sees *x*, merely that *P* directs *P*'s visual receptors at *x*. However, I also talk of *x* looking some way to *P*, and *x* looking like something to *P*, and here it is implied that *P* sees *x*, unless I say (or the context makes it clear) that *P* does not. (Saying that *x* looks some way to *P* is merely another neutral way of talking about the sensa *P* has).

basic causal condition in an attempt to arrive at the necessary and sufficient conditions for seeing.<sup>3</sup>

### 3.iii. Grice's Argument for the Causal Theory

The main argument for the basic causal theory comes from Grice [1961]. Suppose *P* has a sensum *S* which a normal human would describe as of a pillar in front of *P*. What is required for it to be the case that *P* is seeing a pillar in front of *P* by having *S*? Obviously, one such necessary requirement is that there be such a pillar in front of *P*.

More than this requirement is needed, though. Suppose that there does exist a pillar, *A*, in front of *P*. Suppose, however, that between this pillar and *P* is a mirror, and this mirror reflects a different pillar *B*, which has the same property values<sup>4</sup> as *A*. In this case it is clear that *P* sees *B* and not *A*. The obvious explanation of this fact seems to be that *B* causes *S* (by reflecting light waves into *P*'s eyes), whereas *A* does not.

Another example that supports Grice's claim is this. Suppose *A* is in front of *P*, there is no mirror, and *P* has a sensum, *S*, as of a pillar like *A* in front of *P*, that is, the sort of sensum that *P* would have if *P* did see *A*. If, though,

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3 Major works that present some argument for, or version of, the causal theory include Price [1932], Chisholm [1957] ch.10, Hirst [1959] ch.10, Grice [1961], Strawson [1974] and [1979], Bradie [1974], Pears [1976], Goldman [1977], Hall [1977], Jackson [1977] pp.167-72, Peacocke [1979], Lewis [1980], Tye [1982], Davies [1983], Pendlebury [1987]. The basic argument for all these theories, though, is Grice's.

4 To keep things clear, I use 'sort of property of *x*' to refer to the general sorts or kinds of property *x* has, for example, shape, size, location, colour and whatever other general sort of property *x* has. I use 'property values of *x*' to refer to the 'values' that these general properties have, that is, the more specific kinds of properties that *x* has. For example, *x* has the general property of colour, and this I call a sort of property of *x*, and *x*'s colour property may have the value red, or light red, or light red shade *a*. (Note that strictly speaking, red and light red are, like colour, sorts of properties that are made up of more specific sorts of properties, and so I could talk about the red or light red property value that *x* has, though I will avoid doing so. Light red shade *a*, though, is a sort of property but it is not made up of any more particular sorts of properties).

I also talk in the same way about *S*, although this is not meant to imply that *S* is an object, for *S* may be a way of sensing. I shall also talk of sensa as having shape, size, location and colour, but this is not meant to imply that sensa have the same sort of properties as physical objects. For example, it seems that 'physical' colour, which is the surface atomic structure of a physical object, is a different property than 'sensory' colour, and the same may be true of shape, size and location.

*S* is an hallucination that by chance happened to be 'of' *A* and is not the result of *A*'s causal effect upon *P*, then we would not say *P* saw *A*. Further support for Grice comes from supposing that *P* is caused to have *S* by a neurophysiologist who is stimulating *P*'s brain with electrodes, and by chance *S* happens to be 'of' the objects in front of *P*. We do not hold that *P* sees these objects, and this, Grice claims, is because these objects do not cause *S*.

It seems clear, Grice holds, that in all these situations *P* does not see *A* because *A* does not cause *S*. *P* does see *B* in the first example, though, because *B* does cause *S*. So in order for *P* to see *x* by having *S*, *x* must cause *S*.

However, as Paul Snowden points out, while this conclusion may seem obvious and plausible, there is no deductive argument here. He says 'why, in [such] cases, are the mentioned objects [i.e. *A*] not sighted?...[The causal connection] is a plausible suggestion because the absence of such a causal connection [between *A* and *S*] is a prominent element in the cases, and there is no other obvious explanation'.<sup>5</sup> But as he also points out, it is open to the non-causal theorist to show that some other explanation is better, or that the causal theory cannot be right because there are (possible) cases in which *P* sees *x*, yet no causal connection exists. I consider some such attempts later.

### 3.iv. Grice's Causal Theory

Grice develops his causal theory as follows. He notes the conceptual restriction on a theory of seeing. He agrees that we must not introduce any scientific facts about the reflection or transmission of light-waves from the object into the retina. His solution is:

I suggest that the best procedure for the Causal Theorist is to indicate the mode of causal connection by examples; to say that, for an object to be perceived by [*P*], it is sufficient that it should be causally involved in the generation of some [sensus that *P* has] in the kind of way in which, for example, when I look at my hand in a good light, my hand is causally

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<sup>5</sup> Snowden [1981] p.182.

responsible for its looking to me as if there were a hand before me, or in which...(and so on), whatever that kind of way may be; and to be enlightened on that question, one must have recourse to the specialist.<sup>6</sup>

The fault with Grice's theory here is that it is far too strong. His theory entails that *P* can only see *x* if the same causal connection exists between *x* and *S* as occurs in the normal cases he refers to. In such cases, the causal connection consists of light waves reflected (or transmitted) by objects into the perceiver's retina, and an effect upon the retina which causes signals to be sent along the optic nerve to the visual cortex.

But *P* may see *x* even if these conditions do not hold. For example, suppose that in the future *P*'s eyesight fails, and *P*'s eyes are replaced by miniature video cameras hooked up to *P*'s optic nerve. It may even be possible to replace the optic nerve with an electronic device. Or suppose that *P* is a creature who has radically different neurophysiology to us. *P* can still see, but *P* has nothing like the optic nerve that humans have. Or suppose that *P*'s visual experiences are produced in bat-like fashion, using some form of echolocation, where rapid sonic pulses are sent out by *P* and bounced off *x* back to *P*, allowing *P* to have the same visual *sensa* that a normal human would.

What makes it true that *P* sees *x* is not that there exists any particular sort of causal connection between *x* and *S*. Any causal connection will do, as long as it produces *S*. The important question now is, what other conditions are required for it to be true that *P* sees *x* by having *S*?<sup>7</sup>

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6 Grice [1961] p.105. Note that Grice explicitly linked his theory to a sense-datum theory.

7 As Peacocke in [1979], pp.144-5, and McLaughlin in [1984], pp.575-6, have noted, Grice treats 'seeing' in a way similar to the way Kripke in [1972] and Putnam in [1975] treat what they call 'natural kind' terms. A natural kind term is a term that refers to a substance, for example, gold, and the full meaning or definition of such a term cannot be given *a priori*. The concept associated with the term (for example, 'soft yellow metal' for 'gold'), can help fix the reference of the term, but it does not constitute the definition of the term. The definition can only be given after empirical investigation has revealed the underlying properties of the substance. Only substances with that property are instances of the kind.

With seeing, Grice holds something similar. One can only say what seeing actually is once the appropriate empirical investigations have revealed the nature of the causal connection involved in those circumstances referred to by 'seeing'. 'Seeing' will then only apply to those cases in which that sort of causal connection exists. Grice is wrong, however. 'Seeing' is in fact what has been

### 3.v. The MRTA and the *E-x* Relation

I have already remarked that the causal theory fits well with mental object theories and the adverbial-type theories. However, it is not clear what the MRTA will hold about the *E-x* relation. The MRTA theorist might be tempted to hold that for *P* to see *x* there must exist an unanalysable relation between *x* and *P*. However, I cannot see any reason for holding that this is a part of the ordinary concept. I do not see that the way the concept is used requires that this is a part of the concept.

The MRTA theorist might take an approach similar to Grice, and hold that while the ordinary concept does not hold that seeing is a matter of there being an unanalysable relation between *x* and *P*, we can only determine what seeing is after philosophical inquiry establishes what is common to all cases of seeing, and this has been shown to be the unanalysable relation.

This theory might seem to have an advantage over Grice's theory, because it does not rule out the possibility of aliens seeing, or seeing by use of prosthetics, or echolocatory seeing, because in all these cases there can exist this relation.

However, this approach cannot work. We know *a priori* that all these different situations count as seeing, and this requires that we know *a priori* why these cases count as seeing. But we do not know *a priori* that the 'some relation' exists in all these different situations, if we do not know what the 'some relation' is. And if we discovered that there was some reason for supposing that this relation did not exist in some of these cases, we would not say that they are therefore not really cases of seeing.<sup>8</sup>

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It is possible for the MRTA to accept a causal theory. The MRTA would call a 'nominal kind' term, which is a term that contains a complete definition within the concept associated with the term, for example, 'bachelor'. There is no underlying structure to bachelors, *qua* bachelors, awaiting empirical discovery. What counts as a bachelor is determined purely by the concept, and this is also the case with 'seeing'. (See McGinn [1980] for a discussion of nominal kind terms).

<sup>8</sup> Whereas we would say that a piece of soft yellow metal is not gold if it does not have the right atomic structure.

need to hold that *P* sees *x* when *x* causes *S*, and whenever certain other necessary conditions hold (whatever they are), while holding that in *all* such cases *P*'s visual experience consists of an unanalysable relation between *x* and *P*. This relation between *P* and *x*, though, is not part of what it means for *P* to see *x*.

What might seem to present a problem for this position is that, as I will show, there are some cases where there is no correct answer to the question of whether *P* sees or hallucinates (this holds not just for my causal theory, but for any causal theory). Does the unanalysable relation hold in these cases or not?

I do not think this is any great problem for the MRTA. It can simply hold that in clear-cut cases of seeing, the unanalysable relation holds, and in the 'grey' cases, it may, or it may not, but as long as it exists in the clear-cut cases, the essence of the theory remains.

### 3.vi. Causal Mechanism

So far our causal analysis of seeing is that for *P* to see *x* by having *S*, there must be a causal connection between *x* and *P* such that *x* causes *S*. This raises the question, what is meant by 'causal connection' here?

One thing that could be meant is that there must be some sort of causal mechanism between *x* and *P*, that is, that there must be a transfer of force or energy from *x* to *P*, or, to take a weaker position, that *x* must 'exert an influence' or 'act upon' *P* in a way that results in *P* having *S*.

There are two problems with this position. The first is that it seems that someone can master the concept of seeing without having any such idea about causal mechanism, even implicitly. The second problem is as follows. Suppose that *P* claims to be able to see objects on the far side of a thick brick wall, and *P* is able to give descriptions of their appearance and behaviour, and independent checks reveal these reports to be accurate. Suppose also that extensive testing reveals no sort of causal mechanism operating between the objects and *P*. It still seems correct, the objection goes, to say that *P* sees the objects despite there being no causal mechanism, and so causal mechanism cannot be involved in the concept of seeing.<sup>9</sup>



I am by no means sure that it is true that *P* sees in this case. Intuitively, though, there does seem to be some appeal to the claim that *P* does see here, and I think it is best to try and accomodate this intuition.<sup>10</sup>

### 3.vii. A Counterfactual Analysis of Causation

The understanding of causation in the concept of seeing is, I suspect, a basic counterfactual understanding, which comes, roughly, to this. '(Event) *c* causes (event) *e*' means 'if *c* had not occurred, *e* would not have occurred.' That is, for *c* to cause *e*, it need only be the case that without the existence of *c*, *e* would not have occurred. Or, that if *c* were different, then (at least in most cases) *e* would also be different.<sup>11</sup>

There are, of course, many difficulties with holding that a counterfactual analysis of cause is adequate. For example, how different could *c* be and still be *c*? And could it not be the case that *c* can cause *e*, yet if *c* did not exist, circumstances could have been such that *e* would have occurred anyway? For example, a sheet of paper directly in front of an identical sheet of paper can cause a visual experience in *P*, yet if that sheet of paper were not there, the other sheet of paper would have caused *P* to have the same visual experience.

It may be that these problems, and others, show that a counterfactual analysis of causation cannot be the correct analysis. This presents no problem for my analysis of seeing. What I hold is that to understand seeing one merely needs to have the ordinary, pre-theoretical understanding of causation, whatever that understanding comes to. Perhaps the constant conjunction analysis is the

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<sup>9</sup> Dretske in [1969] pp.50-1 makes use of such an example against the causal theory conceived of as a causal mechanism theory.

<sup>10</sup> One might hold that imaginability is not necessarily an indication of what is really possible (as Tye does in [1989] pp.135-8), and so one might claim that the events described in this case are not really possible at all. I agree that these events may not really be possible, but I think that the fact that they are imaginable means that the concept must have an answer to whether such a case, if it were possible, would count as seeing or not.

<sup>11</sup> This analysis of causation is obviously very rough and ready. I do not wish, however, to spend time trying to improve it. It would obviously be demanding too much to demand that we solve seeing and causation. Also, I do not think it is essential to our analysis of seeing that we have a properly worked-out analysis of causation. For a more sophisticated counterfactual analysis of causation, see Lewis [1973] and [1986a].

correct analysis of causation; if so, this analysis can be used in the analysis of seeing in place of the counterfactual analysis.

The counterfactual understanding of what causation is overcomes the problems that faced the mechanistic understanding of causation. The first problem for the mechanistic position was that it seemed that someone could master the concept of seeing without having such an understanding. But it does seem that the master of the concept of seeing must have some understanding of causation like the counterfactual understanding.

This follows from the fact that to understand that one can see  $x$  via a mirror, one must realize that the objects that one sees are not necessarily in front of one's eyes, and that the object that is seen is the object that one's sensum is counterfactually dependent upon. In Grice's example,  $P$  does not see the object behind the mirror, because  $P$ 's sensum  $S$  is not counterfactually dependent upon it.  $P$  does see the object reflected by the mirror because  $S$  is counterfactually dependent upon it.

The second problem for the mechanistic understanding was that it seemed that  $P$  could see  $x$  in circumstances where no causal mechanism between  $x$  and  $P$  existed. This is not a problem for the counterfactual understanding because in these circumstances there is a counterfactual dependence of  $S$  upon  $x$ , and so  $P$  can see  $x$  here.

The counterfactual understanding also has another advantage over the mechanistic understanding. The mechanistic understanding requires that for  $P$  to see  $x$ , there be some transfer of force or energy from  $x$  to  $P$  such that  $P$  has  $S$ . Yet  $P$  could see a totally black object even though there is no transfer of force or energy from that object to  $P$ ; thus causal mechanism cannot be necessary for seeing. On the counterfactual understanding of cause, though, this problem disappears, because on this view of causation, the black object does cause  $S$ .<sup>12</sup>

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<sup>12</sup> Goldman, who holds that the mechanistic understanding of causation is necessary to seeing, attempts to account for this case in a partly mechanistic and partly counterfactual way in [1977], p.282. His approach seems to work, but does not solve the other problems for the mechanistic understanding I mentioned above.

## 4. Against the Causal Theory

### 4.i. The Resemblance Theory

One non-causal theory of seeing is the resemblance theory. This theory holds that for *P* to see *x* by having a sensum *S*, *S* must resemble *x*.

Anscombe argues for this theory as follows. Normally *P* sees, say, a watch, by having a sensum *S* which resembles a watch. Suppose, though, that *S* is a red triangle. In this case, we would not hold that *P* sees the watch, even if there is a causal connection between the watch and *S*, because there is no resemblance between them. It must therefore be that resemblance is the necessary and sufficient condition for seeing.

Note that even if it were true that *P* sees *x* only when there is a resemblance between *x* and *S*, this does not show that a causal connection is not also a necessary condition. To show that, it would need to be shown that *P* can see *x* when there is no causal connection between *x* and *P*.

The argument, however, does not work. Resemblance is neither necessary nor sufficient for seeing. The possibility of 'fortuitous satisfaction' shows that resemblance is not a sufficient condition for seeing. In many cases where *P* has *S*, there will be objects that resemble *x* but which *P* does not see. Take Grice's example. *P* has a visual experience as of a pillar in front of *P*. There is in fact a pillar in front of *P*, which very closely resembles *P*'s sensum, but *P* does not see that pillar.<sup>1</sup>

Resemblance is not even a necessary condition for seeing, because *P* can see *x* even when *S* does not resemble *x*. For example, *P* can see a star even when *P*'s sensum *S* is just a tiny, twinkling dot. If this counts as resemblance, then virtually anything counts as resemblance, and *P* sees almost every object that exists in the universe. The resemblance theory cannot, therefore, be right.

Another argument that shows that the resemblance theory is wrong is as follows. We allow that other sorts of organisms can see physical objects, even

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<sup>1</sup> The pillar behind the mirror may even resemble *S* more than the pillar reflected by the mirror. Suppose the pillar behind the mirror is red, and the reflected pillar is white. If the reflected mirror is illuminated by red light, then *S* will resemble the pillar behind the mirror more than the reflected pillar.

though those organisms may have visual sensa with different property values than the property values of the sensa that humans normally have when seeing such objects in such situations.<sup>2</sup> Suppose, then, that a human being, *P*, has a sensum *S* that closely resembles *x*. Organism *O* may have a sensum *S'* that does not resemble *S*, and thus does not resemble *x*, yet *O* can see *x* by having *S'*. Resemblance, therefore, cannot be necessary to seeing.

(A similar problem with a resemblance analysis of seeing is that nothing like it can be used for analysing hearing, smelling and touching objects, because we do not demand that the sensations we have when hearing, smelling or touching an object resemble the object in any way).

A further argument against the resemblance theory is this. Suppose the adverbial theory turned out to be correct. If so, the properties that *S* has would not be the same sort of properties that *x* has,<sup>3</sup> because *S* would not really be an object like *x*, but a way of sensing. This would entail that *S* and *x* could not resemble each other.<sup>4</sup> Would this show that no-one ever sees a physical object? Hardly. All it would show is that resemblance is not necessary for seeing.

(Hall in [1987] claims that the resemblance theory fails because it cannot specify what counts as resemblance. He refers to Anscombe's example of the watch and the red triangle, and notes that there are some points of resemblance between them, as there will be between every object and sensum. For example, the predicates 'is non-blue', 'has a shape', 'is either red or shiny', 'is visible' are true of both the watch and the sensum. Hall doubts the possibility of

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2 Other sorts of organisms may even experience sensa with property values that humans have never experienced. This seems especially possible with colour; other organisms may experience colours that humans have never experienced, just as some humans, those who are colour-blind, have never experienced some colours that standard humans have. However, we cannot suppose that the property values of the sensa of other organisms are too different from ours, otherwise their sensa may not be visual sensa. See s.10 for a discussion of what makes a sensum a visual sensum.

3 This may even be true if the mental object theory is correct. For while most mental object theorists, such as Jackson in [1977], hold that mental objects have properties in common with physical objects, such as shape, size, distance away from *P* and relative position to *P*, it is hard to see how non-physical objects could possibly have these physical properties.

4 I also show later on that we would allow that an organism could see properties such as electric charge by having sensa that do not have electric charge as a property; the colour of the sensa could be what 'represents' the electric charge. As colour and electric charge do not resemble each other, the resemblance theory must be false.

specifying how much resemblance is enough.

Hall says 'Since any pair of things will admit of an infinite number of joint true descriptions, 'enough' will probably have to be specified in terms of some proportion - perhaps the number of descriptions true only of both [*S*] and [*x*] divided by the number of descriptions true only of [*S*]. Determining such a proportion, and justifying some lower limit below which seeing does not occur, seem pretty hopeless.'<sup>5</sup>

I am not convinced by this objection. Even if it is impossible to explicitly specify what counts as resemblance in terms of some such proportions, it could be that we have an intuitive grasp of what property resemblances are involved in seeing. Such an intuitive grasp will not enable us to specify any clear-cut boundary between resemblance and non-resemblance, and so between seeing and non-seeing, but many ordinary concepts have such fuzzy boundaries, and I show later that seeing is one such concept. So I do not think Hall's objection is a good one).

#### 4.ii. The Satisfaction Theory

The satisfaction theory may seem to escape some of the problems of the resemblance theory. The satisfaction theory holds that what counts for seeing is not resemblance between *x* and *S*, but whether *x* 'satisfies' some beliefs that *P* has about *x* on the basis of *S*. *x* can satisfy such beliefs even when there is no resemblance between *x* and *S*. This allows that other sorts of organisms can see even if they have sensa with very different property values to the sensa that humans have, and even if the adverbial theory is true.

A version of the satisfaction theory can be more formally described as follows. An object *x* can be said to 'satisfy' a definite description 'the *F*' if, and only if, *x* is the one and only *F*. *P* sees *x* if *P* has a visual sensum which causes *P* to believe that the so-and-so has some property, where *x* satisfies 'the so-and-so'.<sup>6</sup>

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<sup>5</sup> Hall [1977] p.387

<sup>6</sup> I am using Tye's formulation of the theory here for convenience (Tye [1982] p.314). For an example of the satisfaction theory, see Chisholm [1976] ch.1, ch.4 s.11, and app.C. Chisholm's theory is summarized by Kim in [1977] p.611. See also Armstrong [1968] ch.10, and Searle [1983].

The satisfaction, theory, unfortunately, does not overcome the first two problems that faced the resemblance theory. The problem of 'fortuitous satisfaction' will show that 'satisfaction' is not a sufficient condition. Consider again Grice's example. Suppose I see the pillar reflected by the mirror, and not the pillar behind the mirror. *P* may well believe as a result of *P*'s visual experience that 'the pillar in front of me is white', and it is the pillar behind the mirror, which *P* does not see, which satisfies this belief (that is, satisfies this description contained in *P*'s belief), and so the satisfaction theory wrongly entails that *P* sees the pillar behind the mirror.

The same example also shows that 'satisfaction' is also not a necessary condition. *P* does see the pillar that is reflected by the mirror, but *P*'s visual experience may not cause *P* to have *any* beliefs which that pillar satisfies. Any beliefs about pillars that *P* has may well be satisfied by the pillar behind the mirror, rather than the pillar that *P* really sees.

#### 4.iii. An Epistemological Objection to the Causal Theory

One objection that is often given against the causal theory is that it entails skepticism about the existence of physical objects, that is, it entails that we cannot know whether external physical objects exist. The argument is that if perception consists of physical objects having causal effects upon us, then our perceptual knowledge of physical objects must involve inference from effect to cause, that is, from the effect physical objects have on us (our visual experience in the case of seeing) to the physical object itself.

This sort of inference is justified if there is some way of establishing the correlation that is presumed to exist between effect and cause. For example, we normally justify the inference from smoke to fire because the correlation between smoke and fire can be independently verified, that is, we can verify that fire causes smoke, and that it is usually fire that causes smoke, by directly observing fire doing so in many cases.

But if the causal theory is true, there is no way of establishing the inference from visual experience (effect) to physical object (cause), because we have no

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Note that Searle and Armstrong both claim that seeing that is more basic than seeing things. See s.12 for my comments on this dispute.

way of independently observing physical objects causing our perceptual experiences. We cannot appeal to our visual experiences as support for the claim that physical objects cause our visual experiences, for this is to beg the question at issue. Our inference, therefore, is not justified.<sup>7</sup>

The reply to this claim is threefold. Firstly, many philosophers hold that we can know that physical objects exist even though we cannot independently observe physical objects causing our perceptual experiences. One argument for this claim that many philosophers accept is that our inference to the existence of physical objects from our perceptual experiences is justified on the grounds that they are the best explanation of our perceptual experiences.<sup>8</sup> Another argument that many other philosophers accept, which comes from G.E. Moore, is that our knowledge of the existence of physical objects is more certain than our knowledge of anything else, and so we do not need to infer the existence of physical objects from our perceptual experiences.

Secondly, even if no such justification works, there is still no particular threat to the causal theory, because the skeptical problem will therefore arise for all theories of seeing. Consider the resemblance theory. How do we know that there exist physical objects that resemble our perceptual experiences? We cannot use our visual experiences to justify this claim, because this is also to beg the question. Or suppose we accept that '*P* sees *x*' means that there exists an unanalysable relation between *P* and *x*, as the MRTA holds. How do we know that there exist physical objects that stand in such relations with perceivers? We cannot use our visual experiences to justify this claim, because this again begs the question. If it is replied that it is simply part of the MRTA's position that physical objects exist, the causal theorist can reply that it is also part of the causal theory that physical objects exist.

Thirdly, even if the analysis of the ordinary concept does entail that we cannot know that physical objects exist, this is not a *reductio* of the analysis. There is no reason why an ordinary concept should not have such a

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<sup>7</sup> Grice's response to this objection is to reject the smoke-fire conception of the causal inference. The connection between smoke and fire, he says, is contingent, whereas the connection between physical objects and visual experience is non-contingent. I shall not go into this move, as it presents many complications, and I hold it fails. Also, it is not clear that Grice's theory is any longer a causal theory. See Bradie [1976] for detailed comments on this issue.

<sup>8</sup> See Jackson [1977] pp.142-7.

consequence. The ordinary person takes it that physical objects exist, and the ordinary person does not stop to think whether this assumption is justified. The concept then develops on the basis of this assumption, and again the ordinary person does not stop to reflect upon whether this concept entails skepticism about the existence of physical objects. So the fact that an analysis of an ordinary concept leads to skeptical problems does not mean the analysis must be wrong.

(One might reply that we should still prefer the analysis that does not have the skeptical problems attached to it. However, we have seen that all the analyses will have this problem. Anyway, I do not see that this claim has any force, for it assumes that an ordinary concept is more likely than not to be philosophically unproblematic, and I do not see that this must be so).

#### **4.iv. An Objection From Teichmann**

Jenny Teichmann puts forward some objections to the causal theory in [1971]. None of these objections have any force. The objection from Teichmann that I shall look at is based on the claim that the concept of causation incorporates notions which 'just will not mesh with our notions of what it is to perceive something'.<sup>9</sup> Consider the ordinary objects of perception, such as trees, chairs and bricks:

[I]t is impossible to classify trees and chairs and so forth in terms of degree of efficacy...whatever changes a brick might undergo, short of shrinking to the point of invisibility...its capacity to produce perception does not vary. To see half a brick is not to undergo half the effect of seeing a whole brick...No-one could classify material objects in such a way that they were listed in order of degree of power to produce perception...changes in position [and] distance, all alter the appearance of an object, not its efficacy.<sup>10</sup>

These causal powers of objects to produce perception are different,

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<sup>9</sup> Teichmann [1971] pp.36.

<sup>10</sup> Teichmann [1971] p.35.



Teichmann says, from the power of, for example, a saucepan handle to produce burns, which varies according to variations in the intrinsic properties of the handle. The concept of causality therefore involves notions about partial and complete causes which do not fit with the concept of perception, which does not allow partial causes.

The problem with this objection is that seeing half a brick *is* to undergo half the effect of seeing a whole brick. When I see a whole brick, it has the effect of taking up a greater proportion of my visual field than when I see half a brick (assuming other factors are kept fixed). The situation is exactly analogous to the saucepan handle being hot along its whole length, thus burning all my palm, and only half the handle being hot, thus burning only half my palm.

I suppose Teichmann might reply to this that what she meant was that perception of an object itself either occurs or it doesn't; she might say that what I am talking about is visual experience, which is not the same as perception. Perception itself cannot half occur; I see the brick whether I see all of it or half of it. But a typical effect of a cause (such as burn from a hot handle) can half occur in certain conditions.

It is true that perception of an object cannot half occur, but what Teichmann ignores is that I can perceive more or less of an object, just as I can be burnt more or less by an object. I can see half the brick, or the whole the brick. In either case, I am said to see the brick. Similarly, I can be burnt a lot by the handle, or only a bit by the handle. In both cases, I am said to have been burnt by the handle. The two cases are exactly analogous.

## 5. Causal Theories

### 5.i. The Causal-Resemblance and Causal-Satisfaction Theories

Earlier, it was shown that the resemblance and satisfaction theories fail. I will now show that hybrid causal-resemblance and causal-satisfaction theories will also fail.

It has already been shown that resemblance is not a necessary condition for seeing, because *P* can see an object which does not resemble *P*'s sensum. Adding a causal connection as another necessary condition cannot change this fact. It has also been shown that resemblance by itself is not sufficient. But perhaps a causal connection together with resemblance constitute necessary and sufficient conditions for seeing, or at least sufficient conditions.

I adapt a device of Tye's to show that this is not so. Suppose Bill is a robot behind the mirror, and Ted is an identical robot reflected by the mirror.<sup>1</sup> Suppose Bill controls Ted's movements by a radio transmitter, and has caused Ted to move to Ted's current position. In this case, Bill is a cause of *P*'s visual experience, and Bill resembles *P*'s visual experience, but *P* does not see Bill. Thus, the causal-resemblance theory fails to provide even sufficient conditions for seeing.

The causal-resemblance theory will also be unable to overcome the problems of other sorts of perceivers and the adverbial theory problem that faced the pure resemblance theory.

The causal-satisfaction theory will also fail. As with resemblance, we have seen that satisfaction is not necessary for seeing, as *P* can see *x* even when *x* does not satisfy any of *P*'s beliefs. Nor will satisfaction be sufficient even with a causal connection between *x* and *P*. If Bill, who is behind the mirror, causes Ted to move to Ted's current position, then Bill is a cause of *P*'s sensum *S*. *S* may cause *P* to believe that the robot in front of *P* is grey, and Bill satisfies that belief. The causal-satisfaction theory therefore entails that *P* sees Bill,

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<sup>1</sup> Tye calls his robots Tim and Tom; I find Bill and Ted make it easier to keep track of which robot is which.

which Bill does not, and so the causal-satisfaction theory is wrong.

### 5.ii. Lewis's 'Counterfactual Matching' Theory

Lewis in [1980] holds something like a causal-satisfaction theory. He holds that *P* sees the objects in front of *P*'s eyes if *P*'s visual experience 'matches' the scene, and would do so in most counterfactual situations in which the scene is varied. (This counterfactual element in the theory does the work of a causal connection between *x* and *E*). By 'match' Lewis means that the visual experience's 'informational content' about the scene is correct. The informational content of the experience is the content of the beliefs the experience tends to cause. This allows that *P* can see the objects in front of *P*'s eyes even though *P* may have no beliefs about them, as long as the visual experience *P* has tends to produce the right sort of beliefs.

Lewis's theory has some similarities with mine, but he is only claiming to have provided sufficient conditions for seeing, not the necessary conditions for seeing,<sup>2</sup> which is just as well, for he has not. For instance, it is possible that *P* could see the scene in front of *P*'s eyes even when *P*'s visual experience did not match the scene, that is, it did not have the tendency to produce in *P* or in other people correct beliefs about the scene in front of *P*'s eyes. This would occur when *P* wears glasses that change what the scene in front of *P* looks like in a way that does not make *P* suspicious that anything unusual has happened, thus causing *P* to have a visual experience that would tend to produce beliefs about the scene in front of the eyes that are incorrect.

Other problems would also arise if we were to take Lewis's theory as providing necessary conditions for seeing *x*. I show in s.8. that Lewis's counterfactual condition is too strong. It also possible that *P* can see objects that are not in front of *P*'s eyes, yet Lewis's theory does not allow for this. And, of course, I am concerned with seeing *x*, whereas Lewis is only concerned with seeing the scene before one's eyes.

(Lewis appears to go back on his claim about necessary conditions later in his piece. For instance, he says on p.245 'if the scene before the eyes causes

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<sup>2</sup> Lewis [1980] p.241

matching visual experience as part of a suitable pattern of counterfactual dependence, then the subject sees; if the scene before the eyes causes matching visual experience without a suitable pattern of counterfactual dependence, then the subject does not see'. This sounds to me like Lewis is claiming that it is necessary for seeing that there be counterfactual dependence. If he is, he is wrong, as I shall show in s.8.i).

Does Lewis at least provide sufficient conditions for seeing the scene in front of one's eyes? One problem he faces is how do we determine what are the beliefs one tends to have on the basis of a visual experience. For one thing, different people will tend to have different beliefs on the basis of the same visual experience. Lewis considers this problem and says 'Only if a certain belief would be produced in almost every case may we take its content as part of the content of the visual experience'.<sup>3</sup> But what if we built a whole lot of organisms<sup>4</sup> that had such experiences, but did not have the beliefs?

### 5.iii. Tye's Causal Theory

We have seen that although a causal connection between  $x$  and  $P$  such that  $x$  causes  $S$  is necessary for  $P$  to see  $x$  by having  $S$ , this is not enough. For example,  $P$  fails to see Bill behind the mirror even when Bill is a cause of  $P$ 's visual experience (for example, when Bill controls Ted's movements by remote control). Why doesn't  $P$  see Bill here? Tye's answer in [1982] is that it is because Bill could move around and change shape and size behind the mirror, and it would not make any difference to the property values  $S$  has.  $P$  sees Ted, however, because such changes in Ted do produce corresponding changes in  $S$ .<sup>5</sup>

So, Tye holds, the necessary and sufficient conditions of  $P$  seeing  $x$  are that  $x$  causes  $S$ , and, if certain of  $x$ 's spatial properties were varied, the corresponding spatial properties of  $S$  would also vary in corresponding ways.

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<sup>3</sup> Lewis [1980] p.240.

<sup>4</sup> We can make them human if Lewis objects that he is only talking about humans.

<sup>5</sup> Jackson presented a similar theory earlier than Tye in [1977] pp.167-71. I look at this theory below.

The spatial properties that Tye is referring to are shape, size, position relative to *P* and distance away from *P* (the last two can also be called location relative to *P*).<sup>6</sup> Tye calls these '*M*-properties'.

So, for example, *P* sees a football because as the football is kicked from left to right, *S* also moves from left to right. As the football's shape and size changes as it is pumped up, *S* also changes shape and size in the same way. It is this sort of correspondence between *M*-properties that make it true that *P* sees the football, according to Tye.

The correspondence between the changes in *M*-properties of *x* and *S* do not have to be so simple, though. For example, when *P* has inverting glasses on, *P* can still see the football, even though when the football is kicked up in the air, *S* will move down, and when the football comes down, *S* will move up. *P* still sees the football because the variations in *x* produce *systematic* variations in *S*, says Tye. If there are no such systematic variations, then *P* does not see *x*.<sup>7</sup>

I first of all present Tye's penultimate definition, rewritten to fit my discussion.

(Tye1) *P* visually perceives *x* = df (i) There is a causal chain of events *C* which ends with *P*'s having an experience of a visual sensum *S*; (ii) *x*'s position in *C* is such that it is in principle possible to vary each *M*-property of *x* or some surface of *x* and thereby produce a systematic variation in the corresponding spatial property of *S* assuming other factors are left alone.<sup>8</sup>

(I have left out of Tye's definition a clause holding that the eyes must causally involved in *C*; Tye allows on p.323 that this clause may be left out.

Tye provides some qualifications of this analysis.

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6 'Position relative to *P*' here means location relative to *P* minus the distance away from *P*, that is, whether *x* is at some point to *P*'s upper left, or to *P*'s lower right, etc.

7 Tye leaves out colour from his account in order 'to sidestep the disagreement between those causal theorists who maintain that material objects lack colour and those who are 'colour objectivists'. (Tye [1982] p.320). (Colour objectivism is the view that physical objects have colour, as we see it in visual experience, as an intrinsic property). I show in s.10.i that colour is involved in seeing, even though it is not necessary, for *P* to see *x*, that colour be involved in *P*'s seeing.

8 Tye [1982] p.319. In Tye's piece, this definition is called (D7).

One. Some philosophers may hold that the surface of a physical object is itself a physical object. If so, for *P* to see a surface *x*, the *M*-properties of *S* must vary systematically with variations in the *M*-properties of *x* itself. To cover this, Tye uses the disjunctive expression '*x* or some surface of *x*'.

Two. 'Some surface of *x*' is used rather than the 'facing surface of *x*' in order to handle cases of seeing the non-facing surface of *x* via a mirror.

Three. Tye defines distance away as *x*'s distance away from either *P*'s visual receptors or from some mirrorlike surface involved in *C* which produces *x*'s image. Relative position is defined in a similar way. This allows that when *P* sees *P*'s own eyes in a mirror, the distance away and relative position of *P*'s eyes can be varied.

Four. Tye notes that *S* need not have all four *M*-properties. For example, when we see a star, the sensum produced by the star has no shape, claims Tye. Tye holds, though, that if *S* does have a particular *M*-property, it must systematically vary with variations in the corresponding *M*-property of *x*. Tye does not address the issue of how many of the *M*-properties must be involved, and whether any of them are necessary).

(Tye1) will handle the problem cases mentioned earlier. It does not entail that my eyes, my optic nerve or the source of illumination are seen when I look at my computer, because variations in the *M*-properties of these objects will not produce systematic variations in *S*. (Tye1) does allow, though, that these objects are seen when I, respectively, look in the mirror, use an autocerebroscope, and look at the light globe in normal circumstances.

What about the case where Bill, behind the mirror, causes Ted, by radio control, to take up Ted's position to the right of *P* so that Ted is reflected by the mirror? (Tye1) will correctly entail that it is Ted, and not Bill that *P* sees, because variations in Ted's *M*-properties cause systematic variations in the *M*-properties of *S*, but variations in Bill's *M*-properties do not.

#### 5.iv. The 'Radio-Link' Problem

(Tye1) is still open to objection, however, as Tye points out. There are possible cases where  $x$  causes  $S$  and the  $M$ -properties of  $S$  are systematically correlated with the  $M$ -properties of  $x$ , yet  $P$  does not see  $x$ . Tye illustrates this objection in the following way.

Suppose Bill is continually sending Ted information about the current state of Bill's  $M$ -properties, and Ted is programmed to (and able to) change Ted's own  $M$ -properties in such a way that the  $M$ -properties of  $S$  caused by Ted's reflection in the mirror vary systematically with the changes in Bill's  $M$ -properties. Hence, if Bill changes shape or size, so does Ted, and if Bill moves to  $P$ 's left, Ted moves so that Ted's reflection in the mirror appears to  $P$  to be moving to  $P$ 's left. In this situation there exists a systematic correlation between the  $M$ -properties of Bill and  $S$  as defined in (Tye1), and so, by (Tye1),  $P$  must be perceiving not only Ted, but Bill. Yet ordinarily, we would hold that in this situation  $P$  does not see Bill, and so, Tye holds, (Tye1) fails.

Or suppose that only Bill exists, and  $P$  sees Bill through a sheet of perfectly transparent glass, in which case an event involving the glass is a cause of  $S$ . Suppose that this is special glass that can change its shape, size, relative position to  $P$  and distance away from  $P$ . Suppose also that Bill is programmed to systematically change  $M$ -properties as the corresponding  $M$ -properties of the glass change. The changes in the  $M$ -properties of the glass will therefore cause systematic variations in  $S$ . (Tye1) will thus entail that  $P$  sees the glass, which  $P$  cannot do if the glass is perfectly transparent.

#### 5.v. Tye's Proposed Solution

Tye's remedy for this flaw in his definition is to change the expression 'assuming other factors are left alone' at the end of the last clause in (Tye1). He holds that the problem with this term is that it

[C]ount[s] as seen *all* objects (outside the viewer's body) which, when

varied with respect to their *M*-properties but otherwise left alone, give rise to systematic variations in the spatial properties of the experienced sensum, *whether or not* these objects, in varying their *M*-properties, play causal roles which differ significantly from their original roles in producing the sensum.<sup>9</sup>

Tye's final definition is

(Tye2) *P* visually perceives *x* = df (i) There is a causal chain of events *C* which ends with *P*'s having an experience of a visual sensum *S*; (ii) *x*'s position in *C* is such that it is in principle possible to vary each *M*-property of *x* or some surface of *x* and thereby produce a systematic variation in the corresponding spatial property of *S*, assuming all other factors are either (a) held fixed, if leaving them alone would result in there being significant differences between the way in which *x* brings about *S* in *C* originally and the way in which *x* brings about *S* as the *M*-properties of *x* or some surface of *x* are varied, or (b) left alone, if leaving them alone would not have that result.<sup>10</sup>

(Tye2), Tye claims, enables him to rule out Bill as a perceived object. Originally, the part Bill played in causing *S* was that Bill caused Ted to take up Ted's position. But once Bill's *M*-properties are varied, the causal role Bill plays in producing *S* becomes much more complex, namely, it now involves Ted 'taking on the new programmed connections which transmit changes in *M*-properties from the former robot to the latter'.<sup>11</sup>

That is, there is a significant difference between the causal role that Bill originally had in the production of *S*, and the causal role that Bill has in the production of *S* as Bill's *M*-properties are varied. Because there is this difference, the variations in *S* that occur when Bill's *M*-properties are varied cannot be counted. So to determine whether *P* sees Bill, these programmed connections must be held fixed when varying Bill's *M*-properties, and in this

9 Tye [1982] p.321. (Tye's italics)

10 Tye [1982] pp.322. Tye calls this definition (D8). I have again left out of this a clause about *P*'s eyes being involved.

11 Tye [1982] p.322.



case, there will not be any systematic changes in *S*. Bill, therefore, is not seen by *P*. *P* still sees Ted, however, as the causal role that Ted plays in producing *S* does not change as Ted's *M*-properties are varied, and so the systematic variations in *S* that result from this do count.

Tye holds that similar points will apply to rule out the glass as a perceived object.

### 5.vi. The Failure of Tye's Proposed Solution

I hold that Tye's proposed solution fails. In the Bill-Ted case, the programmed connections that cause Ted to mimic Bill could also be the cause of Ted taking up Ted's original position. This shows that there need be no 'significant differences' between the causal role that Bill played originally in producing *S*, and the causal role Bill plays when Bill's *M*-properties are varied. It is the same causal role in both cases. (Tye2), therefore, will still entail that I see Bill as well as Ted. So contrary to Tye's claim, the problem is not due to ignoring any such significant differences.

Tye's move will also fail to solve the problem in the glass example. Here there are clearly no such significant differences. As the glass changes its *M*-properties, its causal role in the production of *S* does not change in any way. At all times, it is simply letting through photons which hit *P*'s retina. Any affect the glass has on the photons is uniform throughout the changes. Only a change in this causal role would entitle Tye to hold Bill's *M*-properties fixed, and as there is no change he cannot do so, and so the entailment that *P* sees the glass stands.

### 5.vii. Jackson's 'Functional Spatial Dependence' Theory

It will be instructive to look more deeply at Tye's notion of 'systematic variation'. To help us understand what 'systematic variation' is, and why Tye needs some such notion, we shall look at why Jackson's similar theory fails because it lacks such a condition.

Jackson holds that *P* seeing *x* is a matter of *x* causing *P* to have an experience of a sensum *S*, and the existence what he calls a 'functional spatial dependence' of *S* upon *x*. A functional spatial dependence of *S* upon *x* means that the spatial, that is, the *M*-properties<sup>12</sup> of *S* must be a function of the state of the *M*-properties of *x* as a consequence of the sort of causal connection *C* is. That is, variations in the *M*-properties of *x* must produce variations in the *M*-properties of *S* as a consequence of the sort of causal connection *C* is.<sup>13</sup> Jackson's analysis of seeing, rewritten to fit the terminology of my discussion, will therefore be as follows.

(FJ1) *P* visually perceives *x* = df (i) Some event involving *x* causes *P* to have an experience of a visual sensum *S*; (ii) the *M*-properties of *S* are functionally dependent on the *M*-properties of *x* or some surface of *x* as a consequence of the manner in which *x* causes *P* to experience *S*.

Jackson's conditions are too weak. If functional spatial dependence is simply to be 'a consequence of the sort of causal connection between *x* and *S*', there will be cases where a functional spatial dependence exists, but *x* is not seen. Functional spatial dependence, therefore, cannot be sufficient for seeing.

Suppose *P* takes some hallucinogenic drugs while *P* watches a football being kicked from left to right. The drugs distort *P*'s visual experience of the football, so that *P*'s sensum *S* starts to move erratically around *P*'s visual field, even though the football is still being kicked from left to right. *S* then turns from looking like a football into a banana, and then into a demon's head spouting fire, and then into a balloon that expands and deflates at random. But suppose that at all times, the football's effect on *P* is a cause of *P* having *S*, and that the football's *M*-properties are a cause of the *M*-properties that *S* has at each moment.

The ordinary user of 'see' would hold that *P* is no longer visually perceiving the football. It is not even true, the ordinary user would say, that *P* is misperceiving the football, that is, that *P*'s perception of the football is

<sup>12</sup> Jackson uses relative direction rather than relative position in his list of spatial properties. For convenience I will speak as though Jackson uses relative position. I think relative direction can be covered by relative position. See s.10.i.

<sup>13</sup> Jackson [1977] p.171.

illusory or weak to some degree. *P* just does not see the football here any longer. Jackson's analysis, however, entails that the football is perceived, as the variations in the *M*-properties of *S* are a result of variations in the *M*-properties of the football as a consequence of the causal connection that exists between *S* and the *M*-properties of the ball. This connection, of course, involves the effect of the drug on *P*'s brain, and so it is different than the normal connection that exists when *P* sees physical objects, but as Jackson himself points out,<sup>14</sup> seeing does not require that the causal connection be the normal one. Jackson's theory, therefore, is unacceptable as it stands.<sup>15</sup>

#### 5.viii. 'Systematic Variation'

Tye's analysis of seeing appears to solve this problem. He demands that not only must a variation in any of *x*'s *M*-properties produce a variation in the corresponding *M*-property of *S* as a consequence of the causal connection that exists between *x* and *S*, but this variation must be *systematic*. Tye can therefore hold that *P* does not see the football because the variations produced in the *M*-properties of *S* by variations in the *M*-properties of the football are not systematic variations.

Intuitively, it does seem that the variations produced in *S* by the football fail in some way to be systematic. But what is it for variations to be systematic? One seemingly plausible explanation is that for variations to be systematic, they must not differ from moment to moment in a random fashion. When the football is, for example, thrown straight up, *S* can move straight down, or diagonally, or however, as long as it consistently does so whenever the football is thrown straight up. But if *S* behaves differently every time the football is thrown straight up, the variation is not systematic, and *P* does not see *x*.

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<sup>14</sup> Jackson [1977] p.170.

<sup>15</sup> Jackson on p.171 rejects a certain case as seeing because 'there will be a totally erratic connection between the spatial properties' of the object and *S*. Jackson does not formally incorporate any such point into his theory, and fails to provide any explanation of what an erratic connection is, and so this comment cannot save his theory as it stands. Presumably, Jackson meant by 'erratic connection' something similar to Tye's 'systematic variation', and so the points I make below to the latter apply also to the former.

However, this explanation of what systematic variation is will not do. When the drug starts to take effect, there will be randomness in the correspondence between the *M*-properties of the football and *S* from moment to moment, but *P* can still see the football. So this cannot be what systematic variation is.

## 6. *The Significant Information Causal Theory*

### 6.i. An Informational Explanation of Seeing

I think we can get to a better understanding of what seeing is if we ask, why should it be important that there is systematic variation between the property values of *S* and those of *x* in the cases discussed? The answer, it seems to me, is that the systematic variation is important in such cases as the football case because it provides *P* with information about an object's properties. When there is such a systematic variation, *P* can know where the object is, how fast it is moving, in what direction, what shape it is, what size, and so on, and this is what is important for seeing.

So when *P* looks at the football with inverting glasses on, the relation between the football and *S* is such that *P* can gain information about the *M*-properties of the football from *S*'s *M*-properties, because the variation in the *M*-properties of *S* provide information about the *M*-properties of *x*. *P* also sees the football when the drugs are having a slight effect on *P*, because even though the variations in *S*'s *M*-properties do not vary in any simple way with the variations in *x*'s *M*-properties, *P* is still able to gain some information about the football's *M*-properties on the basis of *S*'s *M*-properties. But when the drugs seriously distort *P*'s visual experience, *P* does not see *S*, because *P* can gain no, or at least, very little, information about the football's *M*-properties.

### 6.ii. Strong and Weak Seeing

Before continuing with this informational analysis of seeing, I will point out what I think is an important part of the concept of seeing. This is the fact that *P*'s seeing of an object *x* can be strong or weak to some degree, and that *P*'s seeing of *x* in situation *A* may be stronger or weaker than in situation *B*. This is a feature of seeing that has been confused by many philosophers of perception with veridical and illusory seeing, when in fact the two are different. (In s.11 I

show how they differ).

My explanation of strong and weak seeing is that when *S* provides a lot of information about *x*, *P* sees *x* strongly, and when *S* does not provide much information about *x*, *P* sees *x* weakly; hence, the degree of strength or weakness of *P*'s seeing of *x* is determined by how much information *S* provides about *x*. And if *S* provides little or no information about *x*, *P* does not see *x* at all.

### 6.iii. Information and Belief

What do I mean when I say that *S* provides information to *P* about *x*? One thing I do not mean is that *P* gains true beliefs about *x* on the basis of *S*.<sup>1</sup> I hold that *P* can see *x* by gaining information about *x* from *S*, without *P* having any true beliefs about *x*. I present the following cases to support the claim that *P* can see *x* without having any true beliefs about *x*.

Suppose *P* and *Q* are fitted with special glasses that contain a complicated arrangement of mirrors and lens that distort and invert the light waves that enter *P*'s eyes, radically changing the properties of the sensa that *P* and *Q* have from what they would normally be. It is conceivable that *Q* could learn to get around in the world of physical objects with these glasses on, in the same way that people have learned to adjust while wearing simple inverting glasses. That is, *Q* could learn<sup>2</sup> what the relation between the properties of *x* and the properties of *S* is, enabling *Q* to gain true beliefs about the *M*-properties of *x* from the *M*-properties of *S*. Suppose, however, that *P* lacks *Q*'s ability to adjust to the glasses, and *P* never gains true beliefs about the properties of the objects around *P* from *P*'s sensa.

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1 Armstrong, in [1968] ch.10 also talks about perception being the acquiring of information about objects. However, unlike me, he means by information the acquiring of true beliefs about objects. See pp.209-10. Armstrong allows that *P* can gain information about *x* by also gaining false beliefs about *x*. However, if all *P*'s beliefs about *x* are false, what makes them beliefs about *x*, and not *y*? Armstrong also differs from me because he is not so concerned to separate the issues of what is it to have a visual experience and what is it to see *x* on the basis of that visual experience, because he holds that gaining true beliefs about *x* constitutes both having a visual experience and seeing *x*.

2 This learning may be unconscious, but this does effect my point.

There is no doubt that *Q* sees objects with the distorting glasses on. The question is, does *P* also see them? Does *P* see them as fully as *Q*? How can *P* see them when *P* gains very little in the way of true beliefs about them from *P*'s visual experience?

I hold that *P* sees the objects, and sees them as fully as *Q* does. My justification for this is that I think ordinarily we hold that if *P* and *Q* are in the same 'perceptual situation', that is, they are the same sort of perceiver, their surrounding environment is the same, and they are connected to the objects in their surrounding environment in the same way, and their visual experience is phenomenologically the same, then even though *Q* may gain more true beliefs about the surrounding objects than *P*, even to the extent that *Q* learns enough to interact normally with these objects and *P* does not, *P* still sees these objects.

This conclusion is supported by the following cases. Suppose *P* and *Q* both have a small pink square piece of paper in front of their eyes. Suppose *Q* correctly believes on the basis of *Q*'s visual experience that there is a small pink square object close to *Q*'s eyes. *P*, on the other hand, mistakenly believes on the basis of *P*'s visual experience that there is a large object far away from *P*. *P* also mistakenly believes that *P* is wearing distorting glasses, and as a result believes that the object is really round and to *P*'s left. *P* also mistakenly believes that there is a red light illuminating the object, and as a result *P* believes that the object is white.

*P*'s beliefs about the properties of this object are false, whereas *Q*'s are true. However, the ordinary user would not hold that *P* does not see the object. *P* does see it, and *P* sees it as strongly as *Q* does, only *P* is mistaken about what it is that *P* sees, that is, *P* has no true beliefs about it from having that visual experience. Thus, seeing an object is not the same as having true beliefs about it on the basis of a visual experience.

This conclusion is also supported by the cases of certain people who were blind from birth or early infancy, but had their visual systems repaired by an operation.<sup>3</sup> Some such people, most typically those who were active and intelligent before the operation, can soon make use of their visual experiences, and gain true beliefs about objects from them. But even the fastest learners take

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<sup>3</sup> See Gregory [1966] pp.193-8.

some time to learn what their visual experiences indicate about the physical objects that are the causes of these experiences.

Suppose we ask the question, in the period after the operation, when these people are having normal visual experiences caused in the normal way by physical objects, but before they can gain true beliefs about these objects on the basis of these visual experiences, do they see these objects? I think that the most ordinary users of 'see' would allow that they do see these objects, even though they do not as yet have any true beliefs about them from their visual experiences. These people are no longer blind, and they now see objects, only they do not see that objects have such-and-such properties, or see them as being the objects they are.

Some of these patients take a very long time to be able to make such use of their visual experiences, and some are never able to properly use their visual experiences, and can never gain much in the way of true beliefs about objects from them. I think we would allow that these patients also see. Assuming that they have normal enough visual experiences,<sup>4</sup> they are no more blind than the first group of patients. They can see objects as well, only they are incapable of ever gaining true beliefs about physical objects from their visual experiences.

Consider also a person from the 'country of the blind', a place where people have visual systems which do not work, and no-one has any conception of the possibility of anything like visual experience. Suppose, for some reason, that this person's visual system starts working, and physical objects start causing that person to have normal human visual experiences, but this person has no idea what is happening. This person, at least initially, gains no true beliefs about the physical objects that cause the visual experiences that this person has, but it still seems right to allow that this person sees the objects. This person simply fails to realize that they are seeing objects.

These points show that *P* can see *x* even when *P* has no true beliefs, or at least, very few determinate true beliefs, about *x*. Thus, any 'information' theory, such as Armstrong's, that holds seeing *x* is a matter of gaining true beliefs about *x*, is wrong.<sup>5</sup>

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4 If their visual experiences are deficient in some way, and this is the reason why they do not gain true beliefs about objects, then this example does not support my claim, but this makes no difference to the worth of my other examples.

5 One who holds a doxastic theory of visual experience might object that if *P*'s visual



My information theory holds that *P* seeing *x* is a matter of *P* gaining information about *x* (as well as a causal connection between *x* and *S*), but I understand gaining information about *x* as something different than the gaining of true beliefs about *x*. The sense of information I take to be relevant to seeing is the sense which Armstrong refers to, in order to explain that this is not the sense in which he is using the term, in the following passage from [1968]:

It is often natural to think of information or misinformation as something distinct from the true or false beliefs one acquires as a result of the information or misinformation. Spoken or written words are often naturally spoken of as information, and they are distinct from the beliefs which the words create in hearer or reader.<sup>6</sup>

I allow that something *x*, such as a sentence, an image or a sensum, can be said to carry information about something else, *y*, independently of any true beliefs that anyone gains about *y* from *x*. What is it for *x* carry information about *y* in this sense? *x* carries information about *y* when there is some possible being who could have some sufficient amount of determinate true beliefs about *y* from *x*. So *P* sees *x* when *P* has a sensum *S* that (as well as being caused by *x*) carries information about *x* in this sense, even though *P* may have no determinate true beliefs about *x* from *S*.

This allows that *P* and *Q* can both see *x*, and see *x* as strongly as each other, by having identical sensa, even though *Q* may have more true beliefs about *x* on the basis of *S* than *P* does. It is because *P*'s sensum carries as much information about *x* as *Q*'s sensum does.

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experience consists of *P* having certain sorts of beliefs (or belief-like states) about the physical objects around *P*, then *P* cannot see *x* without having true beliefs about *x*. However, even if this is so, *P* can still see *x* even when such beliefs are entirely false, as would be the case when *P* sees *x* in a distorting mirror without realizing it.

<sup>6</sup> Armstrong [1968] p.210.

#### 6.iv. Significant Information

There is an obvious problem with my theory as it stands. Suppose *P* is looking at the print-out of the raw data from a radio telescope, which consists of rows of 1s and 0s. This print-out may contain information, in the sense relevant to seeing, about the spatial properties of a star, because some possible being could gain determinate true beliefs about the star from it, and so *P*'s sensum contains information, in the sense relevant to seeing, about a star. My theory, as it stands, therefore entails that *P* sees the star in this situation. But *P* obviously does not see the star in this situation.

It might be thought that I can avoid this problem by claiming that my theory does not entail that *P* sees the star because *P*'s sensum *S* in this situation carries information about the paper on which the data is printed, and so *P* sees the paper, and *P* cannot see an object by having *S* if *P* already sees another object by having *S*. This move does not overcome the problem, though. Suppose we had connected *P*'s visual cortex directly to a computer which received the raw data from the radio telescope, and which stimulated *P*'s visual cortex in a way that caused *P* to be visually aware of images of numbers, and those numbers were same numbers that were on the print-out. In this situation, there is no other object such as the print-out paper which *P* sees by having *S*. (Anyway, I show later that *P* can see two objects with the one sensum).

What needs to be added to my theory is the condition that it must be possible that some visual perceiver of *P*'s kind, *P*\*, could understand the information about *x* carried by *S*, that is, it must be possible that *P*\* can have a sensum just like *P*'s sensum, and that *P*\* can have a sufficient number of determinate true beliefs about *x* on the basis of that sensum.<sup>7</sup> This is not to say that this perceiver must actually exist; all that is required is that it be possible that there could be such a perceiver of this kind. We can put this point by saying that the information *S* carries must have 'significance' for *P*. Hence, *P* sees *x* when *S* carries 'significant information'<sup>8</sup> about *x* for *P*. For this reason, I

<sup>7</sup> From now on I will often use 'true beliefs' rather than 'sufficient determinate true beliefs', for convenience, but it should be understood that I still require that there be a sufficient number of these of these beliefs and that they be determinate. See s.10 for more comments on these conditions.

<sup>8</sup> I sometimes speak of *S* 'carrying' significant information, and sometimes of *S* 'providing' or 'constituting' significant information for *P*. No difference in meaning between these terms is

call my theory the 'significant information causal theory'.

The significant information causal theory will allow us to say that *P* does not see the star by seeing the print-out of the raw data, because no perceiver of *P*'s kind could have determinate true beliefs about the star on the basis of the sensum *P* has, that is, that this sensum does not provide significant information about the star to *P*.

The significant information theory still allows that *P* sees *x* when *P* wears the distorting glasses even though *P* does not have true beliefs about *x* from *S*, because *S* carries information about *x* which a perceiver of *P*'s kind could understand, that is, it is possible that a visual perceiver of *P*'s kind could have sufficient determinate true beliefs about *x* on the basis of *S*. *Q*, for example, is a visual perceiver of *P*'s kind, and *Q* was able to have sufficient determinate true beliefs about *x* on the basis of *S*. Thus, *P* sees *x* with the distorting glasses on because *S* provides significant information to *P*.

The theory also allows that people who were blind from birth and who have had their visual systems repaired by an operation see the objects that cause their sensa, even though they have not gained any true beliefs about the properties of these objects that they see. This is because it is possible that perceivers of their kind, for instance, normal humans, could have true beliefs about the properties of these objects by having such sensa.

The significant information theory will explain strong and weak seeing in the following way. When *P* has a sensum *S* caused by *x*, and it is possible that a perceiver of *P*'s kind, *P*\*, can have many determinate true beliefs about *x* on the basis of *x*, *P* sees *x* strongly (as a perceiver of *P*\*'s kind). The less determinate *P*\*'s beliefs, the weaker *P*'s seeing is, and the less beliefs *P*\* has, the weaker *P*'s seeing is (as *P*\*'s kind of perceiver). If *P*\* has no true beliefs about *x* that are of a certain level of determinateness, then *P* does not see *x* (as *P*\*'s kind of perceiver).

The significant information theory explains *P* seeing a property of *x*, for example, *x*'s shape, as follows. If *P* has a sensum *S* which provides significant information about a particular property of *x*, that is, if a perceiver of

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intended.

*P*'s kind, *P*\*, can have a sufficient number of determinate true beliefs about that property on the basis of *S*, then *P* sees that property.

## 6.v. The Relativity of Significant Information

Suppose someone objected to my claim that it is not possible that a visual perceiver of *P*'s kind<sup>9</sup> could have true beliefs about the star by seeing the raw data from the radio telescope. They might point out that if we radically rewired *P*'s brain, and incorporated some computer circuitry into it, then it could be possible that *P* could have true beliefs about the star on the basis of the raw data.

One obvious reply that could be made to this objection is that with these changes to *P*'s brain, *P* would not be the same kind of perceiver as before, and so the objection does not show that a perceiver of *P*'s kind could possibly have true beliefs about the star on the basis of the raw data.

The problem with this reply is that it assumes that *P* belongs to only one kind of (visual) perceiver. This is a natural assumption to make, but I think it is wrong.

The different kinds of possible perceivers there are, are not mutually exclusive. There is considerable overlap between kinds. This is because we are free to invent any kind we like, with whatever criteria for membership we like. The basic facts about the world do not include facts about the kinds of perceivers there are. Facts about what kind of perceiver *P* is depend on how we divide up the world, and so there is no basic fact about what kind of perceiver *P* is, and so there is no one kind of perceiver that *P* 'really' is rather than any other kind. (I also hold that the same applies to the kind of organism *P* is).<sup>10,11</sup>

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<sup>9</sup> From now on, I will sometimes drop 'visual' from 'kind of visual perceiver', but it should be understood that I mean 'kind of visual perceiver' when I talk about 'kind of perceiver' in such contexts.

<sup>10</sup> I could have perhaps said here that I do not think terms that name kinds of organisms, like 'human', are natural kind terms. However, I avoid saying this here because complications arise.

<sup>11</sup> We can draw our criteria for a kind of perceiver as exactly as we like, in which case there will be a true, objective answer to the question 'does *P* belong to this kind?'. We can also have kinds

We could say kind of perceiver *k* includes all and only those organisms with eyes, optic nerves and a visual cortex with such-and-such characteristics. We could say that kind of perceiver *l* includes all and only those organisms with false teeth or a beak, and that kind of perceiver *m* includes all and only those organisms born on January 1st, 1900. We can also talk about the human kind of perceiver, which includes all and only humans, and the normal human kind of perceiver, a more restricted kind, which excludes humans who have abilities far beyond the norm.<sup>12</sup> Because 'human' and 'normal human' are themselves, I hold, both fuzzy kinds, I hold that 'human kind of perceiver' and 'normal human kind of perceiver' are kinds with fuzzy boundaries.

There can be overlap between kinds of perceivers. Kind of perceiver *k* may include particular perceivers *O*, *P* and *Q*. Kind of perceiver *k'* may include perceivers *P*, *Q* and *R*. Kind *k''* may be so wide that it includes *O*, *P*, *Q*, *R*, and *S*. Which kind of perceiver is *P*? *P* belongs to at least three kinds, *k*, *k'* and *k''*. If we ask, 'but which kind is *P* really?', the answer is that there is no single one kind that *P* really belongs to, *P* belongs to all three.

But if *P* belongs to all three, then if *P* has a sensum caused by *x* but *P* gains no true beliefs about *x* from *S*, what is the answer to the questions 'does *S* carry significant information about *x*?' and 'does *P* see *x*?' These questions must be answered relative to a kind of perceiver. *S* may not carry significant information about *x* for *P* when *P* is considered as a perceiver of kind *k*, because no perceiver of this kind can have true beliefs about *x* by having *S*. Thus, *P* does not see *x* as perceiver of kind *k*. But *S* may carry significant information about *x* for *P* when *P* is considered as a perceiver of kinds *k'* and *k''*, because perceivers of this kind can have true beliefs about *x* on the basis of *S*, and so *P* does see *x* as perceiver of kinds *k'* and *k''*. So

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with fuzzy boundaries, and for these kinds, there can be cases where there is no correct yes-or-no answer to the questions 'is *P* a member of this kind', and 'could a perceiver of this kind have true beliefs about *x* on the basis of *S*?'. (It should be clear that my points about the relativity involved with kinds of perceiver are not meant to deny that it can be true that *P* 'really' is a member of a kind, nor are they meant to deny that there are basic facts about *P*, for example, that *P* has such-and-such a mass. They also have nothing to do with relativity about truth).

12 'Normal human perceiver' refers to that class of humans who count as normal, that is, typical or usual, in regards to perceiving, at this point in time. When people in the future talk of 'normal human perceivers', they will mean normal at that point in time, and this class may be different, if most humans have changed in that time.

these questions can only be answered relative to the kind of perceiver *P* is being considered as, and there is no one kind of perceiver that *P* really is, and so there is no one non-relative answer to these questions.

So when we ask, does *P* see the star when *P* sees the raw data from the radio telescope, we can answer that considered as a normal human kind of perceiver, *P* does not see the star, because no perceiver of this kind can have true beliefs about the star on the basis of this data (and so *S* does not carry significant information about the star for *P* as a normal human kind of perceiver). But when we consider *P* as a member of a wider class of perceiver that includes, in addition to organisms like *P*, super-intelligent beings that can have true beliefs about the star from the raw data, *P* does see the star (and *S* does carry significant information about the star for *P* as a perceiver of this kind).

When *P* fails to gain true beliefs about objects when wearing the distorting glasses, we noted that *P* can be said to see because *Q*, who was the same kind of perceiver as *P*, could have true beliefs about the objects. So considered as the same kind of perceiver as *Q*, *P* does see. But considered as a member of a kind of perceiver that does not include perceivers as intelligent as *Q*, *P* does not see.

We also concluded that those blind people who had their visual systems repaired by operation, but who had not gained any true beliefs about objects on the basis of the *sensa* they had after the operation, can be said to see the objects that cause their *sensa*, because normal humans could have true beliefs about these objects on the basis of such *sensa*. So considered as normal humans, they see. But we could also say that they do not see these objects when we consider them as belonging to the kind of perceiver that only includes humans with cognitive systems very much like theirs, because such beings cannot have true beliefs about these objects on the basis of such *sensa*.<sup>13,14</sup>

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13 One might say that even considered as this latter sort of perceiver, they see the objects, because some of these perceivers have shown that it is possible that a perceiver of this sort can have true beliefs on the basis of such visual experiences, because some of these people have *themselves* developed the ability to do so. However, once they develop the ability to do so, they have changed, even if only in minor ways, and so they may not count as part of the kind any more, if the kind in question has been drawn so tightly as to exclude such people, no matter how similar they are to the way they were before. Thus, even slight changes in *P*'s abilities may mean that *P* no longer belongs to a kind any more, and *P* may belong to new kinds on the

It may be objected that there is one 'real' kind of perceiver that an organism is, and this kind will be the same as the one 'real' kind of organism *P* belongs to, and we already know what the 'real' kinds are (for the most part, at least). They include kinds such as human, dog, cat, horse and so on. I hold, however, that there is no one 'real' kind of organism that any organism *P* belongs to. One argument I have for this claim is as follows. The organisms that exist on Earth now may seem to fall into discrete groups, which may seem to support the idea that there is one 'real' kind that an organism belongs to, but consider the possible organisms that could have existed had evolution been different, or who may exist on other planets, or who could be created by genetic engineering, or who could be, and have been, created by inter-species breeding, or who could be created by combining existing organisms with computers and other electronic machinery.

Such possible organisms are all capable of perceiving, but they do not fall into discrete groups; rather, they form a continuum.<sup>15</sup> Of course, it could still be possible to divide these organisms into discrete kinds if the boundaries of our kinds are drawn sharply enough, but there seems no reason to suppose that these divisions are 'real' divisions.

A similar problem for this view is that such kinds as human, dog, cat, horse and so on, do not have sharply-defined boundaries anyway, but rather very fuzzy boundaries. Suppose *P*'s intelligence is enhanced by drugs. Is *P* still human? It's hard to say. Is a prehistoric caveman human? Again, it's hard to say. It's hard to say because the kind 'human' has no clear-cut boundaries. But if humankind was a 'real' kind, then it would have clear-cut boundaries. Someone may propose to draw exact boundaries for the kind, as biologists do, but on what basis do they decide what the 'real' boundary is? There is no such

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basis of these changes. (Note that if *P* does have true beliefs about *x*, then *P* sees *x* as every kind of perceiver that *P* is, because in this case a perceiver of *P*'s kind, namely *P*, does have true beliefs about *x* on the basis of *S*).

14 There may also be people with brain damage who have normal visual experiences but are unable to have true beliefs about objects on the basis of them. Oliver Sacks' patient, described in the title of his book *The Man Who Mistook His Wife For A Hat*, Sacks [1985], may be one such person. However, in many such cases, it is hard to tell whether the person has normal visual experience, and is unable to have true beliefs on the basis of it, or whether the person no longer has normal visual experience.

15 Richard Dawkins makes a similar point in [1986] pp.262-5.

basis. As most biologists admit, such divisions are for the convenience of biologists only.

(A further problem with this view is that it assumes that we can use existing kinds such as human, dog and cat and that every organism will fit into one or another of these categories, but not more than one. But some such terms are species terms, and some are genus terms. For example, 'dog' is a genus term which includes foxes. But the objector may not want to hold that foxes are the same kind of organism as dogs. What the objector could do to overcome this problem is to point out that foxes and domestic dogs are different kinds of organisms because they belong to different species, and hold that it is species that is important.

But in some cases this person may want to hold that members of different species should be considered as the same kind of perceiver. For example, the objector may want to hold that a Cro-Magnon be considered as a human kind of perceiver, given that Cro-Magnons are so much like humans, and have visual systems pretty much the same as humans. This would allow one to say that a Cro-Magnon sees  $x$  even if no Cro-Magnon can have sufficient determinate true beliefs about  $x$ , because a human being could have sufficient determinate true beliefs about  $x$  on the basis of  $S$ . But Cro-Magnons are not of the human species, that is, the species *homo sapiens*, even though they are of the same genus, *homo*).

I do not think, therefore, that 'absolutism' about what kind of perceiver  $P$  is will work, and so we must concede that there is no one 'real' kind of perceiver (or organism) that  $P$  really is.

Even though we can make up whatever kinds we like, with whatever criteria for membership we like,<sup>16</sup> ordinarily we are interested only in kinds such as human kind of perceiver, or normal human kind of perceiver. So, when a human  $P$  looks at the raw data from the telescope, even though we could say that considered as a certain sort of perceiver,  $P$  sees the star, we are more interested in whether  $P$  sees as a normal human kind of perceiver, or at least as a human kind of perceiver.

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<sup>16</sup> One restriction on our criteria is that we must not refer to  $P$  seeing, otherwise the definition of 'see' will be circular.



We must keep in mind, though, that 'normal human perceiver' and 'human perceiver' are kinds with very fuzzy boundaries, and so there can be cases, such as where *P* wears distorting glasses, or has some sort of unusual prosthetic vision, or where computer circuitry is implanted into *P*'s brain, or where *P* is a 'missing link', where there is no correct answer to the question 'does *P* see as a normal human, or even as a human perceiver?'. (Of course, one could try to draw exact boundaries for such kinds, but most people would disagree over where the boundaries should be drawn, and there would be no basis for saying that these are the correct boundaries for these kinds. We can only say where the 'correct' boundaries are with kinds that we make up ourselves, not with kinds that are 'public property').

#### 6.vi. Solution To Radio-Link Problem.

I come back now to the radio-link problem case. The situation in this case is that *P* sees Ted via a mirror, and Bill, who is behind the mirror, controls Ted via a radio link, so that changes in Bill's *M*-properties produce the same changes in Ted's *M*-properties. The problem is that Tye's causal theory (and Jackson's) entails that Bill is seen as well as Ted, which is at odds with what the ordinary person would hold. My theory will also entail that Bill can be seen by *P*, because (considered as a member of many kinds of perceivers, including normal human perceivers and human perceivers) *P*'s sensum *S* in this situation provides significant information about Bill to *P* (because perceivers of those kinds can have true beliefs about Bill on the basis of *S*).

I hold that the solution to this problem is not to add extra conditions to a theory of seeing, but to accept that Bill is seen. Neither my theory, nor Tye's or Jackson's, are deficient in entailing that Bill is seen. The problem, rather, is that the ordinary person is inconsistent on this matter.

I think the main reason the ordinary person feels that Bill is not seen is because they hold that in having *S* here, *P* sees Ted, and *P* cannot see two different objects by having *S*.<sup>17</sup> But this is not so: we can see two objects at once by having the one sensum. The ordinary person has failed to realize this,

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<sup>17</sup> Unless of course, *P* sees *x* and *y* by having *S* because *y* is a part of *x*.

but we can see that it is so by noting that in mirror perception, we see both the object and the facing surface of the mirror. So it is possible to see two different objects by having *S*. It is, therefore, inconsistent to hold that we cannot do so in the radio-link case, unless some other reason is given which shows that *P* does not see Bill in this case. I can see no such reason, and so it must be that *P* does see Bill.<sup>18</sup>

It cannot be objected that *P* does not see Bill because *P* does not realize that *P* is seeing Bill, because *P* does not have to realize that *P* is seeing an object to be seeing it. *P* may not even realize that *P* is seeing Ted, yet *P* still sees Ted.

Some might object that it is simply part of the concept of seeing that this particular sort of case, even though it fulfills all the requirements for seeing (according not just to my theory but most of the better causal theories), is not counted as a case of seeing. This objection fails, because one can master the concept of seeing without knowing any such rules about such particular cases not being counted as seeing. To learn how to use 'see' properly, one does not need to learn that this sort of case does not count as seeing.

(Some might feel that a causal theorist could avoid the conclusion that Bill is seen by adding the condition that when the theory entails that *P* sees two objects by having *S*, then the object that is most strongly seen is the one that *P* really sees, and *P* does not see the other at all. The fact that we can see via mirrors, though, shows that no such condition is part of the concept of seeing, because here we do see two objects. Besides, it may be that Bill and Ted are seen equally strongly).

The same points apply as well to the case where Bill changes *M*-properties in response to changes in the *M*-properties of the pane of glass, and so I conclude that *P* sees the glass.

It may seem, though, that there is an additional factor in this case which makes it impossible that the glass can be seen, namely, that the glass is perfectly transparent, and therefore, by definition, unseeable. But a perfectly transparent object is only unseeable by definition if we hold that for *P* to see an object *x* by having *S*, *S* must be produced by light waves reflected or transmitted from the object. It has been shown, though, that seeing does not require that *S* must be

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<sup>18</sup> We can say, then, that Ted functions as a sort of 'three-dimensional image' of Bill.

produced by light waves reflected or transmitted by the object. Any sort of causal connection, such as echolocation or heat emission, will do, as long as the sensum produced by such means provides *P* with significant information about the object. So the glass can be seen even though it is perfectly transparent.

## 7. *New Ways of Seeing*

### 7.i. *Television Vision*

In the previous section it was concluded that *P* can see two different objects, *x* and *y*, by having a sensum *S*, if *S* provides significant information about both *x* and *y*. This allowed that *P* can see both a portion of the surface of a mirror, and an object reflected by a mirror, by having the one sensum. If *P* can see an object via a mirror, what about seeing via a television? Suppose *P* sees a television picture of *x*, and that the sensum that *P* has provides *P* with significant information about *x* as well as about some section of the television screen. The situation seems analagous to mirror perception. Does *P* see *x* in this case? I hold that *P* does. After all, it is perfectly acceptable to say things like 'I saw David Boon playing cricket yesterday on TV'. While some would agree with me here, there are some others who would hold that 'seeing' via television isn't 'really' seeing.

I hold that those who deny that seeing can take place via a television are being inconsistent. There is no relevant difference between seeing via a mirror and seeing via a television. In both cases, *x* causes *S*, and *P* receives significant information about *x* from *S*. These are the only relevant facts. It is of no use to point to differences like the fact that the causal process involved in 'television vision' is more complex than in mirror perception, because the complexity of the causal process is irrelevant. It is also of no use to point out that in mirror perception it is the same light waves that are reflected or transmitted by *x* that enter *P*'s eyes, whereas with the television the light waves originally reflected or transmitted by *x* are not the light waves that enter *P*'s eyes, because *P* can see *x* without light waves being involved in the causal process by which *P* sees *x* at all.

I conclude then, that *P* can see *x*, in the literal sense of 'see', by seeing a television picture of *x*. *P*'s seeing of *x* in such a case is just as strong as in a case where *P* sees *x* 'directly' and receives the same amount of significant information about *x*.

Some may still feel, though, that there is something about the television

process which rules out seeing by television. I present further considerations which show that seeing can take place via television.

Suppose that in the future prosthetic eyes are developed which consist of miniature video-cameras placed in *P*'s eye sockets, and a miniature computer placed inside *P*'s skull which receives and processes the cameras' signals and stimulates the optic nerve in a way that causes an appropriate visual experience in *P*. I do not see how it can be denied that *P* sees in such a case.

Suppose then that we use a wireless link between the video camera 'eyes' and the computer/receiver. This makes it possible to place the camera far away from *P*; *P* could even remotely control the camera eyes. *P*'s camera eyes could be at the Bellerive Oval, and *P* could stay at home and watch the cricket with prosthetic vision at the same time that someone else was watching the game on television. In both cases the causal processes are basically the same.<sup>1</sup>

In the television process there is an object which 'receives' information about *x*, and which, on the basis of that information, causes *P* to have *S*, and this object is seen by *P*. But this is no different than what happens in mirror seeing: the mirror also 'receives' information about *x* and, on the basis of that information, causes *P* to have *S*, and the mirror is seen by *P*. In both mirror seeing and television seeing, *x* is seen by *P* seeing the surface of another object. The television just happens to be a more sophisticated 'mirror' than the normal mirror.

What if the television pictures *P* sees of *x* are not 'live' pictures, but pre-recorded pictures? What if *P* is watching a film or video? Suppose *P* watches Groucho Marx in *Duck Soup*. Is *P* seeing Groucho himself, just as *P* sees David Boon when *P* watches the cricket? Or does the fact that the film fails to provide *P* with significant information about Groucho's current properties rule out seeing Groucho on film?

This question can be answered by noting that I can see a star, even though the star may no longer exist. I can see, literally, objects that exist in the past if my visual experience provides significant information about the object's property values at that time. So when I watch *Duck Soup* I see the 1933 Groucho, because the visual experience I have when watching the film provides

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<sup>1</sup> Watching the game by television involves additional processing done by the television station, but this is irrelevant.

me with significant information about Groucho Marx at that time in 1933.<sup>2</sup>

These conclusions about seeing via television, film and video, I hold, are not just conclusions entailed by my theory. They will be entailed, I hold, by any good causal theory. For example, Tye's theory will entail them, as there exists a systematic variation between the *M*-properties of *x* and *S* in these cases. And Jackson's theory will entail them, as there exists a functional spatial dependence of *S* upon *x* in these cases.

## **7.ii. Future Technology and the Future Use of 'See'**

It might be objected to my arguments that most ordinary people just do not allow that *P* can see via television or film or video, and my claims about inconsistency miss the point. Even if it is inconsistent to say that *P* does not see Bill behind the mirror, or via television, the ordinary person is not going to change their belief that these cases just do not count as seeing. So my analysis is useless, because it is just not going to fit with the way that most ordinary users use 'see', even if the real masters of 'see' would not hold such things.

In reply to this, I would point out that there are many people would accept that one can see via a television, especially once they have considered the matter. I would also point out that many people might come to accept that cases such as where Bill is behind the mirror and controlling Ted count as seeing if they were acquainted with my arguments.

This last claim may seem to overestimate the power of philosophical reasoning to impress the ordinary person, not to mention the worth of my arguments. However, I think that there are other reasons why, in the future, the ordinary person will come to accept that such cases count as seeing, and any claims to the contrary will come to seem wrong and pointless. I am claiming, then, that any assumptions that some people have that such cases do not count as seeing will disappear in the future.<sup>3</sup>

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<sup>2</sup> The same points will apply to hearing records or compact discs. If I listen to a record of Groucho singing 'Hooray for Captain Spaulding' in 1933, I am hearing the 1933 Groucho himself singing, as well as hearing a record

<sup>3</sup> I also claim that even if the concept of seeing that I am analysing is not the ordinary concept, it

Some might object to my claims here, and hold that even if a new concept of seeing becomes accepted in the future, what is important is the current concept, because important epistemological and metaphysical matters hang on this concept and its correct analysis. I show in s.14 that this view is mistaken.

The reason why it will be commonly accepted in the future that such cases count as seeing is because of likely developments in the fields of prosthetic vision, virtual reality and, especially, telepresence. Prosthetic vision involves the use of artificial devices as replacements for the organs involved in the normal human visual process, such as the eyes and the optic nerve. I have already described some such cases in this work, and I assume that the reader is familiar enough with this idea not to require any more detailed explanation.<sup>4</sup>

The importance of prosthetic vision is that in the future, if, as seems most likely, prosthetic vision becomes commonplace, the ordinary person will most probably allow that objects can be seen by someone who has prosthetic vision, and so the ordinary person will come to accept that seeing can involve causal processes that are different than the standard processes involved in seeing now.

The principles behind virtual reality, fast becoming a well-known field, should be recognizable by any philosopher who is familiar with 'brain in a vat' thought-experiments. Virtual reality is a highly-interactive computer-generated simulation of a three-dimensional environment. Users can interact with a 'virtual world' using goggles, which contain a video screen for each eye, headphones, a microphone, and wired-up gloves which send information to the computer about the movement of the user's hand. The computer displays the environment from the user's point-of-view, and any movements that the user's head makes are detected by sensors in the goggles, which allows the display to be continually updated to the user's point-of-view.<sup>5</sup>

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is still a concept that is interesting enough to warrant an analysis. Lewis makes similar comments in [1980] p.244: 'I do not really think my favoured use is at all idiosyncratic. But it scarcely matters: I would like to understand it whether it is idiosyncratic or not'.

4 A seminal paper on this topic is Brindley and Lewin [1968]. They implanted tiny radio receivers into the brain of a blind patient. The receivers were connected by electrodes to the occipital lobe of this patient. By sending the appropriate radio signals, the patient was able to have visual experiences of simple patterns of light.

5 The idea of virtual reality has, of course, long been a topic for science fiction writers, and many,

Many 'virtual worlds' use a representation of the user's hand in the display, which the user can move by moving the glove, enabling the user to control 'virtual objects'. Some gloves have pressure pads which can simulate the feel of an object in the hand. Full body suits which send and receive information, and can stimulate the body in appropriate ways, have even been proposed.

Virtual worlds at present have blocky graphics, and are not very detailed, due to the enormous amount of computing power required to produce detailed three-dimensional images which are constantly updated in real-time. With increases in computing power, virtual worlds will become more and more detailed and realistic.

It is possible for more than one person to be 'jacked-in' to the same virtual world; the users can even be physically remote from one another. Each user can see a graphic image representing the other users within the virtual environment. At present, the representation of other people is, like all the graphics in virtual worlds, rather simple. But with increases in computer power, these representations of other people will become much more realistic.

'Telepresence' is the name given to the use of a device, such as a robot, which a user can control from a distance, and which contains sensors, such as cameras, which send back information about the device's environment which is displayed on a screen for the user to see. Telepresence is already used in many dangerous environments, such as in fires and in dangerous sections of nuclear power plants. It is increasingly being used in surgery, and NASA is intending to use it in the future for exploration of other planets.

Already virtual reality-type goggles are replacing standard-sized television screens, and virtual reality gloves are being used to control the remote device. In the future, it is quite possible that a high degree of control over a remote robot-like device by the user will be achievable. In this sort of situation it will feel to the user very much like they are actually physically located in the remote environment. This feeling has already been reported by users of telepresence, and by users of virtual reality.<sup>6</sup>

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such as William Gibson, have based stories on the possibility of the computer being 'jacked-in' directly to the brain, *a la* the 'brain in a vat', eliminating the television screens and headphones.

<sup>6</sup> See Dennett [1979b] and Sanford [1981] for interesting speculations that start from such



It will become, and has become in some cases, natural for those working within the field of telepresence, and for those who use such technology, to speak of *seeing* the environment the remote device is located in, not in any analogical sense of the term, but in the full, literal sense, and thus to allow that an object can be seen by seeing a television picture of it. This acceptance will most probably spread to ordinary users of 'see', and so it will become acceptable to the ordinary person to say that *P*, literally, sees an object by seeing television pictures of it.

Any insistence that the remote objects themselves are not really seen, only television pictures of them, will come to seem to the ordinary person to be a pointless claim. It will be regarded as the same mistake that is made when someone insists that the historical meaning of a word is the 'real' meaning, not the current meaning.

I think that the same will happen in regards to interacting with other people in virtual reality, once the representations of other people in the virtual environment becomes more realistic. The ordinary person will allow that *P* sees *Q* by seeing a 'virtual *Q*', which is nothing more than a television picture which represents *Q*.

Thus, anyone who rejects my claims that *P* sees Bill behind the mirror, and that *P* sees *x* by seeing a television picture of *x*, on the basis that most ordinary people just do not count such cases as seeing, will have to concede that this will probably not be so in the future.

### 7.iii. Photos, Paintings and Static Virtual Images

If *P* sees *x* by seeing a film, video or television picture of *x*, does *P* also see *x* if *P* sees a photo of *x*? I think so, though I concede that this position may seem even more counter-intuitive to many people than my claim that *P* sees *x* by seeing a film of *x*.

One apparent difference between films and photos that may be a relevant difference is that a photo can only provide significant information about an object at an instant of time, whereas a film can provide information about an

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possibilities.

object over some period of time.

However, there is in fact no such difference. The 'instant' of time that a photo captures is not an extensionless temporal interval. A photo exposure takes time to occur, albeit a fraction of a second.<sup>7</sup> Thus, the only difference between a film and a photo in regards to time is that a photo provides significant information about  $x$  over a shorter period of time than a film, but this is a difference in degree, not kind, and is irrelevant to seeing.

Even if photos did only provide significant information about  $x$  at some extensionless point in time, I still think  $P$  can see  $x$  by seeing a photo of  $x$ . Suppose  $P$  is watching *Duck Soup*, and  $P$ 's eyes close and then open and shut very quickly. During this time,  $P$  sees only a very brief portion of the film with Groucho in it. Even if during this time there is no change on the screen,  $P$  still sees Groucho. But suppose that during this brief period  $P$  only saw one frame of the film. A film frame is nothing more than a transparent photo, and so if  $P$  sees Groucho by seeing this frame, then  $P$  sees Groucho if  $P$  sees a photo of him.

I conclude, then, that in cases where seeing a photo of  $x$  provides significant information about  $x$ , then seeing the photo constitutes seeing  $x$ . (Obviously, a bad photo of  $x$  will provide less information about  $x$ , and so  $P$  will not see  $x$  as strongly with a bad photo as with a good photo).

What about paintings and drawings of  $x$ ? To claim that seeing a drawing of  $x$  constitutes seeing  $x$  is even more counter-intuitive than my previous claims, but as I do not see any relevant difference between a photo and an accurate painting of  $x$ , I hold that seeing a painting or drawing of  $x$  that provides significant information about  $x$  constitutes seeing  $x$ . The less accurate the drawing is, that is, the less information it provides about  $x$ , the less strongly  $P$  sees  $x$  by seeing the picture. (There must of course be a causal connection between  $x$  and the sensum  $P$  has; it is not enough for the picture to just accidentally look like  $x$ ).

The same points will also apply to static 'recorded' virtual reality environments, such as have been made of the surface of Mars. These are computer-generated images of some real-life object or environment, like Mars, based on data received by the computer about the object. In the case of the

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<sup>7</sup> This is why if the object moves rapidly enough, the image on the film is blurred.

virtual Mars environment, a user can 'move' around the simulated surface of Mars, exploring mountains and crevices and all the features of the landscape. This virtual landscape, however, is fixed in time (though it is updated now and then). It is, in essence, just a gigantic electronic photo, and so I hold that the same points that apply to photos apply to these virtual reality environments. Hence, in seeing a virtual Mars landscape, *P* is seeing Mars itself at the time the data was recorded.

Some might object that even if seeing a photo or television image of Mars is seeing Mars, seeing a virtual image of Mars is different, because this is a computer construction, which is not the same as a photo or television picture, which are 'direct impressions' of Mars. However, a photo is also a construction of the apparatus of the camera, and a television image is a construction of the camera and other television equipment, and so photos and television pictures are no different in this respect to virtual images.

(What if the VR landscape of Mars is made up of data recorded at different times? Suppose I look at two virtual Mars mountains,  $VM_1$  and  $VM_2$ .  $VM_1$  provides significant information about the property values of Mars mountain  $MM_1$  as it was at  $t_1$ , and  $VM_2$  provides significant information about the property values of Mars mountain  $MM_2$ , as it was at  $t_2$ . In this case we simply say that at the same time I see  $MM_1$  as it was at  $t_1$ , and  $MM_2$  as it was at  $t_2$ , just as I can see at the same time, two stars, one as it was at  $t_1$  and the second as it was at  $t_2$ ).

#### 7.iv. Visual Images Caused By Descriptions

Suppose I read a description about what an object  $x$  looks, or looked, like. I conjure up in my mind a visual image or sensum of  $x$  based on this description.  $x$  has played a part in the causal process by which this visual image with its particular property values comes to exist. I can have true beliefs about many of the property values of  $x$  from this image. Do I therefore see  $x$  in this situation? My answer is yes.<sup>8</sup>

Having visual experiences caused in this way is no different in principle

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<sup>8</sup> How strongly I see will of course depend on how accurate the description is, and how accurate the image is.

than having them caused by a video tape in a video player. A video contains information about the property values of certain objects coded in the arrangement of magnetic particles on its tape. The right device can interpret this information so that a television can send photons to the eye of a normal human perceiver *P*, so that *P* has a visual experience similar to the visual experience *P* would have when seeing such an object in normal circumstances for a normal human.

The book in question also codes information about objects in the arrangement of marks printed on the page, and is also capable of causing visual experiences in a normal human perceiver *P* similar to the visual experiences *P* would have when seeing such objects in normal circumstances for a normal human. In this case the mechanism that interprets the coded information is the perceiver himself, rather than a television, but this is of no consequence. I can see, then, no fundamental difference between the two cases.<sup>9</sup>

The fact that *P* does not always choose to conjure up visual images when reading such a description does not mean that *P* does not see when *P* does conjure up the images, any more than the fact that *P* may choose to close *P*'s eyes to prevent visual experiences taking place in normal circumstances does not mean that *P* does not see when *P*'s eyes are open.

I think there is support for my claims here from the ordinary use of 'see'. When a person is asked to picture an object in their mind, and they are given descriptions to help them do so, they may say, when they feel their picture is accurate, 'Now I see it'. Consider also those people who have gone blind and who picture objects and events in their minds when they read using Braille. They often describe this as 'seeing with their fingers', and they mean this literally.

It may be that the visual sensa normal humans have when exercising their visual imagination and the visual experience that normal humans have when their eyes and optic nerve are stimulated are caused by different parts or faculties of the brain (or mind). The visual sensa that *P* has when *P* conjures up a visual

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<sup>9</sup> The fact that in the visual image case I may also gain the true beliefs about *x* on the basis of reading the description is irrelevant. Being 'pre-empted' does not stop a visual experience from constituting seeing. What matters is whether the sensa themselves provide information for me.

image may be caused by a visual imagery module in *P*'s brain, whereas the visual sensa that *P* has as a result of signals coming from the optic nerve may be caused by a different module in *P*'s brain. However, even if this is so, it is not relevant to seeing, because as long as *P*'s sensum is a visual sensum, it does not matter what part of *P*'s brain (or mind) produces it.<sup>10,11</sup>

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<sup>10</sup> See s.10 for a discussion of what makes a sensum a visual sensum.

<sup>11</sup> It may be that considered as a certain sort of perceiver, *P* can see a part of *P*'s brain when *P* has a visual experience, if that experience provides significant information for *P*, as that sort of perceiver, about some part of the brain that causes the sensum.

## 8. Further Specifications

### 8.i. Systematic Variation Rejected

So far my significant information theory has, it seems, provided a fuller explanation of seeing than Tye's theory (or Jackson's). But the following problem case arises for my theory.

Suppose that *P*'s door is wired so that whenever anyone with the key to the door puts the key in the door's lock, a light goes on inside, which *P* sees. When *P* sees the light go on, *P* is having a visual experience which enables a perceiver of *P*'s sort to have correct, and fairly determinate, beliefs about there being an object of a certain shape and size at a certain location (namely, an object the shape and size of the key located where the lock is). Thus, my theory entails that *P* sees the key here.

This is a conclusion many people would disagree with. Tye's theory, however, does not have this consequence. Variations in the key's properties will not cause any systematic variations in the sensum *P* has, for if the key had different shapes, sizes and locations, the light would not go on, and so Tye's theory does not entail that *P* sees the key.

My theory, as it stands, does not fit in with the intuition that 'systematic variation' is necessary to seeing, and so if we accept that systematic variation is necessary to seeing, then we must reject my theory as it stands. To make it fit this intuition, I could add a condition of the following sort: the causal connection between *x* and *P* which results in *x* causing *S* must be such that if *x*'s property values were varied, *S*'s property values would be such that a perceiver of *P*'s sort could gain true beliefs about *x*.

Such a condition would rule out cases in which there is no systematic variation, such as the key example. However, I am not going to add any such condition, because I believe the 'systematic variation' intuition, which underlies the theories of Tye and Jackson (as well as Lewis), is wrong. It has been convenient for me to approach what I think is the correct theory through a discussion of systematic variation, and for a long time I thought systematic variation was necessary for seeing, but I no longer think so. Here is why.

*P* can see *x* through a tiny gap in a wall which is close to *x*'s eyes by having a tiny sensum *S*, while the rest of *P*'s visual field is taken up by the sensum which the wall causes. Variations in *x*'s property values here will produce very few systematic variations in *S*'s property values (in fact, they will produce very few variations in *S* at all). Most variations in *x*'s shape and size will not produce any systematic variations in (respectively) *S*'s shape and size. Most variations in *x*'s relative position and distance away will not produce systematic variations in (respectively) *S*'s relative position and distance away. Colour is an exception to this, but we can make it so that the light is poor, or that *P* is colour blind to get around this point.

It might seem that moves could be made to escape this problem. Perhaps, one might say, Tye could escape this problem by adding to his analysis some condition about how the sort of causal connection that held between *x* and *S* in the first place must be kept in place when we consider whether there would be systematic variation, and this would allow us remove from the imagined scene any objects, like the wall, that would alter the causal connection. Rather than discuss any such possible move, I present the following variation on my argument that no such move can get around.

Suppose the following happens. First of all, I lose my ability to see red, so that red objects appear black to me. I can still, of course, see objects. I then gradually lost my ability to see green, yellow, orange, and all the colours except light blue. In these circumstances, I am unable to see non-light blue objects, but I can still see light blue objects.

Then my peripheral vision begins to fade, and this lack spreads towards the centre of my vision, so that I can only see objects that are directly in my line of sight. It still seems correct to say that I see those light blue objects that are directly in my line of sight. Suppose further that the restricted nature of my vision continues to grow, so that I can only see light blue objects of a certain shape and size at a certain point in front of me.

It still seems to be acceptable to say that I see such an object when it causes me to have a visual experience. But in such a case there does not exist any 'systematic variation' between *x* and *S*, for if the object's property values are varied, my visual experience is simply blank. Thus, I can see even when there is no systematic variation, and so systematic variation is not necessary for

seeing.<sup>1</sup>

The same might be true of some creature who has evolved in circumstances where it only needs such limited but precise vision. Suppose that there is cave-dwelling fish with this sort of vision. It is effectively blind for the most part, but when the right sort of fish is at the right spot in front of it, it can grab it and eat it. We would not want to say that this creature is blind, if it has visual experience in such circumstances. It sees, only its seeing is limited.

The case of the key seems to be exactly the same sort of case, in the relevant respects, as these cases. I hold, therefore, that *P* sees the key in this case by seeing the light.

Lewis, however, in briefly considering such a circumstance, has the following to say: 'it is easy to imagine cases of partial blindness, or of rudimentary prosthetic vision, in which the counterfactual dependence [i.e. systematic variation] is unsatisfactory and it is therefore doubtful whether the subject may be said to see'.<sup>2</sup> However, Lewis's claim here is not based on what the ordinary user of 'see' is likely to say, but about what his own theory, which involves a counterfactual element similar to Tye's, entails.

It is significant that Lewis uses the term 'partially blind'. This is the term that most people would use to describe me in the situation above. But what it means to be partially blind is that one can see to some extent. So if I am correctly described as partially blind, rather than totally blind, then, in the above situation, I do see, which is what my theory entails, but not what Tye's, Jackson's and Lewis's theories entail.

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<sup>1</sup> It will not be possible for Tye to escape this problem by adding the sort of extra condition I mentioned above, because in this case, the sort of causal connection that exists between *x* and *S* cannot exist when *x*'s property values are varied.

<sup>2</sup> Lewis [1980] p.246. Lewis has told me in conversation that he is not so certain about his position here any more, but still wishes to maintain it.



## 8.ii The 'One-Key' Condition

Consider  $P$ 's true beliefs about the key. Suppose  $P$  had no good grounds for believing that the light indicated the presence of a key of a certain size and shape at a certain location. Suppose that  $P$ 's beliefs were the result of a lucky guess. Does this mean  $P$  does not see the key?

No. It does not matter whether  $P$ , or a perceiver of  $P$ 's sort,  $P^*$ , gains such beliefs from an in-built mechanical process, or a conscious process of deduction, or from being told, or by guessing, as long as the beliefs are true. What counts is whether  $P$  can have true beliefs about  $x$ 's property values on the basis of  $S$ .

In answering this question, however, a large deficiency in my theory becomes obvious, as will be revealed by the following case. Suppose  $P$  has a house with large grounds, and the grounds contain sensors which detect movement in the grounds. These sensors are attached to a light which goes on when any of the sensors is activated.  $x$  is an object with property values  $a$ ,  $b$  and  $c$ , and  $x$  is moving in the grounds of  $P$ 's house, thus causing the light to go on.  $P$  sees the light go on, and  $P$  guesses, or is told, that the object which has caused the light to go on, and which is therefore a cause of  $P$ 's visual experience, has property values  $a$ ,  $b$  and  $c$ . This seems to entail, on my theory, that  $P$  sees  $x$ , yet this is clearly going too far. So how can my theory avoid this conclusion?

We can come to the answer to this question by considering the following points. In such circumstances,  $x$  could have a large range of possible property values and still cause the light to go on, and so cause  $P$  to have this sensum  $S$ .  $x$  could be at any location on the grounds and still cause  $S$ .  $x$  could be very large or fairly small (depending on the sensitivity of the sensors) or any size in between and cause  $S$ .  $x$  could be any shape, moving in any direction, and have any colour and cause  $S$ . Thus, the sensum  $S$  that  $P$  has in this sort of circumstance does not *indicate* very much about what property values  $x$  could have, because the range of property values  $x$  could have in these circumstances and still cause  $S$  is very large.

I propose the following. The only true beliefs about  $x$  that  $P^*$  has on the

basis of  $S$  that are relevant to whether  $P$  sees  $x$  or not are true beliefs about the range of possible property values that an object could have in this sort of circumstance such that the object could cause  $S$ , that is, beliefs about the property values that  $S$  indicates an object can have. Thus, the only true beliefs that any perceiver of  $P$ 's kind can have about  $x$  in the case above which will be relevant are that an object is moving somewhere on the grounds, has any shape, any colour, is at least as big as, say a mouse and can be any size bigger. These, though, are very indeterminate beliefs, and so  $P$  does not see  $x$  in this case.

Compare this to the case where the light goes on when the right key is inserted in the lock. In this sort of circumstance, the range of possible property values that  $S$  indicates an object could have, that is, the range of possible property values that the key could have in these circumstances, such that the key could cause  $S$ , is very limited, at least for shape, size and location. The key must have a fairly exact shape, size and location to cause the light to go on, and so to cause  $S$ . These are the beliefs about the key that  $P^*$  is allowed to have on the basis of  $S$ , and they are very determinate beliefs, and so  $P$  sees the key (as any kind of perceiver that can have such true beliefs on the basis of  $S$ ).

So when  $S$  indicates that the range of possible property values that  $x$  can have in such circumstances is fairly small, at least for some of the properties of  $x$ , then  $P$  sees  $x$ , as long as there is some perceiver of  $P$ 's kind who is capable of having such beliefs. In some cases, though, no perceiver of some (or even all) of the kinds of perceiver that  $P$  belongs to may be able to have such beliefs. For example, when  $P$  sees the raw data from the telescope, the *sensa*  $P$  has may indicate a small range of possible property values that the star can have, but no normal human perceiver can have such true beliefs about these values on the basis of  $S$ .

I call this condition the 'one-key only' condition, because it requires that for  $P$  to see  $x$ , there only be 'one key' that 'fits the lock', that is, only a fairly small range of values that  $x$  can have to cause  $S$  in such circumstances. This metaphor should be taken too literally, for as we shall see,  $P$  can see  $x$  even when  $S$  indicates that  $x$  has a range of possible property values that is larger than the metaphor would suggest, that is, larger than the range the average real key must stay within if it is to be able to open the average lock. (I will also show later that  $P$  may not gain any significant information about some of  $x$ 's

property values, such as shape and size, but *P* can still see *x* if *P* gains significant information about some of the others).

### 8.iii. Other Possible 'Keys'

I have said that *P* does not see *x* if it is the case that *S* could be caused, in such circumstances, by objects with property values outside the allowed range of possible property values. (My theory also holds that *P* does not see a property of *x*, even if *P* sees *x*, if another object with values outside the allowed range for that property can cause *S* in such circumstances). But in most cases of seeing, it seems to be possible that there are many other objects different to *x* (that is, with property values outside the allowed range) that could cause *P* to have a sensum with the same property values as *S*. For example, a neurophysiologist could stimulate *P*'s brain and cause such a sensum, as could a virtual reality computer which is hooked up to *P*'s brain. And a drug could cause *P* to hallucinate such a sensum.

These possibilities, though, will not count, because they will involve different circumstances than the circumstances that hold in the actual situation where *P* sees *x*, and the 'one-key only' condition holds that only the property values that an object can have and cause *S* in sufficiently similar circumstances count. Circumstances that involve direct stimulation of *P*'s brain or optic nerve, or which involve the effect of drugs on *P*'s visual system do not count as the same sort of circumstances.

The concept of seeing, I hold, demands that *S* provide significant information about *x* to *P*, by indicating what *x* must be like to cause *S* to have the property values *S* has *in circumstances similar to the actual circumstances*. Thus, seeing demands that *S* provide a perceiver of *P*'s kind with a basis for having true beliefs about objects in circumstances like those that obtain, but it does not demand that *S* provide such a basis for a perceiver of *P*'s kind having true beliefs about objects whatever the circumstances, and I do not think any theorist could suppose that it did. This just demands too much.

(If *P*'s beliefs must be about what *S*'s property values indicate about

*x*'s property values, *in those circumstances*, does this mean that *P\** must have the same sort of perceptual system as *P* has? Surely if *P\** has a different perceptual system, then the causal connection between *x* and *S* is not the same, and so the circumstances are not sufficiently similar. I hold that *P\** does not have to have the same sort of perceptual system as *P*. All that needs to be considered is the following. If *P\** had a sensum with *S*'s property values, could *P\** have true beliefs about what such a sensum would indicate about *x* in the circumstances that *P* is in, circumstances that include the operation of *P*'s perceptual system?)

What about the following possibility? The same visual experience that *P* has when *P* sees a group of objects could also be caused by a group of objects with all the same property values as the first except that they have a different location, and are reflected by a giant mirror? I think the concept of seeing allows us to hold that a situation involving mirrors is not sufficiently similar to the actual situation, and so we can ignore this possibility. When a sensum *S*, or a whole visual experience *E*, is caused by light waves being reflected directly from an object into *P*'s eyes, the concept of seeing does not demand that *E* indicate whether a mirror is involved or not. That is, it does not demand that *E* provide significant information to *P* about whether a mirror is involved or not, any more than it demands that *E* provide significant information about whether the experience is an hallucination. It demands only that *S* provide significant information about what *x* must be like in circumstances like those that obtain, which in this case involves light waves which are reflected or transmitted directly from objects to *P*.

However, there will be cases where *P* sees *x*, yet there are possible situations involving the same sort of circumstances, for example, where objects reflect light directly into *P*'s eyes, and where there are no mirrors or neurophysiologists stimulating *P*'s brain, in which *P* has that same sensum, but there is no object with *x*'s property values. Gregory provides an example where a card can be made to look to be the same size as a much bigger card. This is achieved by providing cues which trick the subject's visual system into taking it that the card is further away from the subject than it really is.<sup>3</sup> This

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<sup>3</sup> Gregory [1966] pp.182-3.

seems to show that I cannot say that *P* sees either card in either situation, because it is possible, in each case, that *P* could have the same visual experience with a different card, even though the circumstances are the same.

(Suppose one tried to escape this sort of problem case by saying that for the circumstances in the alternative situation to count as sufficiently similar to the circumstances in the actual situation, they must be *very much* like those in the actual situation, perhaps even to the extent that all the objects in the alternative situation must be the same as in the actual situation, except for the object that replaces *x*. This will not work, because there are cases where such illusions occur where there is no change to any of the objects except for the object that replaces *x*. The next situation is such a case, as is the mask case below).

We could also point to the situation where a small object up close to *P* looks like a large object far away from *P*. Most people have experienced this effect at some time. We could suppose, then, that when *P* sees, say, a building far away, it is possible that the same sensum could be produced by seeing a model of the building up close, and so my theory will entail that *P* does not see the building.

The illusion of the Ames room also provides us with another problem case. The Ames room is a room in which the back wall is further away from the viewer at its left than its right. The dimensions of the room are distorted in such a way, and it is painted with geometrical figures in such a way that the effect it has on the visual system of a viewer is the same effect as a normal rectangular room has, and so it produces the same sensum that a viewer would have if looking at a rectangular room, which the normal viewer would describe as sensum as of a rectangular-room. Unsuspecting viewers believe that the room really is rectangular.<sup>4</sup> Gregory points out that 'there is an infinite set of distorted rooms which could give the same images as those of a normal rectangular room'.<sup>5</sup>

Another problem case is that of the concave mask. Suppose some plaster is placed on a person's face, so that indentations the shape and size of the person's

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<sup>4</sup> See Gregory [1966] p.178-81.

<sup>5</sup> Gregory [1966] p.179.

nose, eyes, lips, cheekbones and so on are left in the plaster. If one were to look at those indentations in the plaster after it has been taken off, one would, unless one were very close to the mask, have the same sensum as one would when looking at a normal mask in which the nose, eyes, lips and cheekbone stick out. That is, the mask looks to have protruding, convex features like a normal mask has, even though it has concave features. This can occur, it seems, because the effect on the retina is the same in the two cases.<sup>6</sup>

A similar problem case is where *P* sees a scene in front of *P*'s eyes, but *P* could have had the same sensum produced by an extremely well painted representation of that scene. This picture would need to have exactly the right cues for depth, and this would cause us to see it as three-dimensional, and we would not be able to distinguish it from the actual scene. (No such picture actually exists, because it is virtually impossible in practice to get all the cues exactly right, and the effect would only work from one viewing point).

#### 8.iv. The 'High Frequency' Condition

I think what we have so far failed to realize is that *x* does not have to be the only object that can cause *S*, as long as *S* is caused in *P* by *x* most of the time, that is, the great majority of the time. (Similarly, a range of possible property values does not have to be the only range that can cause *S*, for *P* to see that property of *x*, as long as *S* is caused by it most of the time). Once we realize this, the problem cases above disappear. *S* can be caused by a number of objects with very different property values,  $x, x_1, x_2, \dots, x_n$ , and *P* can still see *x* if it is the case that *S* is mostly caused by *x* in those circumstances, because *S* indicates to *P* that there is a high probability that *x* (that is, an object with a certain range of property values) is causing *S*, and this will constitute significant information about *x* for *P*, as long as that range of property values is small, and a perceiver of *P*'s sort can have those true beliefs by having *S*.

What does '*S* is caused by *x* most of the time' mean? Does it mean that over the whole course of *P*'s life, past, present and future, *S* is mostly caused by *x*, or does it mean that in *P*'s life so far, *S* is mostly caused by *x*? The

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<sup>6</sup> See Gregory [1974] p.204.

time period it refers to, I think, is a future period. It means that in the future for some period,  $S$  must be caused by  $x$  most of the time. The number of times  $x$  caused  $S$  in the past is irrelevant, I hold. For suppose  $y$  mostly caused  $x$  in the past, but, for some reason, from now on  $x$  will mostly cause  $S$ . In this case, even though it was true that in the past,  $P$  saw  $y$  by having  $S$  (assuming the other conditions were fulfilled), we will not want to say that  $P$  continues to do so once the change takes place, because from now on, if a perceiver of  $P$ 's kind,  $P^*$ , took  $S$  to indicate that  $y$  is the probable cause of  $S$ ,  $P^*$  would not be able have any true beliefs about the objects that cause  $S$ , at least not as many as  $P^*$  would have if  $P^*$  started taking  $S$  to indicate that  $x$  is the likely cause.

We can more easily gauge our intuitions on this issue if we think in terms of the following case. Suppose  $P$  has limited prosthetic vision, and lives in a restricted environment made up of block shaped objects. When  $P$  sees either a cube or a sphere,  $P$  has a red circular sensum at the appropriate location in  $P$ 's visual field. For the first ten years of  $P$ 's existence, there are many cubes in  $P$ 's environment, but hardly any spheres, and such a sensum is mostly caused by cubes, and this is what  $P$  believes. In this case we would hold that  $P$  can see the shape of cubes by having  $S$ , even though occasionally  $S$  is caused by a sphere.

But suppose that after this ten years, the number of spheres increases dramatically and the number of cubes becomes very small, and as a result such a sensum is from then on caused mostly by spheres. After this has happened, we will most likely want to say that  $P$  sees the shape of the spheres by having  $S$ .

So it is some future period that counts. This period, though, is not necessarily the rest of  $P$ 's future. We can see this if we suppose that in our example, ten years after the spheres took over, the cubes came to dominate again, and the cubes once again became the object that mostly caused  $S$ . In this case, we will want to say that during the second ten years,  $P$  saw the spheres by having  $S$ , but now the change back to the cubes has occurred,  $P$  sees the cubes by having  $S$  from now on.

So what length of time is this future period? I think the future period is measured not in terms of time, but in terms of the number of occurrences of  $S$ . Suppose that up to  $t_1$ ,  $S$  has mostly been caused by  $y$ . After  $t_1$ , for the rest of  $P$ 's life, which will be twenty years or so,  $S$  will hardly ever be caused by  $y$ ,

and mostly always by  $x$ . But suppose that  $S$  is caused by  $y$  sometime in the first few months after  $t_1$ , and is not caused again by any object until a year later. It would not be true to say that  $P$  saw  $y$  by having  $S$  that first time after  $t_1$ , even though  $S$  was only caused by  $y$  during that whole year. What is important is, for some number of occurrences of  $S$  in the future, what proportion of those occurrences of  $S$  will be caused by  $x$ .

There is no exact number of occurrences that can be specified here, for the concept of seeing is fuzzy, if not downright vague, on this issue. It is also very fuzzy on the question of how often, in regard to this number, must  $S$  be caused by  $x$  for it to be true that  $S$  is mostly caused by  $x$ ? It would seem to be at least 70-75% of the time, but no exact figure can be put on it.<sup>7</sup> There is no clear line between seeing and non-seeing in this respect. Note that the vagueness here is not a problem for my theory, for it is simply part of the concept.

Let us look at a few examples to see that this fits with our ordinary intuitions. Take the grounds of  $P$ 's house case. Suppose that almost all the area within the grounds is very hard to get to, except for the front door, so that most times the light is set off it is by something coming to the front door. In this case, it seems acceptable to say that  $P$  sees the location of the thing at the front door by seeing the light go off, even though it is possible that in those circumstances, things that had a different location could have caused the light to go off as well. However, if moving things started to get into the grounds, setting off the light, so that it was no longer true that something coming up to the front door was mostly the cause of  $S$ , then  $P$  would no longer see  $x$  by seeing the light, and this seems right.

Consider the key example. Suppose there were five locks around  $P$ 's house that would set off the light, and they all were designed for very different keys. If locks 2 to 5 were bricked up and never used, then whenever someone inserted the right key into lock 1,  $P$  would see it by seeing the light. But if the other locks were unbricked, and started being used, then  $P$  would no longer see the key that fits in lock 1 by seeing the light, and this also seems right.

My theory will also solve the problem cases. Take the Ames room

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<sup>7</sup> I do not think that  $P$  sees more strongly if this figure is, say, 95%, than if it, say 85%. However, I am not sure about this.



problem. Even though the same sensum that we have when looking at a normal room can also be caused by an Ames room, we can still say that we see the normal room, because it is what causes that sort of sensum most of the time. As for seeing a normal mask or face with protruding features, the fact that a mask with inverted features can cause the same sensum does not matter, because masks and faces with protruding features are what mostly cause us to have such sensa. Similar comments apply to the other problem cases.

### **8.v. Low Frequency Cases**

However, it may occur to the reader that I have a big problem here. Not only do I see the back wall of a normal room, I also see the back wall of the Ames room. I also see the inverted mask as well as the normal mask, and I see the model of the building which is close up but which looks far away as well as seeing the building that really is far away, and I see the picture that looks just like a group of objects as well as seeing those objects. Yet my theory, it seems, does not allow that I see any of these things, because these things are not what usually cause such sensa for me.

If we think carefully, we can see that this objection fails. What my theory will entail about the inverted mask, for instance, is not that I do not see the mask, but that I do not see its inverted shape, for this shape is hardly ever the cause of the shape property values of my sensa. However, the other property values of my sensa in this case are normally caused by an object with the other property values that the mask has. So I can, for example, see the mask's size because objects of that size normally cause a sensum of that size. I can see the mask's relative position to me, its distance away (though not its distance away for all its features, for example, the cheekbone indentations), its colour and the shape it has (apart from the inverted aspects of its shape) through having that sensum. Seeing all these properties of the mask means that I still see the mask fairly strongly, and so my theory does not have the failing this objection claims it has.

The fact that my theory entails that I do not see the inverted shape of the mask fits in perfectly, I think, with our ordinary ways of speaking about seeing,

for no-one would claim that they did see the inverted shape of the mask.

I can imagine a possible objection to this claim. It is true, this objector may concede, that we do not see the inverted shape of the mask, but the objector may claim that this is not because my theory is right, but because it just happens that the visual perceptual system works on probability. They might say that the visual system regards the input it receives from the mask as most likely to have been caused by features that protrude, and so it causes me to have a sensum with 'protruding' features. But it is a contingent feature of perceptual systems that they work this way. Though there are good evolutionary reasons why they should have evolved this way, we could, if we knew how, tamper with my visual system so that when it receives such input, it causes me to experience those features as inverted. If I, or any other organism, had that sort of altered visual system, and looked at the inverted mask, we would say that we saw the inverted shape of it, even though it was not the usual cause of such a visual experience. This fact fails to fit in with my theory. My theory, therefore, does not fit in with the facts about seeing.

This objection fails. Suppose we did alter my visual system so that when I look at an inverted mask, I have a sensum with inverted features. I allow that this is quite possible. However, this means that any non-inverted mask or face, which also acts upon my visual system in the same way, will also look inverted. This inverted sensum, then, will mostly be caused by normal masks and faces, and so by having such a sensum I will be seeing the protruding aspects of such things, and so when I look at the inverted mask it will not be true that I see its inverted shape, because its inverted shape is not the usual cause of this sort of sensum. So my theory still does fit in with the facts about seeing.

My theory will also allow that I see the model of the building that looks far away, the picture and the Ames room. I can see the model of the building that looks far away because I see its relative position, its shape and its colour. What I do not see is its distance away or its size, but this fits perfectly with ordinary usage, because no-one would say that I see how far away it was, or its size, even though I see it.<sup>8</sup>

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<sup>8</sup> I am assuming here that not only do I judge that the object is far away, but that it looks far away, and the sensum that I have here is different than the sensum I would have when the model looks close up. It may be, though, that I can have a sensum that looks close up, yet I mistakenly judge that it is far away. In this case, we could say that I do see the size and distance away of the sensum, because

I also see enough of the properties of the picture to see the picture. I see the colour and relative positions of the pictures that make it up, and I also see the shape, size and distance away of some of these pictures. What I do not see is the shape, size and/or distance away of those pictures which create a three-dimensional effect and cause me to have a sensum of an object with a different shape, size and/or distance away than the colour patch has.<sup>9</sup>

The Ames room might seem to still create a problem, for an objector might say that it seems that my theory only allows that I can see the colour and relative position property values of the back wall, but not its shape, size or distance away, because the values of these properties are different than with the normal wall which usually cause such sensa. The objector will concede that I can see the back wall of the Ames room by seeing its colour and relative position, but will point out that if I only see it by seeing these two properties of it, my seeing of it is not that strong. The objector might then claim that my actual seeing of the Ames room is stronger than this, because I see its shape, size and distance away properties to some degree (though admittedly not as strongly as with the normal wall). This problem can be solved once the following points are considered.

#### 8.vi. Property Value Ranges

For  $P$  to see, say,  $x$ 's light blue colour,  $S$  must indicate to  $P^*$  that there is a high probability that  $S$  is caused by an object with a small range of possible colour values, and this range must include only light blue colour values (though

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this is the sensum that is mostly caused by small objects that are close up.

There is a problem in this regard for a mental object theorist such as Jackson in [1977]. Suppose that to me, the object first looks far away, and then close up. Jackson's theory holds that sensa have the properties objects look to have, and this entails that here a mental object goes from being far away to close up (either in 'mental space', or, for Jackson, in physical space). But the object does not look to move from being far away to being close up, it looks to stay still, and so the mental object must stay still. This is a contradiction. Jackson could perhaps escape this problem if he could allow that the object does not look to have the property of being far away in the first place; I merely misjudged how it looks. But if I can misjudge the way an object looks, then Jackson's whole theory is undermined, because it relies on the idea that an object must have the properties it looks to have.

9 This conclusion might seem dubious if we are thinking of the picture as looking two-dimensional, like a normal picture. But we must remember that the picture looks three-dimensional, and so the shape, size and distance away that one of these colour patches has does not necessarily look the same as it would in a normal picture.

not necessarily all of them). If, however, *P* does not see *x*'s light blueness, that does not mean *P* cannot see *x*'s colour at all. *P* may be able to see a less specific colour that *x* has, for example, *x*'s blueness. To see *x*'s blueness, *S* must indicate to *P*\* that there is a high probability that *S* is caused by an object with a fairly small range of possible colour values, though not as small a range as with *x*'s light blueness. This range will include only blue colour values. *P* does not see *x* as strongly by only seeing *x*'s blueness as *P* does when *P* sees *x*'s light blueness, because if *P*\* can believe that *x* is light blue rather than just blue, *P*\*'s beliefs here are more determinate.

Suppose *P* cannot see *x*'s blueness. *P* may still be able to see an even less specific colour that *x* has. For example, suppose *P* has a visual system that gives *P* blue sensa for red and blue objects, green sensa for green and yellow objects, yellow sensa for yellow and orange objects, and so on. *P* may have a blue sensum which indicates to *P*\* that there is a high probability that *S* is caused by an object with a smallish range of possible colour values, which includes only blue and red colour values. In such circumstances, *P* can see this blue-or-red colour (call it what you like) that *x* has. *P*'s seeing of *x*'s colour here is weaker still than when *P* sees *x*'s light blueness or *x*'s blueness.

It is not necessary that the kinds of properties of *x* that *P* can see are those that we are normally concerned with. Not only can *P* see red, blue and so on, and light blue, dark red and so on, *P* can see more general kinds of colour properties, such as blue-redness. The same applies to other property kinds of *x*. *P* can see *x*'s property of rectangularity, if *P* has a sensum which, rather than indicating that *x*'s front surface is a circle, a square, a triangle, or some specific sort of rectangle, etc., but whether *x* has the more general property of being rectangular (including being square).

*P* can see *x* by seeing these broader kinds of properties, because *P* is still gaining significant information about *x*, that is, *P*\* can still have true beliefs about *x* which are determinate enough for seeing. However, once the beliefs become too indeterminate, *P* does not see. It will not be possible to draw any clear-cut boundaries between beliefs that are sufficiently determinate and those which are not (that is, a boundary between those ranges of possible property values that are small enough and those that are too large), and it will be hard

enough even saying roughly where these fuzzy boundaries are. So this is another way in which seeing can be fuzzy.

We can try and get some fix on where the boundaries would roughly lie by trying some thought experiments and testing our intuitions. In the case of colour, one might suppose that if *S* indicates only that there is a high probability that *S* is caused by an object that has more than 5 or 6 of what Hardin calls the prototype-centred colour categories,<sup>10</sup> then *P*'s true beliefs will not be determinate enough, and so *P* will not see *x*'s colour.

In the case of shape, if *S* indicates only that there is a high probability that *S* is caused by an object that is not rectangular, then *P* also, it seems, does not see *x*'s shape. One can imagine similar situations for other properties of *x*, and one will no doubt find that no clear boundaries can be drawn with them either.<sup>11</sup>

These considerations allow us to say the following about the Ames room case. The sensum *S* that is caused by the back wall of the Ames room indicates that there is a high probability that *S* is caused by an object with a small range of possible shape, size and distance away values. These are the property values possessed by a normal wall, but the back wall of the Ames room does not have such a range of values, and so I cannot see those properties when I look at back wall of the Ames room. However, *S* also indicates that there is a high probability that *S* is caused by an object with a larger range of possible shape, size and distance away values, and the back wall of the Ames room does possess property values within that range, and so I can see these less specific properties of the back wall of the Ames room.

Thus, my theory entails that my seeing of the back wall of the Ames room is stronger than it seemed to the objector above. And because the shape, size and distance away properties of the back wall of the Ames room that I see are less

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10 Hardin [1992] p.377. He takes this term from Rosch [1975]. There are eleven prototype-centred colour categories: red, blue, yellow, green, orange, purple, brown, pink, white, black and (middle) grey.

11 It may even be that ordinary intuition varies the range according to social context, the object in question, and the property category in question. For example, we seem to demand more determinate beliefs about location when asking whether we see a needle, then when we ask whether we see a satellite in the sky. McLaughlin makes claims such as these in [1984]. I discuss this issue in s.9.iii and iv.

specific than the shape, size and distance away properties of the normal wall that I see, it remains true that my seeing of the back wall of the Ames room is not as strong as my seeing of the normal wall.

## 9. Further Problems and Solutions

### 9.i. Lewis's Censor

Lewis raises a problem for causal theories (including those, like his, that use counterfactuals to do the work of a causal connection between  $x$  and  $S$ ), which he calls the 'censor' problem. He asks us to suppose that  $P$  has prosthetic eyes. These eyes are working normally, so that the objects before  $P$ 's eyes cause  $P$  to have the normal sort of visual experience a normal human would have in such circumstances. But suppose, he says, that if the circumstances were any different,  $P$  would still have that same visual experience, because there is a censor standing by, ready to cause  $P$  to have that exact same experience if the scene before  $P$ 's eyes were any different. Because the scene causes the desired visual experience in  $P$ , the censor does nothing. 'But if the scene were any different, the censor would intervene and cause the same experience by other means'.<sup>1</sup>

The puzzle here is whether  $P$  sees the objects before  $P$ 's eyes or not. Lewis seems to hold that the ordinary user is likely to be unsure about whether  $P$  does see here, and so we can only determine whether  $P$  sees here by analysis. I agree with Lewis that the ordinary person is likely to be unsure about this case, but I also hold that they are more likely than not to hold that  $P$  does see the objects here. It would be preferable, then, for an analysis to entail this.

Let us firstly look at Lewis's comments on this case. For convenience, I shall continue to speak in terms of Tye's theory (nothing of what Lewis says here is missed by doing this). For  $P$  to see  $x$ , it must be that variations in  $x$  produce systematic variations in  $S$  given the causal connection that holds between  $x$  and  $S$ . If we hold that that causal connection does not include the censor, because the censor lies idle in the actual situation, then, Lewis says, we hold the censor fixed, and prevent the censor from affecting  $P$ 's visual experience. This entails that the presence of the censor does not stop  $P$  from seeing  $x$ .

However, Lewis holds that this position is wrong. He holds that

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<sup>1</sup> Lewis [1980] p.248.

[T]he censor's idleness is an essential factor in the causal process...We cannot uniformly ignore or hold fixed those causal factors which are absences of intervention. The standard process might be riddled with them. (Think of a circuit built up from exclusive-or gates: every output signal from such a gate is caused partly by the absence of a second input signal).<sup>2</sup>

Lewis holds, that is, that the censor's intervention is a part of the causal connection, and therefore cannot be held fixed when we consider whether variations in  $x$  produce systematic variations in  $S$ . He therefore concludes that because, when the censor is not held fixed, any variation in  $x$  will not produce any variations in  $S$  at all,  $P$  does not see  $x$  because of the presence of the censor.

The same dilemma seems to arise for my theory. If we hold that the censor is part of the causal process, then the 'one key only' condition will not be fulfilled, because  $P$  would have exactly the same visual experience no matter what  $x$ 's properties were like, and this entails that  $P$  does not see  $x$ . If, however, we hold that the censor is not part of the causal process, then the one-key condition is fulfilled, and so  $P$  sees  $x$ .

I hold that the censor is not part of the causal process, and so  $P$  sees  $x$  in the censor case. My argument against Lewis is as follows. Suppose that as I look at my computer screen as I type these words, there is, unbeknownst to me, a man behind me with a knife held in each hand. If there is any change in the location of my computer screen, the man will plunge his knives into my eyes. I do not think anyone can seriously claim that I do not see my computer screen because of the presence of this man and his knives. Yet this is what Lewis's position entails, for the absence of intervention by this man in this situation is in principle no different than the absence of intervention by the censor, and so according to Lewis's theory, variations in the properties of the screen will not produce any systematic variations in  $S$  at all. (I am not sure what visual experiences one has when knives are plunged into one's eyes, but obviously there won't be any systematic variation).

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<sup>2</sup> Lewis [1980] p.248.



There is no important difference in principle that I can see between this case and Lewis's censor case. Lewis cannot object that the knifer is only a 'temporary attachment' to my causal process, whereas the censor is a permanent part of the causal process, for the censor may only be part of *P*'s causal process for a few minutes. So unless Lewis wants to take the extreme counter-intuitive position that anyone who is in the sort of position I was in this example does not see, he will have to acknowledge that the censor case is a case of seeing.

### 9.ii. The Idle Mechanism Problem

This presents the causal theorist with a problem, though. We have concluded that the absences of intervention in the censor and knife cases should not be regarded as part of the causal process. But, as Lewis points out, the standard causal process may be 'riddled' with absences of interventions. So it seems that some absences of intervention must be regarded as part of the causal process.

I will show that Tye, Jackson and Lewis are committed to holding this. Speaking in terms of Tye's theory, for *P* to see *x*, it must be that variations in *x*'s property values produce systematic variations in *S*'s property values. But if the mechanisms which lie idle in the actual situation are held fixed when *x*'s property values are varied, there may be no systematic variations in *S* as a result. For example, suppose *P* has mechanisms that are activated only by the causal effect that a red, square object of a particular size and location has on *P*. Other sorts of causal effects on *P* will not activate these mechanisms, but will activate other mechanisms, which may lie idle in the actual situation.<sup>3</sup>

If the mechanisms that are idle in the actual situation are not considered part of the causal process, then they must be kept idle in the counterfactual

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<sup>3</sup> Hardin reports that something like this is the case with colour mechanisms. He says that the standard causal process for colour vision involves two neurophysiological channels which send information about the light hitting the retina to the brain. 'One chromatic channel carries information that is registered by the brain as redness or greenness, but not both at once, and the other carries information that is registered by the brain as yellowness or blueness, but not both at once.' (Hardin [1990] p.565). If *P* is looking at a scene which contains no red or green objects, and no red or green light enters *P*'s eyes, then *P*'s red-green mechanism lies idle. That is, there is an absence of intervention by this mechanism in this situation.

situations, and so no systematic variations in *S*'s property values may occur when *x*'s property values are varied, because the property values that *x* will have in such situations will not produce the appropriate *sensa*, because the appropriate mechanisms are being kept idle.

So Tye, Jackson and Lewis must require that some absences of intervention are a part of the causal process. But the problem they face is how can they determine which absences of intervention are part of the causal process and which are not? Why is the man behind me out, and a colour mechanism in?

It cannot be that those mechanisms that are often, or even sometimes, active in causing *P*'s visual experiences are part of the causal process, because *P* may have been newly created a few minutes ago, and some of the mechanisms may not have been used yet. Also, the censor may have been active in causing *P*'s visual experiences in the past, yet we saw that the censor should not be considered part of the causal process.<sup>4</sup> There seems, therefore, to be no non-arbitrary way of determining which mechanisms are in and which are out.

My theory, however, does not face this problem. The fact that there may be mechanisms in *P*'s brain that are sometimes, or often, involved in the production of certain sorts of *sensa* and which lie idle in a particular case is irrelevant, on my theory, to whether *P* sees *x* or not in that situation. My theory simply holds that if, given the mechanisms that *are* operating, *x* causes *S* and it is most likely that the cause of *S* in those circumstances is an object that has property values that are similar to *x*'s, and a perceiver of *P*'s sort is capable of gaining true beliefs about *x* on the basis of *S*, then *P* sees *x*. There is no reference here to idle mechanisms. My theory, therefore, escapes the idle mechanism problem that Tye, Jackson and Lewis face.

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<sup>4</sup> We also cannot say that only those mechanisms that are 'natural' to the organism are a part of the causal process. Apart from being too vague, this will entail that any organism we genetically engineer cannot be able to see, and anyone with prosthetic vision cannot see

### 9.iii. McLaughlin's Objection to Causal Theories

McLaughlin in [1984] claims that any causal theory entails a 'supervenience' thesis of the following form:

(ST) If an object and a person's [visual] experience bear the same causal connection to each other (in the relevant respects) as do a second object and a second person's [visual] experience, then the first person [visually] perceives the first object iff the second person [visually] perceives the second object.<sup>5</sup>

McLaughlin claims that this thesis is false. While it is true, he concedes, that *P* can only see objects that cause a visual experience in *P*, this is not the whole story. Whether or not a person sees an object is in part a matter of the social context in which they are in. That is, whether or not *P* sees *x* is partly a matter of convention, and conventions can change without there being any change in the causal connection. So any causal theory cannot be the whole story of seeing.

As it stands, however, (ST) is not entailed by my theory. If *P* and *Q* are different sorts of perceivers, then *P*'s visual experience may not count as significant information about the object for *P*, whereas *Q*'s visual experience, which is the same as *P*'s, may count as significant information about the object for *Q*. So for the purposes of seeing how McLaughlin's argument affect my theory, we will assume that the two perceivers referred to in (ST) are the same sort of perceiver.

McLaughlin has two arguments to show that (ST) is false. The first is as follows. Any causal theory takes it that *P* sees an object in virtue of it having some effect upon him. But in one context, an effect may be taken to constitute visual perception of *x*, and in another, the same effect may not be considered sufficient. For example, *P* is said to see a person who is covered from head to foot in a burnoose by seeing the burnoose.

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<sup>5</sup> McLaughlin [1984] p.571.

Yet we do not count seeing a pillow with a piece of foam rubber inside as seeing the piece of foam rubber. But the piece of foam rubber may causally affect the spatial position and configuration of the pillow in essentially the same way that the person causally affects the spatial position and configuration of the clothes she is wearing; and both the surface of the burnoose and the surface of the pillow covering may be linked to one's visual experience by micro-causal processes without intrinsic difference.<sup>6</sup>

I agree with McLaughlin that the use of 'see' can vary in such ways, but I do not think these cases present any great threat to a causal theory. No causal theorist is holding that an ordinary concept like 'seeing' is used with anywhere near complete consistency by ordinary users. Such 'conventions' do arise, but the standard causal theorist holds that these 'conventions' are best treated as inconsistencies in the ordinary application of a concept. The standard causal theorist will hold that the best approach to analysing such a concept is to work out the basic criteria underlying the concept, and then use this to remove inconsistencies and sloppiness in the ordinary use of the concept, making it more rigorous.

McLaughlin, though, seems to have a different view of conceptual analysis. He holds that unless an analysis is sensitive to every tiny nuance of the ordinary use of a concept, the analysis of the concept fails. I, however, do not claim that my analysis will reveal every nuance of social convention.

So the disagreement here is not so much about which particular analysis is right or wrong, but about two different ways of doing conceptual analysis. On this issue, I do not think there is a right and wrong answer. As long as each method makes clear its aims, there need be no conflict. There need be no disagreement about the basic facts, such as how  $x$  causes  $S$  in a particular situation, and about how different people describe this situation. The disagreement need only be over how we should describe and classify the basic facts.

What makes the method of conceptual analysis I pursue worthwhile, I

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<sup>6</sup> McLaughlin [1984] p.583.

claim, is that it is more useful than McLaughlin's, because by making the ordinary concept more rigorous, many pseudo-problems created by the sort of conventions that McLaughlin refers to, and by the sloppiness of ordinary language, are dissolved, and ontological and epistemological problems can be seen more clearly.

Of course, McLaughlin might point out that my method of analysis is largely useless if the conventions surrounding the use of a concept are many and deeply-ingrained in the concept, as he appears to be claiming. Any proposed 'cleaned-up' concept will simply not gain acceptance by the ordinary person, and probably not even be useful as a specialist term. This may be true with some analyses of some concepts, but I do not think it is the case with my analysis of seeing. I think McLaughlin has overstated the extent to which 'conventions' govern the use of 'see', or, as I would put it, the extent to which there are such inconsistencies in the ordinary use of 'see'. (Thus, I disagree with McLaughlin over the facts about usage, but this is a disagreement independent of our conflict over conceptual analysis).

I think that many of the cases in which it seems that conventions govern the use of 'see', and which I would thus hold involve an inconsistency, involve nothing of the sort. One reason why there seems to be such things involved in many of these cases is that most people fail to realize that seeing can be a matter of degree. When this is realized, it can be seen that there is no convention, and no inconsistency.

Take, for example, McLaughlin's claim that the answer to the question 'does *P* see *x*' is often dependent upon the interests of the person asking the question.<sup>7</sup> Here is an example that seems to support this claim. There is an object *x* on the table. We throw some material over it in a way that does not reveal its shape. In this case, no-one holds that we see *x*. But suppose that we tighten the material a bit so that *x* causes there to be a bump sticking up in the material. We are then asked if we see *x* here. Some would say yes, some would say no.

McLaughlin would probably say that the answer to such a question depends upon the interests of the person asking the question. If this questioner wants to know if we see *x* as we see objects normally, then the answer is no. But if the questioner wants to know if we see *x* in order to locate *x*, then the

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<sup>7</sup> McLaughlin [1984] p.582.

answer is yes. Thus the answer here is a matter of convention, McLaughlin would probably say, and I would have to hold that there is an inconsistency in the ordinary use of see here.

However, I think that there is a better explanation of the way 'see' is being used here. If we hold that we see  $x$  in this case, but only weakly, then the 'convention' disappears. When the questioner is interested in whether we see  $x$  as we normally see an object, we answer no, meaning that we do not see  $x$  as strongly as in normal cases of seeing an object. This does not mean that we do not see  $x$  at all, and this realization is usually felt in people as the feeling that we do 'sort of' see  $x$ . When the questioner is interested in whether we see  $x$  for the purpose of locating  $x$ , all that is being asked is whether we see  $x$  strongly enough to locate  $x$ , and in this case, we say yes, because saying yes in this situation does not imply that we see  $x$  as strongly as we do in normal cases of seeing.

Hence, the fact that the ordinary person answers 'yes' or 'no' here depending upon the context does not mean that 'yes' is correct in some contexts and 'no' in other contexts. The correct answer is 'yes, but not strongly'. The ordinary person may answer 'yes' in some contexts and 'no' in others because the ordinary person is not fully aware of the fact that seeing can be weaker or stronger. There is thus no convention involved here, and no inconsistency.

I do not have the space to look at any other cases in which the question 'does  $P$  see  $x$ ' seems to involve convention, but I think that an examination of many such cases will show that the answer to the question 'does  $P$  see  $x$ ' does not depend upon convention at all, but on non-conventional facts, such as the fact that seeing can be a matter of degree.

#### 9.iv. Part-Whole Relations

McLaughlin's other argument for holding that (ST) is false is as follows.  $P$  sees an object in virtue of seeing some part of it, but whether seeing a part of an object counts as seeing the object varies from context to context. For example, suppose at  $t_1$  Judy sees the facing surface of one mural, and at  $t_2$  the

facing surface of a second mural. Suppose also that in both cases the causal connection is exactly the same, and Judy has exactly the same visual experience in both cases. This does not entail that Judy sees both murals, however. For suppose that the part of the first mural that she saw comprised the entire painted surface of it, while the part of the second mural that she saw was only a small part of an enormous mural. In the first case, she sees the first mural, but she does not see the second mural in the second case. This entails that (ST) is false.

This example is, I think, a bad one, for I think many people would hold that Judy does see both murals. She does not see all parts of the large mural, but she still sees it by seeing a part of it, just as I can see a house by seeing some part of it. To see an object it is not required that one sees all parts of the object,<sup>8</sup> or even some large proportion of it.

McLaughlin could overcome this point by using an example in which the part of the larger object is so small that seeing the part does not ordinarily count as seeing  $x$ . For example,  $P$  and  $Q$  both see the facing surface of identical bricks.  $Q$ 's brick is a part of a building,  $P$ 's is not.  $P$  sees the brick itself by seeing a part of it (namely, the facing surface of it), yet  $Q$  does not see the building by seeing a part of it (the facing surface of one of its bricks), even though the connection between the brick and  $P$  is the same as the connection between the building and  $Q$  (so that  $P$  and  $Q$  have identical visual experiences).

The standard causal theorist can overcome this objection by adding the condition that the part of  $x$  seen must be a sufficiently large part. This condition explains why  $Q$  does not see the building, even though  $P$  sees the brick: the brick is not a sufficiently large part of the building.

McLaughlin, though, claims that a causal theory cannot be supplemented with any condition concerning part-whole relations, such as that  $P$  sees  $x$  if  $P$  sees a sufficiently large part of  $x$ . One problem with such a condition is the vagueness of what counts as 'sufficiently large', but the main problem with it, according to McLaughlin, is the fact that sometimes  $P$  can see a very small part of an object, and still see the object, and sometimes  $P$  can see a larger portion

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<sup>8</sup> This might seem to follow from an argument of the following sort:  $P$  sees  $x$ , and  $x = (a + b + c)$ , therefore  $P$  sees  $(a + b + c)$ , therefore  $P$  sees  $b$ . But the logic of 'sees' does not work this way. One sees a part of  $x$ , and thereby sees  $x$ , but this does not entail that one sees other parts of  $x$ , just as one can hit a part of  $x$  and thereby hit  $x$ , without thereby hitting another part of  $x$ .

of an object but not see the object. For example, *P* can see a small part of the Atlantic Ocean, and thereby see the Atlantic Ocean, but *P* may see a brick in a building and not see the building, even though the brick may be a larger part of the building than the portion of the ocean was of the Atlantic Ocean.

McLaughlin may be right here, but I do not see this as any great difficulty for a causal theory. Why can't a causal theory simply add that 'sufficiently large' is vague, and also add that how large the part of *x* must be can vary from context to context? This will entail that (ST) is false, but once this condition is added to a causal theory, (ST) is no longer entailed by the theory. I do not see it as any great admission by a causal theory that contextual factors may play this sort of role in seeing.

How does my causal theory fit into these considerations? I have already said in the exposition of my theory that for *P* to see *x* *P*\* must have a sufficient number of determinate true beliefs about *x*. Thus, instead of having a condition about *P* seeing *x* by seeing a sufficiently large part of *x*, my theory has the condition that *P* sees *x* when *P*\* has a sufficient number of determinate true beliefs about *x* on the basis of *S*. I have already acknowledged the vagueness of any such condition, and I also concede that what counts as a sufficient number of determinate true beliefs may vary from context to context. Thus, my theory does not entail (ST) either.

This admission may seem to go against the grain of my claims in the previous section, where I said we should rid the concept of seeing of what McLaughlin held were contextual factors, and which I held were merely inconsistencies. With these part-whole problem cases, though, I admit that the 'conventions' or inconsistencies are just too difficult to remove. (This is in large part due to the vagueness surrounding the notions of part-whole relations and sufficient determinate true beliefs). It is just not feasible to make the concept rigorous in regard to such cases.



## 10. Visual Properties and Visual Experience

### 10.i. Relevant Properties of $x$

My analysis of seeing so far requires that for  $P$  to see  $x$ ,  $P$ 's sensum  $S$  must be caused by  $x$ , and must provide significant information about certain of  $x$ 's properties to a perceiver of  $P$ 's sort (in accordance with the 'one key' and 'high frequency' conditions). The question that now arises is, which properties of  $x$  must  $S$  provide significant information about?

Tye and Jackson both restrict the properties involved in seeing to the  $M$ -properties of shape, size, distance away and relative position, and exclude such properties as colour, mass and electric charge. However, I see no grounds in my analysis of seeing so far to exclude colour,<sup>1</sup> mass and electric charge, and so I include them.

Jackson has an argument designed to show that colour is not involved in seeing.<sup>2</sup> His argument is directed towards the involvement of colour similarity between  $S$  and  $x$  in seeing, but it can be modified to apply to significant information about  $x$ 's colour.

He points out initially that colour similarity between  $x$  and  $S$  must be irrelevant because, as it happens, there is no colour similarity between  $x$  and  $S$ .  $S$  possesses sensory colour but not physical colour, and  $x$  possesses physical colour but not sensory colour. Jackson then argues that even if we accepted that physical objects had sensory colour (a position which Jackson calls 'colour objectivism'), colour similarity would still be irrelevant, for  $P$  can see  $x$  even though  $S$ 's colour 'differs markedly'<sup>3</sup> from  $x$ 's colour. That is,  $P$  can even see physical objects if the range of colours that  $S$  has is limited to

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1 By colour here I mean 'physical colour', that is, surface atomic structure, and also 'sensory colour', that is, colour as it appears to us in visual experience, if it is the case that sensory colour is different than surface atomic structure and if sensory colour is an intrinsic property of physical objects. As I hold that sensory colour is not an intrinsic property of physical objects, I will consider only physical colour. (If sensory colour is an intrinsic property of physical objects, and our sensa provide significant information about that property, then I hold that sensory colour, as a property of  $x$ , is involved in seeing).

2 Jackson [1977] p.170.

3 Jackson [1977] p.170.

black-and-white. Thus, there need be no similarity between the colour of  $x$  and the colour of  $S$ .

Before modifying this argument to use against the significant information theory, one failing has to be remedied. The argument does show that colour similarity is irrelevant, but it does not show that there need be no relation at all between the colour of  $S$  and the colour of  $x$ . It may be that there needs to be a correlation between the  $x$ 's colour and the shade of  $S$ 's colour, so that, for example,  $x$ 's colour needs to be 'represented' by a particular shade of grey. This could be so even if 'colour objectivism' were false;  $x$ 's physical colour may need to at least be represented by the shade of  $S$ 's sensory colour.

This failing can be remedied by pointing out that in some situations, such as when the colour composition of the light source is rapidly and continually changed at random,  $P$  sees  $x$ , yet there is no correlation between the colour of  $x$  (whether physical or sensory) and both the colour, and shade of colour, of  $S$ .

The argument can now be turned against the involvement of significant information about  $x$ 's colour in seeing  $x$ . In some situations, such as when the colour of the light source is rapidly and continually changed at random,  $P$  sees  $x$  even though the colour of  $S$  provides no significant information about  $x$ 's colour, given that no perceiver of  $P$ 's sort could gain true beliefs about  $x$ 's colour in such a situation. For  $P$  to see  $x$ , therefore, it is not necessary that  $S$  provide significant information about  $x$ 's colour, and so colour information has nothing to do with seeing.

This argument seems unobjectionable until we realize that the same fact is true of the  $M$ -properties.  $P$  can see  $x$  even if  $S$  provides no significant information about  $x$ 's shape. For instance, we can see a star by seeing a twinkling dot, which provides no information about  $x$ 's shape. We can also see  $x$  when  $S$  provides no significant information about  $x$ 's size, or  $x$ 's relative position, or  $x$ 's distance away. For example, suppose  $P$  has prosthetic vision in which a dot of light in  $P$ 's visual field represents the relative position of certain objects. Here,  $S$  provides no significant information about the shape, size and distance away of these objects, (and so  $P$  does not see the shape, size or distance away properties of these objects), yet  $P$  still sees the objects, I hold, although only weakly. Or suppose that while the shape of these sensa provide

significant information about the shapes of the objects, the size, distance away and relative position of the *sensa* do not provide significant information about the size, distance away and relative position of the objects. Again, I hold that *P* still sees these objects, although only weakly.

Thus, information about any of these properties is also not necessary for *P* to see *x*, yet these properties can be involved in seeing. This means that the fact that it is not necessary that *S* provide significant information about a property of *x* for *P* to see *x* is no grounds for holding that significant information about that property is not involved in seeing, and so the argument against the involvement of colour information fails.<sup>4</sup>

Despite the failure of this argument, some may still have an intuition that colour is not involved in seeing. I present the following hypothetical case to show that it is possible that *P* sees *x* even though *S* provides *P* with significant information about *x*'s colour only, which shows that colour can be involved in seeing.

Suppose *P*'s perceptual system is so defective that *P*'s whole visual field is just one uniform colour. Suppose that the colour of the visual field is determined by the predominant (physical) colour of the object or objects in front of *P*'s eyes. As *P* moves *P*'s eyes around, the colour of *P*'s visual field changes, as different objects with different colours come to be in front of *P*'s eyes. *P*'s visual experience provides *P* with some significant information about the colour of the objects in front of *P*'s eyes. It seems perfectly acceptable to me to say that *P* is seeing these objects, although only very weakly. *P* can therefore see *x* by gaining significant information about *x*'s colour only.

It might be objected that the reason *P* sees *x* here is because *P* is also provided with significant information about *x*'s relative position, that it is in front of *P*'s eyes. To avoid this problem, imagine that *P* has flying cameras for

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<sup>4</sup> Tye's comments on p.319 of [1982] show that he agrees that a particular *M*-property may not be involved in a particular case of seeing, although he thinks that only *M*-properties can be involved in seeing. He says 'not all of the four spatial properties of *sensa*...need be exemplified by every *sensum* which is experienced in seeing. If, for example, a man is viewing a distant star in the night sky then, it seems to me, the tiny bright *sensum* he experiences has no shape. Thus here changes in the shape of the star do *not* result in changes in the shape of the *sensum*'. (Tye's italics).

eyes which can travel around, and send signals back to *P*. In this case, *P* can see these objects (as a kind of perceiver) even though *P* receives no significant information (as that same kind of perceiver) about the relative position of these objects from *S*.

(It might be further objected that *P* receives significant information about the position of *x* relative to the camera eye, but the example can be changed so that the camera has many lens situated all around it, some of which are close-range lens and some of which are long-distance lens, and a randomizing element changes whichever lens is operating at any particular minute. This will make it virtually impossible for *P*\* to have any true beliefs about *x*'s relative position).

This shows that *P* can see *x* even when *S* provides significant information only about *x*'s colour, and this shows that significant information about *x*'s colour can be part of *P*'s seeing of *x*. Similar examples will show that *P* can see *x* when significant information is provided about *x*'s shape only, or *x*'s size only, and so on. *P* can therefore see *x* even if significant information about only one property of *x* is provided, and this property need not be an *M*-property.

I hold that these points about colour also apply to mass, electric charge, solidity, density, chemical composition and perhaps about other intrinsic properties of *x*. *P* can see *x* if in having *S*, *P* receives significant information about any of these properties.

But, it may be asked, how can *S* provide *P* with significant information about such properties when *S* itself (presumably) has no mass, electric charge, solidity, density or chemical composition? The fault in this objection comes from its assumption that each property of *S* can provide significant information only about the same sort of property in *x*,<sup>5</sup> or at least about some 'naturally corresponding' property in *x* (for example, sensory colour can only provide information about physical colour).

This assumption should be rejected, as the following thought experiment shows. Suppose *P* has limited prosthetic vision, and sees only those objects close by that have been coated with a special substance. Suppose that *P* sees all

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<sup>5</sup> This assumption is itself derived from the direct realist belief that the properties of *S* just are the properties of *x* (even if in some circumstances the property values *x* looks to have are not the values *x* really does have).

these objects as spheres (even though they have a variety of different shapes), and the colour of the spheres indicates, crudely, the shape of the object, for example, red stands for cube, blue for football-shape, and so on. It seems to me that there is no distortion of meaning to say that *P* is seeing the shapes of these objects in virtue of gaining significant information about their shapes through the colour of the sensa *P* is aware of.

This shows that significant information about a property of *x* does not have to come only from the same 'kind' of property of *S*. Any property of *S* can provide significant information about, or 'represent' or 'code for', any property of *x*.

This claim gets further support from the fact that we have to allow that *S* and *x* may have completely different sorts of properties, even though we ordinarily assume that at least some of them are the same sorts of property. If any adverbial-type theory is correct this will be the case, and it may be so even if the mental object theory is correct (after all how could a non-physical mental object have physical properties?). Given this possibility, we have to allow that information about one sort of property of *x* can be provided by a different sort of property of *S*, and so the objection collapses.

However, one might still argue that the point that significant information about a property of *x* does not have to come only from the same property of *S*, or some 'naturally corresponding' property of *S* does not establish that *P* can see *x* in virtue of gaining significant information about properties such as mass and electric charge (that is, that properties such as mass and electric charge can be seen). It may be true that we can see the spatial properties of *x* through the colour of *S*, but this does not mean we can see other properties of *x*, such as mass and electric charge by having a visual sensum, for most people just do not hold that these sort of properties can be involved in seeing.

A moment's reflection will show that most people would hold no such thing. What most people would hold, correctly, is that, as a matter of contingent fact, given the perceptual apparatus humans have, humans do not see mass and electric charge, but virtually no-one would hold, after reflection, that seeing mass and electric charge is a conceptual impossibility. After all, some animals, such as electric eels, perceive electrical fields, and if it were discovered that the sensory experience that eels had in such cases was a visual sensory experience

(with, say, colour representing the strength of the field's charge)<sup>6</sup>, it would be acceptable to say that the eels saw the electrical charge.<sup>7</sup> And if eels can see electric charge, then so, in principle, can humans. This sort of case counts as seeing, rather than hearing, because *P*'s sensory experience is visual. The fact that the ears are involved in the causal connection does not make it hearing rather than seeing, for we have seen that the sort of causal connection that holds between *P* and *x* is irrelevant to whether *P* sees or not.

I also hold that it is possible that *P* sees *x* in cases where *P*'s perceptual system is 'rewired' so that *P*'s auditory signals are sent to *P*'s visual cortex. In such a case, *P* could see *x* if *P*'s visual experience was such that it constituted significant information about the (physical) sounds transmitted by *x*. (Whether any such rewiring is likely to result in any sort of visual experience that would constitute significant information about *x* to *P* is another question). This sort of case counts as seeing, rather than hearing, because *P*'s sensory experience is visual. The fact that the ears are involved in the causal connection does not make it hearing rather than seeing, for we have seen that the sort of causal connection that holds between *P* and *x* is irrelevant to whether *P* sees or not. (Similar points apply to signals from any other of *P*'s sense-receptors, such as the olfactory sense).

In short, I hold that significant information about any of *x*'s intrinsic properties is enough for seeing. The issue of what exactly are the intrinsic properties of a physical object I wish to avoid, and so the list I offer below is not intended to be complete, and may not be entirely correct. We have also seen that certain relative properties of *x* are involved in seeing, such as distance away and relative position from *P* or from *P*'s visual receptors.

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<sup>6</sup> I once saw a television program on animal perception which, in attempting to give viewers an 'eel's eye view' of the world, represented the electric field as colour.

<sup>7</sup> However, not everyone would accept this. I would expect that there would be some viewers of the television show who would say of the simulation of the eel's sensory experience 'but that's only seeing the electric fields as colour, it's not really seeing the electric field itself, as it is *in itself*'. I hold that anyone who demands that to see a property one must see it as it is in itself has misunderstood the concept of seeing, even allowing that it is possible to see a property as it is in itself. (What could be said, of course, is 'that's not necessarily how the eel sees colour. The eel may have a completely different sort of sensory experience by which it sees, or perceives, electric charge').

I also add the following relative properties: shape, size, distance away, relative position, mass, electric charge, solidity and density, all relative to any other object.<sup>8</sup> This other object need not be contemporaneous with  $x$ . It could be an object at some point of time in the past. It could even be  $x$  at some point of time in the past. This allows that  $P$  can see literally, the movement of  $x$ , or the growth or diminution of  $x$ , or the change in  $x$ 's shape over time. Some may object that these are not really properties that one can see, rather they are properties one infers  $x$  has from visual experience, but I think most ordinary people would accept that they can be seen.

These conclusions can be formalized as follows.

(SI) A visual sensum  $S$  provides significant information about a physical object  $x$  to  $P = \text{df}$  (i) An event involving  $x$  causes  $P$  to have a visual experience of  $S$ ; ii) A perceiver of a kind that  $P$  belongs to,  $P^*$ , can have a sufficient number of determinate true beliefs, on the basis of  $S$ , in accordance with the 'one-key only' condition and the 'high frequency' condition, about the values of any of the following properties of  $x$ :  
 a) intrinsic properties of  $x$ , such as shape, size, mass, electric charge, solidity, density, physical colour (i.e. surface atomic structure), chemical composition; b) certain relative properties of  $x$ , namely distance away from  $P$ , or from  $P$ 's visual receptors, position relative to  $P$  or  $P$ 's visual receptors, and the following properties relative to any other object, including objects at past times, and including  $x$  at past times: shape, size, distance away, relative position, mass, electric charge, solidity and density.

My position, it appears, gives equal status to the  $M$ -properties and the non- $M$ -properties such as colour. Does this mean that any intuition that colour is not important to seeing is totally wrong? No. While it is false that the non- $M$ -properties such as colour are not involved in seeing, it is true that they are not as important as the  $M$ -properties, for  $P$  sees  $x$  more strongly by seeing one of

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<sup>8</sup> Note that significant information about these relative properties may involve sensa other than  $S$ , and sensa that existed at earlier times. I should also note that it may be that for  $S$  to look to have a size and distance away, there must be other sensa around  $S$ . If we just had  $S$  against a black background,  $S$  may not look to have any particular size and distance away

*x*'s *M*-properties than by seeing one of *x*'s non-*M*-properties. (I say more about this in section 11.i).

## 10.ii. The Boundaries of Visual Experience

The significant information theory holds that to see *x*, *P* must have a visual experience, a sensory experience of visual *sensa*. What makes an experience a visual experience rather than an auditory experience, or any other sort of sensory experience? And what makes an experience a sensory experience rather than a non-sensory experience? I hold that for an experience to be a visual experience, it must involve awareness of at least some of the properties that occur in normal human visual experience, that is, those properties we call sensory colour, shape, size, distance away and relative position. An experience without such properties we just would not call a visual experience.<sup>9</sup>

Is there a clear dividing line between visual sensory experience and other sorts of sensory experience? Mental object theorists may hold that there is, and it may seem that this is true, as it seems impossible to imagine a sensory experience that is partly a visual experience and partly some other sort of sensory experience. However, this may be due to the limitations of our cognitive system, rather than because such an experience is impossible. After all, the same sort of argument would have 'proved' to the people of the 'country of the blind' that visual experience was impossible.

And if physicalism is true, or, at least, if it possible that physicalism is true, then it does seem that such an experience could be possible. Suppose that what makes a sensory experience the sort of sensory experience it is, is a matter of the manner in which information is processed in the brain. Suppose then that *P* is having a visual experience. This will consist of certain processes in *P*'s brain taking place. Suppose we slightly alter these processes, and we keep making such slight alterations, until the processes are quite different. It may be that as *P*'s sensory experience changes, there is no clear-cut point at which *P* can say that the experience is no longer a visual experience.<sup>10</sup>

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<sup>9</sup> It should also be remembered that we concluded in s.7.iv. that it does not matter whether a visual *sensum* is produced by different parts or faculties of the brain (or mind).



So there may be cases where there is no correct yes-or-no answer to the question, 'is this a visual experience', and this means that there is another way in which there may not always be a correct yes-or-no answer to the question of whether *P* sees *x* or not.<sup>11</sup>

### 10.iii. Blindsight

The phenomenon of 'blindsight' presents complications for my theory. Some people have suffered damage to, or have had surgically removed, parts of, or all of, the striate cortex, which is the primary visual cortex. The striate cortex 'receives a massive projection of neurons from the lateral geniculate nucleus' and this area 'was widely regarded as the first major processing region for visual information'.<sup>12</sup> Damage to this area results in a loss of visual awareness. Some people have had the entire striate cortex of one hemisphere removed, and no longer have any visual awareness on one side of their visual field. Yet, surprisingly, when they are presented with objects in front of their (undamaged) eyes on that side of the visual field (with controls to make sure that there can be no signals sent to the undamaged striate cortex in the other hemisphere), they are able to make some crude discriminations, based only on the information received through the eyes.

Patricia Churchland in [1986] presents one such example. A patient D.B. had undergone surgical removal of the major portion of the striate cortex in the right hemisphere. As a result he was blind on his left side. Yet when a point of light was shone at his blind side, he was able to point with almost 100% accuracy to exactly where the point of light was. He could also discriminate horizontal from vertical bars of light, and X's from O's.<sup>13</sup> When questioned about why he pointed there, he said he was just guessing, as he couldn't see any

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10 We could, of course, undertake to set boundaries, but this would be an artificial exercise.

11 The lack of a yes-or-no answer here does not introduce relativity into the concept of seeing in the same way that the concept of 'kind of perceiver' does. The latter concept makes seeing relative because there is no one unique kind of perceiver that *P* is, whereas whether *P* is having a visual experience or not is a non-relative matter, only one with fuzzy boundaries (just as there are fuzzy boundaries between a sufficient number and an insufficient number of determinate true beliefs).

12 Patricia Churchland [1986] p.224.

13 Patricia Churchland [1986] pp.225-7. Her reference is Weiskrantz et al [1974].

light. Further work by Perenin and Jeannerod [1978] has shown that the same happens with patients who have had all their striate cortex removed from one hemisphere.

The most plausible neurophysiological explanation of blindsight is that some information is being sent from the eyes to the higher areas of the brain through the superior colliculus, which Trevarthan in [1970] has shown in experiments on split-brain patients is a second, minor pathway for information from the eyes.<sup>14</sup>

The phenomenon of blindsight challenges the perhaps intuitive assumption that such discriminative behaviour by a human, such as shown by D.B., requires that person to be having a visual experience, or at least some sort of sensory experience. Churchland points out that we could perhaps save this assumption, but only by abandoning another intuitive assumption, that if one is having a visual experience (or any other sensory experience), one knows one is having that experience. It could be that blindsight patients are aware of visual *sensa*, but are not aware that they are aware of visual *sensa*, that is, they are not self-consciously aware of their awareness of visual *sensa*.

Something like this might occur in the case of the long-distance truck driver, referred to by Armstrong in [1978]. Armstrong describes a truck-driver who suddenly 'comes to' and realizes that for the past ten or so minutes he has not been self-consciously aware of what he was doing. Because he still managed to carry out the sophisticated task of driving a truck, Armstrong concludes that he must have been conscious at some level. He must have been consciously aware, at least, of his surroundings.<sup>15</sup> It could be, then, that he was aware of visual *sensa* throughout this period, but was not self-consciously aware of them.<sup>16</sup>

I do not wish to claim that a person can have visual experiences of which they are not self-consciously aware, for there are plausible alternative explanations of such cases. However, I accept that it is possible that *P* can have

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<sup>14</sup> Note that patients who have had pregeniculate lesions, which prevents information from the retina going anywhere, including the superior colliculus pathway, cannot make any discriminations at all.

<sup>15</sup> Armstrong [1978] pp.59-61.

<sup>16</sup> I am unsure whether Armstrong holds that the truck driver really has a visual experience of visual *sensa* that is anything like normal visual experience during this period.

a visual experience of which *P* is not self-consciously aware. As this is still a visual experience, I hold that *P* can see by having this sort of visual experience.

Some might object that even if this sort of experience is possible, it is not a visual experience, because what we *mean* by a visual experience is that it is one that we are self-consciously aware of. I disagree; I hold that what is necessary and sufficient for something to be a visual experience is that it involves awareness of *sensa* with the same sort of properties that our ordinary visual *sensa* have. Anyway, I can always call this sort of experience a 'visual experience\*', and point out that it shares enough properties in common with visual experiences to justify the claim that *P* can see by having a visual experience\*.

It is possible that D.B. is having a visual experience of which D.B. is not self-consciously aware (a visual experience\*, if you like). I hold that if this is the case, then D.B. sees. Presumably, if D.B. does have a visual experience here it would not be as 'full' as normal visual experience, and so D.B. would only see weakly, but this is still seeing. In fact, though, it is unlikely that D.B. and the other blindsight patients are having visual experiences(\*). It is unlikely because these patients have suffered extensive damage to neurophysiological systems that are centrally involved in visual experience, and also because their discriminative 'visual' capacities are so limited. If any visual experience is occurring, it is at most only a very crude visual experience.<sup>17</sup>

Interestingly, some patients, when pressed, admit to making their discriminations on the basis of a 'feeling', such as a prickling or a feeling of 'gunfire at a distance'. These 'feelings' will qualify as sensory experiences, and so, I hold these patients do perceive in some way.<sup>18</sup> This perception is not, though, visual perception, because these sensory experiences are not visual sensory experiences. We could label such ways of perceiving 'prickle-perceiving' and 'gunfire-perceiving' respectively.<sup>19</sup>

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17 The flip side of blindsight is blindness denial, which also presents problems for our ordinary folk psychological assumptions/intuitions. For details on this and other cases puzzling to common sense, see Churchland [1986] pp. 228-35.

18 In the next section I show that *P* can also perceive even though *P* has no sensory experience at all.

19 A similar phenomenon is 'facial vision'. There are many people who are totally blind but who

#### 10.iv Perceiving and Sensory Experience

Suppose *P* has blindsight, and we accept that *P* has no sensory experience at any level of consciousness. If we hold that *P* cannot perceive without having some sort of sensory experience, then *P* in this case cannot perceive. I hold, however, that this conclusion is too restrictive. It seems to me that in this case *P* does perceive (although *P* does not visually perceive). So it should not be a necessary condition of *P* perceiving *x* that *P* has a sensory experience.

I think we are committed to this position because we hold that many primitive organisms, such as earthworms, which in all probability do not have sensory experiences, perceive.

If an organism as simple as an earthworm, which has no sensory experiences, can perceive, what is for *P* to perceive something? I hold that the analysis of seeing at a fairly basic level is the following:

(P1) An organism *P* perceives *x* = df (i) A event involving *x* has a causal effect upon *P* which produces, by way of *P*'s internal mechanisms, an internal state in *P*; (ii) This internal state is of such a kind that a perceiver of *P*'s kind, *P*\*, can, on the basis of that state, in accordance with the 'one-key only' condition and 'frequency' condition, display selective behaviour towards *x*.

This is, in effect, a significant information analysis of perceiving, given that I analyse significant information about *x* in terms of a perceiver of *P*'s

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are quite good at avoiding objects in their path, and many of these people report that when they come before a largish object in their path, it feels as though something is touching their face, even though nothing is. Investigations have shown that what is happening is that the person's perceptual system is using echoes of the person's own footsteps and other sounds to spatially locate the objects, and this information is 'reported' to the subject as a tactile facial sensation. (See Dawkins [1986] p.23).

This is a form of echolocation, such as bats use. It is possible that echolocation could cause visual experiences, in which case the person would be seeing 'through their ears'. Richard Dawkins in [1986] pp.33-4, has even gone so far as to claim that it is likely that bat echolocation produces visual experiences in bats.

sort,  $P^*$ , gaining true beliefs about  $x$ , and that the general analysis of  $P^*$  having a belief about  $x$  that I accept is in terms of  $P^*$  being in a state that provides  $P^*$  with the capacity to display selective behaviour towards  $x$ .<sup>20</sup>

Some might feel that even if my analysis of visual perception holds, this analysis of perception in general will not, because it is too mechanistic. If all that is required for something  $P$  to perceive  $x$  is that  $P$  is a thing that can be set up to receive input from  $x$  which puts  $P$  in a state apt for selective behaviour towards  $x$ , then simple machines like thermostat-controlled heaters can be said to perceive, and this is absurd.

When asked why thermostat-controlled heaters do not perceive, the reply is usually 'because they have no understanding, no beliefs about their surrounding environment'. It is, of course, true that a heater has absolutely nothing like a cognitive system such as humans or higher animals have, and so the claim that the heater has nothing like an understanding of its environment, and has no beliefs about its environment, as humans and higher animals do, is perfectly true, although I think that perhaps such heaters can be said to have very, very rudimentary beliefs about their environment, given that they have a capacity for selective behaviour towards the environment.

However, the truth of this point is irrelevant, as a comparison with humans and higher animals is unfair. The earthworm perceives, but its internal states are also nowhere near as sophisticated as the cognitive system of humans and higher animals. An earthworm can also hardly be said to have much understanding of its environment, or any beliefs about it like humans do. So we cannot use this sort of argument to show that the heater does not perceive.

I am not claiming, however, that a thermostat-controlled heater does perceive. I think some basic level of complexity in the 'cognitive system' of a machine or organism is needed for it to be true that it perceives, and whatever that level is, the heater does not have it. But there are computers and robots that have been built that I think do approach the requisite level of complexity, and there will in all likelihood be even more sophisticated computers and robots built in the future that will reach that level. I cannot see any grounds other than vitalistic ones for denying that sophisticated computers perceive while allowing that earthworms do.<sup>21</sup>

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20 This general approach to belief I take from Armstrong [1968]. See pp.339-40.

At this point, I think we can overcome an objection that Alston in [1990] raises to a theory like mine. On p.95 he asks, if *P* can see *x* by having a sensory experience which provides information about *x*, why don't we allow that we can perceive objects by having an emotional experience, given that an emotional experience qualifies as a sensory experience,<sup>22</sup> and that 'these experiences too have their causes, and the experiences carry information about those causes'.<sup>23</sup> Presumably, Alston regards parts of *P*'s brain as the objects that these experiences carry information about.

My answer is that we do perceive in such a case, if there is some perceiver of *P*'s kind that can have sufficient determinate true beliefs about some objects on the basis of these experiences.<sup>24</sup> This is not to say that a normal human perceiver is capable of having such beliefs, if having such beliefs requires that this perceiver have abilities which the normal human perceiver does not have. (Paul Churchland, though, is one philosopher who thinks that the normal human perceiver is capable of gaining such abilities).<sup>25</sup>

Some ordinary people might not accept that our emotional experiences can constitute perception of objects, but this will be for reasons that do not support Alston. For one thing, they think of the property values of the sensory experiences we presently regard as perceptual as being out there in the world, while the property values of emotional experiences are internal. However, we have seen that the property values of a sensory experience involved in perception can be internal. Secondly, they think that the 'purpose' of those sensory experiences we presently regard as being perceptual is for perceiving, while emotion experiences have different 'purposes'. However, I do not think that we can accept the view that mechanisms have any real 'purpose', for

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21 Dualistic grounds cannot be used here, as earthworms, presumably, do not have non-physical minds. Anyway, even if all the most primitive organisms that perceive do have non-physical minds, this still would not show that machines cannot perceive, because we allow that an earthworm, or any creature for that matter, can perceive *even if it has no non-physical mind*.

22 Emotional experiences obviously involve no awareness of a sensory object, and so Alston says these experiences 'are quite properly construed in an adverbial way'. (p.95).

23 Alston [1990] p.95.

24 I noted in s.7.iv that it is possible that *P*'s visual experience may provide significant information about *P*'s brain.

25 See Paul Churchland [1979] and [1981].

reasons that I do not have the space to detail here.

To see that it is possible to perceive by having emotional experiences, one need only consider the following thought-experiment. Suppose there were humans who felt a pain or some emotional experience when they touched an object, and that there was a range of recognisable experiences of this sort that objects produced in these people, and each experience was only produced by one particular property value of an object. It would be perfectly natural for such people to say they perceive in this way. In fact, if these experiences were only caused by touching objects, such people would probably externalize the feelings, and attribute them to the objects, just as many people do with felt temperature properties.

Michael Ayers has recently disputed this claim in [1993]. Ayers' argument is that when we feel electric shocks, the property values of the shock experience are closely correlated with the values of the electric current, yet we do not attribute the property values of the shock feeling to the electric current itself. My reply to this is that the fact that we do not attribute the properties of our experience in this case to the object hardly shows that it is impossible that we could do so in other cases, and do so 'naturally'.

## 11. True Believers

### 11.i. True Beliefs

So far, as the reader will have no doubt noticed, I have avoided being very specific about the true beliefs  $P$  must be able to gain from  $S$  about  $x$ 's property values for  $P$  to see  $x$ . The reason for this is because it is impossible to be very specific about these beliefs.

What I have said so far is that these beliefs can be about the values of any of  $x$ 's intrinsic properties and about the values of certain of  $x$ 's relational properties. I have said that  $P^*$  need only have such true beliefs about one of these properties for  $P$  to see  $x$ , and that there is no one property about which it is necessary for  $P$  to have true beliefs about.

I do think, though, that the  $M$ -properties are more important than the non- $M$ -properties. By this I mean that  $P$  sees  $x$  more strongly by seeing, for example,  $x$ 's distance away than by seeing  $x$ 's colour, even if the beliefs that  $P^*$  can have about both properties of  $x$  on the basis of  $S$  are equally determinate.

It also seems to me that location, that is, distance away and relative position are more important than shape and size, and this, I would suppose, is due to the fact that the importance of our visual experiences is that it enables us to gain true beliefs about objects, and the importance of gaining true beliefs about objects is that it allows us to interact with them, and in order to interact with an object, it is more important that we know where it is, than what shape and size it has, and what colour it is, and what it is made of.

I come to these conclusions simply by thought-experiments, against which I check my intuitions. If most people disagree with me here, I will not be averse to dropping this claim.

I have also said that these beliefs should be determinate to some degree. The more determinate the beliefs are, the stronger  $P$  sees. The less determinate they are, the weaker is  $P$ 's seeing. When do the beliefs become so indeterminate that  $P$  is no longer seeing? I do not think there is any clear-cut boundary in this regard. The boundary between seeing and not seeing is fuzzy.



This is not surprising when we reflect on a situation such as when *P* sees the football while on drugs. *P*'s seeing gets weaker and weaker, until *P* no longer sees the football. But there is no precise point at which *P*'s visual experience changed from seeing to non-seeing of the football. Any theory of seeing should acknowledge the fuzziness here.<sup>1</sup>

Can we indicate where this fuzzy boundary lies? Unfortunately, there is no general formula which will tell us where the boundary, even a fuzzy one, lies for every possible case. We have to determine each possible case individually, going on our intuitions as to when there is not enough significant information. Not surprisingly, such intuitions may differ from person to person. (This fact is not a threat to my theory, for my theory simply says that the beliefs *P*\* must be able to gain from *S* must be determinate to some degree. We can agree upon this, even though we may disagree over when *P*'s beliefs become too indeterminate)

I will present my intuitions on the following case in order to try and provide some idea of my intuitions on where such boundaries should be drawn.

Suppose *P* has a crude prosthetic visual system which simply displays the relative position of a randomly chosen object, *x*, which is reflecting or transmitting light into *P*'s prosthetic eye. A dot appears in *P*'s visual field to represent the relative position of *x*. No information about the shape, size, distance away or colour of *x* is provided by this sensum *S*. The only true determinate belief about *x*'s property values that a perceiver of *P*'s kind can get from *S* here is the relative position of *x*.<sup>2</sup> In this case, *P* is seeing the object, but *P*'s seeing is much weaker than normal human seeing.

Suppose, though, that *P*'s prosthetic system is so crude that all it does is produce a dot on the right side of *P*'s visual field if the object is on *P*'s right, and a dot on the left side of *P*'s visual field if the object is on *P*'s left. In this case, it is not clear whether the beliefs about *x*'s relative position that *P*\* can have here are determinate enough to make it true that *P* is seeing *x*. This case

<sup>1</sup> Most theories will entail that the boundary is fuzzy, although most theorists do not explicitly discuss this point. Some writers seem to think that it tells against a theory that it is unable to provide a clear-cut boundary; as, for example, Hall does in [1977], pp.387 with the resemblance and satisfaction theories. (See my comments on Hall in s.4.i).

<sup>2</sup> *S* indicates here that *x* is big enough to reflect or transmit light in sufficient quantity to be detected by *P*'s visual system, but any such belief is too indeterminate to count.

lies in the fuzzy areas between seeing and non-seeing. I would tend to say that this is still seeing, although most people might not.

Suppose then that *P*'s visual system is made so crude that so long as there is some object reflecting or transmitting light into *P*'s eye, *P* will have a visual experience of a dot in the centre of *P*'s visual field. In this case, it seems that the beliefs about *x*'s relative position that *P*\* could gain here are so indeterminate (as *x* could be at so many different positions) that *P* does not see *x*.

The reader can imagine similar cases for shape, size, colour and so on.<sup>3</sup>

### 11.ii. What Must *P*\*'s Beliefs Be Like?

One problem for an account of seeing like mine that involves belief is as follows. Consider a Neanderthal, *N*, who looks at *x*, and has a sensum *S* caused by *x*. For *N* to see *x*'s colour, as a Neanderthal kind of perceiver, it must be possible that a perceiver of *N*'s kind, another Neanderthal, *N*\*, could have true beliefs about the property values of *x*'s physical colour, that is, *x*'s surface atomic structure on the basis of *S*. But no Neanderthal may be capable of having true beliefs about a property such as surface atomic structure, except for the very general belief that the object has some property, whatever that is, which causes *x* to look that colour in such circumstances to *N*.<sup>4</sup>

This shows that *P* can see (physical) colour without *P*\* having any beliefs

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3 One problem case that is posed for many theories of seeing involves *P* looking at an object which has an object directly behind it of exactly the same colour, for example, a small white piece of paper which lies on top of a larger piece of paper of exactly the same colour, and *P* does not realise that there are two objects here, one in front of, or on top of, the other.

Smith in [1984] (a rather unclear Husserl-inspired paper), argues that the object here is not seen, and holds that this is a problem for causal theories, because they entail that it is seen. It is not clear what my theory entails here; I would need to make clear a number of points surrounding this case. Anyway, I am not sure whether the ordinary user would hold that the front object is not seen. Some people would probably say that the front object is seen, while some will not. Until I work out what the ordinary position here is, and the reasons for it, there is no point discussing the case in the context of my theory.

4 Assuming that *N*\* does not have any beliefs like 'Objects with the property that causes them to look dark in colour will heat faster than those which have the property that causes them to look light in colour', for such a belief will count as a belief about surface atomic structure. (The example can be changed if it is felt that I am underestimating the mental capabilities of Neanderthals).

about this property other than that it is that property of the object, whatever that property is, that causes it to look that (sensory) colour in those circumstances to *P*.

Does the same apply to the other properties of *x*? Before discussing this question, a further issue needs to be made clear. It is possible that there are organisms that have visual experiences but do not have anything like the cognitive states that count as the having of a belief for a human being. Can these organisms see? I hold that such organisms can see, because I hold that we should be liberal about what counts as a belief about *x*. An organism can be said to have a belief about *x* if, to put it crudely, the organism has internal states that give it the capacity to display selective behaviour towards *x*.

As I have noted, I take this account of belief from Armstrong.<sup>5</sup> Of course, this is only a first approximation of a theory of belief, but, I believe, it is on the right track. However, we must be careful here. We cannot just say that any internal state caused by *x* counts as a belief about *x*, because this is not enough. (If any internal state caused by *x* counted as a belief about *x*, then it would be true that whenever *P* sees *x*, *P* has beliefs about *x*, because to see *x*, *x* must causally effect *P* by causing a visual experience. This makes it too easy for Armstrong to be right when he claims that for *P* to see *x*, *P* must have beliefs about *x*). The internal state must be one that plays some appropriate role in *P*'s normal behaviour, whatever that role is.<sup>6</sup>

Now to consider the other properties of *x*. First of all, consider non-*M*-properties such as mass, electric charge, density and solidity. Suppose that the (sensory) colour *S* has is caused by *x*'s mass, and different mass property values cause *S* to have different colours. Suppose *P*\* can have no beliefs about mass on the basis of *S* here, except for the belief that *x* has some property that causes it to look that colour. Does *P* see *x*'s mass here? The answer, I think, must be yes, given that we allow that *P* can see physical colour in this sort of case. If physical colour, why not mass? I see no reason for making a distinction here between physical colour and mass, or between physical colour and any of the other non-*M*-properties of *x*. So *P* can see a

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<sup>5</sup> Armstrong [1968] pp.339-40.

<sup>6</sup> What may be the case is that having a visual experience is a matter of brain processes like those involved in normal belief occurring in the 'visual module' of the brain.

non-*M*-property of *x*, as a perceiver of *P*\*'s kind, even if the only true belief that *P*\* can have about a property of that kind on the basis of *S* is that it is that property of *x*, whatever it is, that causes *S* to have that sensory colour in those circumstances.

The situation, however, seems to be different for *M*-properties. We can see that this is so by imagining the following situation. *P* has limited and unusual prosthetic vision. Only those objects in front of *P*'s visual receptors that are coated with a special substance can cause *P* to have visual experiences.<sup>7</sup> The size, relative position and distance away of *P*'s sensa in this situation represent the size, distance away and relative position of an object, as in normal seeing, but all *P*'s sensa are square or cube-shaped. The shape of an object is roughly represented by the colour of the sensum. Suppose that *P* does not have true beliefs about the shapes of these objects from *P*'s sensa.

If *P* belongs to the normal human kind of perceiver, then *P* sees the shapes of these objects, because a normal human could have true beliefs about the shapes of these objects from the colours of the sensa. But suppose *P* also belongs to perceiver kind *k*, and no perceiver of this kind, *P*\*, has the ability to understand the correlation between the colour of *S* and the shape of *x*. The only true belief that *P*\* can have about *x*'s shape is that *x* has some property, whatever that is, which causes *x* to look to have the colour it does in those circumstances to *P*.

It seems, intuitively, to me at least, that with shape, this sort of belief is not enough for *P* (as perceiver of kind *k*) to see *x*'s shape, even though this sort of belief is sufficient with the non-*M*-properties. To see *x*'s shape, it seems, *P*\* must have beliefs about, for example, *x* being a sphere because *x* is red, and *x* being a cube because *x* is blue, and so on (and *P*\* must have some true beliefs about what sphere and cubes are).

So the concept of seeing demands more when the *M*-properties are concerned. This will explain why, as I claimed in s.10.i, *P* sees more strongly by seeing one of *x*'s *M*-properties than by seeing one of *x*'s non-*M*-properties. As with the earlier claim, though, I am not averse to abandoning this claim if most people's intuitions do not align with mine on this matter.

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<sup>7</sup> I add this condition to simplify the content of *P*'s visual field, to make the situation easier to conceive.

### 11.iii Word Vision

I present a final problem case for the significant information theory, which I call the 'word vision' problem. Suppose that *P*'s eyes are replaced by miniature cameras, and the output signals of these cameras are sent to a miniature computer implanted in *P*'s visual cortex. This computer, we shall suppose, is capable of highly sophisticated interpretation of video signals. For example, the camera sends video signals of two people playing soccer, and the computer outputs the following sentences describing the scene: 'Soccer ball of normal shape and size kicked by human 1 across field of vision, left to right, 40 kph, caught by human 2, kicked back to human 1, human 1 runs 5 metres towards human 2, throws soccer ball with both hands over head to human 2'.

Suppose that the computer is connected to *P*'s visual cortex and that it can electrically stimulate the cortex so that *P* has a visual experience in which *P* is aware of visual images of these sentences, which roll up *P*'s field of vision like the credits on a film. This visual experience provides *P* with significant information about the properties of some of the objects around *P*, and so the significant information theory will entail that *P* sees these objects.

It may seem to some that to say that *P* sees here is just stretching the term 'see' too far, and so the significant information theory must be modified or rejected. In order to answer this claim, we should firstly ask the objector to be more specific about why this case should not be counted as a case of seeing.

There are a few reasons I can see that may be offered. The first reason is that for *P* to gain information here *P* needs to do a lot of high-level intelligent interpreting of *P*'s visual experience (namely understand language), because there is no simple correspondence between the property values of *P*'s *sensa* and the property values of the physical objects that cause them. This explanation will fail, though, because in the distorting glasses case, *P* could see *x*, yet there was no simple correspondence between the property values of *S* and the property values of *x*, and *P* had to do a lot of intelligent interpreting of *P*'s visual experience to gain information about *x*.

Perhaps the very fact that language is involved debars this case from being

a case of seeing. Isn't gaining information about an object through language something different than seeing an object? The following consideration will show that this objection fails. Imagine that *P* sees *x*'s shape by having a sensum *S* that has the shape that a sensum normally has in such a situation. This shape, however, could be very different, and it could still provide significant information about *x*'s shape. *P* might have *sensa* with very abstract shapes that provide significant information about *x*'s shape. Abstract shape 1 might tell *P* that *x* is a cube, abstract shape 2 might tell *P* that *x* is a sphere, and so on. But these abstract shapes are functioning in the same way as the words images in the word vision case are, as symbols in a language. So this case involves language just as the word vision case does. (The language involved in the word vision case is more sophisticated than the language in this case, but that is irrelevant to the point). So the involvement of language in the word vision case cannot provide a basis for holding that *P* does not see in the word vision case.

Another possible reason is that for *P* to see *x*, there must be one *sensa* that represents *x*, and not a continuous stream of different *sensa*. In the word vision case, *P* is aware of a number of different *sensa* (for instance, each letter of each sentence is a different *sensa*), and so *P* does not see *x*. This explanation should also be rejected. Firstly, I can see no good reason why *x* cannot be represented by a number of different *sensa*. For example, *P* may have unusual prosthetic vision in which *P* sees two *sensa* next to each other. The colour of the first may represent *x*'s physical colour, and the colour of the second may represent *x*'s shape. Secondly, any decision about what constitutes the dividing line between *sensa* will be arbitrary. If we wanted, we could say that what we normally call one sensum is really two *sensa* right next to each other, or a number of *sensa*. Or we could say that our visual field is just one big sensum.<sup>8</sup> This objection therefore fails.<sup>9</sup>

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8 Barnes [1945] takes this fact to be an argument against the existence of *sensa* as mental objects. I am, of course, not taking *sensa* here to be mental objects. Anyway, I do not think Barnes' arguments work, for reasons similar to those given in Jackson [1977], pp.117-9.

9 A fourth possible reason that might be offered is that for *P* to see *x* by having *S*, the significant information about *x*'s property values that *S* provides cannot just be provided by one property of *S*, yet in the word vision case, this is the case, for all the significant information about *x*'s properties comes from *S*'s shape values. We have already seen how this objection would be overcome.

So the objector to word vision has failed to explain why *P* does not see *x* with 'word vision'. I can see no other reason to rule it out, and so I conclude that *P* does see with 'word vision'. This may clash with the intuitions of many people, as it did to some degree initially with mine, but I hold that this conclusion will not seem counter-intuitive once the points my analysis of seeing makes sink in.

## 12. Illusion and Hallucination

### 12.i. The Relativity of Veridical and Illusory Seeing

There are two ways in which ordinary people take the terms 'veridical seeing' and 'illusory seeing'. The first way holds that *P*'s seeing of *x* is veridical when the way *x* looks to *P* is the way *x* really is, that is, the property values *S* has are also the property values *x* has. When *P*'s seeing of *x* is illusory, *P* sees *x*, but does not see *x* the way it really is, that is, the property values of *S* are not the property values *x* has, although they are similar.

This understanding of veridical and illusory seeing assumes that the properties of *S* can resemble, to a greater or lesser degree, the properties of *x* (or even that the properties of *S* are the properties of *x*). However, those people who have properly mastered the concept of seeing, realize, at least implicitly, that resemblance is not involved in seeing, and that *P* can see *x* veridically even when *S* does not resemble *x* at all, that is when the property values of *S* are different than the property values of *x*.<sup>1</sup>

The proper masters of the concepts of veridical and illusory seeing realize, at least implicitly, that veridical and illusory seeing are relative concepts. *P*'s seeing is not veridical or illusory absolutely, but relative to some standard perceiver and circumstances. *P*'s seeing of *x* is veridical if the property values that *x* looks to have to *P* (that is, the property values that *S* has) are the same as the property values that *x* would look to have to some standard perceiver in some standard circumstances. *P*'s seeing of *x* is illusory if the property values that *x* looks to have to *P* are not the same as the property values *x* would look to have to some standard perceiver in standard circumstances, but are similar to some degree. The greater the similarity between the property values of *S* in the actual and comparison situations, the less the illusion, and the less the similarity, the greater the illusion.

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<sup>1</sup> As we saw earlier, there may even be a difference in the kinds of properties that *S* and *x* have.



The analysis of veridical seeing is can be put more formally as follows:

(VS) *P*'s seeing of *x* is veridical = df (i) *P* sees *x* by having a visual sensum *S*; (ii) the property values of *S* are the same as the property values of the sensum that some standard perceiver in some standard circumstances would have when seeing *x*.

The analysis of illusory seeing is:

(IS) *P*'s seeing of *x* is illusory = df (i) *P* sees *x* by having a visual sensum *S*; (ii) the property values of *S* are not the same as the property values of the sensum that some standard perceiver in some standard circumstances would have when seeing *x*, but are similar to some degree; (iii) the stronger the similarity between the sensa in the actual and comparison situations, the greater the illusion, and the less the similarity, the less the illusion.

## 12.ii. Implicit Standards in Ordinary Talk

But if illusion is relative, an objector may ask, how is that we talk about illusion without referring to a standard? The reason is that we implicitly understand that normal talk of illusion takes as its standard an ideal human perceiver in normal Earth daylight circumstances. This allows that those cases we normally regard as clear cases of illusion, such as seeing a stick half-submerged in water, so that it looks bent or broken, or seeing an object through distorting glasses, or via a distorting mirror, or through translucent glass, or in dark or coloured light, are illusions. They are not illusions simpliciter, but they are illusions relative to an ideal human perceiver in normal daylight circumstances on Earth, because the sensa we have in such situations are different than the sensum this perceiver would have when seeing these objects in normal Earth daylight circumstances, because such circumstances do not include water, distorting glasses and mirrors and dark or coloured light.

This explanation also allows that *P* suffers illusion when *P*'s seeing of *x* is affected by drugs or illness or damage to *P*'s perceptual system. The sensa

that *P* have in such circumstances are different than the *sensa* that the ideal perceiver would have when seeing objects in normal circumstances, because the ideal perceiver is not on drugs, is not ill, and has an undamaged perceptual system.

It is also open to us, though, to talk about illusion relative to other standards, as long as we are explicit about doing so. This allows that what may be an illusion relative to an ideal human perceiver in normal Earth daylight circumstances may not be an illusion relative to another standard. For example, if *P* is colour blind, and has red *sensa* when seeing blue objects, then relative to the ideal human perceiver, *P* suffers illusion, but relative to other perceivers who have the same visual system as *P*, *P* sees veridically. If *P* sees a white object illuminated by red light, then *P* suffers illusion relative to the ideal human in normal Earth daylight conditions, but does not suffer illusion relative to the ideal human on a planet where the light is red.<sup>2</sup> And if *P* wears distorting glasses, *P* suffers illusion relative to the ideal human, but *P* sees veridically relative to perceivers who have distorting glasses-type vision.<sup>3</sup>

The 'ideal human perceiver' and 'normal Earth daylight circumstances' are, of course, rather vague terms. This is responsible, I think, for our uncertainty over the following sort of case. Suppose we see an aeroplane in the sky which has the shape of a dot. Most people would say that this is an illusion, but most people, I think, would also be uneasy about whether this really is an illusion. I think the reason for this is that it is not clear what the normal Earth daylight circumstances that we implicitly use as a standard involve in regards to distance away. Are we considering what an object *x* looks like if *x* were a normal distance away from the perceiver, say a few metres, or are we considering what *x* would look like in otherwise normal conditions when *x* is far away?

If the former, then we suffer illusion in the aeroplane case, because the shape the aeroplane looks to have to a normal human in these circumstances,

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2 Assuming that the perceptual systems of this human has not 'adjusted' to the red light, so that the *sensa* had by this human is as it normally would be on Earth, just as the perceptual systems of those subjects who wear inverting glasses for weeks 're-invert' the inverted visual fields after a week or so.

3 Hence, we might say of some aliens, 'Their seeing is illusory relative to us, but not relative to their own way of seeing'. (Of course, it is evolutionary unlikely that there would be any creatures with such vision).

where the aeroplane is up close, will be a different shape than the shape the aeroplane looks to have in the actual circumstances, where the aeroplane is far away. If the latter, then this case is one of veridical seeing, because the shape the aeroplane looks to have to a normal human in these circumstances, where the aeroplane remains far away, is the same shape the aeroplane looks to have in the actual circumstances.<sup>4</sup>

So we are unsure about this case because we are unsure about which of two ways we should understand what normal human Earth daylight circumstances involves, and each way produces a different conclusion. So when we talk about illusion in regard to such cases, we need to be explicit about what standard circumstances we are referring to.

I think what is meant by 'ideal human perceiver' is a possible human whose visual perceptual powers are as strong in every respect as the perceptual powers of any human that exists or has existed (a strong perceptual system is one that allows *P* to see objects strongly). Thus, this perceiver may have the red-light vision of a Hottentot, and the blue-light vision of an Eskimo. However, this perceiver is not given perceptual powers that no human has ever had, even if such a perceiver is conceivable, and even if such a perceiver would still be human. This is simply because the ordinary person, as far as illusion is concerned, is not concerned with such possibilities, even though the ordinary person would acknowledge that such a perceiver is possible. When it comes to illusion, the comparisons the ordinary person is interested in is with the sort of visual experiences *actual* people have.<sup>5</sup>

If, though, a human were born who could see even more strongly than this idealized human, say, by being able to see more colours than other humans, and thus make more colour discriminations, it would become the ideal. We would not normally say that it suffered illusion in regard to colour (although it does relative to us, and we could say this if we were explicit about what we were saying), but that we do, because relative to it, we do.

We should also note that the property values we attribute to the standard

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<sup>4</sup> Similar points apply to size as well as shape in this sort of case.

<sup>5</sup> This is not to deny, though, that the concept of illusion allows standard perceivers that are not actual.

perceiver's sensum do not have to be exact property values. We may attribute a range of values that the sensum could have. For example, we may hold that the standard perceiver will have a red sensum in standard circumstances, but allow that this may include a range of shades of red, rather than one exact shade of red. We may also allow that the boundaries of these ranges are fuzzy, so there is not always a yes or no answer to the question of whether *P* suffers illusion relative to a normal human perceiver in normal Earth daylight circumstances.<sup>6</sup>

### 12.iii. Illusion and Strong and Weak Seeing

It should be clear that veridical and illusory seeing are different than strong and weak seeing. *P* can see *x* strongly, as perceiver of kind *k*, because *P\**, a perceiver of kind *k*, can gain true beliefs about *x*, but *P* may suffer illusion relative to some standard perceiver (even *P\**) in some standard circumstances, because the property values of *P*'s sensum *S* may not be the same as the property values of the sensum that the standard perceiver would have when seeing *x* in those standard circumstances.

For example, when *P* wears distorting glasses, *P* can be seeing *x* strongly, because *P\** can have determinate true beliefs about *x* on the basis of *S*, but *S* may be different than the sensum that some standard perceiver would have when seeing *x* in some standard circumstances which do not involve distorting glasses. *P* can even suffer illusion relative to *P\**, because *P\** may not normally have that sensum when seeing *x* in some standard circumstances. *P\** can even be *P*, so that *P* sees *x* strongly because *P* has true beliefs about *x* on the basis of *S*, yet *P* suffers illusion relative to *P*, because *P* would not have such an experience in some standard circumstances.

Seeing can also be weak without being illusory for similar reasons. For example, suppose *P* sees *x* very weakly because *S* indicates very little about *x*'s property values. If *S* is the sensum that some standard perceiver in some

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<sup>6</sup> I think a deeper account could perhaps be given of illusion, in terms of belief. I think that, roughly, *P*'s seeing of *x* is illusory relative to a standard perceiver, *SP*, and standard circumstances when it is the case that if *SP* had *S* in the actual circumstances, and *SP* believed that *SP* had the visual system of *P*, and believed that the standard circumstances held, then *SP* would have certain false beliefs about *x*. I can see many complications for this account, though, and I do not have the space to address them here.

standard circumstances would have when seeing  $x$ , then  $P$  does not suffer illusion relative to this perceiver. This perceiver could even be  $P$ , if  $S$  is the sensum that  $P$  would have in some standard circumstances when seeing  $x$ .

Those who do not realize that illusion is relative often make the mistake of thinking that what are really different degrees in the strength of  $P$ 's seeing are different degrees of illusion. And they think that hallucination comes 'after' illusory seeing, when in fact hallucination comes 'after' weak seeing. This mistake is understandable, as strong seeing in humans is usually veridical seeing relative to the ideal human perceiver in normal Earth daylight circumstances, and weak seeing is often illusory seeing relative to this standard. It is still, however, a mistake, and it is a mistake that leaves these theorists unable to account for the relativity of illusion, and unable to account for the fact that other sorts of perceivers may see objects by having different sensa than we do.

For example, the resemblance theory, which makes this mistake, entails that other sorts of perceivers cannot see  $x$  if the property values of their sensa are very different than ours. The resemblance theorist may try to escape this problem by saying that these other perceivers do see  $x$ , only their seeing is very illusory, but this fails to recognize that relative to that sort of perceiver, their seeing may be perfectly veridical. An adequate analysis of seeing therefore requires a relative analysis of veridical and illusory seeing, and recognition of the concepts of strong and weak seeing, in order to account for the facts about how 'see' is used.

It may seem that Tye's theory escapes this problem. Tye does not talk about veridical and illusory seeing himself, but one might provide an Tyeian analysis of these concepts that seems to allow for the relativity involved in veridical and illusory seeing, while also doing the work required of the notions of strong and weak seeing. This theorist might say that when the variations in  $x$ 's property values produce variations in  $S$ 's property values that are systematic,  $P$  sees veridically, but when these variations are not very systematic, then  $P$ 's seeing is illusory to some degree, and when the variations are not systematic at all,  $P$  is not seeing  $x$ .

This allows that an alien who has sensa with different property values than the values our sensa have can see  $x$  veridically, as long as the property values

of the alien's *sensa* vary systematically with variations in *x*'s property values. And it seems that on this account, veridical seeing will always be what I call strong seeing, and illusory seeing will always be what I call weak seeing.

However, this account of veridical and illusory seeing will not enable this theorist to explain the fact that we say that a normal human *P* suffers illusion (at least relative to us) when *P* wears inverting glasses, for on this theory, *P* is not suffering illusion *at all*, because the variations in *P*'s *sensum* caused by the variations in *x* are just as systematic as they are for a normal human *Q* who sees the same object without the inverting glasses. This account also fails to explain the fact that we can say that the aliens suffer illusion relative to us (although not relative to themselves).

The Tye can remedy these failings by bringing in some notion of relativity for illusion (and saying something like '*P* with the inverting glasses on, and the alien, suffer illusion relative to the normal way of seeing for humans'), because this is not consistent with the definition of illusion given by this theorist earlier. This definition was a non-relative definition, and so the Tye can hold both.

#### 12.iv. Hallucination

If *P* has a *sensum* *S* that provides no significant information about any physical object, then *P* does not see an object by having *S*, and so that part of *P*'s visual experience is non-perceptual. So the definition of a non-perceptual visual experience is:

(NPVE) *P* has a non-perceptual visual experience = df *P* has a visual *sensum* *S* and *P* does not see any object in having *S*.

I am allowing here that *P*'s visual experience can be perceptual in part and non-perceptual in part. If all of *P*'s *sensa* fail to provide significant information about an object, then *P*'s visual experience is wholly non-perceptual.

The *sensa* in a non-visual perceptual experience may be produced by a conscious act of will by *P*, or not. When the former is the case, then *P* is said

to be using *P*'s visual imagination. When the latter is the case, *P* is having an hallucination. The definition of an hallucination will therefore be:

(H) *P* has an hallucination = df (i) *P* has a visual sensum *S* and *P* sees no object in having *S*; (ii) *S* was not caused by a conscious act of will by *P*.<sup>7</sup>

The possible causes of the sensa produced in hallucinations will include unusual external conditions, drugs acting upon *P*, temporary or permanent damage to *P*'s perceptual system, unconscious processes in *P*, and direct electrical stimulation of *P*'s brain, optic nerve or retina.<sup>8</sup>

Note that on my theory of seeing, having an after-image, normally regarded as having an hallucination, will often constitute seeing *x*, if the after-image sensum provides significant information about *x*. This seeing will in most cases be weak, and will be illusory relative to the idea human perceiver and in normal Earth daylight circumstances.

Hallucination, like seeing, will be relative to the kind of perceiver *P* is considered as. As perceiver of kind *k*, *P* may not see any object by having *S*, because no perceiver of kind *k* could have sufficient determinate true beliefs about any object that caused *S*, on the basis of *S*. But considered as perceiver of kind *k'*, *P* may see *x* by having *S*, because a perceiver of kind *k'* could gain such true beliefs about *x* on the basis of *S*.

As I stated in s.10, there is no clear boundary between seeing and non-seeing, or seeing and hallucination, for there is no clear-cut point at which we

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7 (ii) allows that the property values of an hallucinatory sensum can be changed by conscious acts of *P*'s will without that sensum becoming non-hallucinatory. It is not clear, though, whether the sensum would be regarded as hallucinatory once *P* is able to make it go away by a conscious act of will. I think that on this matter the concept of hallucination is indeterminate.

8 Remember that to count as a visual sensum, the sensum does not have to be caused by a particular part of *P*'s brain. If *P*'s brain contains a 'visual stimulus' module that produces visual sensa as a result of the visual receptors being stimulated, and a 'mental image' module which produces visual sensa as a result of a conscious act of will by *P*, then the sensa in both cases can be visual, and the having of either can constitute seeing and the having of either may be non-perceptual.

can say that *S* provides enough significant information about *x* to *P* for *P* to be seeing *x*. The more significant information that *S* provides, the stronger is *P*'s seeing, and the less it provides, the weaker is *P*'s seeing. If *P*'s seeing becomes weak enough, the boundary between seeing and non-seeing is reached, but there is no clear-cut boundary here.



### 13. Seeing Things and Seeing That

#### 13.i. The Relation Between Seeing Things and Seeing That

My concern in this work so far has been with one way of talking about seeing and perceiving. In this way of talking, we talk about seeing things (as well as events or processes). The particular things I have been concerned with are physical objects and their properties. However, we also talk about seeing (and perceiving) *that* some state of affairs is the case, that is, we see that some proposition is true. An example is '*P* sees that the brick is red'. There is disagreement amongst philosophers of perception over whether 'seeing things' or 'seeing that' is more basic.

For *P* to see that *x* is *F*, where *F* is some property, it is necessary that *P* believe that *x* is *F*, on the basis of a visual experience. Thus, those like me who hold that seeing *x* does not require that *P* believe anything about *x* hold that 'seeing that' is not more basic than seeing things.<sup>1</sup> Those who hold that '*P* sees *x*' is analysed in terms of *P* having some belief about *x* having a property will hold that 'seeing that' is more basic.<sup>2</sup>

I hold that seeing things is more basic than seeing that for the following reason. Suppose *P* sees *x* via a distorting mirror without realizing that a mirror is involved. In such a case *P* may have no true beliefs about *x*'s relative position, distance away, shape or size. *x* may be white, but illuminated by red light so that it looks red, and so *P* has a false belief about *x*'s colour. In all, *P* may have no true beliefs about *x*, yet *P* still sees *x*, because a perceiver of *P*'s sort could conceivably gain true beliefs from *S*. (Even if we take belief about *x* to be capacity for selective behaviour towards *x*, *P* cannot be said to have any true beliefs about *x*, because *P* has no such capacity).<sup>3</sup> If *P* has no true beliefs about *x* when *P* sees *x*, seeing *x* cannot be analysed in terms of

1 Jackson also holds this position in [1977] pp.154-67.

2 This position is held by Armstrong in [1961] pp.105-10, 117-8 and in [1968] pp.209-11, 227-31, J. W. Roxbee-Cox in [1971] and John Searle in [1983].

3 Assuming we do not interpret 'capacity' so liberally that any visual experience caused by *x* counts as a belief about *x*.

seeing that  $x$  is  $F$ .

I also think that seeing that can be explained in terms of seeing things. This matter is very involved, and I do not have the space to discuss it.<sup>4</sup> I think that something like the analysis Jackson provides on p.164 of [1977] is right. He holds that ' $P$  sees that  $A$  is  $F$ ' (where  $A$  is any name or definite description of  $x$ , and  $F$  is a property term) is analysed as ' $P$  sees  $A$ ,  $A$  is  $F$ ,  $S$  is  $F$ , and  $P$  believes that  $A$  is  $A$ , that  $A$  is  $F$  and that  $P$  sees  $A$ '.

### 13.ii. Jackson's Argument

Jackson has his own argument to show that ' $P$  sees  $x$ ' cannot be analysed in terms of any statement of the form ' $P$  sees that  $A$  is  $F$ ', even allowing that ' $A$ ' can be any definite description or name of  $x$ . This is because, firstly,  $P$  can see  $x$  without there existing any name of  $x$ , and secondly, even though there is a definite description of  $x$ ,  $P$  can see  $x$  without knowing that definite description. So  $P$  can see  $x$  even though no statement of the form ' $P$  sees that  $A$  is  $F$ ' is true, no matter what name or definite description of  $x$  is substituted for  $A$ .<sup>5</sup>

Jackson uses the following example to support his claim that  $P$  can see  $x$  even though  $P$  knows no definite description of  $x$ . Suppose that  $P$  sees the tenth brick from  $P$ 's left in the fourth row from the top, in the wall opposite  $P$ .  $P$  can see this brick without knowing this (or any other) definite description of it, and so  $P$  does not believe that  $A$  is  $F$ , where  $A$  is any name or definite description of this brick, and thus  $P$  does not see that  $A$  is  $F$ .

I do not think this argument works, for it seems to me that  $P$  can have a belief about this brick even though  $P$  consciously does not know any name or definite description of it.  $P$  can display selective behaviour towards the brick in a way that entitles us to say that  $P$  believes that the tenth brick from  $P$ 's left in the fourth row from the top in the wall opposite  $P$  is, say, red. Thus  $P$  can be said to know a definite description of  $x$ , even though  $P$  does not consciously

<sup>4</sup> See Jackson's discussion in [1977], p.161-7.

<sup>5</sup> Jackson shows on pp.156-7 that the problem cannot be solved by allowing indefinite descriptions true of  $x$ .

know any such definite description. And *P* can be said to believe that the tenth brick from *P*'s left in the fourth row from the top in the wall opposite *P* is red, even though *P* does not consciously have any such belief.

(Sometimes in such cases *P* may consciously think 'that brick is red'. 'That brick' is the conscious 'shorthand' *P* uses for the definite description which *P* knows in a non-conscious way. Or perhaps we should say that it is linguistic 'shorthand' for some non-linguistic belief that *P* has about *x*, a belief which allows us to say that *P* knows that '*A* is *F*').

The same points apply to Jackson's other examples. He says that he can see the fifteenth-thousand person to leave the football ground, without seeing that the fifteenth-thousand person to leave the football ground is a Richmond supporter. This may be true, but this does not show that he does not know some definite description of this person. If he is capable of displaying selective behaviour towards this person, he can be said to know a definite description of this person, and to see that the person has some property.

Those, like Armstrong, who hold that 'seeing that' is more basic than 'seeing *x*' are not claiming that *P* necessarily has a conscious belief about every object that *P* sees, and this Jackson fails to consider.<sup>6</sup> What is required to defeat these theorists is my point, that even if we allow that beliefs about *x* do not have to be consciously entertained, *P* can see *x* when *P* has no beliefs, or no true beliefs, about *x*, and so *P* does not see that *A* is *F* even though *P* sees *x*.

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<sup>6</sup> I have already noted, though, that we cannot interpret 'capacity for selective behaviour towards *x*' too loosely, otherwise any effect that *x* has upon *P* counts as a belief about *x*.

## 14. Summary and Concluding Remarks

### 14.i. Summary of the Significant Information Theory

What the significant information theory holds is the following.

(See)  $P$  sees a physical object  $x$  = df  $P$  has a visual sensum  $S$  which provides significant information about  $x$  to  $P$ .

The explanation of how a sensum can provide significant information about a physical object is as follows.

(SI) A visual sensum  $S$  provides significant information about a physical object  $x$  to  $P$  = df (i) An event involving  $x$  causes  $P$  to have a visual experience of  $S$ ; ii) A perceiver of a kind that  $P$  belongs to,  $P^*$ , can have a sufficient number of determinate true beliefs, on the basis of  $S$ , in accordance with the 'one-key only' condition and the 'high frequency' condition, about the values of any of the following properties of  $x$ :  
 a) intrinsic properties of  $x$ , such as shape, size, mass, electric charge, solidity, density, physical colour (i.e. surface atomic structure), chemical composition; b) certain relative properties of  $x$ , namely distance away from  $P$ , or from  $P$ 's visual receptors, position relative to  $P$  or  $P$ 's visual receptors, and the following properties relative to any other object, including objects at past times, and including  $x$  at past times: shape, size, distance away, relative position, mass, electric charge, solidity and density.<sup>1</sup>

The 'one-key only' condition holds that of the true beliefs that  $P^*$  can have about  $x$  on the basis of  $S$ , the only ones which are relevant to the analysis of significant information are those beliefs about the range of possible property

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<sup>1</sup> I have spoken in this work of the significant information condition as separate from the causal condition, which it is, but because I hold that the notion of significant information requires that for  $S$  to provide significant information about  $x$ , there be a causal connection between  $x$  and  $S$ , there is a causal condition in (SI), and this means that no such condition is necessary in (See).

values that objects can have in such circumstances and still cause *S*.

The 'high frequency' condition holds that of these beliefs about the range of possible property values that objects can have in such circumstances and still cause *S*, the only ones which are relevant to the analysis of significant information are those beliefs about the range of possible property values that objects are very likely to have in such circumstances for some period of time in *P*'s future.

(Other qualifications and explanations of 'significant information' can be found, of course, in the body of this work).<sup>2</sup>

#### 14.ii. The Analysis of 'Seeing' and Epistemology

One might ask, how important for epistemology is it to get the right analysis of seeing? Do different analyses have different epistemological consequences? It might seem so, given that many people, under the influence of direct realism, hold that if *P* sees *x*, *P* thereby has sufficient grounds for knowing that *x* exists, whereas if *P* does not see *x*, but only some effect of *x*, then *P* does not necessarily have sufficient grounds for knowing *x* exists. This might be true if a direct realist theory like the MRTA were true. But if we reject the MRTA and are choosing between the various causal theories, the satisfaction theory and the resemblance theory, then I do not think this will hold, as the following considerations will show.

Consider *P* seeing Ted's reflection in the mirror when Ted is controlled by Bill, who is behind the mirror. I call this seeing Bill. Most of the other theorists do not. But whether or not *P* really does see Bill makes no difference to the grounds *P* has for believing in Bill's existence and for believing that Bill has such-and-such properties. The basic facts of the matter that can provide grounds

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<sup>2</sup> One question about seeing I have not yet resolved is whether there must be some limit on how quickly *P*\* must be able to gain true beliefs about *x*'s property values. Suppose *P* is wearing distorting glasses. Must *P*\* be able to work out what *x*'s properties are quickly enough to allow a perceiver of *P*'s sort to make responses to changes in *x* that are normal for the sort of perceiver *P* is? Or is *P*\* allowed to slowly work out what *x*'s properties must be using some complicated mathematical formula? I tend to think that there must be some limits on how quickly *P*\* must be able to gain the true beliefs, but I am not sure about this.

for these beliefs are already there. Where the boundaries of seeing are drawn, that is, how the concept of seeing is 'overlaid' over those facts does not change them.

In other words, to work out whether *P* sees Bill, we have to find out what *P*'s visual experience is like, whether *P*'s visual experience is caused by Bill, how it is caused by Bill, what kinds of perceivers *P* belongs to, and so on. But if we have all these facts, adding that 'therefore *P* sees Bill' or 'therefore *P* does not see Bill' does not change *P*'s epistemological situation in regards to Bill. 'Seeing' is not a fact in addition to the facts about causal connections and visual experiences and so on. *P* has the evidence *P* has, and whether or not *P* can also be said to see makes no difference to the evidence *P* has. So whether or not *P* sees *x* is of no epistemological importance.

(I am doubtful, then, about the observation-theory distinction. It seems to me that we see sub-atomic particles, if they exist, by seeing, for example, the tracks they leave on films, just as we see ordinary, supposedly non-theoretical objects, such as rocks, tables and humans. This is not to say, though, that we do not have stronger grounds for believing that rocks exist than believing the sub-atomic particles of modern physics exist).

If the MRTA were accepted, however, then the question of whether *P* sees *x* does seem to have epistemological significance, because the MRTA holds that a disagreement about whether *P* sees *x* is a disagreement about basic facts. If *P* sees *x*, the MRTA holds, an unanalysable relation exists between *P* and *x*, and in such a case, *P* has sufficient grounds for knowing that *x* exists, whereas if *P* does not see *x*, no such relation exists, and *P* does not necessarily have sufficient grounds for knowing that *x* exists.

However, I hold that *P* is not in any privileged epistemological position regarding *x* even if there is an unanalysable relation between *x* and *P*. This can be shown by making use of an argument Jackson uses to similar effect in [1977].<sup>3</sup> Suppose there exists this unanalysable relation between *x* and *P*, and *P* is therefore directly visually perceiving *x*. But for *P* to know that *x* exists, *P* has to know that *P* is directly perceiving *x*, that is, that the unanalysable relation between *x* and *P* exists, and that *P* is not hallucinating. But in this situation *P* is no better epistemological position to know that *P* is

<sup>3</sup> Jackson [1977] pp.147-51.

not hallucinating than *P* would be even if no such relation existed and *P* really was hallucinating. The fact that the unanalysable relation between *x* and *P* does exist does not mean that *P* therefore knows that it exists.

As Jackson says

[T]here is no *intrinsic* mark of the non-hallucinatory...there is no such thing as *observing* that an experience is veridical - one cannot (and does not) look for the special 'glow of the veridical' about one's experiences to establish that they derive from external objects.<sup>4</sup>

So even if the MRTA were true, *P* does not necessarily have sufficient grounds to know that *x* exists just because *P* sees *x*. Seeing is, I hold, irrelevant to epistemology.<sup>5</sup>

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<sup>4</sup> Jackson [1977] p.151. (Jackson's italics).

<sup>5</sup> Having a visual experience, however, may be relevant to epistemology, because visual experiences may be part of plausible grounds (although not necessarily certain grounds) for claiming knowledge of external physical objects, whereas whether we see these objects adds nothing to the epistemological grounds for believing in them that we will already have.

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### Abbreviations:

*AJP: Australasian Journal of Philosophy*

*Anal: Analysis*

*APQ: American Philosophical Quarterly*

*ASSupp: Aristotelian Society: Supplementary Volume*

*JPh: Journal of Philosophy*

*PAS: Proceedings of the Aristotelian Society*

*Phil: Philosophy*

*PhilRev: Philosophical Review*

*Phil St: Philosophical Studies*

*P&PR: Philosophy and Phenomenological Research*

*PQ: Philosophical Quarterly*

*RevM: Review of Metaphysics*

*Syn: Synthese*

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