Optical Idealism and the Languages of Depth in Descartes and Berkeley

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Depth appears between us and every being that we encounter.[1] Indeed, it is necessary that there be some relation that absents and disconnects us from other beings if we are ever to be present to and connected with beings that have their own identities. Mechanical causation, life, perception and cognition all depend on structures of connection and disconnection, and therefore must be constituted within a relational structure whose form is akin to depth. To the extent that living, perceiving and cognising beings constitute themselves, they are explicitly dependent on such relations of presence and absence, connection and disconnection, and for such beings this relational structure is thus inherently in question. The interrelation between our identities as living, perceiving, cognising, philosophising beings and the identity of other beings is thus manifest for us as an ontological issue in our experience of depth.[2]

It is precisely because such ontological issues are manifest in our experience of depth that I here explore the philosophy of Descartes and Berkeley through a critical study of their accounts of visual depth perception. My study traces philosophical-experiential struggles in which the phenomena of depth push and pull two philosophical perceivers, Descartes and Berkeley, toward two different sorts of idealism about the objects of vision and our relation to them, toward two different sorts of 'optical idealism.' I gather arguments from across each philosopher's corpus, synthesising a coherent account of visual depth perception that in my understanding accurately reflects the general drift of each philosopher's project. I present each account so as to mark the propulsive tensions inherent in each philosopher's critical relation to the fundamental question manifest in our experience of depth.

The fundamental question could be put in the following way: how is it possible that we experience objects as appearing outside of us or as different from us, if objects precisely make their appearance inside of us or in unity with us just in virtue of being experienced by us? For Descartes and Berkeley this question is interdependent with the question of how we experience objects as being at a determinate depth, at a particular distance.[3] Both philosophers appeal to the concept of language to take up these interdependent questions. In my studies I first show how Descartes's and Berkeley's differing fundamental convictions about the origin of our ideas lead to differing conceptions of a 'language of depth.' The main difference is that in Descartes's doctrine motions can cause ideas in us, whereas in Berkeley's doctrine only mind can cause ideas.[4] For Descartes, the language of depth therefore ends up being a causal code, whereas for Berkeley the language of depth is an arbitrary sign system whose meaning is caused by mind. But in both cases instituting a language of depth already idealises our interrelation to the object seen in depth. The second step in each of my studies traces the tensions that follow from this initial idealisation, to show how it demands a further idealisation with broader metaphysical implications. God must be an ideal guarantee of Descartes's

causal encoding, and God must naturalise the meaning of the arbitrary sign system of Berkeley's visual language. In both cases the human experience of depth devolves from an ideality found in God, beyond human experience.

In the conclusion I will suggest how the particular problems that appear within Descartes's and Berkeley's accounts of depth perception, insofar as these problems precipitate into their broader philosophical projects, mark complexities in the clear-cut doctrines that we sometimes mean to indicate when we deem Descartes a rationalist and Berkeley an empiricist. I will also show how these problems are rooted in a conception of depth experience that is common to Descartes and Berkeley, and suggest that we must shift away from this conception of depth experience if we are to get past the problems that appear in their accounts.

Descartes and the Encoding of Depth

The Conversion of the Visible into Motion and Thought

Descartes responds to the fundamental problem posed by the connections and disconnections manifest in our experience of depth by arguing that our ideas of things are different from what is in things themselves—that is, he deals with the problem by embracing it and idealising the connecting disconnection between our ideas and things. In the beginning of *The World*, he argues for this idealisation in the case of light, by comparing light to language. Just as words "bear no resemblance to the things they signify," nature could also have established "some sign which would make us have the sensation of light."[5] Even if nature in itself contains nothing like light, things in nature can be so organised as to produce signs in us that cause us to have ideas of light that refer back to things *qua* luminous. In the rest of *The World*, Descartes specifies how this 'sign system' works by showing how a system of determinate, lawful motions can cause ideas in us that correspond to everything that we sense in the world. Ultimately Descartes describes a "new world" that lies behind our ideas. In itself, this new world is nothing other than continuous uniform matter that is differentiated into things, properties and relations only by its motion, which motion is initiated and partly determined by the immanent activity of God.[6] Descartes thus disconnects the world as given in our ideas, through sensations, and the "new world" as it is in itself. By modelling this disconnection on a naturalised version of the relation between words and things, he re-connects ideas and things through a causal system. In this causal system light itself is moving matter, so the light that we experience is encoded as motion. Descartes's causal system is so transparent to our ideas of vision that in everyday experience we take our visual idea of the experienced world to be identical with things in the world, failing to see that the world in itself is the "new world" of motion. This is much the same, according to Descartes, as failing to notice that we are speaking in one language or another in everyday situations where language becomes transparent and unnoticed.[7]

Descartes's conception of light as motion is crucial to his later work, the *Optics*, which is my main concern here.[8] In the beginning of the *Optics*, Descartes declares that he treats light only to explain how its rays enter the eye, and he does this only in order to explain sight. He then posits three "comparisons," that is, models, for light, which are only supposed to

facilitate the reader's comprehension of light's behaviour. But these models conceive light as motion. The philosophical program articulated in *The World* thus pervades the roots of the account of vision in the *Optics*.

This is most important in Descartes's very first comparison, which compares light to a blind man's stick. A blind man can discern qualities of an object without the object changing the identity or structure of the stick as medium—no determinations of things as such travel through the stick, the stick just ***moves*** as a whole within a larger framework. To the blind man, the differences between mud, tree, rock, and so on, can be "nothing other than the various ways of moving the stick or resisting its movements"; the "resistance or movement of the bodies" is "the sole cause of the sensations he has of them." The blind man can 'see' these differences, but he 'sees' them through resistances that "are nothing like the ideas he forms of them [the bodies]." Likewise we can consider light to be a motion whose determinations are nothing like our ideas of colour, light or coloured bodies.[9] If the blind man can 'see' using motion, then the sighted man can too, and if the proximate cause of our vision is motion that is not in itself coloured, or lit, or luminous, or otherwise like the visible, then the ideas that we derive from motion would not be at all like the visible properties that are in things themselves.

Descartes's idealisation of the connection between our ideas and things is not just a positive move that claims that motion is sufficient to convey ideas of the luminous—there is a negative moment too, since Descartes argues that there are no ideas outside of us. Like the stick, the only thing that 'passes through' light is motion. There is no internal structure in light itself that ties the motion of one ray of light to another, there is no 'travelling' mediator internal to light that carries semblances of visible qualities from the object to the eye. Such an internal structure in light is not necessary, since signs need not "resemble the things they signify," as is shown by the case of words.[10] And there could not be any such internal structure in light, since light in itself is only motion, and since images and sensations are not 'out there' in the world, they are in the ideas of the mind only. By conceiving light as motion, Descartes eliminates the scholastic's intentional species "flitting through the air" from thing to mind,[11] and he eliminates any other theory that claims that the visible is a phenomenon that constitutes itself outside of us. Unlike the obscure apparatus of scholastic doctrine, which is repugnant to Descartes, moving matter is clear and distinct, it can be described mathematically with universally applicable laws, without requiring singular or particular internal principles to secure the identity of different things. God could create the "new world" in Descartes's mathematical form.[12]

On the one hand, this means that we can explain the fact that we experience things as being beyond us in space, without supposing that there are intelligible forms in things themselves that travel to us through space. In effect, the latter supposition puts our mind outside us in things, begging the question inherent in our experience of depth, which is that we are limited to one locus within space but can perceive things that are not identical with this locus. (Here we must remember that while the Cartesian mind is distinct from the body, it is united with the body and is thus limited to a location, even if this unity is problematic.) On the other hand, this means that we must eliminate ***all*** the intelligibility that could be intrinsic to motions that are exterior to us.

We see this elimination of intrinsic intelligibility in Descartes's description of the nerve fibres that mediate between the

eyes (which receive the motions of light) and the brain. The behaviour of nerve fibres is precisely homologous to that of light—they conduct nothing other than independent motions (fibres do not interfere with one another, just as light rays do not interfere with one another). Moreover, Descartes's arguments concerning nerve fibres are essentially the same as those used in the case of light; for example, Descartes again uses a comparison with the blind man to argue that in themselves the fibres do not contain images that are sensible—at most they contain intelligible signs of the sensible.[13]

Outside of the mind there are just independent motions, and there is nothing internal to motions that constitutes anything like an image, idea, form, and so on, of the object or its visible qualities. There is no sense in talking about resemblances between, for example, projections on the back of the eye and the visible, for such 'images' have no integrity, identity or internal constitution that would make them into images. Thus "the soul does not need to contemplate any images resembling the things which it perceives."[14] It is only through the constitutive work of soul that these independent motions are put together to become ideas of the visible and of the visible's qualities: "it is the soul which sees, and not the eye."[15]

The Encoding of Depth, and Disconnections in Descartes's Account

Descartes's analysis idealises the connecting disconnection between mind and things, by turning vision into a thought that is caused by a multiplicity of motions. But these motions are not in themselves visible, precisely because they are the precondition for visibility. For just this reason, Descartes's analysis must presuppose an intelligible world of motion that has determinate structures that mediate optical motion to the eyes, nerves and brain. If Descartes's model of light is to explain how objects cause vision, then the seen, the seer, the seer's eye, and so on, must be embedded in a space that has a determinate geometry and optics. If motions in the eye are to provide the soul with determinate signs ***of*** objects then there must be an already extant, self-sufficient, determinate and uniform "geometry" of the nerve fibres to connect motion to the eye and the brain. Most important, if objects are the cause of our seeing things and if our ideas of objects are true—if vision is ***of*** the world—then the motions of the light and nerve fibres, and the soul's decoding of motion in the brain, must already be guaranteed to allow us to both successfully constitute ideas of objects and have these ideas be true to their objects, even if the being of these ideas is nothing like the being of their objects. There must be a guarantee that the encoding that connects ideas to objects is true to the world.

Descartes seeks this sort of guarantee in the *Meditations*, namely, a guarantee that thought can be thought ***of*** the world and that ideas caused in us are non-deceptive in letting us get a true idea of the world. In the *Meditations*, Descartes articulates this guarantee in terms of judgement, and tries to secure it through an argument whose first step necessarily has a reflexive transcendental form, and whose subsequent steps depend on the discovery of the idea of a supremely perfect and hence existent God within thought's content.

In the *Optics*, Descartes does not explicitly seek such a guarantee for sight, but it is clear that it must be presumed, for vision itself cannot guarantee, let alone see, the "new world" behind Descartes's theory of vision. God is really the only one with a comprehensive 'outside view' of this new world and the perceiver within it. So all of

the structures in this "new world"—its space, its motion, and so on—remain ideal to human thought. This becomes an issue in Descartes's account of distance perception.

Descartes's triangulation account[16] of distance perception depends on a point made in his account of the visual perception of position, namely, that the disposition of the parts of the body relative to one another (such as the direction of the eye or head) is registered by motions in the brain. Given knowledge of the disposition of body parts, the soul can know the position of a seen object by locating it on straight lines that "we can imagine to be drawn" by an inferential process that amounts to following the path of light rays back from the eye to the object.[17] Distance perception is just a triangulation based on the same operation: given the distance along the baseline between the two eyes, and the angle between the optic axes of the eyes and the baseline (the vergence angle), the soul can know "as if by a natural geometry" the distance between the object and the baseline. Descartes likens this to a blind man judging the distance between himself and an object given two sticks, knowledge of the distance between his two hands, knowledge of the angles that the sticks make, and so on.[18] Descartes even notes that one eye is sufficient for this triangulation, if the eye's position is changed.[19]

This account of distance perception marks at least two distinguishable circularities in Descartes's argument. The first circularity spins itself out around an epistemological skepticism. If knowing the space in which objects are located (which I call "world-space") depends on seeing distance, but seeing distance in world-space requires an operation of thought that must, as such, be carried out on a space that is only thought (which I call "thought-space") and that is ideally disconnected from world-space, then we must already know that operations in thought-space can yield results true to world-space. But to know this explicitly, we would already need to know the characteristics of world-space that make it match up with thought-space. In order to know world-space, one already has to know world-space.

Descartes cannot get out of this circularity by saying that some sense other than sight provides us with a more fundamental knowledge of world-space—precisely because of the drift of Descartes's program, all senses are just motions that have been booted into the realm of perception by thought, so all senses yield knowledge of distance only through thought. Knowledge of distance in all cases is the result of a transition from motions determinate within world-space, to thoughts determinate within thought-space. The determinacy of this transition is ***external*** to both human thought and the world of motions, it is somehow 'between' them. Like Archimedes, Descartes would need a standpoint that is out of this world and beyond human intellect if he is to carry off his project and show how we can see the depths of the world, but there is no such standpoint for a human intellect. So Descartes has to presume that thought-space does indeed map onto world-space, but there is no intellectual intuition or idea from sense that could possibly confirm this. The object of such an idea is in itself both beyond the ken and the experiential reach of human being, it transcends us. This idea could only be in God, it is external to us, it is approached only through the reflections of the *Meditations* and only insofar as our ideas of geometry and optics are clear and distinct.

The second circularity is more down to earth but has a similar structure. In order to perceive the distance from the seer to the object in the world, one already has to know other distances in the world that are required

for triangulation, namely, the distance between two eyes or the distance between two locations of one eye, as well as the vergence angle of the eyes. I call these distances "grounding distances," since they ground the triangulation procedure.[20] If thought infers the determinacy of depth from signs given it, yet the given signs only have their determinacy in relation to grounding distances, then thought's inference must be grounded on direct and immediate signs of grounding distances. If thought had to infer grounding distances in the same way that it has to infer the distance to the object, then there would be an endless regress.

Descartes cannot rid himself of this circularity by saying that another sense can provide thought with grounding distances for vision. We could try touching our eyes to measure the baseline between them, but given Descartes's treatment of the senses, tactile distance would equally be the result of an inference that recovers a distance that depends on yet other grounding distances—in this case the relative angular disposition at all the joints in the body and the length of the joints, which length must again be measured, somehow. Instead of getting into these endless and somewhat absurd circles, Descartes tacitly and quite sensibly presumes that we ***just know*** these grounding distances, because our body and nervous system are so configured as to provide us with this knowledge, and we cannot ask any further questions. The significant point here is that the fundamental structures of body through which alone we know the world must therefore be logically and ideally external to the world of our experience. That is to say, even though we can take the measure of our bodies as things, this measure depends on a prior knowledge of grounding distances, and these grounding distances must be 'known' independently of our knowledge of the world. Consequently, grounding distances are not distances in the world, they do not really belong to the body as a thing. The body has a peculiar ideality, it has measures that must be external to the metrical space of the perceived world, since the body is the sole ground of our perceiving the world and its measures. But if perception of distance is perception of a distance in the world, if it is a distance inferred by the soul through motions in the world that are conducted through the system of objects, light, body, eyes, refraction, nerve fibres and the brain, then the ideal body must also have a determinate, albeit ideal, relation to the worldly body that can become the object of our perception or of others's perceptions and that can be measured as a thing. The peculiarly ideal body is doubled.

Descartes's ways of avoiding the above circularities, then, oblige him to tacitly posit an already determined ideal body that is disconnected from an already determined world-space, space as it is in itself; and these again are disconnected from thought-space.[21] On a methodological and metaphysical level, these disconnections beg the question of the connections between these different spaces, which connections are necessary if we are to perceive things in depth. Within the framework of his larger philosophical project, Descartes's strategy for connecting the different spaces amounts to digging into intellect and being, and retrieving a core of intelligibility and clarity that unites these different spaces in light of God. Briefly, the mathematical intelligibility of the motion that determines optical behaviour and "natural geometry" is in a certain sense the apparent form of the intelligible connection between world-space and thought-space, between being and thinking; the combination of the self-clarifying thought which is the *cogito* and the idea of God discovered within this thought are the opening through which

thought eventually discovers and grounds its intelligible linkage to being.

These spaces, their structure, their content and their connection, therefore, are not in themselves ideal for us (even if they may be ideal in themselves for God). They are only ideal and thinkable when they have been re-constituted ***by*** human thought and ***for*** human thought, and they can be re-constituted in this way only because God has already set up the world so that it encodes signs that cause us to decode just the right ideas about the world. The root of the ideality of space is ultimately alien to human thought. Descartes argues that we can have ideas of things other than ourselves, things in depth, because our ideas are disconnected from things in the way that words are disconnected from things meant. But Descartes insists that the connection between 'visual words' and things in depth is mediated by an encoding natural geometry that is concretised in motions. This means that each word in his language of depth depends on a doubling: each word arises in a system of motions that has value both as an ideal measure in a calculative system internal to mind, and as a stretch of matter or motion in a natural world that is not itself ideal (for human mind). The encoding connection that bridges this doubling between idea and nature is precisely excluded from our knowing, since it grounds our knowing. To inspect the basis of the encoding language, we would already need to be able to interpret this language, to see things in depth; and we would have to be able to turn this language of depth onto itself, to see how thought-space gibes with world-space. But turning this language of depth onto its encoding mechanism does not break us out of the language of depth, it just gives us further words of the language, not the things themselves. Descartes cannot use the language of depth to get at its own roots any more than he can use a lens to magnify its own surface, unless he reflects the lens in a mirror—but this requires a pure, ideal reflection external to the causal language of depth, a *cogito* beyond perception. Descartes's encoding language of depth, which naturalises the sign-signified relation in a causal system, depends on an ideality that doubles space and the body, an ideality that can never present itself in perception. As we shall see, Berkeley attacks this doubling and its consequences by banishing external geometry and other 'natural' non-mindful terms from his account, thus internalising all significance within the words of his language of depth—but he too will have to naturalise his language of depth.

Berkeley's Inwardness and the Visual Language of Outness

Visual Language and the Inwardness of Depth

In the beginning of the *Essay Towards a New Theory of Vision* (hereafter, *NTV*) Berkeley makes the famous claim that "distance, of itself and immediately, cannot be seen." This is because "distance being a line directed endwise to the eye, it projects only one point in the fund [i.e., retina] of the eye, which point remains invariably the same whether the distance be longer or shorter."[22] Distance must therefore be perceived by means of some other idea that is an immediate idea of sense (i.e., a sensation).[23] This hints at two doctrines that fundamentally shape Berkeley's entire account—that all ideas must originate in ideas immediately perceived, and that distance cannot be immediately perceived.[24] Already this embeds distance and depth within ideas and disconnects them from a non-ideal realm. Berkeley's task in *NTV* is

to identify the immediate ideas of sense that ***do*** allow us to see distance, and to describe the connections between these ideas and ideas of distance.

Berkeley divides distance perception into two cases, long range and short range. In long range distance perception ideas such as the faintness of the target object can tell us the distance between ourselves and the target. But Berkeley claims that only experience can teach us the connection between ideas such as faintness and ideas of distance. Nothing outside mind could cause us to make this connection.[25]

Likewise, in short range distance perception there is no necessary connection between immediate ideas and ideas of distance. But the argument in this case is played out on quite different ground. In long range distance perception, there is nothing internal to ideas such as faintness that could establish its connection to ideas of distance. When looking at near objects, however, the connection between distance and determinations of the eyes such as their vergence angle seems to be a causal connection explained by the laws of optics, geometry, and so on, that is, by laws external to experience. As we have seen, this is Descartes's doctrine.

In *NTV* Berkeley begins to make his case against this doctrine through several empirical criticisms of Cartesian accounts. Against the Cartesian triangulation account, Berkeley argues that we have no immediate experience of the vergence angle of the eyes.[26] Similarly, we are not conscious of computing distance through a triangulation procedure.[27] So the triangulation account does not accurately reflect our experience of distance perception. My criticism of Descartes's account showed that even if we could know the distances that ground triangulation, these distances would have to be ideal with respect to us, and likewise the geometry and calculation that let us judge the distance. Berkeley fences off this criticism entirely by confining his explanation all and only to experience—no ideal posits external to mind can figure in his account. But precisely because this fencing off depends on facts, it is not fatal—in principle it is possible for us to discover some ***other*** immediate idea that is necessarily connected to distance, or for us to conduct operations on ideas without knowing that we are conducting them.[28] Berkeley, however, takes his factual criticisms a step further and joins them with the concept of a signifying connection in order to reform Cartesian accounts.

Let me explain signifying connections. Using the example of the redness of a blush on the face of a man who is ashamed, Berkeley argues that we cannot immediately perceive that the man is ashamed. Redness in the face is not identical to shame—redness could also signify anger or a disease.[29] There is no necessary connection between the two such that we could infer shame from the idea of redness itself without reference to our experience. Even so, this particular way of turning red in fact always accompanies shame. So once we have learnt this connection from experience, "no sooner shall he behold that color to arise in the face of another but it brings into his mind the idea of that passion which has been observed to accompany it."[30] Strong connections between ideas can be based on a signification taught by experience, yet the connections need not be necessary. I call such connections signifying connections, and the idea that signifies another idea (for example, the redness) a signifying idea.

We are now prepared to follow the Bishop's reform of the Cartesian account. Berkeley replaces the immediate idea of the vergence angle, which we do not in fact experience, with "the sensation arising from the turn of the eyes," which is "immediately perceived."[31] In the Cartesian account the

vergence angle is a measure embedded within a geometry, so the angle necessarily connects to the distance of the object. The turn of the eyes is just an immediate sensation that has no internal connection to any other idea, so the connection between it and distance ***must*** be a signifying connection.

In a discussion of another Cartesian account, one that claims that at close range distance is inversely proportional to the divergence of light rays entering one pupil, Berkeley gives a cognate criticism: we experience neither the divergence of light rays nor a calculation based on this divergence. His reform is also cognate: what we do experience is a blurredness (confusion) correlate with divergence, yet there is no necessary internal connection between blurredness and distance. But Berkeley adds a bit more. When we look at objects through concave mirrors or bi-convex lenses the inverse proportionality between ***divergence*** and the ***apparent*** distance of the object does not necessarily hold, whereas an inverse proportion between ***blurredness*** and the ***apparent*** distance does hold. However, in the case of looking through concave mirrors or bi-convex lenses, the usual relation between ***blurredness*** and the ***actual*** distance of the object is reversed—things can look blurrier when they are actually moved away from us, even if they appear to be looming toward us. Berkeley likens this to encountering a foreigner "who uses the same words with the English, but in a direct contrary signification."[32] Signifying connections, however, can accommodate this reversal of meaning.

The above criticisms, though, are still empirical. A critic could argue that while nothing internal to the idea of the turn of the eyes connects it to distance, this idea is just another name for the vergence angle of the eyes, and likewise blurredness is just another name for divergence. So really there are necessary connections here, and one only need take account of the optical situation of the eye in order to re-establish these necessary connections, even when the eye is looking through lenses. Or, the critic could say that if our eyes did not turn a certain way ***because*** a certain vergence angle is required if they are to point toward the object, then the turn of the eyes could tell us nothing about distance. If Berkeley denies this causal relation he will get into a circle, says the critic: if our eyes somehow signify the distance of the object on their own, then Berkeley will not be able to tell us what distance is in the first place, such that it can be connected with the turn of the eyes—distance would have to be intrinsic within our ideas in some way, rather than being 'out there,' which is absurd. But Berkeley's argument precisely leads him to claim that distance is intrinsic within our ideas.

An empirical, positive argument, however critical, cannot secure Berkeley's claim that no system of external or necessary connections suffices to explain our experience of distance. For Berkeley, it is ultimately repugnant and impossible that any immediate idea on its own could cause us to experience things as outer. We can sometimes experience vision as presenting us with a flattened experience (as the painter seemingly does). Nothing in immediate ideas and nothing outside mind could ***cause*** these ideas to be outer, they are just ideas—we add outness. This seems to be the sort of experiential meaning that ultimately lies behind Berkeley's 'point in the fund of the eye argument.'[33] But the critic of Berkeley can always add empirical detail, positing further layers behind experience, in order to rebuild necessary connections rooted in structures external to mind, which necessary connections can re-establish Cartesian accounts or show that "outness" is caused in

us. Here we come to a problem with the method of the *NTV*. To head off his fact minded critic, Berkeley needs to make a metaphysical argument that disconnects experience from external structures once and for all. Berkeley's study of distance in the *NTV* therefore demands and anticipates the sort of metaphysical position articulated in *A Treatise Concerning the Principles of Human Knowledge* (hereafter *Principles*). It also nicely illustrates the inherent tension of empiricism: positive empirical claims cannot suffice to defend empiricism as a philosophical position, so empiricism always conceals a certain idealism, a negative moment, at its core.

Let me therefore make good on the argument of the *NTV* by appealing to a doctrine established in the later *Principles*, namely, that there can be no necessary connections between any ideas. Berkeley argues for his doctrine in the following way. When we attend to our ideas, we find no power or activity within them. As passive, an idea has no power to cause itself or any other idea to exist, and ideas thus have no power to cause themselves or cause their connections to other ideas. Instead, each idea is caused to be and is connected to other ideas by a cause or power outside it. Berkeley calls the outside cause "mind" or "spirit."[34]

Thus there cannot be any internal or necessary connections between ideas. Moreover, the human mind does not experience itself as establishing the configuration and sequence of immediate ideas of sense. Instead, it apprehends that certain ideas always accompany one another, just as shame always accompanies blushing. Mind thus learns the signifying connections between ideas in the same way that mind learns a new ***language***. We have already seen one case in which Berkeley explicitly compares vision to language, and it is not difficult to find other instances in which this comparison is explicit, thematic and central. In the *Theory of Vision or Visual Language Vindicated and Explained* (hereafter *VL*), which is written after *Principles*, Berkeley puts the doctrine of the *Principles* in the following way: "Ideas, which are observed to be connected together are vulgarly considered under the relation of cause and effect, whereas, in strict and philosophic truth, they are only related as sign to the thing signified."[35] Language, then, replaces causality and necessity. Berkeley begins his argument in *VL* by writing that: "I shall therefore now begin with that conclusion, that *vision is the language of the Author of nature*, from thence deducing theorems and solutions of phenomena, and explaining the nature of visible things, and the visive faculty."[36] Descartes disconnects the being of ideas from the being of things while retaining an encoding causal connection between things and ideas—connections are made outside mind. Berkeley internalises ideas of visual distance and depth within mind, and the connections between ideas are thus not external to mind but internal to mind, and their significance stems from experience, not causality. Ideas of distance are not caused within us in virtue of a natural geometry, but we learn that certain immediate ideas signify the idea of distance.

The Problem of Outness

Berkeley's general approach leads to a number of problems.

The first problem concerns the ideas that let us see distance. Above, I discussed the turn of the eyes and the blurredness of the image. These signifying ideas must stem from immediate ideas of sense and must not make reference to objects in depth—a signifying idea must be ***prior*** to the mediate idea of the distance that it signifies. But the turn of the eyes is really "the turn of the

eyes ***toward*** the object" and confusion is really "confusion ***of*** the image ***of*** the object." The turn of the eyes and the confusion of the image are in this sense ***posterior*** to the idea of the distant object, and signifying ideas are thus mediated by the idea that they signify. If we are to see blurredness, for example, our eyes must latch onto an object outside us that has sharp boundaries. But it is not clear how we can distinguish between blurredness due to distance, the medium, or the object itself (for example, when looking through a foggy window or at a blurry photograph), unless our vision is mediated by an idea of the distant object.[37] There seems to be a circle here. Berkeley's account, though, is very effective at dealing with this circularity, because we are not to bother asking ***why*** or ***how*** a signifying idea signifies an idea of distance. The fact ***that*** a signifying idea does accompany an idea of distance is sufficient to establish the signifying connection. In the end, experience is to sort out this distinction, and in the first instance we do not have to know it.[38]

The moment of idealism which makes all connections between ideas a matter of fact thus dissolves certain empirical criticisms. But the very doctrine that gives this idealism its power—the doctrine that ideas cannot cause their connection to other ideas—leads to a problem with respect to distance. If we cannot experience distance directly by sight, we must experience it in some other way. But if no one immediate idea can on its own connect to another idea, how do we experience distance, which in its very nature would seem to be a relation between ideas?

In the *NTV*, Berkeley claims that visual ideas that signify distance signify what we can ***anticipate touching*** after having moved our bodies "a certain distance, to be measured by the motion of [our] body, which is perceivable by touch."[39] It is true that we ***think*** that we see things at a distance, but "ideas of space, outness and things placed at a distance are not, strictly speaking, the object of sight; they are not otherwise perceived by the eye than by the ear." We do not say that we hear distance, but that hearing suggests to us the distance of a thing; likewise, we should not say that we see distance.[40] Thus, "ideas of space, outness and things placed at a distance are not, strictly speaking, the object of sight"—ideas of space are ***signified*** by objects of sight.[41] But it is evident that Berkeley really means that objects of sight signify anticipated tangible distance. So we must ask whether ideas of space, outness and things at a distance can be the object of the sense of touch, for if they cannot be, then we would have to defer explanation once again.

In the *NTV*, tangible distance has a special privilege—it can be constituted without mind. In *NTV* §45, Berkeley says that by a tangible idea he means an immediate object of sense, and we have seen that it can be measured off by the body. Berkeley also writes that for a blind man who is later made to see, "all those things which, in respect of each other, would by him be thought higher or lower must be such as were conceived to exist without his mind, in the ambient space."[42] In *NTV*, then, Berkeley would seem to conceive tangible distance as a measure of a domain that exists outside mind.

In the *Principles*, however, Berkeley suggests that tangible distance too is nothing without mind. In a reply to objections by those who claim that there are things that exist outside the mind, Berkeley reiterates the *NTV*'s doctrine that outness is not the object of sight, and just after that he claims that it was a "vulgar" but pragmatic error on his part in the *NTV* to suggest that tangibles exist without mind. We do not touch distance, but our experience of touch

signifies the further touching that we can anticipate, and ***this anticipatory structure is all that we mean by distance***. Berkeley, I believe, would have to say: it may be that I have an immediate experience of the stretch of my arm, but this in itself could not be an idea of distance, just as the turn of the eyes is not immediately an idea of distance—the stretch of the arm itself signifies what I can anticipate touching by moving my arm, it signifies relationships between tangibles felt by my hand. ***Distance is thus an object of the mind, not sense***, precisely because distance is anticipatory. The connection and disconnection between myself and my object, which is at the core of distance, is not rooted in external mediating structures that separate my being from that of my object, yet connect me to it causally, as in Descartes's account. Instead, according to Berkeley, distance is all and only an anticipatory—that is, ***temporal***—connection within mind, a connection and disconnection between the ideas given in visual language, and thus it depends on our ability to learn the signifying connections of this language. Distance, we could say, is given by a ***power*** of mind, it is not a structure outside of us that is conveyed to mind by an external causality.

This means that we must have the power to organise immediate ideas of sense into a structure, such that certain ideas go together in anticipating others. But this organisation of immediate ideas cannot depend on mediate ideas of distance, since it is precisely supposed to explain the experiential origin of mediate ideas of distance. At some point we must be given ideas independent of other ideas, which nonetheless lead to ideas of distance. Mind learns that certain ideas signify other ideas only because these ideas always accompany one another, and not because of some internal connection that becomes available upon inspection of the less immediate idea. At some point, then, mind must have the power to make a spontaneous shift from having a disconnected experience of independent ideas, to having an idea of a connection between them. The problem, then, is how connections between immediate ideas are originally formed. More precisely, the problem is how, without relying on ideas that in fact seem to follow from such connections, such connections get put together for the first time as ***relevant, meaningful connections*** that make future experience comprehensible and regular.[43] I call such connections regular connections. We must already be able to discover regular connections between ideas if we are to learn the signifying connections that will let us "regulate our actions, in order to attain those things that are necessary to the preservation and well-being of our bodies," which is what visual language is supposed to let us do.[44]

In *Alciphron*, in a discussion of the infamous man born blind who is made to see, Berkeley takes up a more limited case of a first encounter with the world of experience. Berkeley likens this to a person encountering English for the first time.[45] In such cases humans have the power to learn visual language or English through repetition, because the subject already has ideas of the signifieds and there is some other resource (a language speaker or a regular repeated experience) that can aid the subject in connecting the new signifiers (the English words, the objects of sight) with the old signifieds (men and trees referred to by speech, or felt by touch). The resource extends experience into a new language by taking advantage of regular connections between ideas already available to the subject. But I want to take seriously Berkeley's claim that ideas and connections between ideas come from experience. There must be some point at which we individually have no experience of connections between

immediate ideas. To extend Berkeley's thought experiment about the blind man made to see, we are all at first blind to every dimension of experience and are just presented with a mass of immediate ideas that have no order. It looks as if there is no element within this unconnected mass of immediate ideas that could seed the formation of a network of regular connections. Just as Descartes removes meaningful form as such from the world outside mind, so that form must be ***judged*** by the mind, Berkeley removes meaningful form from immediate experience and makes it a ***result constituted*** by the mind's power of forming signifying connections. But what can give experience a meaningful form in the first place, prior to the mind's experience, such that the mind's power is not misguided?

The power of the human mind will not suffice. Prior to experience, the human mind has no way of discerning regular connections between immediate ideas, and since ideas have no internal connection to one another, mind can only form connections between ideas on the basis of past experience. Without prior experience the human mind has no ground for choosing one particular connection between co-present ideas as being more or less significant or regular than any other connection, unless it has an inbuilt disposition to connect ideas in some particular non-arbitrary fashion. But the latter would imply that the human mind has innate ideas that do not originate in sense, which would contradict Berkeley's doctrines. So the ability to form regular connections must depend on an active cause other than the human mind. But according to Berkeley's doctrine in the *Principles* there is no independently subsisting matter that can act in this way, and the cause of such connections could only be another ***mind or spirit***.

In fact, for Berkeley it is the activity of a mind other than the human mind, namely the activity of God's mind, that gives immediate ideas an internal organisation, at least in the case of vision, to which I restrict myself in what follows. God's active role in immediate ideas takes the form of ***God's authorship of the visual language of nature***. We have already seen that the immediate ideas of sight constitute a universal language of the Author of nature. In *Alciphron*, Alciphron pursues the question of the origin of what I call regular connections of ideas by asking: "Besides, if vision be only a language speaking to the eyes, it may be asked, when did men learn this language?," and moreover, "will any man say he has spent time or been at pains to learn this language of vision?" Euphranor's answer invokes God's language:

> If we have been all practising this language, ever since our first entrance into the world: if the Author of nature constantly speaks to the eyes of all mankind, even in their earliest infancy, whenever the eyes are open in the light, whether alone or in company: it doth not seem to me at all strange, that men should not be aware they had ever learned a language, begun so early, and practised so constantly as this of vision. (*Alciphron*, Fourth Dialogue, §11)

Our visual experience is ordered as a language by the Author of nature, by a mind other than our own, and it has been ordered by this mind ever since our first entrance into the world.

Berkeley's invocation of God's visual language suggests how our visual experience can be organised from within. But this still does not explain how the first signifier encountered becomes comprehensible if we do not already know what the signifier signifies or even that it is significant. In the end, Berkeley must say that the signifiers of the visual language of the Author of nature show their own significance and thus point to their own

coherence as a regularly connected set of immediate ideas. This is suggested by Berkeley's claim that visual language awakens the mind and deserves its utmost attention because it is learned with little pains, expresses the differences between things clearly and aptly, and "instructs with such facility, and dispatch, by one glance of the eye conveying a greater variety of advices, and a more distinct knowledge of things, than could be got by a discourse of several hours."[46] In a human language new words have to be explained to us, and we engage in long discourses concerning the meaning of words that we already know, but there is something immediately self-evident about God's visual language. Its meaning can be revealed in a glance. Moreover, God's visual language is fixed and immutable, which is why the idea of a visible square always suggests and connects with the same tangible figure "in Europe as it does in America."[47]

God's visual language, unlike human language, has a self-evidence to it, a possibility of explicating itself. I would argue that (for Berkeley) it is only because visual language has this self-explicability and is immutable and always present that we can both learn about the significance of ideas of sight from within experience, and have the power to build correlations between sight and the other senses. But it is crucial to note that for Berkeley this does not mean that the signifiers immediately contain within themselves their signified. God's visual language is still a language, with a ***conventional*** relation between the sign and the signified. The significance of immediate ideas cannot rest in things themselves, in a non-arbitrary causal structure, as in the case of Descartes's natural geometry—if this were the case, then external subsistent matter would cause the meaning of things, subverting Berkeley's entire project. The significance of things rests in the convention of the language that is formed by immediate ideas. Yet Berkeley argues that the convention of God's language is ***arbitrary*** and ***natural***:

> A great number of arbitrary signs, various and apposite, do constitute a language. If such arbitrary connection be instituted by men, it is an artificial language; if by the Author of nature, it is a natural language. . . . A connection established by the Author of nature, in the ordinary course of things, may surely be called natural, as that made by men will be called artificial. And yet this does not hinder but the one may be as arbitrary as the other. (*VL* §40)

This tension between ***nature*** and ***arbitrariness*** is the ultimate contradiction beating at the heart of Berkeley's account. To avoid skepticism Berkeley severs all necessary connections between ideas and all causal connections between mind and anything other than mind. Descartes's initial skepticism is articulated and overcome with respect to his "new world" of moving matter—our ideas are truly ***about*** the "new world" because of its natural causal structure, even if the being of our ideas is nothing like the being of this world. But because there is a difference between ideas and their object, there is a possibility of error, except that God has encoded the relation between matter and our ideas through the causal system of the world, optics, body and mind—through natural geometry—in just the right way. Berkeley trumps skepticism by doing away with the whole framework that renders it coherent, by turning mind inward into its own territory. Relations between ideas must be arbitrary in the sense that they have no necessary external standard. But in trying to rid himself of skepticism by turning inward, Berkeley must hold fast to the opposite of skepticism, to the claim that there is a comprehensibly ordered experience that can render itself coherent and true. There still must be a natural order to ideas. But the human mind does not have the power to

organise its own network of ideas from the ground up, else it would have to rely on innate ideas, an outside standard and another inroad for skepticism. Yet there still must be a source for the natural organisation of experience—an *a priori* coiled in the heart of experience. Some other mind—God's mind—must come into the mix and sort experience out. So for Berkeley, experience of depth requires a connection to God's mind, over against the human mind. Distance is not due solely to the power of the human mind, and the true object of distance perception is God *qua* author of nature.

The tension between nature and arbitrariness has important implications for Berkeley's account of distance. While "outness," depth and distance are not to be located in an extended matter or absolute space outside human mind, "outness" and distance do relate human mind to God's natural ordering of the content of experience. Distance, then, has a double structure for Berkeley too. Distance is an anticipation based on human experience, it is rooted in the power of human mind to connect ideas in disconnection from any material cause; but the possibility of this anticipatory system and power depends on the natural structure of ideas that is given to human mind by God; thus our experience of distance connects us with an ideal structure that is both connected and disconnected from us. A similar doubling and relation to an ideal structure would hold for space, although I shall not make the argument here.[48]

The Ideality of Being In Space

I would now like to give a compressed 'phenomenological portrait' of the Cartesian and Berkeleian accounts, emphasising the way that conceptions of depth phenomena and conceptions of our optical relations to things lead each account to an idealism about depth and space.

The Cartesian account could be portrayed as follows. My experience of depth perception entails that I experience space as an unshakeably pervasive structure that undergirds the very possibility of there being things that are distinguishable from me. But space then undergirds my possibility of being, so I am a being in space too. Since I am ***in*** space, I can never be present to space as a whole, I can only directly experience the locus of points occupied by my body. But this is just to say that there is a determinate space beyond me that I do not directly experience. While I cannot directly experience space as such, since I cannot be immediately connected with something that precisely exceeds me, all things are like my body in having a determinate location and way of being within the determinate structure of space. So there is a determinate connection between my sensory surfaces and things in space. For example, light travels in a determinate manner through space toward my eyes. In the right circumstances I can therefore ***infer*** the spatial determinations of things other than me by the sensory effects that they cause in my body, through the connecting disconnection of light. But my experience cannot escape this inferential process to directly experience the 'outside' view that would secure this inference. I am ***in*** space like other things are in space, and yet I have ideas of things at a distance from me, which ideas are nothing like things themselves. But this just means that my natural, causal body and the natural, causal language of depth must be shadowed by ideal doubles that guarantee that the encoding language of depth and my decoding body are capable of yielding a veridical experience of depth. The ideality that supports the causal language of depth

recedes behind experience, because it is presupposed by the experience of depth.

The same fundamental phenomenon motivates the Berkeleian account, but leads to quite a different result. It is true that I cannot experience space as a whole, since I am ***in*** space. But this is not because of the material limitation that I cannot make immediate contact with material beyond me, it is because my experience consists in immediate ideas that are disconnected from one another and disconnected from anything else. To say that I am ***in*** space and have an experience of depth, is to say that I am related to ideas that have a unity beyond me. But the immediate ideas I am given in experience have no internal relational structure of their own. The relational structure in virtue of which I am ***in*** space and related to things in depth must be due to my power of connecting ideas, and to this extent it is based in arbitrary relational possibilities that are given to my mind. But insofar as my experience is naturally comprehensible and the space that I experience in fact exceeds me, this relational structure cannot be arbitrary and cannot originate in my power alone. It must be due to the power of God, in virtue of whom this relational structure is already latent within possibilities given me in experience. Here too we find an ideality, namely, that of the linguistic structure of ideas.

The Cartesian and Berkeleian accounts both interpret the fundamental experience of depth perception as indicating that we are ***in*** space. With the preposition "in" I mean to mark a certain insularity and ideality. We are present to a space from which we are also fundamentally absent, since space in its very presence exceeds us in such a way that our ideas of space can only connect with space as words connect with things. To be specific, the body with which the Cartesian "I" is united is present as extended matter in space, but the Cartesian "I" who perceives through this body is disconnected from this material space and thus depends for perception on its ideal unity with the ideal materiality of the body and this body's ideal relation to Descartes's "new world." For the Cartesian "I" the experience of being present in space thus depends on being co-present to an ideal materiality; but the ideality of this material must be absent from experience, since it can only be comprehended in thought. The Berkeleian perceiver is present to immediate ideas that acquire the significance of "outness" that is proper to space, and is disconnected from all else. But the significance of immediate ideas is rooted in anticipatory, temporal connections between ideas. In one sense, this significance is absent, because it is deferred to the future; yet in another sense, it is present, because the anticipatory relations have a natural clarity and presence in virtue of God's authorship of the linguistic structure that undergirds anticipations.

For the Cartesian perceiver, then, being ***in*** space and being present to things in depth means being in some sense absent from the material spatiality that this experience signifies. For the Berkeleian perceiver, having such experiences means being in some sense absent from the temporalised ideal relation that gives spatiality its significance. In both cases we can be present to things in depth because we are not fully absented from the missing element indicated above—this element is ideally present in virtue of God. To return to the linguistic model of depth: for Descartes, the encoding language of depth can speak to us because the 'book of nature' is God's code-book; and for Berkeley, the language of depth can be learnt because nature is God's *langue* (in the Saussurian sense) and our experience is exposed to the *parole* of God's visual language from day one. But God's code-book and *langue* are ultimately beyond our being and are ideal.

These studies of the sorts of idealisms that emerge from Descartes's and Berkeley's encounter with the optical experience of depth lead to some significant consequences. They suggest that the analysis of the optical works can contribute toward current discussions of Descartes's and Berkeley's philosophy in general. I do not want to dwell on this here, since this would spread into a vast and growing critical project. But reflection on their accounts of depth does suggest complexities, confusions and tensions in the sorts of trajectories that we traditionally indicate when we call Descartes a "rationalist" and Berkeley an "empiricist." Mechanism is quite obviously integral to Descartes's rationalism, yet it is problematic since it demands ideas outside us in matter; and ideal structures that transcend experience seem crucial to Berkeley's immaterialist empiricism. In fact, both my analyses suggest that the motivating experiential tension in each account—that depth is not fully present in the ideas through which we encounter depth—would be better satisfied by Kant's transcendental argument. But then we could say that all that Kant does, is embrace this inherent, problematic structure of presence and absence in our experience of space and raise it to an even higher ideality by saying that space could never be present unless it were all and only a pure intuition—and all this does is give us a new and even more complex understanding of structures of presence and absence in experience. This transcendental move does not really address the problem, so much as convert it into an essential principle—which is precisely the point of a transcendental argument.

On the other hand, the tradition of existential phenomenology tries to discern the essence of such principles without raising their essence into a pure ideality, it tries to put "essences back into existence,"[49] to find transcending in contingency. The above study provides an illuminating contrast that can situate the fundamental move of existential phenomenology with respect to the problem of depth perception and spatiality. I have suggested that Descartes and Berkeley interpret our fundamental experience of depth perception as indicating that we are ***in*** space: space is something excluded from us and beyond us, even though we are lodged within it from the start. Space is ultimately beyond our ideas and thus ends up rooted in an ideality supported by God. Existential phenomenology conceives our fundamental experience of depth perception through quite a different pre-positional relation: we are ***of*** space, not ***in*** space.[50] Our situated existence is fundamentally spatial from the ground up, and the existential-phenomenological account of space will therefore be shaped by an analysis of the structures intrinsic to ourselves as spatial beings. We are not perceivers of ideas who look into space through an optical structure, but embodied beings for whom spatiality is a primordial issue at every level of our being. The language of depth is not a connecting system of ideas that is beyond us, depth is a primordial *langue* and *parole* of our existence, since our existence is constituted by working to implace ourselves within a spatial world that we permeate, and that permeates us.

This suggests that the optical idealisms that follow from Descartes's and Berkeley's languages of depth, which languages insulate us from the world through the disconnecting connections of ideal structures, mark out tensions and rifts that can only be overcome through a fundamental shift in our understanding of what it is to be in depth.

Notes

[1] I am grateful to Graeme Nicholson, Henry Pietersma, John Russon and H.S. Harris for their comments on earlier versions of this material, and to Emilia Angelova for her comments on this paper. I would also like to acknowledge the financial support from the Doctoral Fellowships program of the Social Sciences and Humanities Research Council of Canada.

[2] This intertwining of ontology and our experience of depth has been taken up in different ways by Sartre in *Being and Nothingness*, Heidegger in *Being and Time*, and Merleau-Ponty in *Phenomenology of Perception* and especially in "Eye and Mind."

[3] Throughout I use distance to mean distance from us. Both Descartes and Berkeley took the case of perception of distance from us to the object to be especially problematic, and distinct from the problem of perceiving distance between objects beside one another. For the sake of discussion, I take this distinction as unproblematic. The distinction seems natural enough if we presume that we are essentially given a two dimensional picture of objects. But careful reflection on Descartes's and Berkeley's philosophical positions, as I articulate them below, would show that height and breadth could not in the end be any less problematic if we consider height and breadth to belong to objects in depth. Compare Merleau-Ponty's remark, in his discussion of Cartesian and Berkeleian positions, that depth appears as the most 'existential' of dimensions, and his subsequent remark that breadth and height are also existential dimensions (*Phénoménologie de la perception* (Saint-Amand, France: Galimard, 1945), 296 and 309; *Phenomenology of Perception*, trans. Colin Smith (New Jersey: The Humanities Press, 1962), 256 and 267). Also see Edward S. Casey, "The Element of Voluminousness: Depth and Place Re-examined," in *Merleau-Ponty Vivant*, ed. M. C. Dillon (Albany: SUNY Press, 1991). I take this distinction and the correlate assumption that the problem of distance is fundamentally a problem of recovering three dimensions from two dimensions to be symptomatic of a problem that is central to both Descartes's and Berkeley's as well as other more recent accounts. (See William Epstein, "The Metatheoretical Context," in *Perception of Space and Motion*, eds. William Epstein and Sheena Rogers (San Diego: Academic Press, 1995), 1-22, for a synopsis of scientific conceptions of the problem of recovering three dimensions from two.)

[4] See Turbayne for a contrast between Descartes's mechanism and Berkeley's language based theory in George Berkeley, *Works on Vision*, ed. Colin Murray Turbayne (Westport, Connecticut: Greenwood Press, 1963). In contrast to Turbayne, I want to show that Descartes's theory also stems from an understanding of language, albeit a mechanical understanding. Turbayne (page xvii) agrees with Kant that Berkeley held that space is known only by means of experience, but I want to show how the essential structure of Berkeley's visual language depends on a structure beyond human mind.

[5] *The World* in René Descartes, *The Philosophical Writings of Descartes*, trans. John Cottingham, Robert Stoothoff and Dugald Murdoch, vol. 1 (Cambridge: Cambridge University Press, 1985), AT XI:3-4; *Le Monde* in vol. XI of René Descartes, *Ouevres de Descartes*, publiés par Charles Adam et Paul Tannery, (Paris: J. Vrin, 1964), hereafter AT.

[6] See *The World* Chapter 1, "On the Difference Between our Sensations and the Things That Produce Them", Chapter 6, "Description of a New World, and on the Qualities of the Matter of Which it is Composed" and Chapter 7, "Laws of Nature."

[7] See *The World*, AT XI:3-4.

[8] Descartes began work on *The World* in 1629 and abandoned publication plans in 1633 after Galileo was condemned. *Discourse on the Method*, *Optics*, *Meteorology* and *Geometry* were published in 1636, and the *Meditations* in 1641. See the chronology in de Buzon's edition (René Descartes, *Discours de la méthode suivi de La Dioptrique*, édition établie et présentée par Frédéric de Buzon (Saint-Amand: Galimard, 1991)); cf. the chronology in Cottingham et. al.'s edition.

[9] *Optics*, Discourse I, AT VI: 84-85, in René Descartes, *The Philosophical Writings of Descartes*, trans. John Cottingham, Robert Stoothoff and Dugald Murdoch, vol. 1 (Cambridge: Cambridge University Press, 1985); *La Dioptrique* in de Buzon's edition.

[10] *Optics*, Discourse IV, AT VI: 112.

[11] *Optics*, Discourse I, AT VI: 84-85.

[12] Cf., e.g., Descartes's argument in Meditation Six of the *Meditations* that anything that he can conceive clearly and distinctly can be created by God.

[13] See *Optics* Discourse IV and René Descartes, *Treatise on Man*, trans. Thomas Steele Hall (Cambridge: Harvard University Press, 1972), especially the discussion of the uninterrupted movement of fibres at AT XI:144.

[14] *Optics*, Discourse V, AT VI: 114. Cf. Maurice Merleau-Ponty, *L'Oeil et l'Esprit* (Saint-Amand, France: Galimard, 1964), section 3.

[15] *Optics*, Discourse VI, AT VI: 141. Cf. Descartes's wax experiment in Meditation Two in the *Meditations*, in which soul's judgement is constitutive of the wax's identity.

In the *Treatise on Man*, Descartes suggests that the motions on the "interior surface of the brain," on the pineal gland, do trace an image that is in fact projected on the back of the eye (AT XI: 175). In AT XI: 177 Descartes seems to say that the figures imprinted on the pineal gland are themselves ideas, and that these are subsequently contemplated by the soul. From the point of view of the optics, this would mean that the soul would have to have "yet other eyes" that it would use to contemplate images (cf. the argument at AT VI: 130), which would beg the question.

[16] Descartes has two other accounts of depth perception—an account based on the distinctness and intensity of the object and an account based on focus—that are logically equivalent with respect to the issues that I discuss, and are subject to parallel criticisms. For recent reviews of relevant accounts of depth perception, see Barbara Gillam, "The Perception of Spatial Layout from Static Optical Information," in *Perception of Space and Motion*, eds. William Epstein and Sheena Rogers (San Diego: Academic Press, 1995), 23-67; also see other articles in Epstein and Rogers.

In *Descartes on Seeing: Epistemology and Visual Perception* (Carbondale: Southern Illinois University Press, 1993) Celia Wolf-Devine argues that all three accounts operate mechanically and do not require an intellectual judgement. In this case the accounts, including the triangulation account, would not fall to my criticisms. But my criticisms of Wolf-Devine's claim show why the distinctness and focus accounts would fall to my criticism, and these criticisms would also hold of Wolf-Devine's claim about the triangulation account (see note 18.).

[17] This backward tracing (inverse projection) is possible because Descartes has shown (Discourse V) that, given the laws of optics and the geometry of the eye and its lens, there is a more or less one to one mapping between points on the back of the eye and points on a picture plane in front of the eye. This one to one mapping is thus another assumption that Descartes has to make about the world.

[18] There is a dispute in the literature as to whether the operation in the case of vision actually involves a judgement. I claim that it does, as does Nancy L. Maull ("Cartesian Optics and the Geometrization of Nature," in *René Descartes: Critical Assessments*, ed. Georges J.D. Moya, vol. IV, (London: Routledge, 1991)). On the basis of Descartes's word choice in the French edition, Wolf-Devine argues that it does not, although she acknowledges that the Replies to the Sixth Objections support the contrary interpretation (*Descartes on Seeing: Epistemology and Visual Perception* (Carbondale: Southern Illinois University Press, 1993), 74-75). Suppose we accept Wolf-Devine's argument, despite Descartes's claim in the *Optics* that it is the soul that sees, not the eyes (AT VI:141). Seeing distance, then, does not require an intellectual judgement, rather our muscles and brain are configured *in advance* by God so as to mechanically produce knowledge of distance in us. But this just means that the causal inference backward from motions to distance is carried out by a causal mechanism instead of the soul. The process that allows us to know distance is still fixed *in advance*, and can be so fixed because of the 'geometry' of the world, light, eyes, nerves, and so on—in this respect Descartes is markedly different from Berkeley. This would still lead to the results that I develop, which could be put in the following way if we were to develop them within Wolf-Devine's interpretation: (1) God is required, external to human experience, to ensure that the geometrical relation embodied by the mechanical judgement mechanism accurately reflects the geometry of the world, and (2) the body and its mechanisms must have a peculiar, ideal doubling, since bodies are both sized objects in the world like any other, yet their mechanical structures are an ideal ground of their function as veridical measurers of the world.

I would also argue that Wolf-Devine's position adds a complication to feasible interpretations of Descartes's account, since we would have to explain how a mechanism can achieve binocular fusion of the image, so as to properly triangulate the eyes, without there being an image available to the mechanism, since on Descartes's argument there is no image external to mind.

Note that Wolf-Devine's claim that Descartes's focus and distinctness accounts of distance perception are mechanical would also be susceptible of the same sort of criticism.

[19] *Optics*, Discourse VI, AT VI: 137-138.

[20] The angles in question should be taken as distances because they are, logically speaking, nothing other than distances under another aspect, just because there is a determinate relation between angular and linear distance in natural geometry. This determinate relation is captured by the relational structure of a triangle's measures, and this relational structure is in turn determinative of the mathematical geometry of the space in question. (Cf., e.g., *Ideas of Space:*

Euclidean, Non-Euclidean and Relativistic, second edition, by Jeremy Gray (Oxford University Press: 1989).)

[21] Cf. Maurice Merleau-Ponty, *La structure du comportement* (Paris: Quadrige/Presses Universitaires de France, 1942), 204-205; Maurice Merleau-Ponty, *The Structure of Behaviour*, trans. Alden L. Fisher (London: Methuen, 1965), 190. Merleau-Ponty notes that Descartes's philosophy leads to three orders of events that are external to one another: events of nature, organic events, and those of thought; he links this to his interpretation of images in the *Optics* and the doubling of the body. Also cf. Merleau-Ponty's conception of the ready made world in the *Phenomenology of Perception*, particularly in the chapter on space.

[22] *NTV* §2 (in George Berkeley, *Works on Vision*, ed. Colin Murray Turbayne (Westport, Connecticut: Greenwood Press, 1963)).

A terminological clarification is warranted here. Atherton argues that Berkeley's commentators confuse the issue of distance, which is metrical, with the issue of depth, which she takes to be qualitative, and outness, which is the issue of whether things are outside us at all (Margaret Atherton, *Berkeley's Revolution in Vision* (Ithaca: Cornell University Press, 1990), 73-76). She argues that Berkeley's criticism of the Cartesian account in *NTV* is motivated by the problem of metrical judgements of distance. While distance, depth and outness can and should be distinguished, I would argue that they are interdependent and inseparable phenomena, for reasons that I suggest in the beginning of the paper. A critical analysis would therefore show that the support that Atherton offers for her argument is misguided. More, to the extent that she tacitly acknowledges that Berkeley's criticism of the geometric account of distance perception does not just institute a new quantitative perceptual apparatus, but an essentially different, non-geometrical account of perception, Atherton herself cannot separate depth, distance and outness.

See also Lorne Falkenstein, "Intuition and Construction in Berkeley's Account of Visual Space," *Journal of the History of Philosophy* 32 (1994): 63-84, and Robert Gray, "Berkeley's Theory of Space," *Journal of the History of Philosophy* 16 (1978): 415-434, who point out that in *NTV* §112 Berkeley uses "distance" to mean the number of points between two other points, and not just the distance outward from the observer as Armstrong suggests (D.M. Armstrong, *Berkeley's Theory of Vision* (Victoria, Australia: Melbourne University Press, 1960)). But Falkenstein and Gray show that despite this usage in *NTV* §112, distance in Armstrong's sense is Berkeley's main preoccupation. Note that Armstrong argues that "distance" covers what Atherton would call "distance" and "depth."

In my discussion of Berkeley, then, as throughout the paper, I intend "depth" to include "distance," and "distance" to mean the distance between ourselves and objects, not the distance between objects.

[23] Throughout this section I use the word "idea" in Berkeley's sense. Berkeley uses "idea" to designate both concepts that we have in thought (for example, mathematical or philosophical ideas) and what might be called "sensations" in current discourse (for example, colours, sounds or smells). Sensations cannot be traced back to any other ideas, and Berkeley often calls them ideas of sense, ideas perceived or immediate ideas. (Cf., e.g., *Principles* §1 and *VL* §§9-11.) The latter is the term that I use when referring to "sensations."

My understanding of the immediacy of ideas is quite different than the one proposed by Schwartz (*Vision: Variations on Some Berkeleian Themes* (Cambridge: Blackwell,1994), esp. 10 ff.). Schwartz gives a positive explanation of immediate ideas, in the sense that his explanation refers to physiological and empirical factors. On my understanding, immediate ideas are better understood in negative terms, that is, they are ideas that are not mediated by other ideas, and given Berkeley's inward turn, it is best not to refer immediate ideas to any positivity outside of ideas.

[24] Cf. *NTV* §§9-10 and §19. For purposes of discussion I take Berkeley's 'point on the retina' argument as successful. This argument has been subject to much criticism in the literature. See Gary Thrane, "Berkeley's "Proper Object of Vision"," *Journal of the History of Ideas* 38 (1977): 243-260; Robert Gray, "Berkeley's Theory of Space," *Journal of the History of Philosophy* 16 (1978): 415-434; D.M. Armstrong, *Berkeley's Theory of Vision* (Victoria, Australia: Melbourne University Press, 1960); and Margaret Atherton, *Berkeley's Revolution in Vision* (Ithaca: Cornell University Press, 1990).

[25] Cf. *NTV* §3.

[26] Cf. *NTV* §§3-5, 12-15.

Although Berkeley does not name Descartes in the body of his text, the triangulation argument that he explicates is essentially the same as Descartes's and in §42 he discusses the example of the blind man performing a triangulation with two sticks. An excerpt from Discourse VI of Descartes's *Optics*, including the triangulation account of distance, was

published as an appendix to the second edition of *NTV*. A footnote in Berkeley's fourth and last edition (1732) refers the reader to "Descartes and others." (See Turbayne's edition in *Works on Vision*.) So it is quite reasonable to take Berkeley's criticism as directed against Cartesian accounts.

[27] Cf. *NTV* §12 and §19.

[28] Berkeley's doctrine in *A Treatise Concerning the Principles of Human Knowledge* (Indianapolis: Hackett, 1982, hereafter *Principles*) would seem to rule out the latter possibility. Cf. Maull's claim that Berkeley's criticisms miss the mark, since Descartes never claimed that we explicitly know the angles and calculations involved, and that Berkeley's real contribution is in his criticism of the geometrical basis of Descartes's account ("Cartesian Optics and the Geometrization of Nature," in *René Descartes: Critical Assessments*, ed. Georges J.D. Moya, vol. IV (London: Routledge, 1991), 263-4). Atherton makes the same point (*Berkeley's Revolution in Vision* (Ithaca: Cornell University Press, 1990), 79-80). Wolf-Devine's interpretation of Descartes's triangulation account would support Maull and Atherton (Celia Wolf-Devine, *Descartes on Seeing: Epistemology and Visual Perception* (Carbondale: Southern Illinois University Press, 1993), 74-75).

[29] My thanks to H.S. Harris for pointing out the significance of this point.

[30] See *NTV* §23 and §25.

[31] Cf. *NTV* §§16-18.

[32] *NTV* §32, cf. §§28-39 for Berkeley's discussion of the problem of distance perception through lenses, etc., which was posed by Dr. Barrow. Note that an "eye strain" account runs parallel to the "blurredness/confusion" account; basically, we feel eye strain when we try to resolve blurred images, and this strain can be connected with the distance of the object.

[33] Cf. Gary Thrane, "Berkeley's "Proper Object of Vision"," *Journal of the History of Ideas* 38 (1977): 243-260 for a distinction between three versions of this argument; the claim made here would draw on the phenomenological version. With respect to the painter, note that many critics have pointed out that it is quite difficult to learn to see in 'two dimensions,' as the painter is supposed to. The more profound criticism is given in R. G. Collingwood, *Principles of Art* (New York: Oxford University Press, 1938), 144-151, and Maurice Merleau-Ponty, *L'Oeil et l'Esprit* (Saint-Amand, France: Galimard, 1964), namely that to conceive painting as a collapse of three dimensions into two is to engage in a bad metaphysical construal of painting, and what we must understand is that the painter paints with her body, which is intrinsically a being of depth. For Merleau-Ponty this metaphysical analysis of painting shows that depth perception as well is truly an activity of body *qua* being of depth.

[34] Cf. *Principles*, §§24-26, §8.

[35] In George Berkeley, *Works on Vision*, ed. Colin Murray Turbayne (Westport, Connecticut: Greenwood Press, 1963), §13. See Turbayne's introduction to *Works on Vision* for a detailed discussion of the role of the concept or metaphor of language in Berkeley's discussion of vision. In *Vision: Variations on Some Berkeleian Themes* (Cambridge: Blackwell,1994), 10 ff., Robert Schwartz suggests that Descartes and Berkeley use the metaphor of language for the same purpose, but as I contend, the structure of language is quite different in their accounts.

[36] *VL* §38, Berkeley's italics. Cf. *NTV* §147.

[37] See Gerhard Richter's 'photo-realistic' paintings for artworks that are deliberately 'out of focus' and have a peculiar perceptual presence that seems to refuse unambiguous solidity and distance.

[38] See Patricia S. Churchland, Vilayanur S. Ramachandran, and Terrence J. Sejnowski, "A Critique of Pure Vision," in *Large scale neuronal theories of the brain: Computational neuroscience*, eds. Christof Koch and Joel L. Davis (Cambridge, MA, US: MIT Press, 1994), 23-60, for particular examples of cognate circularities in the computational analysis of vision.

It is not clear to me how experience would actually sort itself out for Berkeley, unless we suppose (1) that one sense—which in Berkeley's case would be touch—is more immediately in contact with its object and (2) that there is no difficulty transferring properties determined in this sensorium to another sensorium. But claim (2) is precisely problematised by Berkeley's doctrine in the *Principles*, and claim (1) becomes problematic (as we shall see) when we ask how it is that we learn to perceive tangible distance.

[39] *NTV* §45.

[40] *NTV* §46. Cf. Berkeley's comments about hearing in *NTV* §45 and §47. To explain why we do not easily mix up the tangible distances and the audible, but we do easily mix up the tangible distances and the visible, Berkeley appeals to the linguistic model for visual depth perception. Just as language becomes transparent to us when we are familiar with

it, the visual language of depth becomes transparent too, and we forget that seeing an object at a distance really means anticipating a future tangible experience—and the visual language of depth is far more transparent than the audible language of depth. (*NTV* §51. Cf. *VL §*48, and *Alciphron*, Fourth dialogue, end of §11 and §12 in George Berkeley, *Works on Vision*, ed. Colin Murray Turbayne (Westport, Connecticut: Greenwood Press, 1963). Also compare Descartes's point that we do not notice the inferential structure of depth perception because this structure, like everyday language becomes transparent to us (discussed on page 3 ff. above).)

[41] *NTV* §46.

[42] *NTV* §94.

[43] Here, for the purposes of brevity, I conflate two questions: one is how immediate ideas of one sense connect together to form a mediate idea within the same sensory domain, for example, how we have the idea that an object is confused or united in a figure; the other is how ideas of one sense get connected to ideas of another sense.

Concerning these questions, it becomes an issue whether Berkeley is an 'intuitionist' or a 'constructivist' with respect to all aspects of vision, or with respect to three dimensional vision only, and not two dimensional vision. See Lorne Falkenstein, "Intuition and Construction in Berkeley's Account of Visual Space," *Journal of the History of Philosophy* 32 (1994): 63-84 for a review of some of the issues, and an argument that ultimately claims that Berkeley is an 'intuitionist' with respect to two dimensional vision, even if this is not unambiguous and there is evidence for the other side.

In the context of Berkeley's works on vision, the question as to whether two dimensional structures (lines, planes, figures, etc.) are immediately given in vision without 'construction' by the mind is entwined with interpretation of Berkeley on *minima visibilia*. Robert Gray, "Berkeley's Theory of Space," *Journal of the History of Philosophy* 16 (1978): 415-434 focuses on *minima visibilia* as does Falkenstein's article, and both are worthy of criticism. I see nothing incompatible with holding that there are minimum visibles and that height and breadth are given by 'counting' minimum visibles, while at the same time holding that a 'construction' on minimum visibles is necessary to give apparent line and figure. More important, it is central to Berkeley's doctrine that minimum visibles are immediate, but depth is mediate, so even if we grant that apparent line and figure are intuited (i.e., that there is an inherent order that mediates immediate minimum visibles in an array, which already seems to be a contradiction), this does not mean that what appears to be a line signifies a line. There is nothing in immediate ideas that could determine whether two adjacent minimum visibles signify two distant objects, or a short linear object in the 'picture plane,' or two different points close up, and so on. Since minimum visibles are precisely immediate, there is nothing intrinsic to them that can indicate whether they belong together in a figure, unless we presume that all minimum visibles conform precisely to points on a single picture plane in front of us, which we cannot, which is precisely why distance—the possibility of things being in more than one plane—is an issue for us. There is no sense in which immediate experience of minimum visibles is unambiguously two or three dimensional and there is no sense in which minimum visibles unambiguously form figures. In "The Spaces of Berkeley's World," in *Berkeley: Critical and Interpretive Essays*, ed. Colin M. Turbayne (Minneapolis: University of Minnesota Press, 1982), Thrane claims that Berkeley's visual space corresponds to neither a normal two or three dimensional Euclidean manifold but is more like Mach's meta-geometrical space, which backs up this point. It may be true, as Falkenstein argues, that Berkeley could define a line as the shortest distance between two points (page 70), but this would be a line in thought—not every experienced set of minimum visibles that conforms to this definition therefore immediately signifies the experience of a line. We already have to know distance to know the significance of the points, which is why, for example, the interrelation between size and distance is tricky.

My exposition, however, does not hinge on the success of the argument that Berkeley is a 'constructivist' when it comes to two dimensional space, since the issue of distance ends up being temporal for Berkeley, and he cannot be an 'intuitionist' about associations whose significance builds over time.

[44] *NTV* §147.

[45] *Alciphron*, in George Berkeley, *Works on Vision*, ed. Colin Murray Turbayne (Westport, Connecticut: Greenwood Press, 1963), Fourth Dialogue, §11.

[46] *Alciphron*, Fourth Dialogue, §15.

[47] *NTV* §152.

[48] This claim about space would be in keeping with Berkeley's criticism of Newtonian space (see *Principles* §116).

[49] See Merleau-Ponty, *Phénoménologie de la perception*, “Avant-Propos,” I; *Phenomenology of Perception*, “Preface,” vii.

[50] See Merleau-Ponty, *Phénoménologie de la perception*, “La spatialité du corps propres et la motricité”; *Phenomenology of Perception*, “The Spatiality of One’s Own Body and Motility.” See also Edward S. Casey, *Getting Back into Place: Toward a Renewed Understanding of the Place-World* (Bloomington, Indiana: Indiana University Press, 1993).