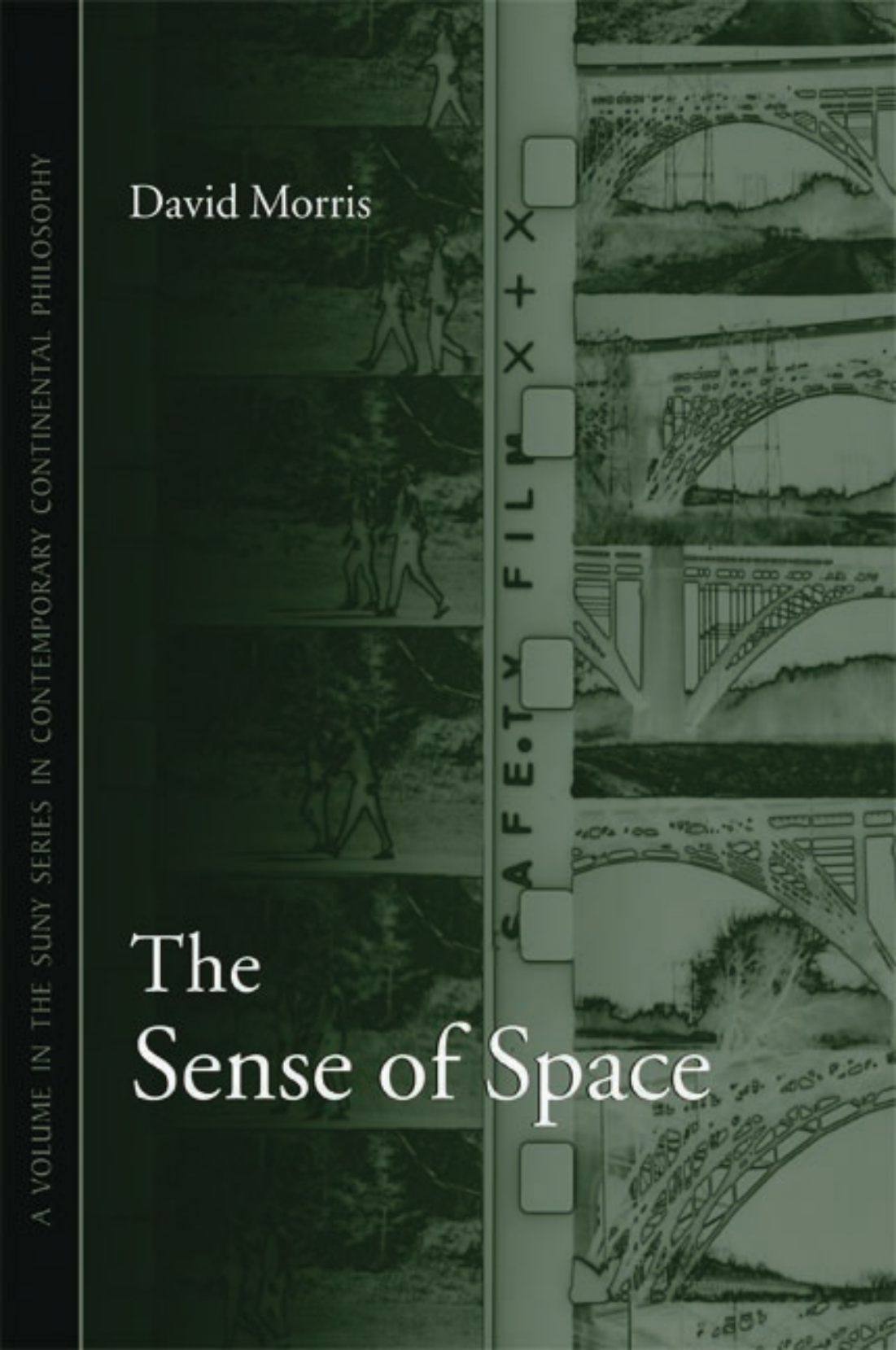
A VOLUME IN THE SUNY SERIES IN CONTEMPORARY CONTINENTAL PHILOSOPHY
David Morris
The Sense of Space
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THE SENSE OF SPACE

SUNY series in
Contemporary Continental Philosophy

Dennis J. Schmidt, editor

THE SENSE OF SPACE

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PREFACE

THE SENSE OF SPACE is the basis of all social experience and of perceptual experience in general. Without it we would have no sense of a world beyond us. But what is the basis of spatial experience, and what does our sense of space tell us about us and our social being?

The concern here is not the space that would be measured by the surveyor, geometer, or scientist, but perceived space as we experience it before objectifying it, what I shall call lived space. The answer demands a study of perception in terms of the moving body.

Merleau-Ponty's *Phenomenology of Perception* placed the body at the center of philosophy. Contemporary and previous thinkers had discussed the body: one can think of Sartre, de Beauvoir, Marcel, Bergson, the body as haunting Husserl's *Nachlass*, the curious peripheral glimpses of the body in Heidegger, the current of bodily discussion that runs through Nietzsche, the discussion in Dewey and James, even the focus on the body that we find in Spinoza and Aristotle—and there are others to be mentioned as well. But no one had put as deep an emphasis on beginning philosophy with the lived body—the body of experience; no one had taken the study of the lived body into such great depth.

Since the *Phenomenology*, the philosophy of the body has been transformed. Post-structuralism enjoins suspicion of a body that would be granted positive primacy, and detects in what we call "body" the shaping or constitutive forces of outside powers. Feminist philosophy draws attention to the body as the site of sexual difference neglected by phenomenology. Critics of phenomenological method urge that the phenomenology of the body repeats the prejudices of the philosophy of consciousness that it aims to avoid, merely cloaking the Cartesian ego in corporeal disguise. All of these movements question and complicate the concept of the body to be found in Merleau-Ponty. When it comes to the *Phenomenology*, however, the most important critic is Merleau-Ponty himself: his posthumous *The Visible and the Invisible* appears to throw the earlier work into question, as being caught up in phenomenological presuppositions insufficient to the ontology of the body. A

survey would show that the literature and discussion of Merleau-Ponty after the publication of *The Visible and the Invisible* increasingly focuses on that work rather than the earlier *Phenomenology* or *The Structure of Behaviour*. Merleau-Ponty, though, repeatedly urges that a book is never something complete and that the thinker never quite fully grasps his or her work. In short, a thinker can never close the book on her or his work.

This book tries to reopen the *Phenomenology*, to rethink its concept of the body in a way that critically engages dominant traditions and current results of philosophy and science. Specifically, it rethinks what Merleau-Ponty calls the body schema—rethinks it in terms of movement in a way that draws on the philosophy of Bergson (an underplayed thread in the weave of Merleau-Ponty's philosophy) and the contemporary scientific program called dynamic systems theory (an offshoot of J. J. Gibson's ecological psychology). The book shows how the moving body is inherently open to the world, how the schema and meaning of perception are not possessions of a closed body-subject, but are rooted in an inherently developmental body, a body that contracts perceptual meaning through learning that is both social and constrained by the body's own topology and relation to place. Securing this point about perception and the topology of the moving body is the task of part one, "The Moving Sense of the Body." Part two, "The Spatial Sense of the Moving Body," shows how our sense of depth and orientation emerge from such a topology in relation to place, and how this sense is rooted in movement and development in a social place.

Previous works by Elisabeth Ströker (1987), Sue Cataldi (1993), Patrick Heelan (1983), and Edward Casey (1993, 1997) present studies of spatial perception in relation to phenomenology, Merleau-Ponty's philosophy, and place. (Also see Hatfield 1990; Plomer 1991.) Part one of this book adds to this literature by approaching perception through the expressive topology of the moving, developmental body. Part two adds to the literature by giving a detailed study of the way that our sense of space points back to a moving body that envelops and is enveloped by things, that resides on earth and that develops.

Parts one and two, though, are inherently joined, for a moving developmental body is a body in place, and a body developing in place is a spatial body. Our sense of space arises in the intersection of movement and place, specifically developmental movement and social place. The intersection will have an ethical aspect, since a social, developmental body is a body placed in an ethical situation. The conclusion unpacks some implications by showing how our responsibility in face of others and in face of place inheres in our sense of space, and how our sense of space thus entwines with our sense of the ethical and of place.

This book has been a long time coming, and many thanks are due. I would especially like to thank Graeme Nicholson, for his unfailing support of the earlier explorations and writing that led to this book; John Russon for his

teaching, observations, and advice that made this book possible; Edward S. Casey for his work on place, which inspired my investigations, and for his careful comments and enthusiasm. Thanks are also due to Peter Simpson, Maria Talero, Kym Maclaren, David Ciavatta, and Gregory Recco for ongoing philosophical conversation on concepts central to the book; to my colleagues in the Department of Philosophy at Trent University for their support and interest, and especially to Constantin V. Boundas for his guidance on Deleuze-Bergson. The critical comments of anonymous referees were indispensable in improving the book. I would also like to acknowledge the Social Sciences and Humanities Research Council of Canada and Trent University for supporting various stages of this work, and Andrew Robinson, Karen Hicks and Michael Bruder for their proofing of and comments on drafts. Most of all, thanks are due to Emilia Angelova for her immense support, confidence, and deeply critical and insightful engagement with this work.

This book is dedicated to the memory of Ida Jupiter, my grandmother, who died on the day the first version of the book was completed; and to Mr. Haller, a survivor of the concentration camps who lived across the street when I was a child, and who could not walk down the street without turning around to check behind his back.

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LIST OF ABBREVIATIONS

Abbrev.	Title	Citation Form
OE	Merleau-Ponty, *L'Oeil et l'esprit* / "Eye and Mind" (In *The Primacy of Perception*)	*OE* [page # in the French] [page # in English]
PP	Merleau-Ponty, *Phénoménologie de la perception* / *Phenomenology of Perception*	*PP* [page # in the French] / [page # in the English]
SdC	Merleau-Ponty, *La Structure du comportment* / *The Structure of Behaviour*	*SdC* [page # in the French] [page # in the English]
MM	Bergson, Henri, *Matter and Memory*	MM [page # in the English]

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INTRODUCTION

THE PROBLEM OF DEPTH

IMAGINE SITTING IN an outdoor plaza, watching things go on around you. I am thinking in particular of City Hall in Toronto. I am sitting on a bench near the fountains, whose pool is used as a skating rink in winter; to my right, paraboloid ribbons of concrete arch over the pool, connecting its near and far sides. In front, in the distance, are the two buildings of City Hall, which curve toward me in a semicircle around the lenticular council chamber nestled in between. Large squares of concrete tile the floor of the plaza, sponging up the sun and hurling it back through air that shimmers with heat. The tiles incise a grid that sometimes tinges the plaza's visual expanse with the aura of a perspective study, an effect reinforced by the overhead walkway which marks the perimeter of the square, running above the sides and back of the plaza, along Queen Street behind me. Within this gridwork, people move back and forth buying ice cream cones from pedal-carts, vanishing into City Hall on errands, chatting with clothing aflutter in the wind; children splash their feet in the pool.

The sense of this situation, or any other situation, depends on people and things appearing and moving around in depth. Depth is what gives bodies volume in the first place, it is what makes situations possible. As Edward Casey puts it, following Merleau-Ponty, depth should really be called the "first dimension" rather than the "third"; that is, depth is the most primordial dimension, not a 'bonus' dimension added to the other two.[1] All our studies and all our inquiries begin in depth: without depth, there would be no things and no people, nothing to study, and there would be nobody who could perceive or study things. This is one reason for beginning a study of spatial perception with a study of depth.

In what follows, "depth" designates the "first dimension," in which one experiences the distance between oneself and other things, in which one

experiences things as having volume. Depth is to be distinguished from height and width, in which one experiences the spread of already voluminous things and the distance between things that stand side by side.[2] Once we have a way of modeling our environment geometrically, and techniques for measuring it, we can treat depth as an objective dimension interchangeable with height and width. But before that we must have a more basic perceptual experience of voluminous things, and that is our focus: how do we first of all perceive things and ourselves as standing out in depth? That is to say, our focus is lived depth, depth as we experience it, before we objectify it through geometry and measurement.

Given the primordiality of depth, accounts of depth perception inevitably couple with basic claims about the being of the perceiver and the perceived world. Consider Berkeley's infamous problem about visual depth perception. Crudely put, images on the retina are wide like things are wide, but they are not deep like things are deep. Retinal images are flat, so how can they give us a sense of depth? Berkeley's solution reconfigures the problem: depth perception is not a leap from flat images to a mind-independent depth, it is the perceiver's transition from one ordering of ideas to another. The solution is inseparable from Berkeley's radical metaphysical claim that to be is to be perceived, that matter and depth are orderings of ideas, not mind-independent realities. Merleau-Ponty shows that analysis of perception always amounts to analysis of the perceiver's existence, but this sketch of Berkeley's solution suggests that the coupling of perception and existence is especially deep in the case of depth perception, which is not surprising if depth manifests our most primordial contact with the world. This is another reason for beginning in depth: it opens a connection between spatial perception and our existence.

This introductory exploration of depth perception will press us into basic points and problems of spatial perception. A full account of depth perception must wait for subsequent chapters.

DEPTH AND THE CROSSING OF THE BODY AND THE WORLD

To map a central point about the being of the body in depth, I return to the bench at City Hall, describing my experience. But the description would equally apply to anyone reporting on their experience of any situation.

First, I am on a bench in the very world I am perceiving. So I would seem to be part of the depths that I perceive. There is a problem, though. I perceive things in depth as here or there, near or far, in front or behind, and so on. But I do not perceive myself in this way. I am neither in front of nor behind myself, neither near nor far from myself; I am not over there and I am not even here in the way that the bench is here. I am not a point within a coordinate system already fixed outside me. My body is the original 'here,' the origin from which here and there, near and far, exfoliate; my body

appears to escape the depth orderings that apply to things around me, to belong to a different order.[3]

I am on a bench, perceiving the depths of the world, but I appear to be at odds with those depths. The depth of my body appears to be extra-ordinary. Ordinary depth is a matter of ordered relations and distances between things, whereas my body, while having depth, does not fit into this ordered framework; it is extra-ordinary. What is at stake in the contrast between these two sorts of depth, ordinary and extra-ordinary depth, is *ordinality*. The hyphenated construction *extra-ordinary* is a reminder of this usage. As opposed to *one, two,* and *three,* which are cardinal numbers, *first, second, third,* are *ordinals*, numbers that denote order rather than quantity. The ordinary depths of the perceived world are ordered by 'here-there,' 'near-far,' and so on, while my body usually has an extra-ordinary depth that is not subject to that ordering.[4] As Heidegger observes, I am not in the plaza in the way that water is in the pool, and I touch the bench in a different way than the bench touches the ground (Heidegger 1962, §12). My being and the being of the bench are different, and this difference is reflected in the experienced difference between different sorts of depth.

Yet if I experience myself as the extra-ordinary origin of the order of 'here' and 'there', I must also belong to that ordinary order. I must be distant from things as things are distant from me, and although my body appears to escape ordinary depth, my body also has a thickness and depth within the world. The extra-ordinary depth of the body joins with the ordinary depth of the world. How is this join, a join of different orders of depth and being, to be conceived? At stake in this question is the concept of the body. Our reflex is to think of the body as a self-contained sensing system positioned within a spatial container, to join the depths of body and world in terms of a larger, already established order of depth. In fact, there is no fixed threshold between ordinary and extra-ordinary depth, and we must revise our concept of the body.

In ordinary experience the body is not spread out in the way that people and things are spread out in a plaza. It would be odd for me to say "I am here, but my leg is there, in a different spot." This is another sense in which the depth of the body is extra-ordinary. The entire spread of the body counts as 'here'; unlike other things, the body appears as having little or no interior ordinality. (Again, in my car the turn signal is to the left of the steering wheel, but it would be strange to say that my writing hand is to the left of my head; my left hand is not *on* my left, it defines or *is* my left.) But now my foot is hurting, and I reach down to find out if my shoe is too tight or if there is a stone in it. In reaching down I am in part treating my body as a thing in ordinary depth, as having an interior ordinality of 'heres' and 'theres.' And there would be no perception at all if my body did not spread out amidst things in ordinary depth. The extra-ordinary depth of the body and the ordinary depth of the world are in exchange.

But the exchange between ordinary and extra-ordinary depth is not described by a fixed threshold. When I am just going about doing things, my watch, shoes, coat, and so on, are neither here nor there in ordinary depth, they are incorporated into the extra-ordinary depth of my body. But I can doff my coat, slough the outer coating of my body's extra-ordinary depth into ordinary depth. Things are incorporated into the extra-ordinary depth of the body, or the extra-ordinary depth of the body seeps outward into things; either way you put it, there is no fixed threshold between ordinary and extra-ordinary depth. It is tempting to draw a fixed threshold, but in doing so *we* are imposing fixity on something fundamentally flowing.[5]

The fluctuating threshold of ordinary and extra-ordinary depth manifests a living tension between body and world. It is rather like the threshold in Rilke's ninth *Duino Elegy*. Rilke suggests that an angel who looks on the world from above might define the word *threshold* in terms of a material construction such as a doorsill. But angels cannot say things with the intensity of those who toil a mortal life. For mortals "threshold [*Schwelle*]" is "what it means to two lovers that they too should be wearing down an old doorsill [*Schwelle der Tür*] a bit more" (Rilke 1978, 80). Place a doorsill anywhere you like. If nobody crosses it, it will not be a threshold. On the other hand, a tree trunk or rivulet in the forest is a threshold when people cross it in moving from one region to another. Before there are thresholds, there is region-crossing that wears down things, which things then manifest thresholds. Similarly, skirmishes do not begin over already fixed borders, borders are first of all drawn in the midst of skirmishes. What is primary is not the material of thresholds, but the need for region-crossing, which need inheres in the life of moving yet place-dwelling mortals.[6]

The most primordial region-crossing is the crossing of body and world. In "Eye and Mind" Merleau-Ponty writes that "There is a human body when, between the seeing and the seen, between touching and the touched, between one eye and the other, between hand and hand, a blending of some sort takes place—when the spark is lit between sensing and sensible, lighting the fire that will not stop burning until some accident of the body will undo what no accident would have sufficed to do . . ." (*OE* 21/163, ellipsis Merleau-Ponty's). Life is a spark of desire that crosses body and world in the very moment that it constitutes a living difference between them. This crossing of body and world marks the first threshold, the root of all other thresholds and the root of our sense of depth and space.

The usage of "crossing" here and below draws on multiple resonances of the term and is meant to resonate with the concepts of "chiasm" and "reversibility" that haunt Merleau-Ponty's later philosophy.[7] A child's play-chant is cross between speech and song, a spontaneous sing-song that marks a difference between speech and song even while showing how the two cross in a common origin; a person living between cultures crosses those cultures in a way that reciprocally marks new differences and new commonalities;

crossed messages are mixed up, yet the mix-up plays on and therefore plays up distinctive meanings of the messages; two things that are mixed up yield a cross between them. Crossing differentiates by mixing, mixes by differentiating, marks differences through reciprocating mixes and overlaps. Whereas the phrase *interaction of body and world* suggests that body and world are two already independent things that subsequently interact, speaking of their crossing suggests that the two are inherently interdependent, differentiated only in being mixed. "Crossing" captures Merleau-Ponty's point, in his early and late philosophy, that body and world are in a living tension.

And the experience of a difference between ordinary and extra-ordinary depth, and of their flowing threshold, shows that body and world cross one another. The body is not simply contained on its side of things as a sensory machine within which signs of depth are decoded, the body is in the depths of the world, yet is in those depths through a flowing threshold that overlaps body and world. At a deeper level, a body of this sort is neither the cladding of pure subjectivity nor an object in the world; the crossing of body and world turns any simple division of subject and object into a problem. Accordingly, this book's study of depth and spatial perception moves beyond the division of subject and object to focus on the perceiving body; but the perceiving body is not self-contained and the perceived world is not a self-contained system. The focus is the crossing of body and world, and the aim is to show how the sense of space is rooted in that crossing.

This calls for a reversal of traditional approaches to depth and spatial perception. In traditional approaches, the primary datum is an already given space, characterized apart from the living activity of the body. The problem is how a self-contained body within that space, which therefore cannot directly contact space as a whole, retrieves measures of space via sensory signals received by the body. For thinkers such as Merleau-Ponty, William James, and John Dewey, this is a grand version of what is often called the "experience error": a result of perceptual experience—the concept of space as a container that appears as independently possessing its own well defined structure—is taken to be the basis and object of spatial perception.[8] The tradition begins with a space already understood in terms of a geometrical or objective model and looks into it to see how the body interacts with it: from space to the body via geometry or another objective model. This book works in the reverse direction, beginning within the crossing of body and world, and seeing how our sense of space emerges from it: from the crossing of body and world to space via living perception. To put it in Bergsonian terms, the proper beginning is a difference in kind, not degree: the beginning is not degrees of measurement within an already defined geometrical system, but the living difference in kind that emerges in the crossing of body and world (MM; Deleuze 1988).

Kant and William James, each in his own way, claim that our sense of space is not the result of synthesizing nonspatial data to yield a spatial result.

Spatiality is a primitive, so primitive that a sense of space must already be given, must already be constituted by us, on our side of things; we are not merely passive receptors of spatial information, we actively constitute the sense of space. This claim is an important thread in the tradition, and vital to what follows. But Kant's transcendental argument claims that spatial experience is constituted by an a priori cognitive structure; and James's empirical argument claims that what might now be called the neurobiology of the body is constitutive of spatial experience, as if experience were rooted in fixed structures of a body-machine (here I am pushing things to an extreme that is likely foreign to James, but not simply so).[9] In contrast to Kant, lived space is constituted within bodily life, not in cognition merely; in contrast to James, lived space is not a primitive of neurobiological structures. Our sense of depth and space is rooted in living dynamics that inherently cross body and world; and our sense of depth and space expresses the sense of the crossing of body and world. Our sense of space is not constituted by cognitive or neurobiological structures that are merely on our side of things; our sense of space is enfolded in an outside, in a world that crosses our body.

To secure this point and approach to the body and space, I first turn to an analysis of traditional accounts of depth perception.

THE CONCEPTUAL DIALECTIC OF TRADITIONAL ACCOUNTS

Traditional philosophical and scientific accounts of depth perception begin by presuming an already established space, and ask how depth perception reconstitutes measures of that space. This presumption is counterpart to the presumption that meaningful perception is built out of meaningless sensations.[10] Bits of sensation are interchangeable, determinate independent of their context, atomic. Single atoms of sensation cannot carry perceptual meaning: they can specify red or orange, but not "flower" and "far." "Flower" and "far" are reconstructed from an array of sensations, and since sensations are neutral to their combination and cannot carry perceptual meaning, the object of the reconstruction is an underlying order of the world, say the flower which causes the array in the perceiver. Spatial perception and perception in general refer to an underlying order that is fixed in advance of perception. *Contra* this presumption, the meaningful order of perceived depth reflects the dynamic crossing of body and world.[11]

Consider the infamous problem that the images projected on our retinas are flat, or, at least, since they really are projected on a curved surface, specify only a two-dimensional array of data. This poses the problem of depth in terms of a difference between two- and three-dimensional orders. But isn't there something wrongheaded about this? Can the perceiver really be flattened into a passive, two-dimensional sensory surface, as if the body and eyes did not already have depth, as if their volume had nothing to do with perception? Can the problem really be reduced to a gap between two and three

dimensions, a gap crossed with a projective geometry, as if the crucial difference were one of dimensional degree? Is depth perception an exercise in geometry, or in living? The initial point about the crossing of body and world suggests the traditional problem is badly put, but the objection cannot simply be hurled at the tradition from the outside. I want to step into the tradition and show that problems that arise within it demand a turn toward the crossing of body and world.[12]

Descartes's solution to the problem of the flat images hinges on the fact that there are two eyes. An object at a distance may project "only one point in the fund of the eye" as Berkeley famously put it—hence the problem.[13] But the lines of sight formed by two eyes directed at one object specify a triangle. For Descartes, depth perception amounts to a geometrical inference of the height of this triangle, an inference based on the angles at the eyes and the distance between them.[14] Descartes's account, together with the Cartesian geometry and coordinate system that facilitate his analysis, inspires a class of accounts that bridge two and three dimensions by means of an inferential process. I call them inferential accounts. Inferential accounts are, perhaps, falling out of favor, but still influence current research programs. For example, roboticists might try to construct a robot that infers depth based on the disparity between two images given to the robot's visual sensors. Some would claim that this is the way our vision works. On my left retina, the image of this sheet of paper is a trapezoid in which the projection of the left edge is longer than the right, whereas on the right retina the projection of the right edge is longer; given that these are images of one rectangular thing, the thing must be so many units distance away from my eye. So I can infer depth from binocular disparity.[15]

Central to Descartes's account is the hypothesis that the contents of perceptual experience, namely ideas, are nothing like that which is perceived. Descartes insists on this at numerous points; he has to, since in the Cartesian philosophy experience belongs to an unextended mind, whereas it refers to extended matter.[16] The mind's inferences therefore cross a gap between ideas and things, between two very different sorts of beings. A similar gap between perceptual content and things is crucial to inferential accounts in general. Why? If the content of perceptual experience is nothing like that which is perceived, then the content is neither two- nor three-dimensional. So the transition between two and three dimensions is freed from the being of actual two- and three-dimensional things; tying the transition to actual two- and three-dimensional things would repeat the problem of the flat images. In the Cartesian account, the transition takes place in the unextended Cartesian mind. In fact, a Cartesian mind can infer an *imagined* three-dimensional space from an array of *imagined* two-dimensional data. In more recent accounts, the transition takes place in a computational process that qua computation is unextended, even if carried out by a materially extended computer: a computer program can navigate a simulated, nonexistent three-dimensional

space, reconstructing that space from two-dimensional arrays of data constructed by the experimenter. (Such programs exist, and are an easy way of testing out robot algorithms without actually building robots.) The ideas in the Cartesian mind, the data in the computer, are neither two-dimensional nor three-dimensional, and the transitions between the two are transitions between signs.

In being freed of the relation between actual two- and three-dimensional things, the problem is in one sense solved. The Cartesian perceiver and the inferential robot in the real world are making exactly the same sort of transition between signs when detecting depth: they are just inferring one array of data from another. Inferential accounts work by abstracting the problem of depth from the actual depths of the world, converting a problem about bodies with depth into a problem of signs and geometry.

This abstraction, though, skips over the initial problem of three-dimensional things and two-dimensional receptive surfaces; the solution conceals a deeper problem. The inferences of the unextended mind, the calculations of the robotic eye, do refer to the depths of the world. How is this reference possible? By hypothesis of the inferential account, depth needs to be inferred, because the perceiver has no direct contact with the world in depth, just ideas or signs. The two-dimensional grist of the inferential mill is nothing like depth itself. But grounding the inference from two-dimensional data to a world in depth requires knowledge of the world in depth, knowledge of how projection works. Somewhere along the way the perceiver must have something more than an inference about a world in depth, must already have a veridical encounter with a world in depth, some premises and principles to bootstrap and ground inferences.

There is a circle at the core of inferential accounts. If depth can only be inferred, then the ground of this inference cannot itself be inferred. Any attempt to infer the ground would already require this ground and get stuck in a circle. There must be some already established framework that grounds and is prior to the inference of depth, what I call an inferential framework.

On first glance, the circle is not completely vicious. Descartes, for example, establishes an inferential framework by proving that the world of matter can be known and is susceptible of geometrical analysis. But this precisely means claiming an inferential framework established *prior* to perception. In the example of inferring the distance of a sheet of paper via binocular disparity, my perceptual process in effect assumes that there is one sheet of paper and that the sheet is actually rectangular, not trapezoidal. But how could the given justify this assumption? By an inference from the very same images. One and the same set of images must justify the inferences (a) that the sheet is so many units distance away from me, and (b) that there is just one sheet of paper and that it is rectangular. But conclusion (a) depends on conclusion (b) as a premise, and vice versa. The assumption must remain an assumption, because it must be in place prior to any infer-

ence. The case of the sheet of paper is unduly simplistic, but recent work on vision supports the claims that assumptions would have to be built into visual processes.[17]

Basing perception in assumptions leads to vicious consequences. In machines that take two-dimensional visual inputs as premises for inferences about a three-dimensional world, it turns out that the input radically underdetermines what there is in the world. The machine needs to assume quite an elaborate model of the world. Putting aside the question of where all those assumptions come from (could the machine *learn* them?), and whether we, as opposed to machines, really need an elaborate model of the world to see it in depth, building machines upon assumptions makes them extremely limited and inflexible. Put them in a different sort of environment and they fail. In contrast, our living vision, as we shall see, is quite plastic and resilient.

Inferential accounts begin by supposing a gap between two-dimensional givens and the three-dimensional world. If the gap is not filled in, then perception falls to circularities or equivocations that underdetermine the perceived world. But filling the gap entails assumptions that overdetermine the world and reduplicate it in an internal model. Such assumptions are an instance of what Merleau-Ponty calls a ready-made world, that is, a world specified prior to, and independent of, the dynamics of perceptual life.[18] Not only does the ready-made world neglect the crossing of body and world detected above, not only does it render perception frail in face of a changing world, it fails to account for the meaningful dynamics of lived depth, of which more below.

The inferential approach to perception is also a fine example of the experience error. It is true that a human being with proper tools can, as Descartes claims, infer distance by means of geometrical triangulation. But that is no ground for presuming that depth perception works by triangulation. The presumption is sound only if triangulation is the sole means for gaining a sense of depth. That is certainly not true: as J. J. Gibson (1979) points out, horses and chickens have a fine sense of depth, but their eyes are on opposite sides of their heads, so their visual fields do not overlap and they cannot triangulate on things in the Cartesian manner. We should not presume that our geometry, which results from perception, is the appropriate framework in which to analyze depth perception. (A more expansive form of the error is rampant in Descartes: artificial phenomenon *X* works by mechanism *Y;* so a natural phenomenon that resembles *X* also works by mechanism *Y*. Tennis balls blasted through a fabric sheet would refract in the manner of light, so light refraction works in this way; heated fluids push their way through vessels, so the heart is a heat pump.[19] The problem with Descartes is not so much that he is an idealist, it is that his idealism is brought short by a bad empiricism, or the other way around, if you like.)

In brief, in inferential accounts, the problem of depth is badly put, obscured by the presumptions of the ready-made world and the reduction of experience to its terms.

The objection is in harmony with Berkeley. Against the Cartesians, Berkeley notes that we do not know the angles made by our eyes, that we are not aware of making inferences about depth, that geometrical relations do not hold sway when it comes to our sense of distance, and so on.[20] Berkeley turns from geometry to experience. His turn depends upon (and supports) his claim that there is nothing, not depth, not even matter, outside of the mind. The word *depth* simply refers to certain ordered, anticipatory relations between sensations within the mind. I learn that if the image of the pool at City Hall gets bigger, and keeps getting bigger as I feel my feet thumping the ground, then eventually I will feel cold wetness as my feet splash into the pool. To perceive the pool as distant is just to grasp that certain sensations intrinsically anticipate another series of sensations. Since all the ingredients of depth are given directly to the mind, there is no need to pose the problem in terms of a geometry of an extra-mental world.

For Berkeley the object of depth perception is an order detected within the given. Where Descartes appeals to a geometrical inference from the given to an order beyond the given, Berkeley appeals to a comparison between perceptual givens and language.[21] To learn to perceive the pool in depth is to learn the order in which sensations anticipate one another, and this is much like learning the meaning of words. Crucially, the linguistic order is not like a geometrical system, it is conventional, not axiomatic and deductive, and it cannot be specified once and for all as a systematic whole; meanings circle back on themselves in an ever expanding web. We learn language by tuning into shifts in the linguistic web we weave, from within. And for Berkeley, we learn to perceive depth by tuning into shifts within the web of experience, which web is woven by the author of nature, God.

The Cartesian body is like a web that catches sensation, and the Cartesian mind a spider sitting on the web, inferring flies from sensations; to justify its inferential leap, the skeptical spider must prove that material flies could exist and could be inferred from the geometry of their impact. In contrast, Berkeley trumps skepticism by urging that flies are nothing other than vibrations within the web of ideas.

In this way Berkeley turns from an inferential framework that enables a leap to an extra-experiential order, toward the intrinsic ordering of the web of experience. We can take him as the inspiration or forerunner of accounts in which depth and space perception depend on an intrinsic ordering. I call these intrinsic accounts. The questions that immediately arise when we turn to intrinsic accounts are where does the intrinsic ordering of experience come from and what does it refers to—that is, how does an intrinsic account really work?

According to Berkeley, the ordering of experience is akin to the grammar of a language authored by God, and the meaning of a given ordering refers to nothing other than relations between words of God's visual language. This is nicely consistent. But if the order of ideas is fixed by God, we

have no part in constituting it. In truth Berkeley's order is a new variant of the ready-made world. As in an inferential framework, a fixed order of this sort neglects the crossing of body and world and fails to account for the meaningful dynamics of lived depth.

The Kantian philosophy is an advance upon Berkeley, for at least the ordering of depth is rooted on the side of the subject. The *Critique of Pure Reason* replaces the authority of God, the author of nature, with the authority of the transcendental ego: for experience to be possible, it must already be ordered by the manifold of space, a pure intuition. But the pure intuition of space is a new version of the ready-made world: it is fixed in advance of perception, and would likely fail to account for the dynamic experience of depth that impresses itself upon us.[22] Even Kant suggests that there is something empirical or dynamic at the bottom of our experience of space. In his metaphysical exposition of the concept of space, he refers to the place [*Ort*] in space "in which I find myself" (Kant 1929, A23/B38); but it would be odd to think that the transcendental ego has a place in space, and in general we can suspect that there is a complex and difficult mix of the transcendental and the empirical in Kant. And something empirical and dynamic surely enters judgments of the sublime, which surely also have a spatial aspect, as when the enormousness of a distant storm occasions an experience of the sublime. More, as Edward S. Casey notes in *The Fate of Place* (1997), Kant is quite taken by the difference between left- and right-handedness; this difference is tied to the body, rather than transcendental structures. In any case, if the intrinsic order of experience is to account for the dynamics of experience, it cannot be fixed in advance by the Kantian transcendental ego or the Berkeleian language of the author of nature.

We can find a dynamic order in J. J. Gibson's (1950, 1966, 1979) ecological psychology. His investigations were inspired by his criticism of inferential accounts and by the conviction that most experiments misconceive the perceiver. In the worst case, experimenters treat the perceiver as a cyclopean creature with one immobilized eye who sees only impoverished, artificial optical displays. But we are not like that at all. We are moving beings who probe the world with two glancing eyes, and our natural and built environments are richly textured. Gibson therefore went out of the laboratory and into the field, or constructed experiments to test features that would be native to the field.[23]

Gibson's central insight is that perception is the pick-up of invariants in the flow of information that is generated when the perceiver moves in an environment. In a bit more detail: the information flow generated by movement has intrinsic properties; the properties have an environmental significance that remains invariant through movement; so invariants directly specify certain aspects of the perceived environment. For example, natural outdoor environments are covered by textured material like grass or stone, and man-made environments have texture too. As I look at things further