

Chapter Thirteen

To journey along a way of life

Maps, wayfinding and navigation

INTRODUCTION

Everyone has probably had the experience, at some time or other, of feeling lost, or of not knowing in which way to turn in order to reach a desired destination. Yet for most of the time we know where we are, and how to get to where we want to go. Ordinary life would be well-nigh impossible if we did not. It remains a challenge, however, to account for everyday skills of orientation and wayfinding. This challenge is compounded by the considerable potential for misunderstanding surrounding the question of what it actually *means* to know where one is, or the way to go. For the map-using stranger, making his way in unfamiliar country, ‘being here’ or ‘going there’ generally entails the ability to identify one’s current or intended future position with a certain spatial or geographic location, defined by the intersection of particular coordinates on the map. But a person who has grown up in a country and is conversant with its ways knows quite well where he is, or in what direction to go, without having to consult an artefactual map. What, then, does he have that the stranger lacks? According to a view that has found wide support in the literatures of geography and psychology, there is no difference in principle between them. Both are map-users. For both, knowing where one is means identifying one’s position in the world with a location on the map. The difference is just that the native inhabitant’s map is held not in the hand but in the head, preserved not on paper but in memory, in the form of a comprehensive spatial representation of his usual surroundings. At any moment, it is supposed, he can access this mental or ‘cognitive’ map, and determine his location in terms of it.

In this chapter I shall argue, to the contrary, that there is no such map, and that the belief in its existence is a consequence of the mistaken attribution to native people of a sense of what it means to know one’s whereabouts that effectively treats them as strangers in their own country. Indeed the native inhabitant may be unable to specify his location in space, in terms of any independent system of coordinates, and yet will still insist with good cause that he knows where he is. This, as I shall show, is because places do not have locations but histories. Bound together by the itineraries of their inhabitants, places exist not in space but as nodes in a matrix of movement. I shall call this matrix a ‘region’. It is the knowledge of the region, and with it the ability to situate one’s current position within the historical context of journeys previously made – journeys to, from and around places – that distinguishes the countryman from the stranger. Ordinary wayfinding, then, more closely resembles storytelling than map-using. To use a map is to navigate by means of it: that is, to plot a course from one *location* to another in *space*. Wayfinding, by contrast, is a matter of moving from one *place* to another in a *region*. But while it would

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be wrong, or at least misleading, to liken the countryman's knowledge to a map, there is a certain parallel to be drawn between the processes of knowing and mapping. Both are environmentally situated activities, both are carried out along paths of travel, and both unfold over time. Just as wayfinding has to be distinguished from navigation, however, so also mapping must be distinguished from mapmaking. For the designs to which mapping gives rise – including what have been variously categorised as 'native maps' and 'sketch maps' – are not so much representations of space as condensed histories. Thus, to put my thesis in a nutshell, knowing is like mapping, not because knowledge is like a map, but because the products of mapping (graphic inscriptions), as those of knowing (stories), are fundamentally *un-maplike*. What follows is an elaboration of this argument.

COGNITIVE MAPS

At the most general level, the question of how people find their way around may be posed in terms of two alternative metaphors. Following David Rubin (1988: 375), I call the first a complex-structure metaphor, and the second a complex-process metaphor. The former, which has long been dominant in cognitive psychology, holds that even before the individual steps forth into the environment, he has already had copied into his mind – through some mechanism of replication – a comprehensive description of its objects, features and locations, and the relations between them. This, of course, is the cognitive map. Having determined his current whereabouts and desired destination within the map, and having plotted the route between them, his actual movement from place to place is a perfectly straightforward, indeed almost mechanical matter of executing the prescribed course. Getting from A to B, in short, is explained through the harnessing of a simple process, of bodily locomotion, to a complex structure, the mental map. With a complex-process metaphor, on the other hand, little or no pre-structured content is imputed to the mind. Instead, wayfinding is understood as a skilled performance in which the traveller, whose powers of perception and action have been fine-tuned through previous experience, 'feels his way' towards his goal, continually adjusting his movements in response to an ongoing perceptual monitoring of his surroundings. What the first approach explains through positing an isomorphism between structures in the world and structures in the mind, the second explains as the unfolding of a field of relations established through the immersion of the actor-perceiver within a given environmental context. This is the approach favoured by ecological psychology, and it is the one I follow here.

Before pursuing an ecological approach to wayfinding, however, it is worth reflecting on the circumstances in which the notion of the cognitive map came to be introduced in the first place. At that time, some half a century ago, psychology was still in the grip of the behaviourist paradigm. Animals, including human beings, were supposed to respond more or less automatically, in ways conditioned by previous experience, to particular environmental stimuli. Seeking to verify this simple model, psychologists devised numerous experiments in which their star laboratory animal – the humble rat – was induced to run through a variety of mazes. Starved at the outset, having successfully negotiated the maze the rat would be rewarded with food from a box. The idea was that through repeated trials, the animal would learn to take one particular path rather than another at each successive 'choice-point' along the route. The whole route would then be remembered as a chain of conditioned responses, such as right or left turns, triggered by the successive appearance of particular stimuli in the form of gateways in the maze. But rats are enterprising creatures, and they often found ways of subverting the experimenters' intentions.

They would, for example, manage to climb out of the maze near the start by pushing back the cover and then run directly over the top to the food box, where they would climb back down and eat. This caused some consternation in the behaviourist camp, since according to the stimulus-response model they should have had no idea of the direction in which to head off in search of food, knowing no other way than the familiar route through the maze, with all its twists and turns.

To further test the rats' abilities, psychologist Edward C. Tolman and his collaborators devised what they called a 'spatial orientation' experiment (Tolman, Ritchie and Kalish 1946). A maze was first set up as shown in Figure 13.1. Starting at A, the animals had to run across an open circular table, then through the alley CD, and finally along the roundabout route through E and F to reach the food box at G. Once they were accustomed to this, the original maze was replaced with the apparatus shown in Figure 13.2. Starting again at A, the animals ran across the circular table and down the alley, only to find it blocked at one end. After returning to the table and exploring a little way down the other radiating paths, each rat would eventually choose to run all the way out along one of them. The overwhelming majority opted for path number 6 – the path that would take them to precisely the same spot where, in the original set-up, the food box had been located. This experiment seemed to provide convincing evidence that in their training for the first maze, the rats had not merely learned a fixed sequence of steps that would lead them reliably towards their goal. Rather, as Tolman hypothesised, they must have built up 'something like a field map of the environment', upon which could be traced all possible routes and paths and their relationships.

Having located their own position and that of the food box in terms of this map, the rats were able to select the path, in the second maze, that led directly from the one to the other. In light of this ability it was clearly inadequate, Tolman reasoned, to liken the animal's central nervous system – as the behaviourists had done – to a telephone switchboard such that every incoming stimulus simply 'dials up' the appropriate response. The brain was to be compared, instead, to a 'map control room' where stimulus-based information would be collected and collated, and where the routes would be plotted that would finally determine the animal's overt behavioural responses (Tolman 1948: 192).

Despite its provocative title, Tolman's 1948 paper – 'Cognitive maps in rats and men' – had much to say about rats but virtually nothing about human beings. Ironically, what little Tolman did have to say about humans had nothing to do with their abilities of orientation and wayfinding, but with certain psychopathologies which, he thought, could be attributed to regimes of child training that blocked the development of properly comprehensive cognitive maps. Ending on a high moral tone, Tolman preached that only by inculcating the paramount virtues of reason and tolerance could our

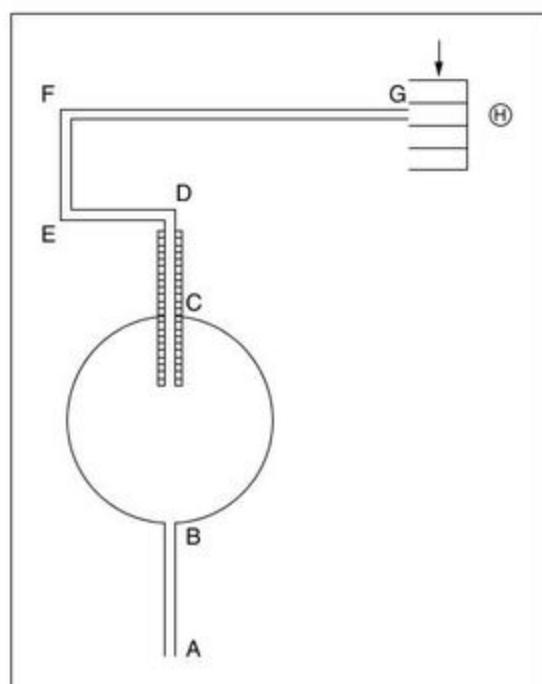


Figure 13.1 The spatial orientation experiment: the original maze.

After Tolman, Ritchie and Kalish, Studies in spacial learning I, *Journal of Experimental Psychology*, 36, 1946.

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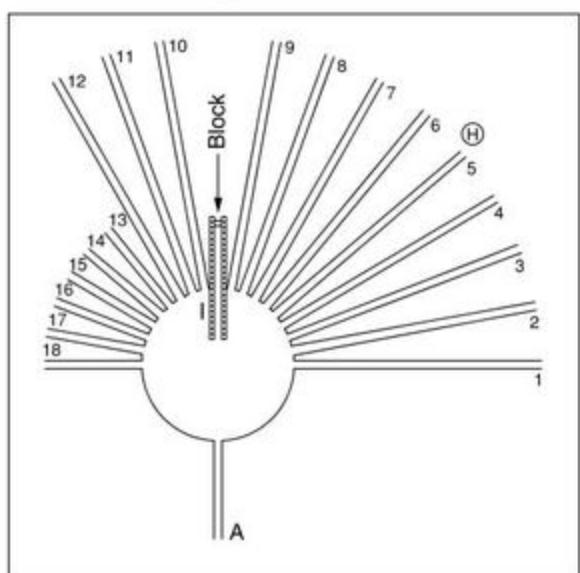


Figure 13.2 The spatial orientation experiment: the replacement maze.

After Tolman, Ritchie and Kalish, Studies in spacial learning I, *Journal of Experimental Psychology*, 36, 1946.

children be furnished with maps sufficiently broad and comprehensive to cope with 'that great God-given maze which is our human world' (1948: 208). It is hard to know what the rats would have made of this! Be that as it may, more recent work by James and Carol Gould on the wayfinding abilities of honey bees helps to put the rats' capacities in perspective. For it turns out that what rats can do, bees can do too: namely, make their way directly to a food source, along a course never taken before. And they can do this without involving anything that we might dignify by terms like 'thought', 'reason' or 'imagination'. The Goulds sound an appropriate note of scepticism when they remark that the calculation a bee would have to undertake in order to plan an optimal route would not be beyond a simple computer. There is no obvious reason why the bee, or for that matter the rat, should have any more of an understanding of the task before it than the computer, or why its solution should call for any intelligence whatsoever (Gould and Gould 1988: 224–5).

Here is what the Goulds did with their bees. First, a group of foragers were trained to fly to a feeding station in some woods out of sight of the hive. Later, individuals about to set off from the hive to the feeder were captured and transported, in an opaque container, to another location well off from their regular route and from which the feeder, likewise, was hidden from view. Here they were released. It was found that the bees flew straight from this location to the feeder, along what can only have been an entirely novel route for them. There is no way in which they could have done this, had they been constrained to follow a fixed sequence of steps between accustomed landmarks – as stipulated by the stimulus-response model. Instead, the Goulds suggest, the bee does what we would do under similar circumstances: 'she would use nearby landmarks to figure out where she is, determine in which direction her goal lies, and then depart directly towards it' (Gould and Gould 1988: 109). She navigates, in other words, in terms of a cognitive map. That humans do likewise was suggested by experiments conducted by Worchsel (cited by Oatley 1977: 539–40), who led his subjects blindfold along two sides of a right-angled triangle and then told them to make their way back along the hypotenuse – a task they completed with considerable accuracy. The ability to update one's position on the cognitive map, and thereby to keep on target despite twists and turns, is – according to Keith Oatley – the basis for any kind of navigation, whether on land or at sea. But whatever the conditions under which it is carried out, navigation 'is a complex cognitive skill' (Oatley 1977: 537).

Comparing what the Goulds say about bees with what Oatley says about humans, we find more than a hint of double standards. Confronted with essentially the same task, its successful accomplishment by humans is attributed to complex skills whereas bees apparently do it on autopilot. I do not mean to deny that human wayfinding is a highly complex, skilled process. But there seems good reason to suppose that it is skilled precisely

to the extent that it goes *beyond* the simple computational operations described by cognitive map theorists. For the environment within which people find their way about is not, as Tolman would have it, a 'great God-given maze', with all its landmarks, routes, openings and obstructions already laid out in advance. It is rather an immensely variegated terrain of comings and goings, which is continually taking shape around the traveller even as the latter's movements contribute to its formation. To hold a course in such an environment is to be attentive at all times to what is going on around you, and to respond in ways that answer to your purpose. This is probably as true of rats, in their ordinary environment, as it is of human beings in theirs. Rats are sensitive and intelligent creatures, and if their performance in experimental mazes manifests a basic computational capacity but no real skill, this is only because the artificial set-up in which they find themselves is a highly impoverished one that deprives them of any opportunity for the exercise of normal powers of discrimination and judgement.

WHAT IS A MAP ANYWAY?

The core assumption of the cognitive approach to orientation and wayfinding is, as we have seen, that perceptually salient aspects of the structure of the world are copied into an analogous structure in the mind (Rubin 1988: 375). This copy is said to be a map, or at least to be maplike in form. But why should this particular metaphor have been adopted, rather than some other? Why maps rather than, say, pictures or images? What is the difference between a map of the world and a picture or image of the world? Any general definition of a map, say Arthur Robinson and Barbara Petchenik, 'must be based on its being simply a representation of things in space' (1976: 15). Yet a perspective drawing would satisfy this criterion, and we would surely not describe such a drawing as a map. One possible approach to defining a map, in contradistinction to the perspectival image, is suggested by Alfred Gell (1985). The approach rests on the idea that maps encode beliefs or propositions about the locations of places and objects that are true (or taken to be true) independently of where one is currently positioned in the world. An example of such a proposition might be that 'Edinburgh is north of London'. One could issue statements to this effect whether one was in London, Edinburgh, or anywhere else for that matter, and they would all be equally valid. In Gell's terms, these statements – each of which is a *token* of the proposition in question – are *non-indexical*, in that their truth conditions are not bound to the place where they are made.

Accordingly, Gell proceeds to define the map as 'any system of spatial knowledge and/or beliefs which takes the form of non-token-indexical statements about the spatial locations of places and objects' (1985: 278–9). Now a person equipped with knowledge in this form ought, in principle, to be able to figure out just how the world should look from any selected point of observation. If I were hiking in the mountains, for example, I should be able to state how the various peaks would appear arrayed before me, were I standing on a particular summit. Such statements, however, since they hold good only for the view from that summit, and none other, are *indexical* of the place. Any set of beliefs and propositions whose tokens are indexical in this sense, having regard for what is where for a subject positioned at a certain location, comprises what Gell calls an *image* (1985: 280). Thus the difference between the image and the map comes to hinge on the criterion of the indexicality or non-indexicality of its tokens. If our knowledge consisted only of images – that is, of token-indexical spatial propositions – then, to follow Gell's argument, we would never be able to hold any coherent idea about our own location in space, or about

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the locations of other places relative to ourselves. We know where we are, not because what we see around us matches to a certain mental image, but because this image has itself been uniquely derived from an underlying map, at a point defined by a given set of spatial coordinates that are indifferent to our own movement. As we travel from one place to another, we pass through a sequence of images, each of which is specific to – and in turn permits us to identify – a particular location along the way. But the map, from which all these images are generated, remains the same wherever we are.

I shall return in due course to what Gell has to say about the nature of navigation and wayfinding. For the moment I want to focus on the implications of this way of distinguishing between the map and the image. It is certainly true, as Gell intimates, that the mere possession of a map, whether mental or artefactual, will not help you to find your way around unless you can use it to generate location-specific images for comparison with immediate perceptual experience. It is also true that no map will do the work that cognitive theorists expect of it unless the information it encodes is invariant with respect to the location of the percipient. Consider Oatley's assertion, for example, that the essence of navigation lies in the 'ability to update one's position within the cognitive map while travelling' (1977: 539). How could this possibly be done if the map keeps changing as one goes along? Oatley himself confuses the issue, when he speaks of the navigator's cognitive map as 'a process, not just a picture' (p. 546). For if the navigator is to look to the map for directions, it can be neither process nor picture, neither embodying his own movement nor representing any particular scenes along the route. 'We only update maps', as Gell observes, 'when the geography of the world changes, not whenever we move about ourselves' (1985: 274). Ultimately, the justification for extending the map metaphor into the domain of cognition must lie in the assumption, more often than not unstated, that what the map affords is a representation of things in space that is independent of any particular point of view.

This assumption, however, raises problems of its own. One of the difficulties that cartographers often face in their attempts to explain the nature of maps is that the very fields, of cognition and communication, from which they might find appropriate analogues have already seized upon the map as an analogue from cartography. 'When non-cartographic writers use the term "map"', as Robinson and Petchenik say, 'they seem to mean that it is possible to take isolated incidents, experiences, and so on, and arrange them intellectually so that there is some coherence, some total relation, instead of individual isolation' (1976: 4). Thus scientists refer to their theories as maps, into which can be fitted the data of observation, while anthropologists are inclined to attribute a similar maplike quality to culture and society (for example, Leach 1976: 51), on the grounds that it furnishes an overarching framework of concepts and categories for the organisation of otherwise fragmentary sensory experience. These, and many other similar metaphorical usages make it appear natural and self-evident that *actual* maps should function in the same way, as schematic representations of the real world, which do not index any position but upon which it should be possible to plot the position of everything in relation to everything else. Now most people in Western societies, educated since their schooldays in the conventions of modern cartography, probably do tend to think of maps as representations of this kind. But whether the artefacts and inscriptions that have at one time or another been designated as maps actually satisfy the requirement of non-indexicality, is moot. The question, in short, is: are maps maplike?

David Turnbull, arguing from the perspective of a sociologist of science, makes a compelling case to the effect that they are not. The idea that maps are independent of

any point of view, that the propositions they encode are equally valid wherever one stands in the world, is, Turnbull contends, a myth – though it is one that has been avidly cultivated in the name of science and objectivity (Turnbull 1989: 15). The reality is that no map, however ‘modern’ or sophisticated the techniques of its production, can be wholly divorced from the practices, interests and understandings of its makers and users. Or to put it another way, every map is necessarily embedded in a ‘form of life’. And to the extent that it is so embedded, it must fail on the criterion of non-indexicality. As Turnbull explains, ‘all maps are in some measure indexical, because no map, representation or theory can be independent of a form of life’ (1989: 20). At first glance, this argument seems to run directly counter to Gell’s insistence that a representation can only be a map insofar as the propositions encoded therein are *non-indexical*. Closer examination, however, reveals a certain slippage in the meaning of indexicality. Is indexing a place the same as indexing a form of life? If the map discloses a perspective or ‘point of view’, is this a view *in* the world, as it appears from a particular place, or a view *of* the world, filtered through the concepts, categories and schemata of a received cultural tradition? Could a map be non-indexical in the first sense and indexical in the second?

Consider an example to which both Gell and Turnbull refer. Micronesian mariners,¹ who are used to voyaging across hundreds of miles of open sea between often tiny islands, know the bearing of any island from any other by its so-called ‘star course’ – that is, by a list of stars whose successive rising or setting points, during the night, indicate the direction in question. The expert mariner has committed to memory an entire compendium of star courses, each unique to a particular pair of islands, and it is in this compendium, according to Gell, that his ‘map’ consists. Now it is clearly the case that any statement of the course between one island A, and another island B, will not depend for its validity on one’s current position at sea. Thus star courses ‘have the essential map property of non-token-indexicality; they do not change truth value according to where they are uttered’ (Gell 1985: 284). Yet it is also fair to say, with Turnbull, that the principles upon which the Micronesian mariner’s map is constructed are securely embedded within the percepts and practices of traditional seafaring, and therefore that it requires a knowledge of this cultural context to be able to ‘read’ and understand the map. It would appear, in short, that while the map indexes a tradition, it is non-indexical with regard to location. The same, moreover, could be said of ‘modern’ maps, constructed on scientific principles with the aid of sophisticated technological gadgetry. Modern science and technology, as Turnbull remarks (1991: 36), are as dependent on tradition for their successful transmission as is Micronesian seafaring lore. And no more than Micronesian maps can modern maps be understood without taking into account ‘the world view, cognitive schema or the culture of the mapmaker’ (Turnbull 1989: 20).

There is, however, something deeply paradoxical about this argument. For to separate tradition from locality, or culture from place, is also to divorce traditional knowledge from the contexts of its production in the environmentally situated experience of practitioners. Thus the form of life is reduced to a ‘world view’ or ‘cognitive schema’ – a set of rules and representations for the organisation of sensory experience that individuals carry in their heads and that are available for transmission independently of their bodily activity in the world. It is as though culture were *received* along lines of traditional transmission from ancestors, and *imported* into the sites of its practical application. But this is to fall right back into the classical view of culture as a map, the analogy – as Bourdieu (1977: 2) points out – ‘which occurs to an outsider who has to find his way around in a foreign landscape and who compensates for his lack of practical mastery, the prerogative of the

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native, by the use of a model of all possible routes'. So here is the paradox: actual maps are made to appear indexical with regard to cultural tradition only by a rendering of culture as non-indexical with regard to locality. The placing of maps within their cultural context is paralleled by the *displacing* of culture from its context in the lifeworld. How, then, are we to resolve this dilemma? How can we hold on to the commonsense notion that maps retain a certain invariance as we move about, that they do not continually recompose themselves to reflect the particularities of wherever we happen to be, while yet recognising their embeddedness in locally situated practices? My answer, in brief, will be that what maps index is *movement*, that the vision they embody is not local but *regional*, but that the ambition of modern cartography has been to convert this regional vision into a *global* one, as though it issued from a point of view above and beyond the world.

HOW TO SEE THE WORLD FROM EVERYWHERE AT ONCE

When you stand at a particular spot, everything appears from a certain angle, while much of the environment will likely be hidden from view behind prominent foreground features. Stand at another spot, and things will appear differently. In order to have any conception of the overall configuration of one's environment, it would seem necessary to be in possession of some kind of totalising scheme into which every one of these location-specific perceptual images could be integrated. This, as we have seen, is an argument commonly adduced to justify positing the existence of cognitive maps. It is an argument, however, that assumes a snapshot theory of vision, as if one could only ever see, in perspective, from a fixed point of observation. 'Is not to see', as Merleau-Ponty asks rhetorically, 'always to see from somewhere?' He proceeds to answer, however, in the negative (Merleau-Ponty 1962: 67). To take up his own example, the house next door may be viewed from this side or that, from inside or outside, or even from up above if one were to fly overhead. But what I see is none of these appearances; it is the house *itself*, in all its concrete actuality. The form of the house is progressively disclosed to me as I move around and about, and in and out, not as the sum of a very large number of images, arrayed in memory like frames on a reel of film, but as the envelope of a continually changing perspectival structure. Observation, Merleau-Ponty claims, consists not in having a fixed point of view on the object, but 'in varying the point of view while keeping the object fixed' (1962: 91). Thus the house is not seen from somewhere but from nowhere – or rather from everywhere (pp. 67–9).

In keeping with his ecological approach to visual perception, James Gibson presents an argument along very similar lines. Animals and people, Gibson writes, see as they move, not just in the intervals between movements. Such ambulatory vision takes place along what he calls a 'path of observation'. A path is to be understood not as an infinite series of discrete points, occupied at successive instants, but as a continuous itinerary of movement. Thus the environment one sees is neither 'seen-at-this-moment' nor 'seen-from-this-point'. On the contrary, 'what one perceives is an environment that surrounds one, that is everywhere equally clear, that is in-the-round or solid, and that is all-of-a-piece' (Gibson 1979: 195–7). But if the features of this environment are revealed as one travels along paths of view, rather than projected from a sequence of points of view, where do these paths begin, and where do they end? And if we see not at this moment in time, but over a certain period, how long is this period? Such questions cannot be precisely answered. Of a minor feature we might say, after only cursory exploration, that we have seen it all. But of a complex, varied and extensive terrain, although we may have criss-crossed it along innumerable paths,

we may still feel there is more to be discovered. As for our perception of the environment as a whole, what else can this be than the outcome of a lifetime's observation, along all the paths we have ever taken? This is what Gibson means when he asserts that perceiving the world over a sufficient length of time, and along a sufficiently extended set of paths, is tantamount to perceiving it 'as if one could be everywhere at once' (p. 197).

It is critically important to distinguish this sense of omnipresence from that implied by the conventional notion of the 'bird's-eye view' (Gibson 1979: 198–9). The latter, of course, has nothing to do with the way birds in flight actually see, but rather describes how we imagine the world would look from a point of observation so far above the earth's surface that the entire territory with which we are familiar from journeys made at ground level could be taken in at a glance. The higher one goes, it is supposed, the more one's vision transcends the locational constraints and narrow horizons of the view from the ground. And by the same token, the more apparently maplike it becomes. Robinson and Petchenik are right to point out that the analogy between the map and the bird's eye view is potentially misleading, not only because of their different geometries of projection, but also because the map is 'a construction, an abstraction, an arrangement of markings that relates to spatial "reality" only by agreement, not by sensory testability' (1976: 53). Nevertheless, anyone who has flown over familiar country by plane will have been astonished, on the one hand, by how strange it looks, and on the other, by how closely the view from the window resembles a topographic map of the same territory. There is nothing strange, however, about the environment perceived from everywhere, in the sense adduced by Merleau-Ponty and Gibson, nor do you have to leave the ground to perceive it in this way. It is not a view from 'up there' rather than 'down here', but one taken *along* the multiple paths that make up a country, and along which people come and go in the practical conduct of life. Our perception of the environment as a whole, in short, is forged not in the ascent from a myopic, local perspective to a panoptic, global one, but in the passage from place to place, and in histories of movement and changing horizons along the way.

The same point could be made, following Edward Casey (1996: 30), through a contrast between *vertical* and *lateral* modes of integration. In the vertical mode, embraced by modern cartography as well as by cognitive map theorists, local particulars obtained by observation on the ground are fitted within an abstract conception of space so as to form a representation of the world as though one were looking down upon it from 'up above'. While the eyes of the body remain close to the ground, the mind's eye – which is witness to this maplike representation – is up with the birds. The lateral mode of integration, by contrast, presupposes no such division between mind and body. For the work of integration is performed by the organism as a whole as it moves around, purposefully and attentively, from place to place. Such movements do not merely connect places that are already located in terms of an independent framework of spatial coordinates. Rather, they bring these places into being as nodes within a wider network of coming and going. Casey refers to this network of interplace movement as a *region* – that is, 'an area concatenated by peregrinations between the places it connects' (1996: 24). Evidently, when Gibson speaks of perceiving the environment from everywhere at once, that 'everywhere' is neither space, nor a portion of space, but a region in this sense. Likewise, every 'somewhere' is not a location in space but a position on a path of movement, one of the matrix of paths comprising the region as a whole. In short, whereas everywhere-as-space is the world as it is imagined from a point of view above and beyond, everywhere-as-region is the world as it is experienced by an inhabitant journeying from place to place along a way of life.

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This idea of the region may be illustrated by means of three ethnographic examples. Among the Walbiri, an Aboriginal people of western central Australia, the entire country is perceived 'in terms of networks of places linked by paths' (Munn 1973a: 215). Originally laid down through the movements of ancestral beings in that formative era known as the Dreaming, these paths are continually retraced in the journeys of the living people who take after them. As they relate the stories of these journeys, Walbiri men and women may draw web-like figures in the sand whose basic components are lines and circles. Every line conveys a journey to or from camp, while every circle conveys the act of making camp by walking all around it. Rather similarly for the Ongees, a group of hunter-gatherers inhabiting the island of Little Andaman in the Bay of Bengal, places are brought into being at the confluences of the paths of movement of humans, animals and spirits. Asked by the ethnographer, Vishvajit Pandya, to draw the places where humans and spirits live, Ongee informants responded by sketching lines of movement (straight for humans, wavy for spirits), leading to the demarcation of the various places at their intersections.² The world of the Ongees, Pandya concludes, 'is not a preconstituted stage on which things happen, but rather an area or region created and constructed by the ongoing practice of movement' (Pandya 1990: 777). My third example is taken from A. Irving Hallowell's study of the Saulteaux (Ojibwa), hunters and trappers of the Berens River district near Lake Winnipeg in Canada. In Saulteaux experience, to move in a certain direction is always to travel from place to place. This is so not only for human persons, but also for the sun, the moon and the winds, all of which are held to be persons of a kind. Thus 'what we refer to abstractly as cardinal directions are to them the *homes* of the winds, the places they come from. Similarly, east is thought of as the place where the sun rises; west, the place where it sets; south is the place to which the souls of the dead travel, and the place from which the summer birds come' (Hallowell 1955: 191). For the Saulteaux, then, as indeed for the Ongee and the Walbiri, 'everywhere' is not a space but a region concatenated by the place-to-place movements of humans, animals, spirits, winds, celestial bodies, and so on.

KNOWING AS YOU GO

We can now return to the paradox I introduced earlier. If our knowledge of the environment is embedded in locally situated practices, how come that it retains a certain constancy as we move about? If all knowledge is context-dependent, how can people take their knowledge with them from one context to another? For clues towards a resolution I turn once again to the work of David Turnbull. One of Turnbull's aims is to break down the conventional distinction between so-called indigenous knowledge and Western science. He does so by emphasising that *all* knowledge, of whatever kind and historical provenance, is generated within a 'field of practices' (1989: 61). And since practices must be carried out by particular people in particular places, all knowledge – including that which we call science – must be inherently local. Let me set aside for the time being the contrary thesis, which Turnbull confusingly appears to entertain at the same time, that the context for both indigenous and scientific knowledge is something like a worldview or cognitive schema, by nature detached from the local sites of its practical expression. I have already drawn attention to the dangers of falling back on a concept of culture that divorces knowledge and its transmission from environmentally situated experience. My present concern is with another difficulty in Turnbull's argument. For while on the one hand, he insists that a common characteristic of all knowledge systems is their 'localness', he also argues,

on the other, that what is critical to the growth and reproduction of any knowledge system is the work that goes into moving its diverse components – including practitioners, their know-how and skills, technical devices and standards of evaluation – from one local site of knowledge production to another (Turnbull 1993a: 30).

Consider the case of Western science. According to what might be called the ‘official’ view of science, data recorded by means of standardised procedures in diverse locations are fitted into a framework of theory consisting of propositions that are strictly non-indexical with regard to place. What happens in practice, however, is a good deal more messy. Not only is it unclear where data collection ends and theory building begins, but also there is no unified body of theory under which all of experience can be subsumed. Rather, there are as many theoretical growth-points as there are sites of practical investigation, and the character of each is conditioned by circumstances peculiar to each place. Much of the labour of science, Turnbull argues, lies in attempts to establish the connectivity and equivalence that would render procedures developed and results obtained in one local context applicable in another (1993a: 37). But if science calls for the constant movement of personnel, knowledge and techniques from place to place, and the assemblage, in each, of inputs of heterogeneous provenance, how can it also share the characteristic of localness? As a system of knowledge, science cannot be rooted in any particular place or places, but must rather emerge from the total network of interplace relations constituting its field of practice. Furthermore, if that is so for science, then it should be equally so for any other knowledge system. As Turnbull himself puts it, ‘all knowing is like travelling, like a journey between the parts of a matrix’ (1991: 35). So what is this matrix? It is, of course, a *region* in the sense defined above – that is, as the sum of journeys made.

My point is that knowing, like the perception of the environment in general, proceeds along paths of observation. One can no more know *in* places than travel in them. Rather, knowledge is regional: it is to be cultivated by moving along paths that lead around, towards or away from places, from or to places elsewhere. Conceived as the ensemble of such place-to-place movements, the notion of region, far from denoting a level of generalisation intermediate between local particulars and global universals, offers a way out of this kind of dichotomous and hierarchical thinking. As every place, through the movements that give rise to it, enfolds its relations to all others, to be somewhere *is* to be everywhere at once. Rephrased in our terms, what Turnbull proposes is a compelling argument to the effect that all knowledge systems, including science, are integrated laterally rather than vertically. The philosopher Joseph Rouse makes much the same point in arguing that ‘we go from one local knowledge to another rather than from universal theories to their particular instantiations’ (Rouse 1987: 72). In light of the foregoing considerations, I would prefer to say that we *know as we go*, from place to place. This does not, however, alter the basic point, which is that science is distinguished from other systems of knowledge by the lengths to which it goes to present itself *as if* it were vertically integrated, as if the scientist’s task were to fit data to theory rather than to put the knowledge that has brought him to one place to work in setting off towards another. To create this illusion, science has to suppress, or to hide from view, the social labour involved in establishing equivalences and connections across places (Turnbull 1996: 62). In this, moreover, it is aided and abetted by modern cartography, which has been similarly concerned to establish its scientific credentials through its claim to produce accurate and objective representations of a world ‘out there’.

Cartographers, like scientists, and indeed like practitioners of any other knowledge system, draw their material from all manner of sources, through both direct observation

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and inquiry into local tradition. The collection and collation of this material may take them – or agents operating on their behalf – on innumerable and often lengthy journeys. None of this, however, appears in the final form of the modern, ‘scientific’ map. To the contrary, one of the most striking characteristics of the modern map is its elimination, or erasure, of the practices and itineraries that contributed to its production (Turnbull 1996: 62). In the words of Michel de Certeau, ‘the map, a totalising stage on which elements of diverse origin are brought together to form a tableau of a “state” of geographical knowledge, pushes away into its prehistory or into its posterity, as if into the wings, the operations of which it is the result or the necessary condition’ (1984: 121). Just as science, in the official view, is charged with the task of integrating site-specific data into an overarching, unified framework of theory, so the mission of cartography is ostensibly one of representing the ‘geographic facts’ on the ground within a single, universal system of spatial coordinates (Edney 1993: 55). The ideal is a perfect congruence between the world and its representation, and progress is measured by the degree of approximation towards it. Thus in the work of the modern cartographer, knowledge generated through movement from place to place within a region is presented *as if* it issued from a totalising vision above and beyond the world. In short, cartography transforms everywhere-as-region, the world as experienced by a mobile inhabitant, into everywhere-as-space, the imaginary ‘bird’s-eye view’ of a transcendent consciousness.

The same transformation, of course, is worked on the ordinary perception of the environment by the theory of cognitive maps. As in the modern artefactual map, so too in its ‘mental’ analogue, all those movements of coming and going through which people develop a knowledge of their environment are pushed into the wings, to recall de Certeau’s phrase, leaving the map as a *fait accompli*, final and complete, the product of a process of making that begins with the layout of the world and ends with that layout copied into the mind. Any journeys undertaken beyond that point are supposed to belong to the phase of map-using rather than mapmaking, and therefore to play no further part in the formation of the map itself. The traditional Micronesian seafarer, in this view, is just as much a map-user as is the modern marine navigator with his charts and compass, even though his skill ‘is entirely mental and perceptual, using no instruments of any kind’ (Oatley 1977: 537). But whereas modern artefactual maps have their authors, designers or manufacturers, the origins of traditional mental maps appear lost in the mists of time. Indeed to say of such maps that they are ‘traditional’ is virtually tantamount to an admission that they have no maker or makers, but rather that they ‘make themselves’ – or that like myths, following Lévi-Strauss’s celebrated aphorism, they ‘think themselves out’ through the medium of men’s minds and without their knowledge (Lévi-Strauss 1966a: 56). In any case the assumption is that the map is made before it is used, that it already exists as a structure in the mind, handed down as part of a received tradition, prior to the traveller’s venturing forth into the world.

My contention, to the contrary, is that people’s knowledge of the environment undergoes continuous formation in the very course of their moving about in it. To return to a distinction which I introduced at the outset, this is to account for such knowledge in terms of the generative potentials of a complex process rather than the replication of a complex structure. That process consists in the engagement of the mobile actor-perceiver with his or her environment. As I have already suggested, we know *as we go*, not *before* we go. Such ambulatory knowing – or knowledgeable ambulating – cannot be accommodated within the terms of the conventional dichotomy between mapmaking and map-using. The traveller or storyteller who knows as he goes is neither making a map

nor using one. He is, quite simply, *mapping*. And the forms or patterns that arise from this mapping process, whether in the imagination or materialised as artefacts, are but stepping stones along the way, punctuating the process rather than initiating it or bringing it to a close. My perspective, in short, accords with what Robert Rundstrom has called ‘process cartography’, in which mapping is seen as ‘open-ended, ongoing, always leading to the next instance of mapping, the next map’ (Rundstrom 1993: 21). In what follows, I first show in more detail how mapping differs from mapmaking. I then turn to the distinction between mapping and map-using. All wayfinding, I argue, is mapping; all navigation map-using. Thus mapping is to map-using as wayfinding to navigation. The overall structure of the argument is summarised in Figure 13.3.

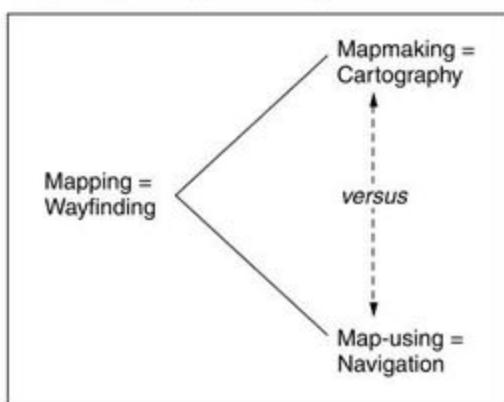


Figure 13.3 The relations between mapping, mapmaking and map-using: a summary.

MAPPING IS NOT MAPMAKING

‘Mapping’ and ‘mapmaking’, according to Denis Wood, ‘do not mean the same thing’ (1992: 32). The difference, in his view, is akin to that between speaking and writing. Wood thinks of mapping as a *capacity* universal to humans, established along with other capacities of the human mind-brain through a process of evolution under natural selection. But the fact that all human beings are capable of mapping does not mean that they all make maps. Likewise, just because all humans can speak does not mean they all write. Whereas mapping, like speaking, might be regarded as a ‘universal expression of individual existence’, mapmaking, like writing, has to be seen as ‘an unusual function of specifiable social circumstances arising only within certain social structures’ (Wood 1993a: 50). In other words, the emergence of mapmaking belongs not to the evolution of humanity but to its history. Yet the difference between mapping and mapmaking, just as that between speaking and writing, is for Wood a very fine one. It is not the difference between outwardly expressing an idea and ‘capturing’ that expression in an alternative medium. For one thing, mapping is no more the externalisation of a map that already exists in the mapper’s head than is speaking the externalisation of a thought. Rather, both mapping and speaking are genres of performance that draw their meanings from the communicative contexts of their enactment. It follows, for another thing, that neither mapmaking nor writing can serve to transcribe pre-existent thoughts or mental representations onto paper. The map, like the written word, is not, in the first place, the transcription of anything, but rather an *inscription*. Thus mapping gives way to mapmaking at the point, not where mental imagery yields an external representation, but where the performative gesture becomes an inscriptive practice (Wood 1993a: 53).

Wood illustrates his argument with a nice example. Two boys have been playing rollerblade hockey. At home over dinner, one explains the layout of the court by gesturing with his hands and fingers over a place mat. The other does the same at school, to impress a friend, but in this case (it is during an art class) he gestures with pencil in hand, over a sheet of paper. Whereas nothing remains of the first boy’s gestures on the mat, those of the second leave a trace in the form of an inscription, a sketch-map, that can be preserved and reproduced indefinitely beyond the context of its production. We may

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suppose that the two boys were of equal ability, and moreover that the first would have had ready access to pencil and paper had he needed it. So why did the second make a map and the first not? The answer, for Wood, lies in the nature of the communicative situation. In general, just as much as in this exemplary instance, it is the situation – at once social and political – that calls for the map. And while the difference between gesturing with an inscribing tool and gesturing without might seem slight, the socio-political consequences are immense. It is the ‘fine line of . . . inscription’, Wood concludes, ‘that differentiates . . . mapping . . . from mapmaking, and mapping *societies* from mapmaking *societies*, in the latter of which it is the inscriptive property of the artefactual map that permits it to serve the interests of the power elites who control the mapmaking process (as well as those who would contest them)’ (1993a: 53).

Now while I agree with Wood that there is an important distinction to be made between mapping and mapmaking, I would draw it along different lines. Before doing so, however, we need to be more precise about the meaning of mapping. Wood himself seems unable to make up his mind whether the term refers to a cognitive capacity, to actual movement in the environment, or to the narrative reenactment of journeys made. At one point he tells us that mapping ‘is the way we humans make and deploy mental maps’ (1992: 32), while at another he dismisses the concept of the mental map only to declare that mapping ‘is really just . . . getting around’ (1993a: 53). Yet in his example of the two boys, mapping appears to consist neither in having a pre-existent ‘map in the head’, nor in bodily movement on the ground, but in a kind of retrospective storytelling. It seems to me that the notion of an evolved capacity for mental mapping is deeply flawed. One could hardly expect any such capacity to spring, fully formed, from an individual’s genetic make-up, in advance of his or her entry into the lifeworld. It would rather have to undergo development in the very unfolding of the individual’s life within an environment. Thus the life-historical process of ‘getting around’ – or in a word, wayfinding – would appear to be a condition for the emergence of a ‘mapping capacity’, rather than a consequence of its application. This leaves us with the third sense of mapping – the retelling of journeys made (or possibly the rehearsal for journeys to be made) – as perhaps the most appropriate. I admit, however, that the distinction between wayfinding and mapping is not hard and fast. For one way of retelling the story of a journey is to retrace one’s steps, or the steps of ancestors who made the journey in the past. In effect, since travelling from one place to another means remembering the way, all wayfinding is mapping, though not all mapping is wayfinding. I return to this point below.

For the time being, let us continue to regard mapping as the re-enactment, in narrative gesture, of the experience of moving from place to place within a region. In this sense, both boys in Wood’s example were engaged in mapping. The fact that one left no trace whereas the other produced a lasting inscription has no appreciable bearing on the nature of the activity as such. The sketch-map that emerged, as the trace of the second boy’s gestures, was a more or less incidental by-product of the mapping process, not its ultimate goal. Rundstrom makes much the same point in his account of mapping among Inuit of the central and eastern Canadian Arctic. An Inuit traveller, returning from a trip, could recount every detail of the environment encountered along the way, miming with his hands the forms of specific land and sea features. Such gestural performance, after a long journey, could last many hours. It could also, given appropriate tools and materials, generate an inscription. Many of these inscriptions were produced at the instigation of Western explorers who made contact with the Inuit. They were often astonished at the accuracy of what they regarded as ‘native maps’. But for Inuit mappers it was the performance that mattered

– ‘the recapitulation of environmental features’ – rather than any material artefacts or inscriptions to which it gave rise (Rundstrom 1990: 165). Undoubtedly the vast majority of maps that have ever been produced in human societies, like those of the Inuit, have been improvised on the spot within a particular dialogic or storytelling context, and without any intention for their preservation or use beyond that context. This applies, for example, to the web-like sand drawings of the Walbiri, to which I have already referred (Munn 1973b: 196). ‘Most maps for most of the time’, as Wood observes, ‘have probably been ephemeral, scratched in sand or snow, or, if committed to a more permanent medium, immediately crunched up and thrown away’ (1993b: 83, see Lewis 1993: 99).

In the course of producing such a map, the mapper takes his interlocutors on a tour of the country, and as he does so his moving hand, which may or may not hold an inscribing implement, traces out the paths taken and the sights or landmarks encountered along the way. Of the maps produced in aboriginal times by the Saulteaux, Hallowell notes that ‘their purpose was not to delineate a section of the country as such, but to indicate a route to be followed, and the emphasis was upon a succession of landmarks roughly indicated in their relations to one another’ (Hallowell 1955: 195). Malcolm Lewis’s studies of native North American and Inuit maps have shown that they invariably rest on deictic principles: that is, they *point* to things, revealing aspects of how they look as one proceeds along a path of observation from ‘here’ to ‘there’ (Lewis 1993: 102). Even in contemporary Western societies, whose inhabitants are bombarded on a daily basis with images founded upon cartographic geometries of plane projection – where they live, as Wood puts it, ‘map-immersed in the world’ (1992: 34) – people continue to describe their environment, to themselves and others, by retracing the paths of movement they customarily take through it rather than by assigning each of its features to a fixed location in space. ‘When we are asked for directions’, as Barbara Belyea notes, ‘few of us can resist pointing and waving our arms, or tracing the traveller’s route over the surface of his map. *The gesture becomes a part of the map*, a feature of its reception’ (Belyea 1996: 11, my emphasis). It may be misleading, Belyea suggests, to liken the inscriptive process to writing, as though the purpose of the exercise were to represent the features of the landscape in the same way that writing is supposed to represent the spoken word. For the graphs on the map are not representations of anything. Every line is rather the trace of a gesture, which itself retraces an actual movement in the world. To read the map is therefore to follow the trace as one would the path of the hand that made it.³

The analogy between mapping and writing, however, may be closer than Belyea thinks. For much of its history, at least in the Western world, writing was understood not as the representation of speech but as a means by which what has been said or told could be committed to memory (Carruthers 1990). Throughout the Middle Ages, as David Olson notes, ‘written records were thought of and treated as reminders rather than representations’ (Olson 1994: 180). And the same was true of medieval maps, which served as memoranda of itineraries, providing directions and advice to the traveller who would undertake the same journey (de Certeau 1984: 120). In the history of writing as in that of mapping, remembering gradually gave way to representation over the same period – from the fifteenth to the seventeenth century – that also saw the rise of modern scientific discourse. De Certeau has shown how, in the course of this transition, the map ‘slowly disengaged itself from the itineraries that were the conditions of its possibility’. For some time, maps would continue to be illustrated with pictures of ships, landforms, people and beasts of various descriptions, winds and currents, and the like. Subsequently dismissed as quaint decorations, these figures were really fragments of stories, telling of the journeys,

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and the incidents that took place along them, from which the map resulted. But eventually, the map won out over these pictorial figurations, eliminating all remaining traces of the practices that produced it (de Certeau 1984: 120–1). Thus the making of maps came to be divorced from the experience of bodily movement in the world.⁴ The cartographer has no need to travel, indeed he may have no experience whatever of the territory he so painstakingly seeks to represent. His task is rather to assemble, off-site, the information provided to him – already shorn of the particular circumstances of its collection – into a comprehensive spatial representation. It is of course no accident that precisely the same task is assigned, by cognitive map theorists, to the mind in operating upon the data of sense.

It is at the point where maps cease to be generated as by-products of story-telling, and are created instead as end-products of projects of spatial representation, that I draw the line between mapping and mapmaking. In effect, mapmaking suppresses, or ‘brackets out’, both the movements of people as they come and go between places (wayfinding), and the re-enactment of those movements in inscriptive gesture (mapping). It thereby creates the appearance that the structure of the map springs directly from the structure of the world, as though the mapmaker served merely to mediate a transcription from one to the other. I call this the cartographic illusion (see Figure 13.4). One aspect of this illusion lies in the assumption that the structure of the world, and so also that of the map which purports to represent it, is fixed without regard to the movement of its inhabitants. Like a theatrical stage from which all the actors have mysteriously disappeared, the world – as it is represented in the map – appears deserted, devoid of life. No-one is there; nothing is going on. Suppose, for example, that I describe a journey I have made by tracing a path with my finger over the surface of a topographic map. Once the map has been folded and put away, nothing of this would remain. So far as the map’s representation of the world is concerned, I may as well have never made the trip. Had I, alternatively, traced my path with a pencil, the resulting lines would be deemed to have added nothing to the map, but rather to have defaced it. To restore the map, they would have to be rubbed out! Either way, *my gesture does not become part of the map* but is excluded from it, as is my original movement from the world it represents.⁵ This is in marked contrast to the maps of native North American Indians and Inuit, as described by such scholars as Lewis, Rundstrom and Belyea, which actually *grow*, line by line, with every additional gesture. So do the charts used by Micronesian seafarers, which ‘literally get larger, coconut-palm rib by cowrie shell, and stick by stone’

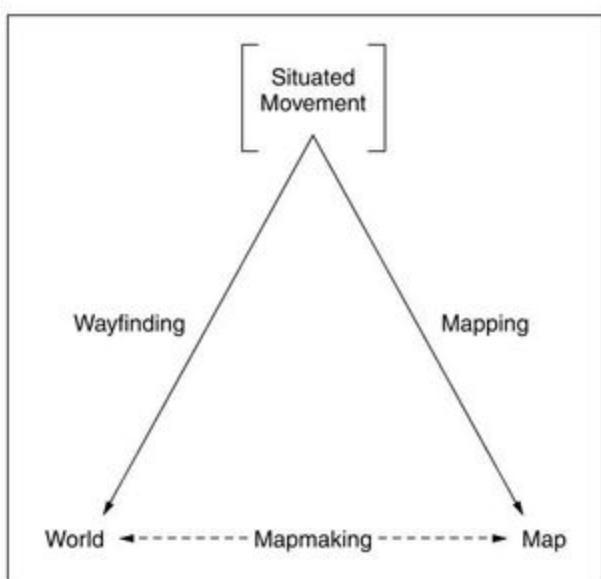


Figure 13.4 The cartographic illusion. The environmentally situated movement entailed in both wayfinding and its narrative re-enactment (mapping) is bracketed out to create the illusion that the form of the map arises, in mapmaking, as a direct transcription of the layout of the world.

(Wood 1992: 31). And so, too, do our own sketch-maps. In these instances the development of the map, as a 'pattern of interconnected lines' (Belyea 1996: 6), parallels that of the region, as a network of coming and going. But the modern topographic map does not grow or develop, it is *made*. And just as the process of its production is eliminated from the final form of the product, so the world it describes is not a world in the making, but one ready-made for life to occupy.

It is this, finally, that lies behind the distinction between the map and the picture, as alternative descriptions of the same country. For those of us schooled in the conventions of modern cartography, the distinction may seem obvious enough. Maps are supposed to furnish an objective record of the disposition of things in space, that is strictly independent of any point of view, whereas pictures show how these things might be experienced by a subject positioned somewhere in that space, or moving through it (Turnbull 1989: 15). It is widely believed, as Svetlana Alpers observes, that 'maps give us the measure of a place and the relationship between places, quantifiable data, while landscape pictures are evocative, and aim rather to give us some quality of a place or the viewer's sense of it. One is closer to science, the other is art'. Anything on the map that evokes the experience of place or movement is dismissed by the scientific cartographer as 'mere decoration'; anything in the picture that conveys factual information about spatial location is dismissed by the artist as 'mere topography' (Alpers 1983: 124–6). But for the Dutch painters and draughtsmen of the seventeenth century, who are the subjects of Alpers's study, these boundaries between maps and pictures, and between science and art, would have made little sense. Mapping and picturing were, for them, one and the same, having as their common aim 'to capture on a surface a great range of knowledge and information about the world' (1983: 122). As mapmaking triumphed over mapping, however, and as cartographers sought to dissociate themselves professionally from artists, so maps were stripped of their pictorial attributes. Thus historians of cartography, viewing the development of mapmaking in retrospect, are able to present it as having progressed from being an 'art' to being a 'science', replacing subjective fancy with hardwon and independently verifiable factual information (Edney 1993: 56). Art, in the words of Brian Harley, was gradually 'edged off the map' (Harley 1989: 4). But to edge art off the map is also to edge human actor-perceivers off the world, to push their direct, sensory experience into the wings, and to consign their narratives of movement and travel to the realms of fable, fantasy and hallucination.

WAYFINDING IS NOT NAVIGATION

'Navigation', writes Edwin Hutchins, 'is a collection of techniques for answering a small number of questions, perhaps the most central of which is "Where am I?"' (Hutchins 1995: 12). So – to return to a question I raised at the outset – what does it mean to know where one is? What would one need to know in order to feel that the question has been satisfactorily answered? First of all, according to Hutchins, one must possess some representation of space – a map – whether internal or external, inscribed in the mind or on a sheet of paper, within which every object or feature in one's environment is assigned a determinate location. One has then to be able to establish a coherent set of correspondences between what is depicted on the map and what is visible in one's surroundings. From these it should be possible to identify one's current position in the world with a specific location on the map. Only then has the question of where one is been answered (Hutchins 1995: 12–13). Alfred Gell, in an article to which I have already referred, argues

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along much the same lines. To know where one is, in Gell's view, it is not enough to have formed a perceptual image of the environment as seen from some place. This image has to be matched to that generated from the map (mental or artefactual) at a particular spatial location. 'Navigation', according to Gell, 'consists of a cyclic process whereby images generated from maps are matched up against perceptual information, and perceptual images are identified with equivalent coordinates on a map' (1985: 280). This process of matching is essentially the same as what Hutchins means by 'establishing correspondences', such as, for example, when we say 'this here' (pointing to contours on the map) corresponds to 'that there' (pointing to the outline of a hill on the horizon).

Now while Gell takes as his principal ethnographic example the classic case of Micronesian seafaring, Hutchins chose to study the practices of nautical navigation on board a large modern naval vessel. Both writers insist, however, that reduced to its bare essentials, navigation is a cognitive task that all of us face all the time as we find our way about, whether at sea or on land. Navigational techniques may of course be distinguished, as Gell admits, both in terms of their complexity and the volume of information handled, and in terms of the extent to which this information is published or transmitted by rote memorisation. But none of this, he claims, alters the fact that 'the essential logical processes involved in all way-finding, from the most elementary and subliminal, to the most complex and laborious, are identical' (Gell 1985: 286). For Hutchins, likewise, we are all navigators in our everyday lives, as the following passage reveals:

When the navigator is satisfied that he has arrived at a coherent set of correspondences, he might look to the chart and say 'Ah, yes; I am here, off this point of land.' *And it is in this sense that most of us feel we know where we are.* We feel that we have achieved reconciliation between the features we see in our world and a representation of that world.

(1995: 13, my emphasis)

Yet as soon as Hutchins takes us on board ship, and introduces us to the work of the navigators on the bridge, things look rather different. For it turns out that establishing correspondences between features on the chart and features in the environment is extremely difficult, and calls for specialised skills that can only be acquired through lengthy training and hands-on experience. To reconcile the chart with the territory, as Hutchins explains, one has to imagine how the world would look from a point of view – that of the 'bird's eye' – from which it is never actually seen, save from an aircraft or satellite. The ordinary passenger, untutored in the techniques of navigation, is quite unable to do this, and may confess to being baffled by maps and charts. He cannot, in other words, translate from his on-board experience of motion as 'moving through a surrounding space' to the depiction of motion on the chart as 'that of an object moving across a space'. Navigators, on the other hand, become so used to thinking of the movement of the ship from this peculiar perspective – as if they were manoeuvring it about like a counter on a game-board – that they find it difficult to imagine this movement, any more, from the ordinary passenger's perspective (Hutchins 1995: 62).

I intend to argue, in accord with Hutchins's ethnography but contrary to his general claim, that we are no more navigators in our everyday lives – in finding our way around in a familiar environment – than we are cartographers when we retrace these movements in narrative. Navigation (or map-using) is, I contend, as strange to the ordinary practices of wayfinding as is cartography (or mapmaking) to ordinary practices of mapping. It would be

hard to imagine why we should find the navigator's charts so baffling, or why his skills should be so specialised, if they were but analogues of cognitive structures and capacities that we use all the time. Thus Gell, along with others who have had resort to the notion of cognitive maps, is surely wrong to regard wayfinding and navigation as processes of a similar or even identical kind. For when we move about, we do not normally think of ourselves as piloting our bodies across the surface of the earth, as the navigator pilots his ship across the ocean. Nor do we have to think in this way in order to know, at any moment, where we are. This is because the question 'Where am I?' is not ordinarily answered in terms of a location in space, determined by the intersection of an independent set of coordinates. Hutchins to the contrary, it is *not* in this sense that most of us feel we know where we are. Indeed I may know precisely where I am and yet have no idea of my geographic location. For it is not by assigning the position where I currently stand to certain spatial coordinates that an answer to the 'where' question is arrived at, but rather by situating that position within the matrix of movement constitutive of a region.

To amplify this point, let me compare two, admittedly fictional, scenarios. In the first you are walking with a friend through unfamiliar terrain, equipped with a topographic map. Arriving at a place that affords a good panoramic view, your friend stops to ask, 'Where are we?' You look around, pointing to various landmarks which you proceed to correlate with markings on the map. Finally, indicating with a finger a particular spot on the map's paper surface, you declare 'We are here'. In the second scenario, you are walking in familiar country around your home, with a companion who is a stranger to the area. Once again, on arrival at a certain place, your companion puts the same question, 'Where are we?' You may respond in the first instance with a place-name. But then, realising that the name alone leaves him none the wiser, you might go on to tell a story about the place – about your own association with it, about other people who have lived and visited there, and about the things that happened to them. Now in the second case you have no need to consult an artefactual map, nor would it be of any avail to you, not because you have resort instead to a map inside your head, but because knowing your present whereabouts has nothing to do with fixing your location in space. As someone who has lived in a country, and is used to its ways, knowing where you are lies not in the establishment of a point-to-point correspondence between the world and its representation, but in the remembering of journeys previously made, and that brought you to the place along the same or different paths. In the first scenario, of course, you have no knowledge of this kind. Having never visited the country before you do not know where you are, in the sense you do when on home ground, even though you may be able to locate your own position, and that of everything else, with pin-point accuracy on your map.

For those who know a country, in short, the answers to such basic questions as 'Where am I?' and 'Which way should I go?' are found in narratives of past movement. It is in this respect, as noted earlier, that wayfinding and mapping become one and the same: to follow a path is also to retrace one's steps, or the steps of one's predecessors. And in this respect, too, wayfinding differs fundamentally from navigation, just as mapping differs from map-using. For when navigating in a strange country by means of a topographic map, the relation between one's position on the ground and one's location in space, as defined by particular map coordinates, is strictly synchronic, and divorced from any narrative context. It is possible to specify where one is – one's current location – without regard to where one has been, or where one is going. In ordinary wayfinding, by contrast, every place holds within it memories of previous arrivals and departures, as well as expectations of how one may reach it, or reach other places from it. Thus do places enfold the passage

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of time: they are neither of the past, present or future but all three rolled into one. Endlessly generated through the comings and goings of their inhabitants, they figure not as locations in space but as specific vortices in a current of movement, of innumerable journeys actually made. Taking this view of place as my starting point, I now want to show how wayfinding might be understood not as following a course from one spatial location to another, but as a movement in *time*, more akin to playing music or story-telling than to reading a map.

PATHS, FLOWS AND THE PASSAGE OF TIME

The inspiration for this move comes from Gibson, and follows from his insight – which I explored in an earlier section – that the environment is perceived not from multiple points of view but along a path of observation. Rejecting both of the dominant psychological approaches to wayfinding, as chains of conditioned responses to environmental stimuli and as navigation by means of cognitive maps, Gibson proposes an alternative, ‘the theory of reversible occlusion’ (1979: 198). In brief, the theory states that one knows the way in terms of the specific order in which the surfaces of the environment come into or pass out of sight as one proceeds along a path. Suppose, for example, that you are walking along a street in town, or through a valley in the countryside. The surfaces you can see – the facades of buildings in the one case, or the ground rising on either side in the other – comprise a *vista*. As Gibson explains, a vista is ‘a semienclosure, a set of unhidden surfaces, . . . what is seen from here, with the proviso that “here” is not a point but an extended region’. But now, as you turn the corner into another street, or reach the brow of the ridge at the head of the valley, a new set of surfaces, previously hidden, looms into view, while those of the original vista disappear from sight. The passage from one vista to another, during which the former is gradually occluded while the latter opens up, constitutes a *transition*. Thus to travel from place to place involves the opening up and closing off of vistas, in a particular order, through a continuous series of reversible transitions. It is through this ordering of vistas, Gibson maintains, that the structure of the environment is progressively disclosed to the moving observer, such that he or she can eventually perceive it from everywhere at once (Gibson 1979: 198–9).

Gibson’s notion of wayfinding through reversible occlusion has been further developed in recent work by psychologist Harry Heft (1996). We have already seen how the forms of environmental features are revealed as the envelopes of a continually modulating perspective structure along a path of observation. Now this flow of perspective structure, as Heft points out, also specifies the observer’s own movements relative to the layout of the environment. As every path of travel gives rise to its own distinctive flow pattern, so every such pattern uniquely specifies a certain path. To find one’s way, Heft argues, means to travel along a particular route so as to generate or recreate the flow of perspective structure peculiar to the path leading to one’s destination (1996: 122). One remembers the route as a succession of vistas connected by transitions, rather as one might remember a piece of music as a series of thematic sections linked by bridge passages. Just as with musical performance, wayfinding has an essentially *temporal* character (1996: 112): the path, like the musical melody, unfolds over time rather than across space. In this connection, it is important to remind ourselves of Gibson’s contention that every path should be conceived as a unitary movement, and not as a potentially infinite set of adjacent points (Gibson 1979: 197). In music, a melodic phrase is not just a sequence of discrete tones; what counts is the rising or falling of pitch that gives shape to the phrase as a whole. Likewise in wayfinding,

the path is specified not as a sequence of point-indexical images, but as the coming-into-sight and passing-out-of-sight of variously contoured and textured surfaces.

In this respect, too, the theory of wayfinding advanced here differs profoundly from that which Gell has caricatured under the rubric of 'mapless practical mastery', and which he attributes, *inter alia*, to Bourdieu (Gell 1985; see Bourdieu 1977: 2). 'We can suppose', writes Gell, 'that practical mastery of the environment consists of possessing complete knowledge of what the environment looks like from all practically-available points of view'. The master traveller, equipped with such knowledge, remembers the journey from A to B as a 'chain of linked landscape images', each particular to a certain point along the route, selected from the total stock of images filed in memory. As he proceeds on his way he will pause, every so often, to check that what he sees from the spot where he stands corresponds to the image he has on file (Gell 1985: 274–5). Our argument, to the contrary, is that mastery consists in knowing what the environment looks like from all practically available *paths* of view, that what the traveller remembers are vistas and transitions rather than location-specific images, and that keeping track is a matter of regenerating the flow of perspective structure over time. Now for Gell the theory of mapless practical mastery, taken on its own, could not possibly work, since it would leave the traveller bereft of any means to formulate navigational decisions. It is all very well to know that you are currently where you ought to be – that what you see around you matches your expectations for a certain stage in your journey. But this alone will not tell you in which direction to go to reach the next checkpoint. Nor, if what you see does *not* match any of the images in the chain for the particular journey you are making, do you have any way of working out how to get back on track. In short, to go from A to B, or from any point to any other along the way, you need to be able to ascertain their relative locations in space. And this, Gell reasons, requires a map.

If it were true that all wayfinding consisted of navigation between fixed points, Gell's argument would be unassailable. But it is not. Ordinary movement in a familiar environment lacks the stop-go character of navigation, in which every physical or bodily manoeuvre (displacement in space) is preceded by a mental or calculative one (fixing the course). 'Finding one's way' is not a computational operation carried out prior to departure from a place, but is tantamount to one's own movement through the world. To recapitulate my earlier point, we know *as we go*, not *before* we go. Thus the operation is not complete until one has reached one's final destination: only then can the traveller truly claim to have found his way. The notion of 'finding' has here to be understood in its original sense of exploratory movement, at once improvisatory and assured, guided by past experience and by a continual monitoring of fluctuations not only in the pattern of reflected light but also in the sounds and 'feel' of the environment. There is no better illustration of this than the example that Gell himself uses in an attempt to prove, to the contrary, that wayfinding is based on the execution of pre-formulated 'navigational decisions' (1985: 282). This is the case of Micronesian seafaring. In a classic paper on the subject, Thomas Gladwin describes how, at every moment during a voyage, the mariner is attentive to 'a combination of motion, sound, feel of the wind, wave patterns, star relationships, etc.', all of which – through comparison with remembered observations from past experience – translates into 'a slight increase or decrease in pressure on the steering paddle, or a grunted instruction to slack off the sail a trifle' (Gladwin 1964: 171–2). Quite unlike the European navigator, with his charts and compass, the Micronesian seafarer feels his way towards his destination by continually adjusting his movements in relation to the *flow* of waves, wind, current and stars.⁶ In this respect his activity does not differ in principle

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from that of the terrestrial traveller who responds to the flow of perspective structure as he journeys through a landscape. Both are essentially engaged in projects of wayfinding rather than navigation: thus Hallowell's observation that for the Saulteaux, direction always has the meaning of 'toward such-and-such a place', is paralleled by Gladwin's that the Micronesian mariner proceeds as if he were constantly within sight of land (Hallowell 1955: 190–1, Gladwin 1964: 173). And once it is recognised that the wayfinder's multi-sensory monitoring is of flows, not images, and that flows specify paths and not spatial locations, Gell's objections to the idea of mapless practical mastery fall away.

Micronesian seafaring resembles terrestrial wayfinding in one other critical respect: every journey is apprehended and remembered as a movement through time rather than across space. Islands, for the mariner, are not pinned down to specific spatial or geographic locations, nor does he imagine his craft to be covering the distance over a planar surface from one such location to another. Throughout the voyage he remains, apparently stationary, at the centre of a world that stretches around as far as the horizon, with the great dome of the heavens above. But as the journey proceeds the island of embarkation slips ever farther astern while the destination island draws ever closer. At the same time an island off to one side, selected as a point of reference for the voyage, is supposed to swing past the boat, falling as it does so under the rising or setting positions of a series of stars. The fact that the reference island (*etak*) is normally invisible below the horizon, and may not even exist at all, has been a source of puzzlement to many interpreters who – assuming that the mariner's task is to navigate from one spatial location to another – have proposed that the *etak* is used to obtain a locational fix. Nothing in what the mariners themselves have to say, however, suggests that it serves any such purpose. The alleged bearing of the *etak* does not enter into any numerical computation. Rather, pointing to the *etak* is the mariner's way of indicating where he is in terms of the temporal unfolding of the voyage as a whole (Hutchins 1995: 87–8). We have already seen how, in terrestrial wayfinding, a route from one place to another is remembered as a temporally ordered sequence of vistas. In much the same way, the Micronesian mariner remembers an inter-island voyage as a sequence of *etak* segments, each of which begins as the reference island falls under one particular star and ends as it falls under the next in line. At any movement, the mariner will know what segment he is in. As it swings beneath the horizon, from segment to segment, the *etak* island marks in its movement the passage of time, just as do the sun, moon and stars overhead, in theirs. Completion of the penultimate segment should bring the mariner, at length, to the final '*etak* of sighting', as the island for which he is bound hoves into view.

THE WORLD HAS NO SURFACE

One further contrast remains to be drawn between wayfinding and navigation, and it takes us back to the cartographic notion of the map as a representation of some portion of the earth's surface. The following 'official' definition of the map, issued by the International Cartographic Association, is exemplary:

A map is a representation normally to scale and on a flat medium, of a selection of material or abstract features on, or in relation to, the surface of the Earth or of a celestial body.

(cited in Robinson and Petchenik 1976: 17)

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Now the idea that the world is presented to the traveller as a surface to be traversed presupposes the specialised, 'bird's-eye view' of the cartographer or navigator. Indeed the world can only be perceived to have an exterior surface by a mind that is situated above and beyond it. In ordinary wayfinding however, whether on land or at sea, the world is apprehended from within. One makes one's way *through* it, not over or across it. Of course the traveller encounters surfaces of diverse kinds – of solid ground, water, vegetation, buildings, and so on – and it is largely thanks to the responses of these surfaces to light, sound and the pressure of touch that he perceives the environment in the way he does. For the mariner the ocean, with its subtle differences of tint and colour, sculpted by the wind into waves and ripples, and breaking up around the boat into foam and spray, presents an infinitely variegated and ever changing surface. Likewise for the pedestrian, making his way along a forest track, the surface of the ground is a patchwork of mud, furrowed by the imprint of previous journeys, puddles, fallen leaves, broken boughs, and outcropping rocks and stones. These are surfaces, however, *in* the world, not *of* the world. That is to say, they are formed on the interface, not between matter and mind, but between solid or liquid substance and the gaseous medium (air) in which humans live and breathe, and which affords movement and sensory perception.⁷ In short for its manifold inhabitants, journeying along their respective ways of life, the world itself *has no surface*.

I noted earlier the parallel between the tracing of paths on the ground in wayfinding and the tracing of lines on paper (or in sand, snow, etc.) in mapping: indeed to the extent that all wayfinding is mapping, these are one and the same. Our conclusion, however, that for the mapper or wayfinder the world has no surface, calls for some qualification of the view, for which I argued above, that mapping is an inscriptive process. This need not be so. If a map consists of a network of interconnected lines, each corresponding to a path of movement through the world, there is no necessary reason why these lines should be inscribed on a surface. One could think of the gesturing hand, in mapping, as a weaving hand rather than a drawing hand, and of the result as something more akin to a cat's cradle than a graph. The lines of the map could be threads, wires or sticks. Micronesian mariners used coconut leaf ribs to map the intersecting courses of ocean swells (Turnbull 1991: 24). Or to take a familiar example from a contemporary urban context, one could construct a route map for the London Underground out of stiff wire, soldered at the intersections, and it would serve just as well as the conventional printed versions. The fact that the map is generally reproduced on paper is a matter of obvious practical convenience, but not of logical necessity. The meaning of the map lies entirely in its routes and intersections, whereas the paper surface has no significance whatsoever. To read the map is to trace a continuous path from one station to another, without regard to their respective locations on the surface. With the modern topographic map it is quite otherwise, for in this case the paper surface of the map stands for nothing less than the *surface of the earth*. One of the most revealing indicators of this change in the significance of the map-surface, corresponding to the transition from mapping to mapmaking, lies in the appearance of frame boundaries. Native maps, as Belyea points out (1996: 6), are never framed. A line or border drawn around and enclosing such a map would have no meaning. The frame of the topographic map, by contrast, defines the portion of the earth's surface that the map purports to represent. Thus the appearance of borders around the map corresponds to the disappearance of the itineraries and practices that give rise to it.

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CONCLUSION

There is a paradox at the heart of modern cartography. The more it aims to furnish a precise and comprehensive representation of reality, the less true to life this representation appears. ‘To present a useful and truthful picture’, as Mark Monmonier writes, ‘an accurate map must tell white lies’ (Monmonier 1991: 1). But the reason for the discrepancy between truth and accuracy is not quite what Monmonier claims it to be. It is not that the map must leave things out if critical information is not to be drowned in a welter of ever finer particulars. It is rather that the world of our experience is a world suspended in movement, that is continually coming into being as we – through our own movement – contribute to its formation. In the cartographic world, by contrast, all is still and silent. There is neither sunlight nor moonlight; there are no variations of light or shade, no clouds, no shadows or reflections. The wind does not blow, neither disturbing the trees nor whipping water into waves. No birds fly in the sky, or sing in the woods; forests and pastures are devoid of animal life; houses and streets are empty of people and traffic. To dismiss all this – to suggest that what is excluded in the cartographic reduction amounts, in Monmonier’s words, to a ‘fog of detail’ – is perverse, to say the least (Wood 1992: 76). For it is no less than the stuff of life itself. Were one magically transported into the looking-glass world behind the map, one would indeed feel lost and disoriented, as in a fog. But the fogginess is a function not of the amount or density of detail but of the arrestation of movement. Detached from the flow of which each is but a moment, details settle like an opaque precipitate upon the surface of the earth. Little wonder, then, that the cartographer feels the need to sweep them up, or that the navigator prefers to brush them aside in plotting a course!

The ordinary wayfinder, on the other hand, is not generally troubled by detail. Quite to the contrary, the richer and more varied the texture of the environment, the easier it is to find one’s way about. But above all, wayfinding depends upon the attunement of the traveller’s movements in response to the movements, in his or her surroundings, of other people, animals, the wind, celestial bodies, and so on. Where nothing moves there is nothing to which one can respond: at such times – as before a storm, or during an eclipse – the experienced traveller can lose his bearings even in familiar terrain. These observations should finally lay to rest the cartographic illusion, namely that the world is pre-prepared as a stage upon which living things propel themselves about, from one location to another. Life, in this view, is an internal property of objects, transported upon the exterior surface of a lifeless earth. In the view I have set forth here, by contrast, the world is *not* ready-made for life to occupy. Contrary to the assumptions of cartographers and cognitive map theorists, life is not contained within things, nor is it transported about. It is rather laid down along paths of movement, of action and perception. Every living being, accordingly, grows and reaches out into the environment along the sum of its paths. To find one’s way is to advance along a line of growth, in a world which is never quite the same from one moment to the next, and whose future configuration can never be fully known. Ways of life are not therefore determined in advance, as routes to be followed, but have continually to be worked out anew. And these ways, far from being inscribed upon the surface of an inanimate world, are the very threads from which the living world is woven.

Chapter Fourteen

Stop, look and listen!

Vision, hearing and human movement

ON HEARING SOUNDS, AND SEEING THINGS

Near the house where I grew up was a path I often took, which crossed a railway line. Beside the track was a notice which advised the pedestrian to 'stop, look and listen' before attempting to cross the line. I may not always have followed this advice as closely as I should, but at least I knew what it meant. To me, as doubtless to others who walked that path, it made perfectly good sense. In the absence of automatic signalling arrangements, how else is one to know whether a train is coming save by looking and listening? Only later did I discover that what is obvious to pedestrians is, to philosophers, utterly baffling. To be sure, the philosopher might admit, our knowledge of the world can only come through some form of perception. Yet it seems that the one thing we cannot perceive is perception itself. You may claim to see a train, but only by way of the light that reaches your eyes. And you hear it only by way of the sound that reaches your ears. So how can you know that the train exists at a certain distance, as a detached material object, behind the perceptual images, shaped in light and sound, that you have of it? And if it exists only in your perception – in your eyes and ears, or even in your thoughts – then how can it run you down? Nor is that all. Looking and listening, we receive one set of sensations through the eyes, and another, quite different set through the ears. Supposing that our knowledge is ultimately founded on sensory experience, how do we know that the sights and sounds that come to our notice are all manifestations of the same thing, the train, that is bearing down on us? If we hear sounds rather than things (like trains), then how do I know that *this* sound I hear belongs to *that* train I see?

These are among the most ancient of philosophical conundrums, and it is not my intention to resolve them here. I do mean to suggest, however, that the way in which they are posed bears the imprint of a certain way of imagining the human subject – namely, as a seat of awareness, bounded by the skin, and set over against the world – that is deeply sedimented in the Western tradition of thought. The problem of perception, thus, is one of how anything can be translated or 'cross over' from the outside to the inside, from the macrocosm of the world to the microcosm of the mind. This is why visual and aural perception are usually described, in the writings of philosophers and psychologists, as processes of *seeing* and *hearing*. Sight begins at the point where light enters the eyes of the stationary perceiver, hearing at the point where sound strikes his ears – at the interface, in short, between outside and inside. Yet the notice beside the railway tracks did not advise the pedestrian to 'stand, see and hear'. It advised him to 'stop, look and listen': that is, to interrupt one bodily activity, of walking, and to initiate another, of looking-and-listening (as I show later, these are better regarded as aspects of one activity than as two distinct