Earth, sky, wind, and weather

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This paper seeks to understand what it means to live 'in the open'. It begins with an account of experiments that test whether children have acquired a scientifically correct understanding of the shape of the earth, according to which people live all around on the outside of a solid sphere. This understanding cannot accommodate the phenomenon of the sky, in relation to which the earth can appear only as the ground of human habitation. James Gibson's ecological approach to perception offers a possible alternative, depicting earth and sky as complementary hemispheres. Yet for Gibson, this earth-sky can be inhabited only insofar as it is furnished with objects. To that extent, it ceases to be open. Drawing on elements of Merleau-Ponty's phenomenology, it is argued that in the open world persons and things relate not as closed forms but by virtue of their common immersion in the generative fluxes of the medium – in wind and weather. Fundamental to life is the process of respiration, by which organisms continually disrupt any boundary between earth and sky, binding substance and medium together in forging their own growth and movement. Thus to inhabit the open is not to be stranded on the outer surface of the earth but to be caught up in the transformations of the weather-world.

We all know what it feels like to be out in the open air on a windy day. Yet once we try to pin it down within established categories and conventions of thought, no experience could be more elusive. What is the open air? Does it circulate in the sky or the atmosphere? Are these the same or different? If the atmosphere surrounds our planet, and the sky arches above our heads, then in what shape or form can the earth exist in relation to the sky? And if we are *out* in the open world of earth and sky, how can we simultaneously be *in* the wind? How, in other words, can we inhabit the open? If we can do so only by containing it, then how can the wind still blow? In what follows I seek to establish what it means to be 'in the open'. Instead of thinking of the inhabited world as composed of mutually exclusive hemispheres of sky and earth, separated by the ground, we need to attend, as I shall show, to the fluxes of wind and weather. To feel the wind is not to make external, tactile contact with our surroundings but to mingle with them. In this mingling, as we live and breathe, the wind, light, and moisture of the sky bind with the substances of the earth in the continual forging of a way through the tangle of life-lines that comprise the land.

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To reach this conclusion I shall proceed in four stages. I begin with what is supposed to be the objective, scientific account of the shape of the earth, an account that cannot readily accommodate the phenomenon of the sky. For in relation to the sky, the earth can exist only as a ground of habitation. Yet as I go on to show, a ground populated solely by people and objects, and a sky that is empty but for birds and clouds, can exist only within a simulacrum of the world, modelled in an interior space. The third stage of the argument is to show that in the open world, beings relate not as closed, objective forms but by virtue of their common immersion in the fluxes of the medium. The process of respiration, by which air is taken in by organisms from the medium and in turn surrendered to it, is fundamental to all life. Thus, finally, to inhabit the open is to dwell within a weather-world in which every being is destined to combine wind, rain, sunshine, and earth in the continuation of its own existence.

How to draw the sky

There is currently some controversy in the fields of cognitive and developmental psychology concerning how children learn the shape of the earth. A number of studies suggest that a correct understanding of the earth, as a solid sphere surrounded by space, challenges fundamental presuppositions that children everywhere, regardless of cultural background, initially bring to their reasoning about the world. These presuppositions are, firstly, that the ground is flat, and, secondly, that unless supported, things fall. To grasp such a counter-intuitive understanding that the earth is round like a ball and that people can live anywhere on its surface without falling off calls, it is argued, for nothing less than a complete conceptual restructuring in the child's mind, comparable to a paradigm shift in the history of science. Experimenting with schoolchildren aged between 6 and 11 years, researchers claim to have identified a developmental sequence in thinking about the earth, running from an initial mental model of an earth that is flat like a pancake to a final model of a spherical earth, by way of various intermediate models in which children attempt to reconcile their initial presuppositions with information supplied by their teachers, or gleaned from books and other sources (Vosniadou 1994; Vosniadou & Brewer 1992; see Fig. 1).

But this research is not without its critics. They argue that the problems of reconciliation that many children undoubtedly faced in these experiments have less to do with their own intuitions or 'naïve theories' about the world than with the demands of an experimental situation in which they are called upon to justify what they had said or drawn in response to previous questioning. In reality, these critics claim, children do not begin with any beliefs, intuitions or theories about the shape of the earth, but rather set out with an open mind. Their knowledge is then acquired piecemeal, in loosely connected fragments, through participation in a social and cultural environment that is scaffolded by knowledgeable adults such as teachers, but also by artefacts such as the ubiquitous globes of school classrooms. Since there is no initial conceptual barrier to be overcome, and given adequate scaffolding, children have little difficulty in acquiring a 'scientific' picture of the earth. Indeed, experiments involving children having to choose between ready-made pictures – rather than drawing them themselves or having to respond to interrogation – seem to show little difference in understanding between younger and older children, or even between children and adults (Nobes, Martin & Panagiotaki 2005).

I do not intend to take a stance in this debate. It is but one version of a long-standing argument in psychology about whether knowledge acquisition is strongly

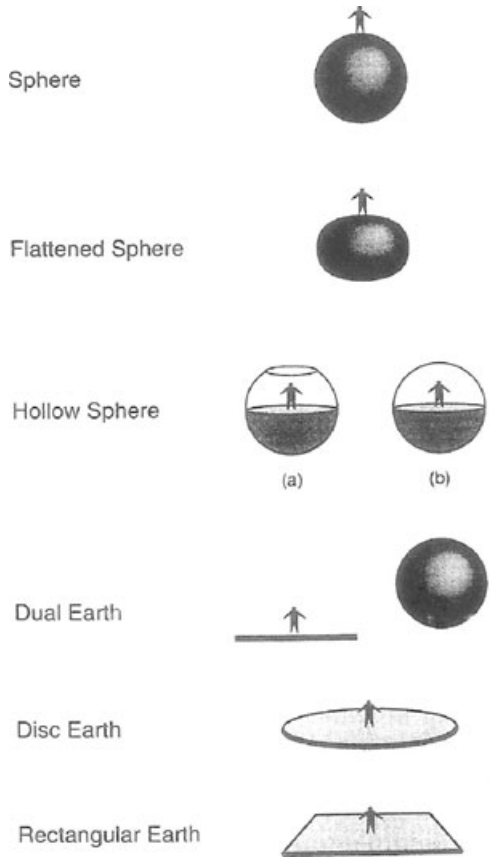

Figure 1. Mental models of the Earth. Reproduced from Vosniadou & Brewer (1992: 549) with the kind permission of Elsevier.

constrained by innate mental structures or more fundamentally dependent on sociocultural contexts of learning. It is what the two sides have in common that interests me. For neither is in any doubt that there exists a 'scientifically correct' account of the shape of the earth, against which any alternatives may be judged more or less erroneous.[1] More remarkably, both sides seem to agree that where there is an earth, there must also be a sky. How, then, might we render a 'scientifically correct' account of the nature and shape of the sky? Let me present two examples, taken from studies representing opposed positions in the debate outlined above, of what is taken to be the 'correct' view. In the first example, 6-year-old Ethan tells the experimenter – in response to her questions – that the earth has the shape of a ball, that to see it one should look downwards, and that it is completely surrounded by space. The experimenter then asks Ethan to draw a picture of the earth, and he obliges with a rough circle, within which he draws the outlines of what look like continents. 'Now', commands the experimenter, 'draw the sky'. Ethan is perplexed. 'The sky has no shape', he protests, 'you mean space'. Nevertheless, draw the sky he must, so he proceeds to describe a ring around the circle depicting the earth (Vosniadou & Brewer 1992: 557, see Fig. 2A).

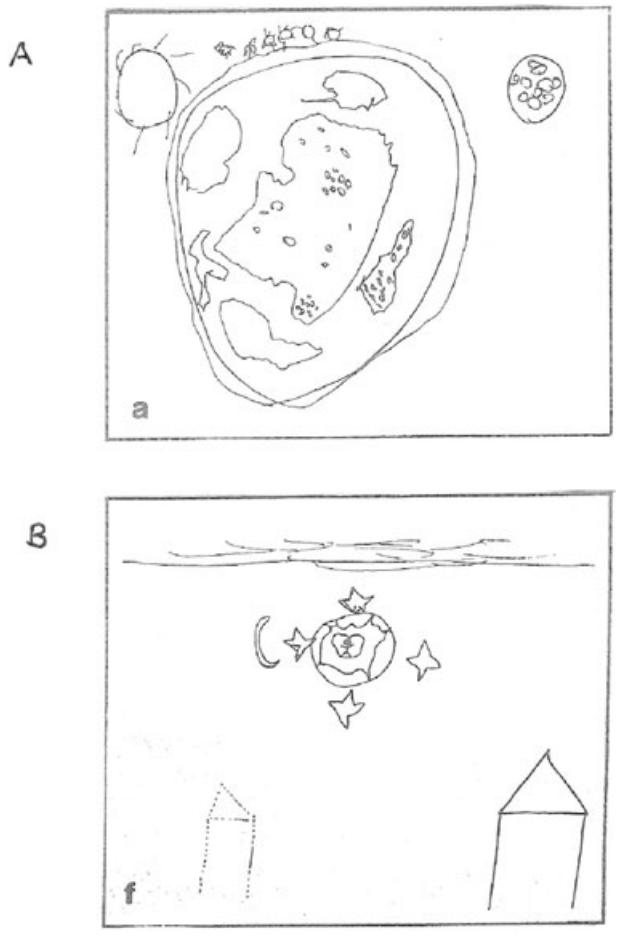

Figure 2. A: Ethan's drawing of the spherical earth surrounded by the 'sky'. B: Darcy's drawing of the sky, the ground (with houses) and the spherical earth. Reproduced from Vosniadou & Brewer (1992: 558) with the kind permission of Elsevier.

In the second example the experimenters prepared a set of picture-cards, each of which showed the earth, people, and sky in one of sixteen possible combinations of the following alternatives: earth a solid sphere, flattened sphere, hollow sphere, or disc; people all around or only on top; sky all around or only on top. Participants, who included both children (aged 5-10) and adults, were individually asked first to select the card they thought looked most like the real earth and then to repeat the procedure with all the others so as to yield a ranking from 'most' to 'least like the Earth' (Nobes, Martin & Panagiotaki 2005: 52-4). Some two-thirds of the participants in the study selected, as their first choice, the combination of solid sphere with both people and sky all around. On the card depicting this combination, the earth figures as a greeny-brown ball, with rigid, Lego-like people standing around its circumference and set against a light blue background flecked with fluffy white patches resembling clouds (Fig. 3). The selection of this card by the majority of participants, according to the

Figure 3. Spherical earth with people and sky around. Reproduced from Nobes *et al.* (2005: 54) with the kind permission of the British Psychological Society.

authors of this study, 'indicated a scientific understanding of the Earth' (Nobes *et al.* 2005: 55-7). The picture is, however, strangely paradoxical. On the one hand, it depicts people distributed around the outer surface of a solidly spherical earth, but, on the other hand, it depicts the sky in a form that would be apparent only to someone lying on his or her back on the earth's surface, gazing upwards! The perspective that leads us to recognize the earth as a ball is not one that could possibly yield an image of a blue sky with scattered clouds.

The perspectival double-take involved in the attempt to combine the spherical earth and the sky in the same picture confused participants in the first experiment, as much as in the second. Ethan, as we have seen, took the experimenter to mean not sky but space, and the gesture he made to signal his understanding that space is all around left its trace in the outer ring of his drawing. But the reaction of another participant in this study, 9-year-old Darcy, is even more revealing. Responding to the experimenter's request, Darcy has drawn a round earth, and has added the moon and some stars. The experimenter then asks Darcy – as she had asked Ethan – to draw the sky. Like Ethan, Darcy is thrown by this. 'It's icky', she says. Her solution, however, is to sketch some roughly horizontal lines, looking much like a cloud-base, near the top of the paper, and above her drawing of the earth, moon, and stars. When the experimenter asks where people live, Darcy draws a house whose base lies along the lower border of the paper. The experimenter asks again, and Darcy draws another house. On the third request, Darcy eventually gives in to the experimenter's implicit demands, rubs out one of her houses, and draws a stick figure upon her round earth (Fig. 2B). But this only sparks off a further bout of interrogation. 'This house is on the earth isn't it?', says the experimenter, pointing to the sketch of the house that remains after the other was

erased. 'How come the earth is flat here but before you made it round?' The following dialogue ensues:

> *Darcy:* Because it's on the ground.
> *Experimenter:* But why does that make it look flat?
> *Darcy:* Because the ground's flat.
> *Experimenter:* But the shape of the earth is ...
> *Darcy:* Round.
>
> (Vosniadou & Brewer 1992: 570)

To the experimenter it seemed that Darcy was being thoroughly inconsistent, wavering between conceptions of the earth's surface as round and flat. What she failed to observe was that Darcy was being absolutely consistent in applying a distinction between the *earth* and the *ground*. As Darcy explains, the earth is indeed round, as shown in her drawing. However, the houses people live in are built on the ground, and the ground is flat. Thus the houses in her drawing were on the ground and not on the earth's surface at all.

Of course the word 'earth' can mean many things, depending on the context. Sometimes we use it to refer to the ground beneath our feet, or even to the soil itself; at other times the word refers to our entire planet. In this case the context of the experimental interview unequivocally specified the earth in the latter sense, compelling Darcy to have resort to the term 'ground' in order to uphold a distinction she needed to make, but which the experimenter refused to recognize. In retrospect, we can see that it was the experimenter's instruction to complete the picture of planet earth by adding the *sky* that threw the whole exercise into confusion. For in relation to the sky, the earth can figure only in the phenomenal form of the ground upon which people live and on which their dwellings are built. The result, in effect, was not one complete picture but two quite separate pictures superimposed on the same page. One is a picture of our planet as it might be seen from outer space; the other is a picture of the ground, the sky and the abodes in which people live as they appear in the phenomenal world of inhabitants. Reporting on the results of their experiments, however, the authors of this study project their own double-take onto their experimental subjects (Vosniadou & Brewer 1992: 569-71). Thus Darcy, along with many others, is credited with a 'dual earth model', one of a number of synthetic models that are said to be intermediate between the naïve presupposition that the earth is flat and the mature understanding that it is round like a ball (Fig. 1).

According to the dual earth model, 'there are two earths: a round one which is up in the sky and a flat one where people live' (Vosniadou & Brewer 1992: 550). A dual-earther can stand on the ground looking up at the sky and see there not just the clouds, the sun and the moon, and the stars but also this other earth with its inhabitants stuck to the outer surface. This is of course the same view, of a spherical earth floating in a blue sky, that is represented in the 'correct' picture-card in the second of our two studies (Fig. 3). Children who selected this card, according to the authors of this study, 'already know that the people and sky are around the earth' (Nobes *et al.* 2005: 59). Scientifically speaking, of course, what surrounds the earth is its atmosphere, a gaseous envelope that peters out with increasing distance from the earth's surface. By no stretch of the imagination can the image of the sky on the picture-card be taken as even a minimally accurate representation of the atmosphere, nor did the experimenters intend it to be so. It is more likely, then, that participants who chose this card were treating the sky-design

as a kind of wallpaper, characterized by shapes and colours drawn from everyday experience, upon which is mounted a quite separate image of the earth modelled perhaps on the familiar classroom globe. And just as Darcy found it necessary to distinguish the planetary earth from the ground beneath our feet, so, too, most people who are entirely familiar and at ease with the idea that the earth takes the form of a solid sphere would probably want to distinguish the atmosphere that surrounds the planet from the sky over our heads.

It is not obvious how one should draw this sky. Indeed, as the authors of the first study admit, 'asking children to draw the sky may appear strange to an adult' (Vosniadou & Brewer 1992: 544). The purpose of the exercise, they explain, was to help them distinguish children who thought the sky was on top of the earth from those who thought it surrounded the earth. In their terms, Darcy – who drew her sky above the round earth – expressed a scientifically incorrect, dual earth model, whereas Ethan – who drew a ring around his earth – was operating with a correct, spherical model. Yet Ethan, who probably lacked a notion of the atmosphere, thought the experimenter must be referring to space, and not to the sky. Darcy, for her part, realized (as the experimenters apparently did not) that the sky can be described only within a picture of the earth conceived as the ground of human habitation, and that in relation to such habitation, it can only be 'on top'. Indeed the experimenters, unlike the children they worked with, seem fundamentally confused. 'The idea that we live all around on the outside of a spherical earth', they write, 'is counter-intuitive and does not agree with everyday experience' (Vosniadou & Brewer 1992: 541).[2] Quite so. From this 'scientific' perspective, human beings are *ex*habitants of the earth. But like the ground we tread, the sky belongs to the world that people *in*habit. That is to say, it belongs to the world as it is presented to experience – to the phenomenal rather than the physical order of reality. It is in the experimenters' failure to distinguish between these orders that the confusion lies.

Furnishing the earth

How, then, might we describe the shape of the world from the point of view of an inhabitant? One possible approach to answering this question was proposed by James Gibson in his pioneering work *The ecological approach to visual perception* (1979). Gibson begins by emphasizing the distinction between what he calls the 'physical world' and the 'environment' (1979: 8). The planet earth is part of the physical world, as is the atmosphere that surrounds it. Both the earth and its atmosphere were in existence long before any life evolved in its oceans or on its terrestrial surfaces. An environment, by contrast, can exist only in relation to the forms of life that inhabit it. It is a world that exists not in and of itself, but as the ambience of its inhabitants. Though no less real than the physical world, the environment is not a reality *of* objects or bodies in space but reality *for* the beings that make a living there. Thus conceived, the environment – Gibson argues – 'is better described in terms of a *medium*, *substances* and the *surfaces* that separate them' (1979: 16).

For human beings the medium is normally air. Of course we need air to breathe. But also, offering little resistance, it allows us to move about – to do things, make things, and touch things. It also transmits radiant energy and mechanical vibration, so that we can see and hear. And it allows us to smell, since the molecules that excite our olfactory receptors are diffused in it. Thus the medium, according to Gibson, affords movement and perception. Substances, on the other hand, are relatively resistant to both. They

include all kinds of more or less solid stuff like rock, gravel, sand, soil, mud, wood, concrete, and so on. Such materials furnish necessary physical foundations for life – we need them to stand on – but it is not generally possible to see or move *through* them. The status of water is ambiguous. For aquatic creatures such as fish, water is a medium; for terrestrial creatures such as humans, it is a substance. This ambiguity does not, in itself, invalidate the distinction, but only reinforces the point that the qualities of an environment can be considered in relation only to specific forms of life (Gibson 1979: 16-21).

At the interface between the medium and substances are *surfaces*. Surfaces are where radiant energy is reflected or absorbed, where vibrations are passed to the medium, where vaporization or diffusion into the medium occur, and what our bodies come up against in touch. So far as perception is concerned, surfaces are therefore 'where most of the action is' (Gibson 1979: 23). All surfaces have certain properties. These include a particular, relatively persistent layout, a degree of resistance to deformation and disintegration, a distinctive shape, and a characteristically non-homogeneous texture. As illustration, Gibson offers a series of six photographs depicting different kinds of familiar surface. One shows the transverse surface of sawn wood, another shows clouds in the sky, another a field of mown grass, another a woven textile, another the rippled surface of a pond, and another a patch of gravel. In each case, the texture of the surface immediately allows us to identify what it is a surface *of* (1979: 26-7). We can recognize the texture visually because of the characteristic scatter pattern in the light reflected from the surface. But conversely, if there is no discernible pattern or structure in the ambient light, then there is no identifiable texture, and instead of perceiving a surface we see an empty void (Gibson 1979: 51-2).

The perception of the sky offers a case in point. Comparing the textureless, clear blue sky of a summer's day with the textured earth beneath, we perceive the surface of the earth as what we usually call *ground*, whereas the sky above is perceived as vacant space without limit. The ground surface, according to Gibson, is 'the literal *basis* of the terrestrial environment ... the reference surface for all other surfaces' (1979: 10, 33). It supports things that are drawn to the earth by the force of gravity, and extends towards a horizon where earth and sky appear to meet. By contrast, the sky has no surface. However, amidst the textureless void of the sky there may exist textured regions that specify the surfaces, for example of clouds, *in* the sky. Shower clouds in the sky differ from, say, puddles on the ground formed by the falling rain in that whereas when the puddle dries out, one surface – of water – gives way to reveal another – of dry mud – in its place, when the cloud disperses, it vanishes to leave no surface at all. Likewise, if we stand in a forest and look upwards, the canopy of leaves provides an overhead texture, but in the spaces between them, open to the sky, we see only holes. 'It is into these holes', Gibson states, 'that the birds fly' (1979: 106).

Or so it seems. Gibson's account of the sky, however, is fraught with contradiction. If the sky is the epitome of emptiness, and if that is what we perceive when we gaze skywards, then is the sky a part of the inhabited environment or is it not? Can an environment have holes in it? Can it be truly 'open'? There are moments when Gibson seems to answer in the affirmative. He is insistent, for example, that an environment does *not* simply consist of objects in space, closed-contour forms suspended in an empty void. It consists, rather, 'of the earth and the sky with objects *on* the earth and *in* the sky, of mountains and clouds, fires and sunsets, pebbles and stars' (1979: 66). Thus clouds, sunsets, and stars are presented to us as phenomena situated within that part of

the environment we call the sky. This is one of two parts, or hemispheres, that comprise the world of the inhabitant. The other part is the earth. The ground on which the inhabitant stands – the earth-sky interface – stretches out to the horizon, 'a great circle between the upper and the lower hemisphere separating the sky and the earth' (1979: 162).

Superficially, this cosmology resembles what Vosniadou and Brewer call the 'hollow sphere' model, which, like the dual earth model, they regard as intermediate between conceptions of the earth as flat and as a solid sphere. According to this model the earth is a ball that is solid below and hollow above, while people stand on the flat interface between the two hemispherical zones. To them, the sky appears as a dome over their heads (Vosniadou & Brewer 1992: 549-50; see Fig. 1). There is a critical difference, however, between this cosmology and Gibson's. It is that for Gibson, the 'spherical field' of the inhabitant's perception is unbounded. The horizon is not a boundary, because it moves with the inhabitant. It cannot be reached or crossed. Things do not break through a barrier when they come into view. And when you look upwards, you do not see yourself surrounded by a closed surface. Life under the sky is lived *in the open*, not within the confines of a hollow hemisphere with a flat base and a domed top. The very idea of confinement, Gibson suggests, is an artefact of the practice of outline drawing (1979: 66). But the sky has no outline, and you cannot draw it. All you can draw are the shapes of things *in* the sky, or silhouetted a*gainst* it.

Yet at another moment, Gibson declares that 'an open environment is seldom or never realized', and that life within such an environment would be all but impossible (1979: 78). In ordinary circumstances, the environment is 'cluttered' with every kind of thing, from hills and mountains to animals and plants, objects and artefacts. Or to put it another way, the environment is *furnished*. 'The furniture of the earth', Gibson continues, 'like the furnishings of a room, is what makes it livable'. A cloudless sky, in these terms, would be uninhabitable, and could not therefore form any part of the environment for a living being. Birds could not fly in it. And an empty earth, while it might provide the inhabitant with a base on which to stand and walk, affords nothing else; 'the furniture of the earth affords all the rest of behavior' (1979: 78). It seems that so long as they are stranded in the open, Gibsonian perceivers are as much exhabitants of the world as are the figures depicted in the psychological experiments described earlier, living 'all around on the outside' of the earth's surface. Like actors on the stage, they can make their entrance only once the surface has been furnished with the properties and scenery that make it possible for the play to proceed. Roaming around as on a set, or like a householder in the attic, they are fated to pick their way amidst the clutter of the world.

Let me return to Gibson's characterization of the environment, as consisting not just of objects but 'of the earth and the sky with objects *on* the earth and *in* the sky' (1979: 66). Consider some of the things that he takes to be objects: on the earth there are mountains, pebbles, and fires; in the sky there are clouds, sunsets, and stars. Of the things on the earth, perhaps only pebbles can be regarded as objects in any ordinary sense, and even then, only if we consider each individual stone in isolation from its neighbours, from the ground on which it lies, and from the processes that brought it there. The hill is not an object on the earth's surface but a formation of that surface, which can appear as an object only through its artificial excision from the landscape of which it is an integral part. And the fire is not an object but a manifestation of the process of combustion. Turning to the sky: stars, whatever their astronomical

significance, are perceived not as objects but as points of light, and sunsets as the momentary glow of the sky as the sun vanishes beneath the horizon. Nor are clouds objects. Each is rather an incoherent, vaporous tumescence that swells and is carried along in the currents of the medium. To observe the clouds is not to view the furniture of the sky but to catch a fleeting glimpse of a sky-in-formation, never the same from one moment to the next.

Indeed in a world that is truly open there are no objects as such. For the object, having closed in on itself, has turned its back on the world, cutting itself off from the paths along which it came into being, and presenting only its congealed, outer surfaces for inspection. The open world, however, has no insides or outsides, only comings and goings. Such productive movements may generate formations, swellings, growths, protuberances and occurrences, but not objects. Thus in the open world hills rise up, as can be experienced by climbing them or, from a distance, by following the contours with one's eyes (Ingold 2000: 203). Fires burn, as we know from their flickering flames, the swirling of smoke, and the warming of the body. And pebbles grate. It is of course this grating that gives rise to their rounded forms; tread on them, and that is what you hear underfoot. In the sky, the sun shines by day and the moon and stars by night, and clouds billow. They *are*, respectively, their shining and billowing, just as the hills *are* their rising, the fire *is* its burning, and the pebbles *are* their grating.

In short, and contrary to Gibson's contention, it is not through being furnished with objects that the open sphere of sky and earth is turned into a habitable environment. The furnished world is a full-scale model – a world brought indoors and reconstructed within a dedicated, enclosed space. As in a stage set, hills are placed on the ground, while stars, clouds, and the sun and moon are hung from the sky. In this *as if* world hills do not rise, nor do fires burn or pebbles grate, nor do the sun, moon, and stars shine or the clouds billow. They may be made to look as though they do, but the appearance is an illusion. Absolutely nothing is going on. Only once the stage is set, and everything made ready, can the action begin. But the open world that people inhabit is not prepared for them in advance. It is continually coming into being around them. It is a world, that is, of formative and transformative *processes*. If such processes are of the essence of perception, then they are also of the essence of what is perceived. To understand how people can inhabit this world means attending to the dynamic processes of world-formation in which both perceivers and the phenomena they perceive are necessarily immersed. And to achieve this we must shift our attention from the congealed substances of the world, and the solid surfaces they present, to the media in which they take shape, and in which they may also be dissolved. My contention is that it is in the medium – and not on the surface, as Gibson thought (1979: 23) – that 'most of the action is'.

Winds of life

In the open, the medium is rarely, if ever, still. Almost always, it is in a state of flux. Sometimes these fluxes are barely perceptible; at other times they are so strong that they can uproot trees and bring down buildings. They can power mills and send ships around the world. The general term by which we know them is *wind.* But how can we tell that it is windy? A couple of years ago, I put this question to a group of students with whom I was working at the University of Aberdeen. We had been discussing the relation between weather and land (an issue to which I return in the following section), and I wanted to test the difference between the kind of discussion we could have indoors,

with reference to academic texts, and the kind one can have in the open, immersed in the weather and with the land all around us. It is one thing, I surmised, to think *about* land and weather; quite another to think *in* them. Perhaps it is because we generally think and write indoors that we have such difficulty in imagining how any world we inhabit could be other than a furnished room, or how, cast out from this interior space, we could be anything other than exhabitants. What difference would it make, to borrow an expression from Maurice Merleau-Ponty, were we to acknowledge the open world of earth and sky not as the object but as the very '*homeland* of our thoughts' (Merleau-Ponty 1962: 24)?

To find out, we went for a walk in the countryside. It was a spring day of bright sunshine and occasional showers, with a gentle breeze. We could not touch the breeze, yet as the students were the first to admit, we knew it was breezy since we felt it on our exposed faces and in our breathing. Initially, this seemed puzzling. How could we feel the wind without being able to touch it? To resolve the puzzle we were compelled to recognize that feeling and touch are not merely alternative terms for tactile sensation. Of course we are forever touching things in our everyday lives, whenever we make them, or use them, or seek to identify them. And in intimate forms of sociality we touch other people, as they touch us. The action of touch is generally delivered through particular organs, above all the hands but also the lips, tongue, and feet. Feeling, however, infuses our entire being. It is not so much a way of making bodily contact with specific persons or things as a kind of interpenetration of the self and its surroundings: a certain way the world has, as Merleau-Ponty put it, 'of invading us' and our way of 'meeting this invasion' (1962: 317). Feeling, then, lies not just in what we *do* but in what we *are*: in that commingling of the perceiver with the world he or she inhabits that is an existential precondition for the isolation both of things as objects of touch and of the perceiver as a subject who touches. Thus we could not touch unless we first could feel.

To feel the wind, then, is to experience this commingling. While we did not touch it, we touched *in* it. A moment's reflection reveals that what goes for tactile perception goes for visual and auditory perception as well.[3] Let me return for a moment to the phenomenon of the sky. No more than the wind is the sky an object of perception. It is not something we look *at*. On our walk in the countryside we could see all manner of phenomena, thanks to their illumination by the sunlight. The sky, however, was not something we saw in the light, it was luminosity itself. Just like the feeling of the wind, the light of the sky is experienced as a commingling of the perceiver and the world without which there could be no things to see at all. As we touch *in* the wind, so we see *in* the sky. 'As I contemplate the blue of the sky', wrote Merleau-Ponty, 'I am not *set over against* it as an acosmic subject; ... I abandon myself to it and plunge into this mystery, ... I am the sky itself as it is drawn together and unified, ... my consciousness is saturated with this limitless blue' (1962: 214). The mystery of which Merleau-Ponty speaks here is the mystery of vision, the astonishment of the discovery that behind the sheer ordinariness of the sight of things lies the primal experience of being able to *see*. Light is just another word for this discovery (Ingold 2000: 264-5). Similarly, the mystery of sound lies in the discovery that we can hear. And while we may touch our surroundings in the wind and see them in the sky, it is above all in the rain that we hear them. The theologian John Hull, telling of his experience of going blind in adulthood, describes how steadily falling rain 'brings out the contours of everything', bathing the world in sound just as the sun bathes it in light. 'My body and the rain intermingle, and become

one audio-tactile, three-dimensional universe, within which and throughout the whole of which lies my awareness' (Hull 1997: 26-7, 120).

To inhabit the open world, then, is to be immersed in the fluxes of the medium: in sunshine, rain, and wind. This immersion, in turn, underwrites our capacities – respectively – to see, hear, and touch. Of course we are not alone in feeling and responding to the wind. So likewise do birds in flight. Nicole Revel (2005) has described how Palawan Highlanders of the Philippines have a very special relationship with birds, considering them to be their close yet ephemeral companions. Their understanding of this relationship is epitomized in the practice of flying kites. Constructed of leaves or paper with split bamboo struts, kites are regarded as the copies of birds. Flying a kite is as close as terrestrial humans can get to sharing the experience of their avian companions. Playing the wind, flyers can feel with their hands, holding the connecting strings, what birds might feel with their wings. 'Anchored to the earth', as Revel puts it, Palawan kite-flyers 'dream in the air, their thrill equal to the splendour of the whirling of their ephemeral creations' (2005: 407). Becoming like birds, their consciousness is launched on the same aerial currents that animate their kites, and is subject to the same turbulence. In an *as if* world, however, furnished only with objects, neither kites nor birds could fly. A world of objects has no room for the wind, for the simple reason that the wind is not an object. It is no more an object than is, say, fire or cloud. As the fire *is* its burning and the cloud *is* its billowing, so the wind *is* its blowing. As such it belongs to the world we inhabit, not to some full-scale model of it. Birds fly in the air, and not – as Gibson claimed (1979: 106) – in the 'holes' between trees. Moreover, every tree, in the arc of its trunk and the twisting of its branches, bears testimony to the currents of wind in which it grew.

Yet in the fields of anthropology and material culture studies there is a persistent tendency to write as though people and material objects were indeed *all there is*. Perception is then held to lie in the reciprocal interplay between embodied persons and materialized things, in which each acts upon the other. If things can 'act back', the argument goes, it is because they are endowed with agency, just as persons are. Let me return to the example of flying a kite. By way of the string, we might suppose, your earthbound hand acts upon the kite, while reciprocally the aerial kite acts upon your hand. Through these actions, each continually answers in its movements to the movements of the other. A kite does not fly, however, because it has an agency of its own that counteracts that of the flyer. It flies because it is lifted up in the currents of the wind. Extinguish these currents, and the kite would drop to the ground, as limp and lifeless as a dead bird. Only so long as the string is stretched tight by the straining of the kite in the wind can it serve as a vector of interaction. Another example might be drawn from Christopher Tilley's explorations in landscape phenomenology. Tilley invites us to imagine a painter and a tree: 'The painter sees the tree and the tree sees the painter, not because the trees have eyes, but because the trees affect, move the painter ... In this sense the trees have agency and are not merely passive objects' (2004: 18). The tree, however, is not motionless. It is blowing in the wind, and the visuo-manual gestures of the painter – who follows with his brush the tree's characteristic lines of bending and recoil – resonate to its movements. In just the same way, the gestures of the flyer resonate to the movements of the kite as it swoops in the currents of air.

It is not, then, the tree that moves the painter, any more than it is the kite that moves the flyer. Rather, the resonant movements of the flyer and the kite in the one case, and of the painter and the tree in the other, are founded in their common immersion in the

currents of the medium. It is only thanks to this immersion that they can interact at all. If there were no wind, then the flyer could not interact with the kite, nor could the painter interact with the tree. More generally, in a world reduced to people and objects, interaction would be impossible. We cannot, then, restore this world to life simply by endowing these objects with 'agency'. Indeed the much-vaunted 'problem of agency' is of our own creation, and has its source in an inverted view of reality that represents the dynamic potential of the lifeworld to animate forms of manifold kinds as an interior property that is carved up and distributed among the forms themselves, whence it is supposed to set the world in motion (Ingold 2005*b*: 125). This is rather like saying that a river flows because of the interactions between eddies and banks, forgetting that there would be neither eddies nor banks to interact were it not for the flow of the river itself. Similarly, there would be neither people nor trees, nor birds, clouds, fires, sunsets, or any of the other phenomena we have considered were it not for the fluxes in the medium.

This argument has a bearing on the very meaning of life. We might agree that as well as people, birds and trees are alive. But a habit of thought that leads us to suppose that the world is inhabited by entities that are already closed in upon themselves prevents us from seeing that life can be anything other than an interior property of things. Conceived as the creative potential of a world-in-formation, however, life is not *in* things; rather, things are *in* life, caught up in a current of continual generation. The recognition that all of existence is suspended in such a current underlies the ontological commitments of many of the peoples credited, in classical anthropological literature, with cosmologies of 'animism'. According to a long-established convention, animism is a system of beliefs that imputes life or sprit to things that are truly inert. But this convention is doubly misleading. For one thing, animism is not a system of beliefs *about* the world but a way of being *in* it, characterized by openness rather than closure – that is, by sensitivity and responsiveness to an environment that is always in flux. For another thing, it is not a matter of putting life into things but of restoring those things to the movements that gave rise to them. It should come as no surprise, then, that most animic cosmologies attribute supreme importance to the winds,[4] for not only do the winds give shape and direction to people's lives, they are also creatively (and destructively) powerful in their own right. It is not that they *have* agency; they *are* agency. The wind, to repeat, *is* its blowing, not a thing that blows. Likewise, persons *are* what they do.[5] There is nothing peculiar or anthropomorphic, therefore, about the attribution of personal powers to the winds.

I have already observed that in the open world there are no insides and outsides, only comings and goings. Speaking of the work of the painter, Merleau-Ponty remarks that 'there really is inspiration and expiration of Being' (1964: 167). Breathing in and out, one alternately takes in the medium and surrenders to it. Inspiration is wind becoming breath, expiration is breath becoming wind. The alternation of coming and going, in respiration, is essential to life. The parallel, in many languages, between words for life, wind, and breath bears out this idea. Our English word 'animate', for example, from which the notion of animism is derived, comes from the Latin *animare* (to give life) and *anima* (breath), both in turn derived from the Greek *anemos* (wind).[6] Life, then, is borne – along with the forms it generates – on the currents of the medium: as David Macauley writes, 'with our heads immersed in the thickness of the atmosphere or our lungs and limbs engaged with the swirling winds, we repeatedly breathe, think and dream in the regions of the air' (2005: 307). But by the same token, inhabiting the open

does not yield an experience of embodiment, as though life could be incorporated or wrapped up within a solid bodily matrix. Nor does it yield an experience of disembodiment, of a spirituality altogether removed from the material fluxes of the world. To feel the wind and breathe the air is rather to ride on the wave of the world's ongoing formation – to be forever present at the 'continued birth', as Merleau-Ponty called it, of both persons and things (1964: 168). It is as though every breath was one's first, drawn at the very moment when the world is about to disclose itself for what it is. In this, it is not so much the wind that is embodied as the body, in breathing, that is *enwinded*.

The weather-world

My concern has been to understand what it means to inhabit, that is, to dwell *within*, a world-sphere that is nevertheless open rather than contained. In this world there are no walls, only the horizons progressively disclosed to inhabitants as they go their various ways; no floor, only the ground beneath their feet; no ceiling, only the sky arching overhead; no furniture, only formations and obtrusions. I have suggested that because we generally think and write indoors, the world we describe in our writing is one that has been imaginatively remodelled *as if* it were already set up within an enclosed, interior space. In this *as if* world, populated only by people and objects, those fluxes of the medium that we experience as wind and rain, sunshine and mist, frost and snow, and so on, are simply inconceivable. This, I believe, accounts for their absence from practically all discussions concerning the relations between human beings and the material world. In the alternative view I have presented – a view from the open – what is inconceivable is the idea that life is played out upon the surface of a world that is already furnished with objects. Inhabitants, I contend, make their way *through* a world-in-formation rather than *across* its pre-formed surface. For that reason, the fluxes of the medium through which they move are all-important.

With this conclusion we return to an issue that I and the students with whom I was working deliberated at length as we walked through the Aberdeenshire countryside. What is the relation between the weather and the land? Do they belong to distinct domains, respectively of sky and earth, medium and substance, separated by the ground surface? That, in effect, was Gibson's view. 'The atmospheric medium', he writes, 'is subject to certain kinds of changes that we call weather' (1979: 19). Thus, weather is what is *going on* in the medium.[7] The substance of the earth, however, is impervious to these goings-on. The terrestrial surface, relatively rigid and non-porous, ensures that medium and substance keep to their respective domains and do not mix. It is as though in the forms of the land, the earth had turned its back on the sky, refusing further intercourse with it. Thus the weather swirls about *on top* of the land, but does not participate further in its formation. Yet as every inhabitant knows, rainfall can turn a ploughed field into a sea of mud, frost can shatter solid rocks, lightning can ignite forest fires on land parched by summer heat, and the wind can whip sand into dunes, snow into drifts, and the water of lakes and oceans into waves. As Richard Nelson puts it, in his study of how Koyukon people in Alaska perceive their surroundings, 'weather is the hammer and the land is the anvil' (1983: 33). There are other, more subtle and delicate ways in which the land responds to fluxes in the medium. Think of the pearls of dew that pick out the tendrils of plants and spiders' webs on a cool summer's morning, or of the little trails left by a passing gust of wind in the dry leaves and broken twigs of a woodland floor.

Seasoned inhabitants know how to read the land as an intimate register of wind and weather. Like the Koyukon, they can sense the approach of a storm in the sudden burst of flame in a campfire, or – as the Yup'ik elder Fred George explains – they can read the direction of the prevailing wind in the orientation of tufts of frozen grass sticking out from the snow, or of snow 'waves' on ice-bound lakes (Bradley 2002: 249; Nelson 1983: 41). Yet the more one reads into the land, the more difficult it becomes to ascertain with any certainty where the substance ends and the medium begins. For it is precisely through the *binding* of medium and substance that wind and weather leave their mark in the land. Thus the land itself no longer appears as an interface separating the two, but as a vaguely defined zone of admixture and intermingling. Indeed anyone who has walked through the boreal forest in summer knows that the 'ground' is not really a coherent surface at all but a more or less impenetrable mass of tangled undergrowth, leaf litter and detritus, mosses and lichens, stones and boulders, split by cracks and crevasses, threaded by tree roots, and interspersed with swamps and marshes overgrown with rafts of vegetation that are liable to give way underfoot. Somewhere beneath it all is solid rock, and somewhere above the clear sky, but it is in this intermediate zone that life is lived, at depths depending upon the scale of the creature and its capacity to penetrate an environment that is ever more tightly packed.

It is in this sense that creatures live *in* the land and not *on* it. There could be no life in a world where medium and substance do not mix, or where the earth is locked inside – and the sky locked out – of a solid sphere. Wherever there is life and habitation, the interfacial separation of substance and medium is disrupted to give way to mutual permeability and binding. For it is in the nature of living beings themselves that, by way of their own processes of respiration, of breathing in and out, they bind the medium with substances in forging their own growth and movement through the world. And in this growth and movement they contribute to its ever-evolving weave. The land, we could say, is continually *growing over*, which is why archaeologists have to dig to recover the traces of past lives. And what holds it all together are the tangled and tangible life-lines of its inhabitants. The wind, too, mingles with substance as it blows through the land, leaving traces of its passing in tracks or trails. We could say of the wind that 'it winds', wending its way along twisted paths as do terrestrial travellers. These paths are often likened to ropes. There is an old tradition among Sami people that by tying the ropes into knots the wind may be stopped, and that by untying them they are once more unleashed (Helander & Mustonen 2004: 537).[8] Thus the relation between land and weather does not cut across an impermeable interface between earth and sky but is rather one *between the binding and unbinding of the world*. In the open world the task of habitation is to bind the weather into substantial, living forms, and in that way to participate in weaving the texture of the land. But bindings are not boundaries, and they no more contain the world, or enclose it, than does a knot contain the threads from which it is tied.

If life binds, then fire unbinds. Rather than binding the medium with substance, in the smoke of the hearth we find the reverse transformation, a release of substance to the medium in volatile form. As it rises, smoke mingles with circulations of air in the weather-world, and can even condense into clouds. In northern Finland, where I have carried out fieldwork, every dwelling was traditionally known as a 'smoke' since it could be recognized, even from some distance, by the white column rising vertically into the sky on a still, frosty day. However, the dwelling, with the hearth at its centre, still pertains to the world of the open, as does the life that goes on within it. Just as the living

body is sustained by the rhythmic movement of breathing in and out, so the dwelling is sustained by the continual coming and going of its inhabitants. Thus it is important to distinguish between the 'indoors' of the dwelling that is wrapped around its inhabitants like a warm coat, and the 'indoors' of the *as if* world, of which I have already spoken, that has been reconstructed in an enclosed space. Whereas the former is a place-holder for life, the latter is a container. It has, of course, long been the ambition of modernist architecture to build spaces for living that are fully self-contained – where the whole world has been brought inside. Part of this containment entails creating the illusion of an absolute division between earth and sky, by hiding from view those disruptions of the surface that are inevitable for the bubble to be sustained. It is perhaps in this light that we can interpret the progressive banishment of the hearth, in the architecture of modernity, from the centre to the periphery of the dwelling, along with the confinement of smoke within ever-lengthening chimneys. The tall factory chimney, belching smoke, proclaims the absolute separation of earth and sky at the same time as it hides away the points of disruption where fires actually burn. A history of the chimney, however, has still to be written.

We have come a long way from the image of earth and sky with which I began, epitomized in Ethan's drawing of a ball-like earth, completely surrounded by an outline sky (Fig. 2A). This image, supposedly representing the 'correct' scientific view, leaves people as exhabitants of the earth, stranded on its outer surface. Our question has been: what kind of world can be inhabited? Gibson's answer is to imagine the open surface of the earth strewn with objects, to which people can relate in their activities. From this point of view, the terrestrial environment becomes habitable to the extent that the world is no longer open but enclosed. Such enclosure may never be more than partial, but for just that reason, the inhabitant remains, to an extent, an exile. I have argued, to the contrary, that there are no objects in the open world. To inhabit the open is not to be stranded on a closed surface but to be immersed in the fluxes of the medium, in the incessant movements of wind and weather. Life is borne on these fluxes which, felt rather than touched, permeate the inhabitant's entire being. In this weather-world there is no distinct surface separating earth and sky. Life is rather lived in a zone in which substance and medium are brought together in the constitution of beings which, in their activity, bind the weather-world into the textures of the land. Figure 4 traces the journey we have taken in this argument, from exhabitation to inhabitation.

The Koyukon of Alaska often invoke the beings that inhabit their world by means of riddles. Taking up the subject-position of the being to which he refers, the riddler describes its characteristic movements as though he were carrying them out himself, by means of an analogy with familiar human actions. Like gusts of wind, these are fugitive movements in a weather-world in which all are immersed, and in which nothing ever stands still. This world waits for no-one. It cannot be halted to allow closer inspection, and the image the riddler conjures up is one that vanishes as fast as it appears. In one such riddle, recorded by the Jesuit priest Julius Jetté at the beginning of the twentieth century, the riddler imagines himself as a tuft of grass. The literal translation runs as follows:

over-there around I-sweep-with-my-body.

(Jetté 1913: 199-200)[9]

The riddler is a broom, and the broom *is* its sweeping. He sweeps the place around him, just like the withered grasses that still poke out above the first snows of winter. In the

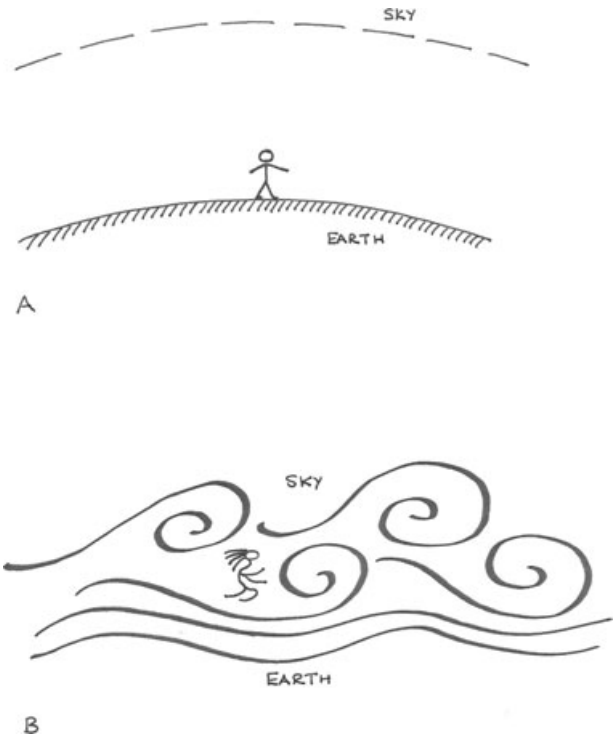

Figure 4. A: The exhabitant of the earth. B: The inhabitant of the weather-world.

wind the blades of grass bend over so as to touch the snow, still soft and loose from recent falls, sweeping a small circular patch around the place where they stand. Perhaps this riddle lies at the other end of the spectrum from Ethan's drawing of the earth and the sky. It concentrates in miniature the manifold of earth, sky, wind, and weather from the perspective of the inhabitant. Here, the whole world is in a tuft of grass. Grown from the earth under the summer sunshine, now frozen in place by winter frost and blown by the wind, the grass makes a place for itself in the world by creating a patch in the snow. It is by such movements that every living being inhabits the world of the open.

NOTES

This paper pulls together ideas from three separate sources which I wish to acknowledge. The first lies in the experience, over the past three years (2004-6), of working with final-year undergraduate students at the University of Aberdeen, who have taken my course 'The 4As: Anthropology, Archaeology, Art and Architecture'. Our discussions about landscape and weather, not just in the classroom but out in the hills and by the seashore, have been quite inspirational, and I would like to thank all the students for their contributions. The second source was one of a series of seminars on 'The Interactive Mind', sponsored by the Arts and Humanities Research Council, and held on that occasion at the University of Sheffield (8-9 April 2005). During this seminar I heard a presentation on 'Conceptual change in children' by Michael Siegal, and was intrigued by the psychological research he described on children's perceptions of the earth and the sky. I determined there and then to look further into this, and am grateful to Dr Siegal for pointing me towards the relevant literature. The third source of inspiration came just two months later with the Oxford conference on 'Wind, Life and Health' (3-4 June 2005). My presentation at the conference was closely based on a paper now

published elsewhere (Ingold 2006). It was at the conference, however, that I first produced the sketch that now appears as Figure 4, and the comments I received encouraged me to develop the idea further. Following the conference, and thanks to the stimulus it provided, I wrote the paper entirely anew, and presented it for the first time – more or less in the form in which it now appears – at the seminar on 'Landscapes and Liminality', held at the University of Turku's research station at Kevo, in Finnish Lapland (5-8 January 2006). This seminar, along with conversations there with Kenneth Olwig, set me thinking about the significance of hearths and chimneys as sites of interchange between the substances of the earth and the fluxes of wind and weather. I presented the paper one more time, just prior to final revision, at a seminar of the Centre for Anthropology at the British Museum, on 7 September 2006. I am grateful to Robert Storrie for the invitation and to participants in the seminar for their comments. Finally, I am grateful to Elsevier for permission to reprint Figures 1 and 2 from *Cognitive Psychology* **24** (S. Vosniadou & W.F. Brewer, 'Mental models of the earth: a study of conceptual change in childhood', 535-585, 1992). I also thank Gavin Nobes for certain points of clarification and, with the British Psychological Society, for granting me permission to reproduce the image in Figure 3 from *British Journal of Developmental Psychology* **23** (G. Nobes, A.E. Martin & G. Panagiotaki, 'The development of scientific knowledge of the Earth', 47-64, 2005).

[1] I have purposefully placed 'scientifically correct' in quotation marks, to indicate that what is at stake is not people's substantive knowledge of the findings of modern science but rather the extent to which their understanding accords with formal schematic conventions consistent with a scientific worldview.

[2] Elsewhere I have characterized this idea of the solid earth by way of an image of the *globe*, and have contrasted this image with that of the hollow *sphere* (Ingold 2000: 209-18). Here, however, in order to conform with accepted usage in the literature cited, I employ the notion of the spherical earth in both senses. The sphere may thus be understood as either solid, with people on the outside, or hollow, with people on the inside.

[3] I have explored these issues of multisensory perception in relation to the weather at greater length in Ingold (2005*a*). See also Ingold (2000: 243-87).

[4] I have discussed this issue of the wind in relation to animic cosmologies at greater length in Ingold (2006). On the personal powers of the winds, and their role in orientation, see, for example, Farnell (1994: 400) on Assiniboine; Krupnik (2004: 205-6) on Yup'ik; Fox (2002: 40) and MacDonald (1998: 180-2) on Inuit; Hallowell (1960: 30) on Ojibwa; and Nelson (1983: 36) on Koyukon.

[5] This notion of agency as the doing of the world has been proposed in rather similar terms by the sociologist of science Andrew Pickering. Significantly, he uses the example of the weather to drive home his point:

> One can start from the idea that the world is filled not, in the first instance, with facts and observations, but with *agency*. The world, I want to say, is continually *doing things*, things that bear upon us not as observation statements upon disembodied intellects but as forces upon material beings. Think of the weather. Winds, storms, droughts, floods, heat and cold – all of these engage with our bodies as well as our minds, often in life-threatening ways (Pickering 1995: 6).

[6] For examples in other languages, see Parkin (this volume).

[7] As such, weather must be distinguished absolutely from climate:

> Climate is an abstraction compounded from a number of variables (temperature, precipitation, air pressure, windspeed, etc.) that are isolated for purposes of measurement. Weather, by contrast, is about what it feels like to be warm or cold, drenched in rain, caught in a storm, and so on. In short, climate is recorded, weather experienced (Ingold & Kurttila 2000: 187).

Igor Krupnik, writing on Yup'ik weather knowledge, alludes to the same distinction when he notes that Yup'ik observation of the weather 'is primarily wind- and ocean-current oriented – unlike the scientific (that is, instrumental) observation, which is first and foremost focused on changes in temperature and atmospheric pressure' (2004: 205). Where scientists read their recording instruments, Yup'ik people observe *what is going on* in the sky and in the sea.

[8] In the course of fieldwork in the Cornish village of Boscastle, in 2003-5, anthropologist Tori L. Jennings came across an etching dating from the sixteenth century, which allegedly shows a sorcerer selling wind tied in knots to sailors. Untying the knots, it was said, would conjure up a wind from a dead calm. Having carried out my own ethnographic work among the Sami, I immediately recognized this etching: it actually comes from a well-known work by Olaus Magnus, then Archbishop of Uppsala, and was published in Uppsala in the year 1555. The book, *Historia de gentibus septentionalibus* ('History of the Peoples of the North'), is celebrated among scholars as one of the first synthetic accounts of the people and cultures of northernmost

Europe. The text that accompanies the picture explains how the heathens of northern Finland would sell the wind to merchants confined to the shore by contrary winds. In return for a payment they were presented with a leather strap with three knots. Opening the first would release light winds, and the second moderate winds. But opening the third would unleash a catastrophic storm. How Magnus's picture found its way to Cornwall is a mystery, but the etching has apparently been on display at the Witchcraft Museum in Boscastle, under the title *The witches of Boscastle selling the wind*, ever since 1960, when the Museum was moved to the village by its previous Director, Cecil Williamson. It is even sold as a postcard in the Museum shop! In August 2004, Boscastle was struck by a devastating flash flood, and the Museum now has a newly painted sign, under the same title, depicting a female witch with a long pointed nose, selling a rope with three knots to a couple of bearded seamen of distinctively Cornish appearance on the shore of a rocky creek (Jennings, pers. comm.).

[9] Jetté refers to the Koyukon people as the Ten'a. This particular riddle is also mentioned by Nelson in his ethnography of the Koyukon, but is given a rather free translation:

> *Wait, I see something: My end sweeps this way and that way and this way around me.*
> *Answer: Grass tassles moving back and forth in the wind, making little curved trails in the snow.*
> (Nelson 1983: 44)

REFERENCES

Bradley, C. 2002. Travelling with Fred George: the changing ways of Yup'ik star navigation in Akiachak, western Alaska. In *The earth is faster now: indigenous observations of Arctic environmental change* (eds) I. Krupnik & D. Jolly, 240-65. Fairbanks, Alaska: Arctic Research Consortium of the United States.

Farnell, B.M. 1994. Ethno-graphics and the moving body. *Man* (N.S.) **29**, 929-74.

Fox, S. 2002. These are things that are really happening. In *The earth is faster now: indigenous observations of Arctic environmental change* (eds) I. Krupnik & D. Jolly, 12-53. Fairbanks, Alaska: Arctic Research Consortium of the United States.

Gibson, J.J. 1979. *The ecological approach to visual perception*. Boston: Houghton Mifflin.

Hallowell, A.I. 1960. Ojibwa ontology, behavior and world view. In *Culture in history: essays in honor of Paul Radin* (ed.) S. Diamond, 19-52. New York: Columbia University Press.

Helander, E. & T. Mustonen (eds) 2004. *Snowscapes, dreamscapes: snowchange book on community voices of change* (Tampere Polytechnic Publications, Series C, Study Materials **12**). Vaasa: Fram Oy.

Hull, J. 1997. *On sight and insight: a journey into the world of blindness*. Oxford: Oneworld Publications.

Ingold, T. 2000. *The perception of the environment: essays on livelihood, dwelling and skill*. London: Routledge.

——— 2005*a*. The eye of the storm: visual perception and the weather. *Visual Studies* **20**, 97-104.

——— 2005*b*. Landscape lives, but archaeology turns to stone. *Norwegian Archaeological Review* **38**, 122-6.

——— 2006. Rethinking the animate, re-animating thought. *Ethnos* **71**, 1-12.

——— & T. Kurttila 2000. Perceiving the environment in Finnish Lapland. *Body and Society* **6**, 183-96.

Jetté, J. 1913. Riddles of the Ten'a Indians. *Anthropos* **8**, 181-201, 630-51.

Krupnik, I. 2004. Yupik ice and weather knowledge: some final remarks. In *Watching ice and weather our way* (eds) I. Krupnik, H. Huntington, C. Koonooka & G. Noongwook, 195, 204-7. Washington, D.C.: Arctic Studies Center, Smithsonian Institution.

Macauley, D. 2005. The flowering of environmental roots and the four elements in Presocratic philosophy: from Empedocles to Deleuze and Guattari. *Worldviews: Environment, Culture, Religion* **9**, 281-314.

MacDonald, J. 1998. *The Arctic sky: Inuit astronomy, star lore, and legend*. Ontario: Royal Ontario Museum/ Iqaluit: Nunavut Research Institute.

Merleau-Ponty, M. 1962. *Phenomenology of perception* (trans. C. Smith). London: Routledge & Kegan Paul.

——— 1964. Eye and mind (trans. C. Dallery). In *The primacy of perception and other essays on phenomenological psychology, the philosophy of art, history and politics* (ed.) J.M. Edie, 159-90. Evanston, Ill.: Northwestern University Press.

Nelson, R.K. 1983. *Make prayers to the raven: a Koyukon view of the northern forest*. Chicago: University Press.

Nobes, G., A.E. Martin & G. Panagiotaki 2005. The development of scientific knowledge of the Earth. *British Journal of Developmental Psychology* **23**, 47-64.

Pickering, A. 1995. *The mangle of practice: time, agency, and science*. Chicago: University Press.

Revel, N. 2005. Palawan Highlanders and Dayaks of Borneo: human beings and birds, their relation. In *Animal names* (eds) A. Minelli, G. Ortalli & G. Sanga, 401-17. Venice: Istituto Veneto di Scienze, Lettere ed Arti.

Tilley, C. 2004. *The materiality of stone*. Oxford: Berg.

Vosniadou, S. 1994. Universal and culture-specific properties of children's mental models of the earth. In *Mapping the mind: domain specificity in cognition and culture* (eds) L.A. Hirschfeld & S.A. Gelman, 412-30. Cambridge: University Press.

——— & W.F. Brewer 1992. Mental models of the earth: a study of conceptual change in childhood. *Cognitive Psychology* **24**, 535-85.

La terre, le ciel, le vent, les éléments

Résumé

L'auteur cherche à comprendre ce que signifie vivre « au grand air ». Il commence par rendre compte d'expériences cherchant à déterminer si les enfants ont acquis une compréhension scientifiquement correcte de la forme de la Terre comme une sphère solide dont la surface extérieure porte l'humanité. Cette compréhension ne peut pas rendre compte du phénomène du ciel par rapport auquel la terre ne peut apparaître que comme la base de l'habitat humain. L'approche écologique de la perception selon James Gibson constitue une alternative possible en décrivant la terre et le ciel comme des hémisphères complémentaires. Cependant, dans l'idée de Gibson, cette terre-ciel ne peut être habitée que si elle est meublée d'objets. Or elle cesse dès lors d'être ouverte. À partir d'éléments de la phénoménologie de Merleau-Ponty, l'auteur affirme qu'à l'air libre, les personnes et les choses sont liées non pas en tant que formes closes mais parce qu'elles sont immergées, les unes comme les autres, dans les flux générateurs du médium : le vent et les phénomènes météorologiques. L'une des caractéristiques fondamentales de la vie est le processus de respiration, par lequel les êtres vivants franchissent en permanence la frontière entre la terre et le ciel, lient l'un à l'autre la substance et le médium en alimentant leur propre croissance et leur activité. Habiter à l'air libre ne signifie donc pas être abandonné sur la surface externe de la Terre, mais être impliqué dans les transformations du monde météorologique.

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