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THE MATERIALS OF LIFE

Touching objects, feeling materials

Let me begin by describing an experiment I have carried out along with the students in the very first week of the 4 As course. For this experiment, I asked them to gather a selection of objects that they found lying around the ‘things’ on which they had chosen to focus their projects. They arrived with a motley assortment of odds and ends: there were coins, paper clips, drinks cans, cigarette butts, a rubber ball, the feather of a seagull, and much else besides. First we deposited all the stuff they had brought in a heap in the middle of the floor (Figure 2.1). We looked at the heap, from which a spider scuttled out across the carpet. It had arrived as a passenger with some item, but no one knew from which. Or was it actually a *part* of the item? Picking up each object in turn, we examined it, investigated its form, interrogated the finder on where it was found and why it had caught his or her attention, and attempted to reconstruct the story of how it had fetched up at that particular place. The coins, for example, told of pockets and purses and of countless transpositions from hand to till and back. The paper clips once fastened the documents of a busy official, while the cans – previously filled with liquid – had been held to thirsty lips through which, only moments before, had been inhaled the smoke of smouldering tobacco. From the tooth marks on its surface, it was apparent that the rubber ball, recovered from a sandy beach, had been the plaything of a dog, while the feather had once graced a bird in flight, high in the air. All of these objects, in short, evidenced other lives – human, canine, avian. And yet in becoming objects they had broken off from these lives – like fallen twigs from a tree – and were left lifeless, as so much bric-a-brac stranded on the riverbank. Only the spider escaped.

In the following week I asked the students to return to their project sites and to bring along, this time, a selection of *materials* gathered from the environs of these sites. This time many of them came with containers full of stuff like sand, gravel, mud and leaf litter. Why containers? Because, as we found as soon as we emptied out the contents, materials do not, of themselves, stay in place or hold to the bounds of any form, and have an inherent tendency to run amok. We are all familiar with Mary



FIGURE 2.2 Smearing materials onto boards covered with paste: from the 4 As class

gesture with the spoon both induces and responds to viscosities and currents of the mixed ingredients in the pan. What is odd is that studies of the material culture of kitchens have generally concentrated on pots and pans, and spoons, to the virtual exclusion of the soup. The focus, in short, has been on objects rather than materials. Yet on second thoughts, this is not a division between what we find in the kitchen: objects here; materials there. It is rather a difference of perspective. Householders might think of pots and pans as objects, at least until they start to cook, but for the dealer in scrap metal, they are lumps of material.

Likewise, we could return to the objects that the students brought in for our first session and ask: what would have happened if we had thought of all this stuff as materials? A coin: that's copper, and we could have sought to explore its properties by hammering it, or seeing what happens when you heat it up or put it in a flame (the flame would turn green). The paper clip: that's a length of wire, and we could unravel it and bend it to other purposes. The drinks can: that's aluminium; feel how light it is! The cigarette butt: well there is still some tobacco inside. Light it, and it will exude smoke, and the smoke makes trails in the air that bend this way and that in response to the fluxes and rhythms of our own breathing. The ball: that's made of rubber, and by applying pressure with the hands, we can feel its softness and springiness. We could even put it between our teeth and imagine what it feels like to be a dog. And of course, to think of the feather as a material is to recognise that it has grown along with the body of the bird of which it was once an integral part, mingling with the air in flight. In every case, by treating these erstwhile objects as materials we rescue them from the cul-de-sac into which they had been cast and restore them to the currents of life.

Making and growing

This chapter is about bringing things back to life. Its basic argument may be expressed by means of a simple diagram. Draw two lines: they need not be straight; indeed you can allow them to meander a little. However, they should proceed alongside one another, like the trails left by two people walking abreast. Each is a path of movement. Let one of these lines stand for the flow of consciousness, saturated as it is by light, sound and feeling. And let the other stand for the flow of materials as they circulate, mix and meld. Now imagine that each of these flows is momentarily stopped up. On the side of consciousness, this stoppage takes on the semblance of an *image*, like a fugitive suddenly caught in the glare of a spotlight. And on the side of materials it takes on the solid form of an *object*, like a boulder placed in the fugitive's path, blocking his passage. On our diagram we could depict both stoppages by a point or blob on each respective line. Now draw a double ended arrow connecting the two blobs. Unlike the original pair of lines, this arrow is not the trace of a movement; it is notional rather than phenomenal, and depicts a connection of some kind between image and object. Now that our diagram is complete (Figure 2.3), we can sum up the argument of this chapter, and indeed of the entire book. It is to switch our perspective from the endless shuttling back and forth from image to object and from object to image, that is such a pronounced feature of academic writing in the fields of anthropology, archaeology, art and architecture, to the material flows and currents of sensory awareness in which images and objects reciprocally take shape. In terms of our diagram, this entails a rotation of 90 degrees, from the lateral to the longitudinal.

We will find this rotation cropping up again and again, in various connections. Indeed we have already encountered it in the last chapter, in our distinction between ethnographic documentation (lateral) and anthropological transformation (longitudinal). With regard to perception, it underpins the distinction between an optical and a haptic relation to the world – a distinction that explains the quite different experiences of tactility described above, showing that the optical relation is by no means limited to a perception mediated by the eye (nor is the haptic relation limited to the hands). With regard to creativity, it distinguishes the improvisatory creativity of labour that works things out as it goes along from the attribution of creativity to the novelty of determinate ends conceived in advance. It underpins the distinctions spelled out in Chapter 7 between interaction and correspondence and in Chapter 8 between articulate and personal knowledge. Most fundamentally, however, it crops up in connection with the question of what it means to make things.

We are accustomed to think of making as a *project*. This is to start with an idea in mind, of what we want to achieve, and with a supply of the raw material needed to achieve it. And it is to finish at the moment when the material has taken on the intended form. At this point, we say, we have produced an *artefact*. A nodule of stone has become an axe, a lump of clay a pot, molten metal a sword. Axe, pot and sword are instances of what scholars call *material culture*, a phrase that perfectly captures this theory of making as the unification of stuff supplied by nature with the conceptual representations of a received cultural tradition. 'Material culture', as Julian Thomas (2007: 15) puts it, 'represents at once ideas that have been made material, and natural substance that has been rendered cultural.' In the literature, the theory is known as *hylomorphism*, from the Greek *hyle* (matter) and *morphe* (form). Whenever we read that in the making of

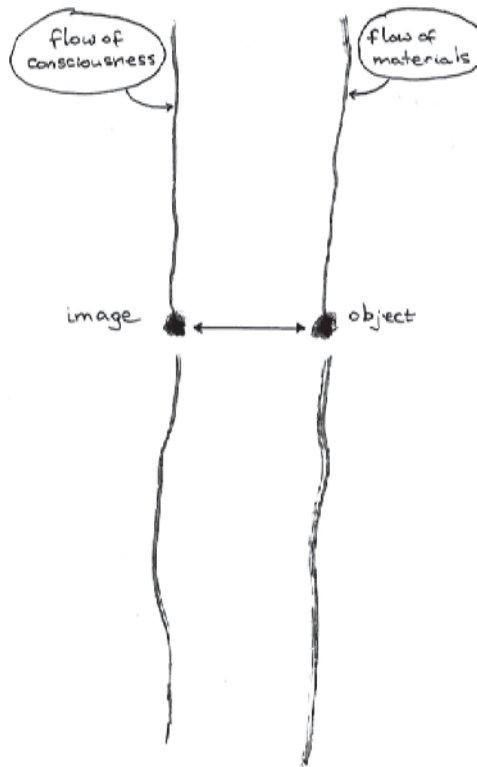


FIGURE 2.3 Consciousness, materials, image, object: the diagram

artefacts, practitioners impose forms internal to the mind upon a material world ‘out there’, hylomorphism is at work.

I want to think of making, instead, as a process of *growth*. This is to place the maker from the outset as a participant in amongst a world of active materials. These materials are what he has to work with, and in the process of making he ‘joins forces’ with them, bringing them together or splitting them apart, synthesising and distilling, in anticipation of what might emerge. The maker’s ambitions, in this understanding, are altogether more humble than those implied by the hylomorphic model. Far from standing aloof, imposing his designs on a world that is ready and waiting to receive them, the most he can do is to intervene in worldly processes that are already going on, and which give rise to the forms of the living world that we see all around us – in plants and animals, in waves of water, snow and sand, in rocks and clouds – adding his own impetus to the forces and energies in play. The difference between a marble statue and a rock formation such as a stalagmite, for example, is not that one has been made and the other not. The difference is only this: that at some point in the formative history of this lump of marble, first a quarryman appeared on the scene who, with much force and with the assistance of hammers and wedges, wrested it from the bedrock, after which a sculptor set to work with a chisel in order, as he might put it, to release the form from

the stone. But as every chip of the chisel contributes to the emergent form of the statue, so every drop of supersaturated solution from the roof of the cave contributes to the form of the stalagmite. When subsequently, the statue is worn down by rain, the form-generating process continues, but now without further human intervention.

To read making longitudinally, as a confluence of forces and materials, rather than laterally, as a transposition from image to object, is to regard it as such a form-generating – or *morphogenetic* – process. This is to soften any distinction we might draw between organism and artefact. For if organisms grow, so too do artefacts. And if artefacts are made, so too are organisms. What varies, among countless other things, is the extent of human involvement in the generation of form: but this variation is one of degree, not kind. This is not of course to deny that the maker may have an idea in mind of what he wants to make. He may even be seeking to copy a piece of work that already stands before him. Does this not distinguish the statue from the stalagmite, once and for all? Can we not speak, in a sense unique to artefacts, of their *design*? This is a question I will leave for later (see [Chapter 5](#)). Suffice it to say, at this point, that even if the maker has a form in mind, it is not this form that creates the work. It is the engagement with materials. And it is therefore to this engagement that we must attend if we are to understand how things are made. Time and again, scholars have written as though to have a design for a thing, you already have the thing itself. Some versions of conceptual art and architecture have taken this reasoning to such an extreme that the thing itself becomes superfluous. It is but a representation – a derivative copy – of the design that preceded it (Frascari 1991: 93). If everything about a form is prefigured in the design, then why bother to make it at all? But makers know better, and one of the purposes of this book is to bring them out of the shadows into which they have been cast by an uncritical application of the hylomorphic model, and to celebrate the creativity of their achievement.

Baskets in the sand

On a cold and windy day in February, the 4 As students and I were out on a sandy peninsula wedged between the beach and the estuary of the River Don, which flows into the sea on the northern flank of the city of Aberdeen. Patches of snow remained on the ground. We were learning to make baskets out of willow, under the direction of anthropologist and craftsperson Stephanie Bunn (see Bunn 2010: 49–50). To form a frame, an odd number of lengths of willow were stuck vertically into the ground, to form a rough circle, tied at the top. Horizontal pieces were then woven alternately in and out of the vertical frame so as gradually to build up a surface in the form of an inverted cone. Students worked at this either singly or in pairs ([Figure 2.4](#)). From the start, I think, many students were surprised by the recalcitrant nature of the material. In a finished basket, the willow seems to sit so naturally there, as if it had always been meant to fall into that shape and was merely fulfilling the role for which it was predestined. But the willow did not want to be bent into shape. Sometimes it put up a fight, springing back and striking the weaver in the face. One had to be careful and coaxing. Then we realised that it was actually this resistance, the friction set up by branches bent forcibly against each other, that held the whole construction together. The form was not imposed on the material from without, but was rather generated in this force field,



FIGURE 2.4 Making baskets in the sand, near Aberdeen beach in north-east Scotland. (Courtesy of Raymond Lucas.)

comprised by the relations between the weaver and the willow. Indeed as novices, we had little control over the precise form and proportions of our baskets. Kneeling on the ground, our weaving involved quite muscular movements of the entire body, or at least from the knees upwards, so that the dimensions of the basket related directly to such bodily dimensions as arm-reach and shoulder-height. Students discovered they had muscles in places they had never imagined, partly because after a while they began to ache. But other forces, too, entered into the formative process. One of these was the wind. A persistent, strengthening wind was bending all the verticals of the frame in one direction, with an inclination that increased with height. No wonder, then, that many baskets, especially those woven nearest to the shore, tilted over somewhat, in an elegant but wholly unintended curve (Figure 2.5).

We laboured for almost three hours, gradually developing a rhythm and a feel for the material. As the work progressed, however, we began to face another problem. How would we know when to stop? There is no obvious point when a basket is finished. The end dawned for us, not when the form came to match initial expectations, for we had none. It came rather with failing light and the imminent prospect of heavy rain, increasing chill and stiffness in the limbs, and the sense that each additional strand was becoming somehow superfluous. At that point it was time to insert a separately woven base and to cut the verticals at the height we had reached. At last, then, we could lift the woven construction from the ground, and turn it upside down to reveal that what we had made was indeed a basket. Each basket was different, uniquely reflecting the mood and



FIGURE 2.5 A near-complete basket. (Courtesy of Raymond Lucas.)

temperament, as well as the physical stature, of its maker. Finally the students straggled off into the gathering dusk, proudly bearing homeward the baskets they had made. Later they would tell me that they had learned more from that one afternoon than from any number of lectures and readings: above all about what it means to make things, about how form arises through movement, and about the dynamic properties of materials.

On matter and form

Perhaps it is unfair to use basketry as a way to criticise the hylomorphic model. The conclusion that the model does not work for weaving does not rule out the possibility that it might work perfectly well for branches of manufacture in which form is more ostensibly imposed on material. What about making bricks, for example? In forming the brick, prior to firing in the kiln, soft clay is pressed into a pre-prepared, rectangular mould. The mould, it seems, prescribes the form while the material – the clay – is initially formless. Surely, as the clay is pressed into the mould, form is united with material just as the logic of hylomorphism requires. But in a thesis entitled *L'individuation à la lumière des*

notions de Forme et d'Information, the philosopher Gilbert Simondon shows that this is not so.¹ For one thing, the mould is no geometric abstraction but a solid construction that has first to be built from a specific material (traditionally, a hardwood such as beech). For another thing, the clay is not raw. Having been dug out from beneath the topsoil, it has first to be ground, sieved to remove stones and other impurities, and then exhaustively kneaded before it is ready for use. In the moulding of a brick, then, form is not united with material. Rather, there is a bringing together or unification of two 'transformational half-chains' (*demi-chaînes de transformations*) – respectively building the mould and preparing the clay – to a point at which they reach a certain compatibility: the clay can take to the mould and the mould can take the clay (Simondon 2005: 41–42). At the moment of encounter, when the brick maker 'dashes' a clot of clay into the mould, the expressive force of the maker's gesture, imparted to the clay, comes hard up against the compressive resistance of the hard wood of the mould's walls. Thus the brick, with its characteristic rectangular outline, results not from the *imposition* of form onto matter but from the *contraposition* of equal and opposed forces immanent in both the clay and the mould. In the field of forces, the form emerges as a more or less transitory equilibration. Perhaps bricks are not so different from baskets after all (Figure 2.6).

Simondon's central postulate of *individuation* holds that the generation of things should be understood as a process of morphogenesis in which form is ever emergent rather than given in advance. As Brian Massumi (2009: 37) explains, in a commentary on Simondon's text, this is to assert 'a primacy of processes of becoming over the states of being through which they pass'. Against the form-receiving passivity of matter posited by hylomorphism, Simondon took the essence of matter, or the material, to lie in *form-taking activity*. The hylomorphic model, Simondon (2005: 46) concludes, corresponds to the perspective of a man who stands outside the works and sees what goes in and what comes out but nothing of what happens in between, of the actual processes whereby materials of diverse kinds come to take on the forms they do. It is as though, in form and matter, he could grasp only the ends of two half-chains but not what brings them together, only a simple relation of moulding rather than the continuous modulation that goes on in the midst of form-taking activity, in the *becoming* of things.

In their 'treatise on nomadology', philosopher Gilles Deleuze and psychoanalyst Félix Guattari have taken up Simondon's crusade against hylomorphism, and, thanks to their influence, the issues it raises are beginning to percolate through to archaeology and anthropology. The trouble with the matter-form model, argue Deleuze and Guattari, is that in assuming 'a fixed form and a matter deemed homogeneous' it fails to acknowledge, on the one hand, the variability of matter – its tensions and elasticities, lines of flow and resistances – and, on the other hand, the conformations and deformations to which these modulations give rise. In reality, they insist, whenever we encounter matter 'it is matter in movement, in flux, in variation', with the consequence that 'this matter-flow can only be *followed*' (Deleuze and Guattari 2004: 450–451). Artisans or practitioners who follow the flow are, in effect, itinerants, wayfarers, whose task is to enter the grain of the world's becoming and bend it to an evolving purpose. Theirs is an 'intuition in action' (*ibid.*: 452).

Whereas Simondon took his key example from brick making, however, Deleuze and Guattari appeal to metallurgy. For them, metallurgy highlights a particular insufficiency of the hylomorphic model, namely that it can only conceive of technical operations as



FIGURE 2.6 A brick maker at work under a thatched shelter, his wheelbarrow beside him. The engraving is by an unknown artist, dating from 1827. (Courtesy of Mary Evans Picture Library.)

sequences of discrete steps, with a clear threshold marking the termination of each step and the commencement of the next. But in metallurgy, these thresholds are precisely where the key operations take place. Thus, even as he beats out the form with hammer on anvil, the smith has periodically to return his iron to the fire: material variation spills over into the formative process and indeed continues beyond it, since it is only after forging that the iron is finally quenched. ‘Matter and form have never seemed more rigid than in metallurgy’, write Deleuze and Guattari, ‘yet the succession of forms tends to be replaced by the form of a continuous development, and the variability of matters tends to be replaced by the matter of a continuous variation’ (ibid.: 453). Instead of the concatenation of discrete operations to which analysts of techniques have given the name *chaîne opératoire*,² we have here something more like an unbroken, contrapuntal coupling of a gestural dance with a modulation of the material. Even iron flows, and the smith has to follow it.

The two faces of materiality

When scholars speak of the ‘material world’ or, more abstractly, of ‘materiality’, what do they mean? Put the question to students of material culture, and you are likely to get contradictory answers. Let me offer a few instances. The first comes from Christopher Tilley, on the topic of stone. Contemplating a stone in its ‘brute materiality’, Tilley perceives a formless lump of matter. Yet we need a concept of materiality, he thinks, in order to understand how particular pieces of stone are given form and meaning within specific social and historical contexts (Tilley 2007: 17). Andrew Jones (2004: 330), likewise, holds that the notion of materiality both encompasses ‘the material or physical component of the environment’ and ‘emphasises how those material properties are enrolled in the life projects of humans’. Nicole Boivin (2008: 26) tells us that she uses the word materiality ‘to emphasise the physicality of the material world’, yet this physicality embraces the fact ‘that it offers possibilities for the human agent’. Introducing a collection of essays on the theme of materiality, Paul Graves-Brown (2000: 1) asserts that their common focus is on the question of ‘how the very material character of the world around us is appropriated by humanity’. And in almost identical terms, Joshua Pollard (2004: 48) explains that ‘by materiality I mean how the material character of the world is comprehended, appropriated and involved in human projects’.

In every case, there seem to be two sides to materiality. On one side is the raw physicality of the world’s ‘material character’; on the other side is the socially and historically situated agency of human beings who, in appropriating this physicality for their purposes, are alleged to project upon it both design and meaning in the conversion of naturally given raw material into the finished forms of artefacts. This duplicity in the comprehension of the material world precisely mirrors that to be found in much older debates surrounding the concept of human nature, which could refer at once to the raw substrate of basic instinct that humans were alleged to share with the ‘brutes’, and to a suite of characters – including language, intelligence and the capacity for symbolic thought – by which they were said to be elevated to a level of being over and above that of all other creatures. The appeal, in these debates, to the ‘*human nature of human nature*’ (Eisenberg 1972) did nothing to resolve this duplicity, but only served to reproduce it. Indeed the very notion of humanity, as we saw in the last chapter (p. 5), epitomises the predicament of a creature that can know itself and the world of which it is inextricably a part only by taking itself out of that world and re-inscribing itself on another level of being: mental rather than material; cultural rather than natural (Ingold 2010: 362–363). In just the same way, in the notion of materiality the world is presented both as the very bedrock of existence and as an externality that is open to comprehension and appropriation by a transcendent humanity. Materiality, like humanity, is Janus-faced.

Now it is not my intention, as archaeologist Bjørnar Olsen (2010: 16) alleges, to eliminate the word ‘materiality’ from our vocabulary or to ban its use. Just as with ‘humanity’, it would probably be difficult for us to manage without it. We do, however, need to be wary of the assumptions that it tends to bring in train, most particularly – as geographers Ben Anderson and John Wylie (2009: 319) warn – that the material world has by nature such properties of obduracy and consistency of shape as define the state of a *solid*. Olsen himself falls prey to this assumption when he appeals to the world’s ‘hard physicality’ (Olsen 2003: 88). Why so hard, so solid? Consider, for example, an ordinary pot. In its time it has seen service in numerous campaigns, from when it was first made

to when, cracked and discarded, it was returned to the earth, only to be uncovered thousands of years later in an archaeological excavation. Yet through all of that, has it not remained steadfastly what it was? Was not the pot, as the hard and physical thing it is, always a pot? Not so, answers archaeologist Cornelius Holtorf (2002: 54), in his 'Notes on the life history of a potsherd'. For the pot's materiality, he claims, is no more and no less than the ways in which, throughout its history, it was variably enrolled in human life-projects. It could, in principle, be anything anyone wanted it to be. But in this very claim, Holtorf lurches from one side of materiality to the other – from the physicality of matter to the forms of its social appropriation. This move does nothing to soften, liquefy or enliven the material. If the pot has a life history (and this could be either 'short' or 'long', depending on whether we count from the moment of manufacture to that of discard or to that of eventual recovery), it is not the history of a life intrinsic to the stuff of which it was made. It is of the human life that has surrounded it and given it meaning.

How about an artefact of flaked stone? Like the pot, the stone would also have had its moments – at least three, according to prehistorian Geoff Bailey (2007: 209): when it was acquired, when it was worked into the form of the artefact, and when the artefact was eventually discarded. To these could be added a fourth moment, when it was recovered by the archaeologist, a fifth when it was illustrated in a publication, and any number of possible moments thereafter. These moments are known to posterity only because they leave a material trace, and the artefact presents itself, according to Bailey, as an accumulation of such traces – for which he reserves the term 'palimpsest'. He even goes so far as to claim that the materiality of a thing such as a stone artefact is *by definition* that aspect by which it outlasts the active moments of its formation or inscription. It is a kind of negative imprint of the formative process. Yet this is to revert, once again, to the hylomorphic characterisation of materiality as form-receiving passivity rather than form-taking activity. In short, whether we find the history of things, with Holtorf, in the life that surrounds them or, with Bailey, in the traces that remain in them after life has moved on, it seems that in the appeal to materiality, the *becoming* of materials – their generative or regenerative potential, indeed their very life – has fallen through the cracks of an already solidified world.

The return to alchemy

What then is matter? What do we mean when we speak of materials? Are matter and materials the same or different? To understand the meaning of materials for those who work *with* them – be they artisans, craftsmen, painters or practitioners of other trades – I believe we need, as art historian James Elkins recommends, to take a 'short course in forgetting chemistry' (Elkins 2000: 9–39). Or more precisely, we have to remember how materials were understood in the days of alchemy. Elkins's point is that prior to the introduction of synthetic paints, the painter's knowledge of his materials was fundamentally alchemical. To paint was to bring together, into a single movement, a certain material mixture, loaded onto the brush, with a certain bodily gesture enacted through the hand that held it. But the science of chemistry can no more define the mixture than can the science of anatomy define the gesture. The chemist thinks of matter in terms of its invariant atomic or molecular constitution. Thus water is H₂O,

and salt is sodium chloride. For the alchemist, by contrast, a material is known not by what it *is* but by what it *does*, specifically when mixed with other materials, treated in particular ways, or placed in particular situations (Conneller 2011: 19). Among innumerable other things, water gurgles down a spout, turns to steam when heated and to ice when cooled, and dissolves salt. And salt, *inter alia*, can be ground into fine white grains that pass through the hole of a dispenser, prevents the freezing of water on roads and pavements, and gives a distinctive flavour to food.

Chantal Conneller introduces her recent discussion of the archaeology of materials by comparing two definitions of gold. One comes from a chemistry textbook, the other from an eighth century Persian philosopher–alchemist. For the chemist, gold is one of the elements in the periodic table, and as such has an essential constitution that is given quite independently of the manifold forms and circumstances of its appearance or of human encounters with it. But for the alchemist, gold was yellowing and gleaming, and anything that yellowed and gleamed, and that would also shine ever brighter under water and could be hammered into thin leaf, would count as gold (Conneller 2011: 4). One way to accommodate these divergent understandings of what is ostensibly the ‘same’ material would be to argue, with the design theorist David Pye, for a distinction between the *properties* and *qualities* of materials. Properties, for Pye, are objective and scientifically measurable; qualities are subjective – they are ideas in people’s heads that they project onto the material in question (Pye 1968: 47). But this would only be to reproduce the duplicity in our understanding of the material world – between its given physicality and its valorisation within human projects of making – that we are seeking to resolve (Ingold 2011a: 30). The experienced practitioner’s knowledge of the properties of materials, like that of the alchemist, is not simply projected onto them but grows out of a lifetime of intimate gestural and sensory engagement in a particular craft or trade. As Conneller (2011: 5) argues, ‘different understandings of materials are not simply “concepts” set apart from “real” properties; they are realised in terms of different practices that themselves have material effects’.

But precisely because these practices are so variable and have such different effects, Conneller warns, we should avoid the temptation to turn understandings drawn from one particular context of material–technical interaction into a meta-theory for everything else. Our task should rather be to describe and analyse every case in its ethnographic specificity. For this reason, whilst broadly sympathetic to attempts by scholars such as Simondon, Deleuze and Guattari, and even myself to overthrow the logic of hylomorphism, Conneller is also critical of their tendency to select just one field of practice as a lens through which to view all others. Thus where Simondon bases his argument on the operations of brick making, Deleuze and Guattari (2004: 454) feel equally free to generalise across the board from metallurgy: ‘metal is coextensive to the whole of matter, and the whole of matter to metallurgy’. If even metal flows, then so – they say – do wood and clay, not to mention grass, water and herds. For my own part, I have drawn on the practices of basketry to advance a rather similar argument about how the forms of things – of all sorts – are generated in fields of force and circulations of materials that cut across any boundaries we might draw between practitioners, materials and the wider environment (Ingold 2000: 339–348). In a certain sense, then, we can say that the smith at his forge, or the carpenter at his bench, is actually weaving. Even the bricklayer may be said to weave as he knots bricks with mortar into the fabric of a wall

to create a regular and repeating pattern (Frampton 1995: 6). This is not, *pace* Conneller, to pretend that there is no difference between the properties of willow, iron, wood and clay, or that the skills of the basket maker are no different from those of the smith, the carpenter and the mason. It is rather to focus on what it means to say of practice that it is skilled, or of materials that they are endowed with properties, whatever the field of practice or the materials involved may be.

The riddle of materials

Another case in point is the understanding of stone – a material that has been of particular interest to archaeologists, not least because of its alleged hardness, solidity and durability (Tilley 2004). Indeed, these properties have been so often highlighted as to make them seem all but universal (Conneller 2011: 82). If you want to build a monument that lasts, then hard stone is an appropriate material to choose. We cannot assume, however, that just because the stony elements of what is nowadays recognised as an archaeological monument have endured, while all the other materials that may have been used in the construction have long since rotted away, this is what the original builders intended, or the reason why they chose to incorporate stone into the construction in the first place. For all we know, stone may have been selected by people in the past not for its solidity and permanence but for their opposites – namely fluidity and mutability. No doubt the flint knappers of old, in the manufacture of stone tools, valued the hard edge. However, the alchemically informed painter values soft stone that can be ground to ochre for its colour. Some kinds of stone are heavy, others light; some are hard, others soft or crumbly; some separate into flat sheets, others can only be split into blocks. All things considered, Conneller (2011: 82) concludes, ‘it is clear that there is no such thing as “stone”; there are many different types of stones with different properties and these stones become different through particular modes of engagement’.

It is not clear, however, whether this typological splitting of generic ‘stone’ into innumerable subtypes will take us any closer to a resolution of our initial question: what is a material? As the Swiss architect Peter Zumthor writes, ‘material is endless’:

Take a stone: you can saw it, grind it, drill into it, or polish it – it will be a different thing each time. Then take tiny amounts of the same stone, or huge amounts, and it will turn into something else again. Then hold it up to the light – different again. There are a thousand different possibilities in one material alone.

(Zumthor 2006: 25)

But if there are as many different kinds of stones as there are possible ways of engaging with them, then – as even Conneller is obliged to admit – no two stones can ever be quite the same. Taken to its logical conclusion, the project of classification would leave us with as many subtypes as there are stones in the world, and we would still not know what stoniness means! Indeed, any attempt to produce a classification of materials, in terms of their properties or attributes, is bound to fail for the simple reason that these properties are not fixed but continually emergent along with the materials themselves. ‘The properties of materials’, as I have argued elsewhere with specific reference to the stoniness of stone, ‘are not attributes but histories’ (Ingold 2011a: 32). Practitioners

know them by knowing their stories: of what they do and what happens to them when treated in particular ways. Such stories are fundamentally resistant to any project of classification (ibid.: 156–164). Materials do not *exist*, in the manner of objects, as static entities with diagnostic attributes; they are not – in the words of Karen Barad – ‘little bits of nature’, awaiting the mark of an external force like culture or history for their completion. Rather, as substances-in-becoming they carry on or *perdure*, forever overtaking the formal destinations that, at one time or another, have been assigned to them, and undergoing continual modulation as they do so. Whatever the objective forms in which they are currently cast, materials are always and already on their ways to becoming something else – always, as Barad puts it, ‘already an ongoing historicity’ (Barad 2003: 821).

Materials are ineffable. They cannot be pinned down in terms of established concepts or categories. To describe any material is to pose a riddle, whose answer can be discovered only through observation and engagement with what is there.³ The riddle gives the material a voice and allows it to tell its own story: it is up to us, then, to listen, and from the clues it offers, to discover what is speaking. To return to an earlier example: ‘I yellow and gleam, and shine ever brighter under running water. What am I?’ The answer is evident to the panner without his having to name it. For it lies there, glinting in the bed of the stream. Just as in the case of panning for gold, to know materials we have to follow them – to ‘follow the matter-flow as pure productivity’ – as artisans have always done (Deleuze and Guattari 2004: 454). Their every technical gesture is a question, to which the material responds according to its bent. In following their materials, practitioners do not so much *interact* as *correspond* with them (see [Chapter 7](#), pp. 105–108). Making, then, is a process of correspondence: not the imposition of preconceived form on raw material substance, but the drawing out or bringing forth of potentials immanent in a world of becoming. In the phenomenal world, every material is such a becoming, one path or trajectory through a maze of trajectories.

In this sense we can agree with Deleuze and Guattari that materials evince a ‘life proper to matter’, albeit one that is hidden or rendered unrecognisable by the terms of the hylomorphic model, which reduce matter to inert substance. It is in this life, they argue – in ‘the immanent power of corporeality in all matter, and ... the esprit de corps accompanying it’ – that the relation between making (as in basketry, brick making or metallurgy) and alchemy is to be found (Deleuze and Guattari 2004: 454). In the act of making the artisan couples his own movements and gestures – indeed his very life – with the becoming of his materials, joining with and following the forces and flows that bring his work to fruition. It is the artisan’s desire to see what the material can *do*, by contrast to the scientist’s desire to know what it *is*, that, as political theorist Jane Bennett explains (2010: 60), enables the former to discern a life in the material and thus, ultimately, to ‘collaborate more productively’ with it. Returning to the diagram with which I began ([Figure 2.3](#)), to see what the material will do, to collaborate with it or, in our terms, to correspond with it, is to read making longitudinally rather than laterally. In the following two chapters we will explore what this reading means in practice, first in the case of prehistoric stonework, second in the case of medieval architecture.