

The Social Context of Creativity

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...remember: nothing remains the same; everything changes; and everything returns...
Hermann Hesse, *Siddhartha*

Abstract

This thesis analyses the long-distance control of the environmentally-situated imagination, in both spatial and temporal dimensions. Central to the project is what I call the extended social brain hypothesis. Grounded in the Peircean conception of 'pragmatism', this re-introduces technical intelligence to Dunbar's social brain—conceptually, through Clark's 'extended mind' philosophy, and materially, through Callon's 'actor–network theory'.

I claim that:

There is no subjectivity without intersubjectivity. That is to say: as an evolutionary matter, it was necessary for the empathic capacities to evolve before the sense of self we identify as human could emerge.

Intersubjectivity is critical to human communication, because of its role in interpreting intention. While the idea that human communication requires three levels of intentionality carries analytical weight, I argue that the inflationary trajectory is wrong as an evolutionary matter. The trend is instead towards increasing powers of individuation.

The capacity for tool-use is emphasized less under the social brain hypothesis, but the importance of digital manipulation needs to be reasserted as part of a mature ontology.

These claims are modulated to substantiate the work-maker, a socially situated (and embodied) creative agent who draws together Peircean notions of epistemology, phenomenology and oral performance.

I affirm that the present thesis, *The Social Context of Creativity*, has been composed by me, and that the work is my own. The thesis has not been submitted for any other degree or professional qualification, neither has it been published in whole or in part.

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Introduction

The social context of creativity is a place of negotiation—one where there is uncertainty regarding outcomes, but one where there is potential for success and gratification, however loosely defined these might be. This claim—modest to the point of banality—entails, however, the adoption of certain normative assumptions. It presumes that the point of view is human, first of all. It further implies a *humanist* perspective—that is to say, it implies an assumption that agency is vested in the subject, rather than the subject being the vehicle of miscellaneous predetermined causes, whether natural or supernatural, physical or metaphysical. Further, again, the initial claim might be held to presume a specific *form* of negotiation, supported by the laws and institutions of the contract, locating creativity in the specific cultural context of modern urban civilization.

Although ‘creativity’ is a vague term, it is (almost) universally regarded as a positive concept, whether the context be vocational, recreational or educational. It is consonant with industrious Lockean liberalism; it is powerfully affirmative enough to transcend the negativity in Schumpeter’s ‘creative destruction’. There is one ironic sense, however, which leads us away from this confident, optimistic prospect and towards the nuanced, ambiguous territory that we are about to explore. In the colloquial term ‘creative accounting’, the narrator creams off the choicest reality to tell a story that serves the best interests of one party at the expense of another. Typically the ‘other’ is the public in some form, and the public—mindful of fallibility and self-interested conduct alike—sets up laws and institutions designed to minimize if not eliminate the margin for imagination.

The key point about creative accounting is that it is intersubjective. That is to say, there needs to be both a narrator and an audience, and the audience needs to *understand* the tale being told. Understanding, here, implies a specifically *rational* evaluation of the story being presented, meaning that comparison, contextualization, precedent and analysis support the *interpretation* of content as it is received. To clarify the intersubjective transaction, therefore, we need to develop a framework synthesizing three broad perspectives. First of all, there is a cognitive question about producing narrative, in the normative sense associated with human discourse. What are the physiological attributes that distinguish these human capacities? Secondly there is an epistemological question about the state of nature, the environment in which rational enquiry takes place. Thirdly there is what might best be called an ethical question, recognizing that both of the previous questions are subject to culturally sustained nuances and perspectives. The

background against which this framework is advanced is relativistic, evolutionary, and fallibilist—it is a process philosophy rather than a progress philosophy.

Problems concerning language, technology, and the social

A useful starting point is ‘Computing Machinery and Intelligence’, where Alan Turing (1950) re-imagined a problem previously posed by Descartes—how to distinguish between animal, human and machine—in the form of a parlour game.¹ Players A and B, a man and a woman, are situated so that they can only communicate indirectly with the third player, an interrogator, who must determine the gender of the players based on their responses to written questions. The catch is that the male player is sanctioned to cheat, with the purpose of tricking the interrogator into reaching a false conclusion. Implicitly, therefore, he is obliged to think creatively in order to respond (in)appropriately to the interrogator’s questions. Turing then asks: ‘What will happen when a machine takes the part of A in this game?’ (434).

Turing’s paper prompted intensive research programmes, and these quickly focused on attempts to simulate professional expertise. Early implementations of so-called ‘expert’ systems were capable of remarkable feats. LUNAR, an artificial lunar geologist, knew about the chemical composition of lunar rocks (although it had no opinion on the value of space flight); CYRUS, programmed to be intimate with the course of then-US Secretary of State Cyrus Vance’s career, knew (more or less) who Mr Vance met and when in the course of his professional (though not his unreported personal) life (and it could not cope with questions about his resignation). These systems were, in Daniel Dennett’s words, ‘Potemkin villages... cleverly constructed facades, like cinema sets’ (1985, p. 135).

‘Classical’ artificial intelligence (AI) research appealed to two variants of a traditional account of human evolutionary success, what Richard Byrne (1997) calls the ‘technical intelligence hypothesis’. One variant is that—uniquely—we are language users; the other

¹ ‘...if there were machines bearing the image of our bodies, and capable of imitating our actions as far as it is morally possible, there would still remain two most certain tests whereby to know that they were not therefore really men. Of these the first is that they could never use words or other signs arranged ... variously so as appositely to reply to what is said in its presence, as men of the lowest grade of intellect can do. The second test is, that although such machines might execute many things with equal or perhaps greater perfection than any of us, they would, without doubt, fail in certain others from which it could be discovered that they did not act from knowledge, but solely from the disposition of their organs. ...[B]y means of these two tests we may ...know the difference between men and brutes; (Descartes, *Principia* V, 1644).

is that we are tool users. Both of these views are universalist, meaning that either claim is true of all humans. However, anthropologists find tool use among primates, undermining the ‘uniqueness’ claim, while under pressure from AI research, certain assumptions about language-use have been shown to rest on an underlying set of assumptions about tool-use that are bound up with a specifically bourgeois evaluation of the relationship between work and material output. Leading commentary on Andy Clark’s paper, ‘Minds, Brains and Tools’ (1999), Dennett remarks that certain key aspects of language use are specific to *written* language. The computational/representational model of mind that emerged out of classical AI research conflates the language-using and the tool-using paradigms, and leans on this material paradigm in doing so.

What Turing’s original game turned on, however, is the *difference* between solving the problem posed in the guise of an embodied agent on the one hand (where determining the gender of a fellow human is normally the intuitive work of a split second), compared to the task of reaching a judgement in the guise of a computer, based solely on the symbolic (i.e. written) responses of the players on the other.² Implicitly, the fact that the game calls for two players in addition to the interrogator represents a social dimension entirely ignored by the classical AI programme. This social dimension is subject to the same evolutionary pressures that act on the individual scale, but it is difficult to gain analytical purchase on the issues involved. Byrne’s ‘technical intelligence hypothesis’ prefigures the ‘social brain hypothesis’, an amalgamation of neuroscience, evolutionary psychology and anthropology that affords a much clearer focus on specifically interpersonal, intersubjective aspects of the social relationships in which the Turing enquiry about communication is embedded.

The appeal to the social discloses a secondary problem: just what *is* the social? Latour and Strum (1986) review a range of historical and contemporary philosophical, biological and anthropological authorities—from Rousseau and Hobbes to Axelrod and Hamilton, Leakey and Lewin, Trivers, and Dawkins. While showing that these authorities don’t agree on much, Latour and Strum’s analysis in terms of an opposition between ‘mythic’ and ‘scientific’ barely establishes grounds for resolving their differences. In a companion paper (Strum & Latour, 1999), the authors propose

² An agent is an entity capable of action; embodiment locates this entity in a material environment. Humans are good examples, but the terms ‘embodied agent’ and ‘human’ are not coextensive.

‘technology’ (to be exact, the deployment of extrasomatic resources) as the intermediary between the two. However, in developing this line of argument, the present thesis identifies a systematic failure to distinguish between a second- and third-person sense of ‘social’. While political philosophy is generally concerned with the third-person variety, grounded in seemingly timeless human behaviour on the mass scale, the creativity envisaged in Turing’s game is of the second-person variety, altogether more intimately geared to interpersonal, intersubjective communication.

Who is the principal intellectual ‘enemy’?

The methodological stance adopted in developing this perspective is modelled on Daniel Dennett’s so-called heterophenomenology—his third-person science of consciousness, but with two important modifications. The first introduces Peirce’s semeiotic, which, instead of fixing on a third-person perspective, combines first-, third-, *and* second-person perspectives. Additionally, Peirce’s work on abductive logic helps us understand the relationship between reason and creative thinking. The second modification draws in the concept of performativity developed by Austin, with its emphasis on action embedded in social discourse. However, in retrofitting Peircean pragmatism and Austinian performativity to Dennett, certain tensions are disclosed regarding the nuances in determinism and logocentrism as they relate respectively to the analytical and continental traditions in contemporary philosophy. The relativistic, evolutionary, fallibilist framework pursued in this thesis cannot support either.

Taking determinism first of all, for simplicity’s sake we can distinguish between three types of determinism: natural, metaphysical, and historical. The term ‘natural’ is used here in the ordinary sense of ‘pertaining to nature’; no ethical position is implied. ‘Natural’ determinism is the experimentally proven realm of cause and effect, but it is bounded (in scientific practice) on one—subatomic—side by quantum mechanics, and on the other—where molecular biology gives way to ecology—by quasi-irreversible path-dependent lock-in (a fancy way of saying ‘history’). Both of these boundaries are governed by statistical probability, and it is in this sense that Peirce—an important figure in the history of probability theory—is anti-determinist.

‘Metaphysical’ determinism references the appeal to extra-material cause characteristic of religious practice. To be anti-determinist in this sense can mean a materialist stance in the qualified sense implied by the previous clause, but it can also mean resistance, on hermeneutic grounds, rather than outright denial. The latter seems to capture the sense in which Bergson is anti-determinist. In a late essay, he remarks:

Listen to the discussion between any two philosophers one of whom upholds determinism, and the other liberty: it is always the determinist who seems to be in the right. He may be a beginner and his adversary a seasoned philosopher. He can plead his cause nonchalantly, while the other sweats blood for his. It will always be said of him that he is simple, clear and right (1946, pp. 41–2).

‘Historical’ determinism is a little different, in that it bears a social sense—via translation of the German term *Bestimmt*—of consent vested in inheritance. Something is determined by virtue of a debate having been settled. It is difficult to oppose social consent, but there are two grounds on which the opposition can be expressed: one is to appeal to a particular species of logocentrism, which I will return to shortly; the other is to refuse the elision of *social* consent with material trace. It is a convenient and productive elision, but this elision is a *process*, and as such our enquiry is obliged to analyse this process in order to understand its operation.

Turning now to logocentrism, the two major traditions dominating contemporary philosophy both have their debates. In continental philosophy, critique focuses on the bias implicit in the emphasis on verbal as opposed to non-verbal communication. This can take two forms, either taking oral performance as the paradigm and privileging speech over (for instance) gesture, or taking speech as the paradigm and privileging the spoken word over the written form. For Derrida, logocentrism is a secular form of metaphysical determinism that philosophy has inherited from the Greeks, for whom the word *logos* can be translated as ‘word’, but can signify ‘ultimate truth’.

In the analytical tradition logocentrism is more elusive, the term being sometimes used as a means to categorize what ‘ordinary language’ philosophy *isn’t*. Ordinary language philosophy, associated principally with the Oxford culture of the 1950s and 1960s but also embracing the later Wittgenstein, grounds philosophical problems in language as it is ordinarily used. The notion of an ideal language to which it might be conjecturally opposed derives in part from theology, but also from natural science. In both cases, the underlying assumption is of an objective universal truth that the process of enquiry progressively yields access to. Perhaps the most familiar form of ideal language thinking in the analytical tradition is the so-called ‘language of thought hypothesis’ associated principally with Jerry Fodor and Noam Chomsky (the latter indirectly, through his nativist concept of ‘universal grammar’), but associated also with the computational/representational model of mind referenced previously.

Prior scholarship

Reviewing the legacy of Turing’s paper, Blay Whitby (1996) summarized its trajectory in terms of three ages: ‘1950–1966: A source of inspiration to all concerned with AI; 1966–

1973: A distraction from some more promising avenues of AI research; 1973–1990: By now a source of distraction mainly to philosophers, rather than AI workers'. What emerged in this latter age was an opposition between a computational/representational theory of cognition exemplified by Jerry Fodor (1968, 1975) and an embodied/embedded theory of perception that first took shape as a critique of 'classical' AI's limitations and blind spots, for instance in Hubert Dreyfus's *What computers can't do* (1972) and John Searle's 'Minds, Brains and Programs' (1980). What turned critique into a positive programme was the rise of connectionism, and this is where Andy Clark comes in.

One obvious retrospective objection to the set-up Turing proposed is to ask what exactly he meant by 'a' machine. The ecology of computing familiar in the present day is expressed in a dense mesh of interrelated devices, layers, protocols, applications and users. Correspondingly, the self, the individual, the embodied agent—in short, the user—has modulated as an interpretative entity in response to the changing understandings that have emerged from the vast programme of research Turing spawned.

In *Microcognition* (1989), Clark tackles philosophical issues raised by the pioneering work of Rumelhart, McClelland and the Parallel Distributed Programming Research Group (1986), which offered an alternative to the dominant, serial Von Neumann computer metaphor in cognitive science. Against this 'symbolic paradigm' the PDP Group posited a 'subsymbolic paradigm' which, rather than involving procedural symbolic manipulation involves 'the "spread of activation", relaxation, and statistical correlation. The mathematical language in which these concepts are naturally expressed are probability theory and the theory of dynamical systems' (1986, 1, 195). A typical PDP network depends on *superpositional storage* to maintain these separate instances simultaneously, and in consequence they exhibit a characteristically human phenomenon, crosstalk. This manifests both in a tendency to mix up items—like an urban human confusing two similar telephone numbers—and in the facility to generalize (Clark 1989, 122–3).³

However, the PDP model's competence does not equate to comprehension. Data *in* the system does not become information *to* the system. In *Associative Engines* (1993), Clark

³ Additionally, Clark (1989) defends the PDP programme against criticisms made by Fodor; this thesis inherits Clark's position vis-à-vis Fodor rather than engaging the latter directly.

cites an example in which a net was trained on data relevant to the granting of bank loans, such as income and job. It was able to make a good correlation between patterns such that in a prevalingly benevolent economic climate it could accurately distinguish between good and bad risks. This competence was not transferable to recession conditions, income level being the more critical element in boom times but job stability being more salient in recessionary conditions (Clark 1993, 71).

The computational role of the environment begins to emerge as a theme in *Associative Engines*, and matures—under such influences as the phenomenology of Merleau-Ponty, the gestalt psychology of James Gibson, the biosemiotics of Maturana & Varela, Dennett’s multiple drafts model of consciousness, and Hutchins’ distributed cognition—to become his signature concept, the extended mind, as expressed in *Being There* (1997), ‘The Extended Mind’ in collaboration with David Chalmers (1998), and ‘Minds, Brains and Tools’ (1999). Briefly stated, the significance of the extended mind is that ‘Embodied agents use bodily actions and environmental interventions to make the world a better place to think in’ (Clark, 2006). Above all, this strategy is *economical*, maximizing cognitive output at the same time as maximizing the efficiency of the vehicle.

Parallel to the emergence of connectionism, criticism of the underlying paradigm equating intelligence with tool use emerged among anthropologists studying and comparing primate populations. Andrew Whiten and Richard Byrne (1988) delivered an evolutionary perspective on the emergence of intelligence that stressed social rather than technical aspects of behaviour. Initially their focus was on ‘Machiavellian’, manipulative behaviour that suggested intentionality on the part of the agent. A second volume (Byrne & Whiten (1997)) explored a broader range of intersubjective and empathic states; Robin Dunbar’s analysis and interpretation of primate brain evolution (1993), (1998) led him to conclude that the answer to the question ‘what did the human brain evolve *for?*’ is answered primarily by addressing social rather than technical/technological issues. For Dunbar, this entails specific claims about group interaction among humans, which, although grounded in the distant evolutionary past, are nevertheless foundational in modern human culture.

Complimenting this perspective, neuroscientists led by Giacomo Rizzolatti discovered a previously unsuspected facet of brain physiology, the so-called ‘mirror neuron’. Mirror neurons are part of the sensorimotor system. This is the part of the brain that coordinates physical action; what Rizzolatti and colleagues discovered is that the same

neuron groups ‘fire’ when a relevant action is witnessed, and also when the agent is ‘thinking about’ the relevant action. Significantly, ‘relevant action’, in this sense, is restricted to specific physiological data—focused on the hand and the mouth (Gallese, Keysers, & Rizzolatti, A unifying view of the basis of social cognition, 2004).

Action understanding, on this view, entails attunement to conspecifics’ intentional states, but using the term ‘understand’ begs the question. To understand is to be able to manipulate discrete thoughts and assemble them in narrative form so that an intention becomes an evidentiary sequence with a causal trail. Skilled motor action can certainly constitute evidence of an intention, but so too can unskilled, unintended or misinterpreted action. What humans are uniquely capable of is the deliberate shaping of the environment so that the varieties of misunderstanding can be managed and minimized.

The present contribution

The Social Context of Creativity draws together these two approaches—embodied mind and social brain—that in differing ways lay stress on the proactive role of the environment in shaping human thought processes. They converge to form what I call the ‘extended social brain hypothesis’, which claims that:

There is no subjectivity without intersubjectivity. That is to say: as an evolutionary matter, it was necessary for the empathic capacities to evolve before the sense of self we identify as human could emerge.

Intersubjectivity is critical to human communication, because of its role in interpreting intention. While the idea that human communication requires three levels of intentionality carries analytical weight, I argue that the inflationary trajectory is wrong as an evolutionary matter. The trend is instead towards increasing powers of individuation.

The capacity for tool-use is emphasized less under the social brain hypothesis, but the importance of digital manipulation needs to be reasserted as part of a mature ontology.

These claims are modulated to substantiate the ‘work-maker’, a socially situated (and embodied) creative agent who draws together Peircean notions of phenomenology, epistemology and environmentally situated oral performance. The key concept is the notion of polyphony, which is used to identify cognitive elements and understand their mutually supportive function. The reference is not primarily to medieval vocal

polyphony, but to early-modern instrumental polyphony, specifically Bach's fugues. In these, several discrete melodic lines are coordinated in time by metrical pulse, and in space by functional harmony. Each element lends support to the other, and no element can claim primordial pre-eminence.

In outline, the scheme grows initially from thinking about ambiguities in the term 'common sense'. I identify four strands—sensory, psychological, semiotic, and cultural—each of which exhibit internal polyphony as well as being in polyphonic relationship with each other.⁴ Sensory polyphony is the singular stream of consciousness made out of the several sense inputs—vision, touch, etcetera. Psychological polyphony concerns the sense that humans understand each other to share these sensory inputs, thanks to the interrelation of neurological attributes such as emotion, sensorimotor control, the mirror neuron system and so on.

Semiotic polyphony concerns the emergent capacity to share, on the basis of sensory data, an understanding of the material environment. Theorizing this development involves a second concept, **recombinant Intentionality**. With psychological polyphony comes a simple capacity to read the intentions of conspecifics, which I call 'bucket-brigade intentionality'. However, humans shape their local environment by detaching intention from performance, deliberately creating an interpretable trace. This practice exploits what might be termed our innate hylozoism, after the pre-Socratic doctrine that life and matter are inseparable.

However, the interpretant's response to these environmental cues is *probabilistically* interpretative, and this calls in a third concept, **Intersubjective Technology**. The significance of probability lies in its topic-neutral capacity to conjoin multiple layers of supervening causal loops. Environmental features (including one's own body) can be locked in to minimize the flexibility of chance, enabling the generation of durable cultural forms, as argued in Actor–Network Theory. We will require, however, a definition of 'technology' that adequately scaffolds the polyphonic model: in order to make the notion of polyphony more than an analogy, some means of conceiving a cognitive equivalent to the musical 'note' is required.

⁴ I use the Peircean spelling, 'semeiotic', where Peirce's ideas are specifically involved, and the conventional 'semiotic' otherwise.

In short, the solution is found in the mind–tool ontology developed in the late 1990s by Daniel Dennett and Andy Clark. At length, the topic is bound up in the problem of individuation, and involves a solution in which the sought entity is defined not in itself but in its relationships by virtue of its capacity to stabilize them. The price of this settlement is a certain vagueness, which, for both Peirce and Heidegger, is sanctioned (to differing degrees) by leaning towards essentialism at the expense of a nominalism that would demand a full intrinsic accounting for the entity in itself.

The plan

The thesis is in three parts: methodologies; performativities; and technologies. In broad terms these correspond to Peirce’s semeiotic categories of secondness, firstness and thirdness. Since these categories afford enormous scope for confusion, suffice it to say initially that these correspond approximately to epistemology, phenomenology, and sociology. Part one begins the task of circumscribing the topic of individuation, with the purpose of laying the epistemological foundation for the subsequent argument. Part two elaborates the extended social brain hypothesis, polyphonic consciousness, mind–tools, and recombinant intentionality. Part three develops the theory of intersubjective technology, which seeks to account for the pragmatic reality of the mind–tool ontology in action. The trajectory leads to a correlation with the notion of ‘Barnesian performativity’ developed by Donald MacKenzie in recent work on the sociology of economics. I introduce the work-maker, the figure at the hub of the social context of creativity, a cognitive agent utilizing mind–tools in the service of Barnesian performance.

There are three chapters in part one. The first, **Peirce and the problem of abduction**, introduces an initial formulation of the cognitive agent, Peirce’s ‘interpretant’, in the context of a review of the main themes in Peirce’s work revolving around the theme of vagueness and the initiation of thought. The second chapter, **Acts of institution**, sets out to define two terms: *dispositif*, which can conveniently be termed ‘a story in the process of being told’; and the obligatory passage point, which can be termed ‘the subject of that story in process of being disclosed’, via Austin’s concept of performativity, which elides story and teller to establish an auctorial figure resembling Peirce’s interpretant. The third chapter—despite its name, **Rorty, elimination and meiosis**—principally concerns Dennett’s ‘heterophenomenology’: a development that intriguingly reflects the prior discussion of obligatory passage points. In formulating his ontology, Dennett ‘passed’ through Rorty, apparently without realizing its significance until some time later. Not only is this interesting in itself, but it becomes the more so

when the connection between Rorty and Peirce is explored, suggesting that the phenomenology behind Dennett is less Husserl's than Peirce's.

In part two, the focus shifts to the social brain, beginning in chapter four with an outline of the principal claims of **the extended social brain hypothesis**. Chapter five introduces **polyphonic consciousness**, a concept that fuses four separate construals of 'common sense'—sensory, psychological, semiotic, and cultural—though the initial focus is on the third of these. The mind–tool ontology as developed by Dennett and Clark is subjected to detailed analysis with attention focused first on the functional nature of the tool, and second on the institutional nature of the mind. Chapter six, **intention, intersubjectivity and implicature**, develops the specifically social aspect of this analysis, uncovering the conflation of second- and third-person senses in a review of Gricean implicature. Chapter seven then introduces a second concept, **recombinant intentionality**, which extends the 'passage point' from part one to develop a sense of how mind–tools progressively populate and equip an environmental niche.

Part three entails a change of register, enlisting the sociohistorical dimension scorned by Peirce and the analytical tradition. The difficulty Peirce diagnosed in the Hegelian historical method can be mitigated by separating the phenomenological from the social and treating the former in terms of Peircean firstness and the latter as thirdness. Chapter eight, **the technologizing of intersubjectivity**, introduces a third concept, 'intersubjective technology', the result of inverting Walter Ong's 'technologizing of the word' while analysing the spoken/written distinction's normative assumptions about language. The impact of literacy is examined in three locations—classical Greece, medieval England, and modern Papua New Guinea—to understand the capacity for mediating intersubjective transactions via material traces that is conjecturally implicated in the concept of literacy. Since we cannot speak of intersubjective *technology* without a theory of technology, chapter nine, **art loves chance**, develops an attitude that draws on Marx, Heidegger, McLuhan, Clark, and post-Peircean probability theory. Finally, chapter ten introduces **the work-maker**, the embodied agent actively engaged in creating the frontiers of knowledge. This figure is explicitly embedded in the world of economic activity and, accordingly, the argument draws on recent work by Donald MacKenzie and others regarding the performativity of economics as a discipline embedded in the economy it purports to describe.

Part One: Methodologies

‘Common sense’ in its most unreflective form tells us that things are plainly and obviously ‘as they are’. Things are identified by consent, and the processes by which consent is negotiated are presumed equally plain and obvious. People disagree about *what* is plain and obvious. There is consent, nevertheless, regarding the *method* by which disputes may be resolved. Philosophers inherit two main approaches from the medieval Scholastic tradition: essentialism (or realism—though adopting the latter term would be to beg the question) and nominalism.

The differences between the two positions are slender—indeed, it was the intensity of arguments over unfalsifiable differences that led Scholasticism to ridicule. Essentialism follows Plato in claiming that universal forms—essences—promulgate the instantiation of matter as humans experience it. Nominalists deny the existence of universals, treating the problems posed by apparently universal terms such as creativity (or intelligence, or strength) as simply non-particular and thus compositional. Nominalists do not deny the existence of *abstract* particulars (such as numbers or geometric axioms), and these require a mental faith that closely resembles that of essentialists. The ‘mental’ modifier here introduces a distinction from ‘naïve’ belief on an assumption of evidential reason wrought (disclosed) in extended (acculturated) debate.

Nominalism is favoured by philosophers of nature, on the premise that intellectual enquiry seeks to disclose compositionality in nature that is presumed to exist independently of human endeavour. Nominalist methods account for innovation by recourse to some variant or other of ‘trial and error’, imputing ‘natural’ selection to the process of discovery. Essentialism, by contrast, appeals to a difficult-to-define meiotic synthesis of addiction and adduction. Addiction has a literal meaning of enslavement, while adduction (and its inverse, abduction) has a literal meaning of being led *towards* (or away from), rather than led *into* in the logical sense associated with induction. Accordingly, there is a sense that there is something about human physiology that implicates the organism’s continuing relationship with its environment in the process of discovery.

The Peircean position is somewhere towards the centre of this debate, a position leaning in favour of an essentialism that he called ‘moderate Scotist realism’—after Duns Scotus, the Scholastic semiotician he particularly admired. In present-day terms, he

would be recognized as a ‘structural realist’, one whose commitment is not to the content deemed ‘real’, as would be the case with ‘naïve realism’ or ‘scientific realism’, but rather to stipulations concerning the apparatus through which enquiry is conducted.

Peirce recognized that enquiry is a rhetorical practice, in which ‘methodeutic’ is an endogenous problem of individuation requiring symmetrical attention. Accordingly, **Methodologies** is about rhetorics of individuation. The term ‘individuation’ has a longstanding ambiguity over a distinction between the *practice* of rendering a particular, and the apriori *existence* of a particular. The distinction *should* be between individuation and individuality, but the exigencies of language intervene (Gracia 1988, 18–21).¹ It is the *process* that concerns us. Therefore, I use the term ‘individuation’ in the abductive, Peircean sense that I will elaborate in detail shortly. With respect to ‘individuality’, we will find that ‘individuation’ discloses an intriguing paradox regarding ‘methodological individualism’, but that will be a matter for Part Two.

¹ Making the distinction between *individuatō* and *individualitas* might seem unnecessarily cumbersome, so that the convenience of using one term rather than the other becomes a matter of economy and linguistic evolution.

1 Peirce and the problem of abduction

The inventor Thomas Alva Edison wanted not only to make the lightbulb, but the socket it plugged into, the power supply to which it was connected, and the dynamo that generated the power supply. Likewise the logician Charles Sanders Peirce sought answers that systematically solved problems across his innumerable domains of enquiry. The corporate orderliness of Edison's Menlo Park invention factory makes for an intriguing conceptual comparison with the insular entanglements of Arisbe, the Pennsylvania address of Peirce's later years. It is a contrast that dramatizes a key aspect of Peirce's speculation about method and innovation. The relative rhetorical status of speaker, apparatus, and datum is clearly articulated in the Menlo Park environment in a way that it is not at Arisbe. Some preliminary remarks are required to contextualize Peirce's analysis, given that the matter of relative status bears on his reception both in his own time and now.

It is instructive to deconstruct the name 'Arisbe', because it says much about Peirce's relationship with the world. The reference is to book VI of Homer's *Iliad*:

Axylus, hospitable, rich, and good:
In fair Arisbe's walls (his native place)
He held his seat! a friend to human race.
Fast by the road, his ever-open door
Obliged the wealthy, and relieved the poor.
To stern Tydides now he falls a prey,
No friend to guard him in the dreadful day!
(Alexander Pope's translation)

The self-pitying final line is as important as the previous, approbatory ones. Although known and respected among professional mathematicians for his developments in statistics and logic, he was academically peripheral, acknowledged for his considerable gifts by the scholarly community but at best a dysfunctional member of it. According to his biographer Joseph Brent, when Peirce applied to the Carnegie Trust in 1903,

The fact that Peirce was refused a grant even though Carnegie himself, the president of the United States, various other politically prominent men, and a majority of the leading members of the scientific community favoured it, was due largely to the nature of his evil reputation, some of it well deserved, and the power of the self-righteous men who controlled the politics of American science in the late nineteenth century. They considered Peirce morally degenerate, mentally unstable—perhaps insane—arrogant, and irresponsible, a man of broken and dissolute character (1993, 288).

Though there are a number of factors contributing to this 'self-righteous' disgust, the most pertinent and difficult, with respect to Peirce's achievement, is the sense about him of narcissistic dishonesty. This is a matter of actively creating the illusion that things are (or will be) other than they are (or are realistically likely to be). Mention should be made,

too, of Peirce's trigeminal neuralgia, an extremely painful and debilitating affliction that he is likely to have medicated with alcohol, opium, morphine and possibly cocaine (Brent 1993, 14).

His writing style is dense, prolix, digressive, and demanding. William James, writing to his old friend during the genesis of Peirce's 1898 Harvard lectures, at one turn says: 'now be a good boy and think a more popular plan out. I don't want the audience to dwindle to 3 or 4...' (Peirce 1992b, 25). Peirce replies: '... Your Harvard students of philosophy find it too arduous a matter to reason exactly. Soon your engineers will find it better to leave great works unbuilt rather than go through the necessary calculations.' Responding to a later draft, James says: 'the fourth lecture seems to me a model of what a popular lecture ought to be. ...

Therefore I remark that I implore you on bended knees to *give it first*, instead of the one you have written, which being full of "sass" to the audience and paradoxical irradiations in all sorts of directions, would have, I fear somewhat of an opposite effect (*ibid*, 32).

1.1 Trichotomic

James understood that Peirce's method of clarification often involved the systematic coining of neologisms. Note, in this example, the formal logic projected into the semantic:

Three modes of evolution have thus been brought before us: evolution by fortuitous variation, evolution by mechanical necessity, and evolution by creative love. We may term them *tychastic* evolution, or *tychasm*, *anancastic* evolution, or *anancasm*, and *agapastic* evolution, or *agapasm*. The doctrines which represent these as severally of principal importance we may term *tychasticism*, *anancasticism*, and *agapasticism*. On the other hand the mere propositions that absolute chance, mechanical necessity, and the law of love are severally operative in the cosmos may receive the names of *tychism*, *anancism*, and *agapism* (Peirce 1992a, 362).

This is from the last essay in the *Monist* series, 'Evolutionary Love', but in the third, 'The Law of Mind' (*ibid.*, 312ff), the term following tychism (with an 'i') is 'synechism'. For Peirce, the contextual difference between tychism and tychasm renders interpretation unproblematic; for the reader (never mind the listener, for whom James feared), such attunement to fine detail is difficult to sustain. Nevertheless, growing familiarity with Peircean habits, most noticeably the habit of making three-fold distinctions, begins to generate an explicative force of its own. Not only does the core argument here divide into three—tychasm, anancasm and agapasm—but so too does the deployment of variants—tychasm, tychasticism, tychism. This is the Trichotomic in action.

The trichotomic underpins Peirce's entire thought-system. In mathematics, the axiom of trichotomy is that for any pair of real numbers, exactly one of three relations is true: $x <$

y , $x = y$, or $x > y$. Peirce's Trichotomic is not so clear-cut. 'Trichotomy', and 'Trichotomic', were titles for draft first chapters of a projected book on logic dating from the late 1880s, and he considered the topic to be an essential point of departure. Repeatedly, among his papers, Peirce reasserts this dogma. In the 1888 draft, he writes: 'For my part, I am a determined foe of no innocent number; I respect and esteem them all their several ways; but I am forced to confess to a leaning to the number three in philosophy' (1992, 247). Later, writing to Victoria Welby (1904):

I was long ago (1867) led, after only three or four years' study, to throw all ideas into the three classes of Firstness, of Secondness, and of Thirdness. This sort of notion is as distasteful to me as to anybody; and for years, I endeavored to pooh-pooh and refute it; but it long ago conquered me completely.

His pioneering editor Charles Hartshorne hints at a broad range of classical and medieval influences (1941, pp. 49–50), and there is an understated hylozoic flavour diffused around the obvious initial source in Aristotle. The connection to Duns Scotus and medieval scholasticism is more firmly established (Boler, 2004). In particular, the formulation has a relationship with the structure of syllogism, which I will discuss further in section 1.3. Most immediately present in Peirce's formulation is the instruction he received from his father in the works of Kant, with which he became critically engaged from his student days at Harvard. The first appearance of the fundamental trichotomy is in an 1868 paper, 'On a new list of categories' (1992a, 1ff), although the distinctions are not, at this point, named 'firstness' etc.

These categories of firstness, secondness and thirdness do not correspond precisely to the mathematical axiom, where each of the three alternative relations are identical in status. Instead, Peirce uses the term 'prescission' (cut off), in distinction from 'precision' (cut down), to create a systematic relationship between his three terms. Prescission and abstraction 'are now limited, not merely to mental separation, but to that which arises from *attention to* one element and *neglect of* the other' (1992a, 3). Secondnesses can be prescinded from thirdnesses, but the reverse is not true; likewise firstnesses from secondnesses.

Peirce's categories exhibit a richness of functional distinction and relationship. He develops the explicit association between his categories and his trichotomy twenty years later. The 1868 category 'quality (Reference to a ground)' becomes Firstness, which 'may have manifold varieties, or rather arbitrariness and variety is its essence, but it is absolute and unsusceptible of differences of degree' (1992a, 280). 'Relation (reference to a correlate)' becomes Secondness, 'dynamical connection'; 'Representation (reference to an interpretant)' becomes Thirdness,

...where of the three terms A, B, C, each is related to each of the others, but by a relation which only subsists by virtue of the third term, and each has a character which belongs to it only so long as the others really influence it. It would not be enough to say that the connection between the terms is dynamical, for forces only subsist between pairs of objects; we had better use the word “vital” to express the mode of connection, for wherever there is life, generation, growth, development, there and there alone is such genuine Thirdness (1992a, 280–1).

Connected to the matter of precission, Peirce now identifies ‘degenerate’ forms of secondness and thirdness—the term ‘degenerate’ being used in its mathematical sense, ‘A limiting case in which a class of object changes its nature so as to belong to another, usually simpler, class’ (Weisstein, Degenerate, n.d.). Characteristically, he plunges into a discussion of degenerate secondness before he has even defined the genuine article:

...a single object considered as second to itself is a degenerate second, and an object considered as second to another with which it has no real connection, so that were that other taken away it would still have those same characters which are implied in relation, is also a degenerate second (1992a, 280–1)

Whereas genuine secondness, as we have seen, is a dynamical connection, ‘degenerate Secondness is a relation of reason, as a mere resemblance’ (*ibid.*). Where secondness has two ‘varieties’ of degeneracy, thirdness has two ‘orders’ of degeneracy. The first is expressed with a precision that makes paraphrase hazardous:

Thirdness of the first order of degeneracy is where two of the three terms are identical, so that the other only mediates between two aspects of the same object or where in some other way there is no vital connection between A, B, and C, but only a dynamical connection between A and B, and another between B and C, thus bringing about a dynamical connection between A and C (*ibid.*).

The second order of degenerate thirdness again invokes the deficiency of ‘mere relations of reason’, in this case where the terms are more or less identical or otherwise lacking in independent dynamical relationships of the kind specified as indicative of the genuine article.

Something is missing, however, in the definition of thirdness that would make it both contained and complete. Given that he has strayed from the precision of the mathematical definition of trichotomy, it is not clear why it is that fourth and multiple terms could not be imagined, other than the exigency of keeping things simple. Russell believed that he could conceive a fourthness, though it is not clear from the fragmentary account in Welby’s correspondence that he was fully apprised of the scope of Peirce’s intent (Cust 1931, 159).¹ Intriguingly, though, there is potential in the term that

¹ Cust was Welby’s daughter. Her editorial habit was to elide technical material; an ellipsis marks the continuation of Russell’s sentence, where he may have elaborated a proof. Since Welby, in response, asks whether Russell is not proposing two secondnesses, he may have had something resembling Aristotle’s square of oppositions in mind. Regarding the rigour of Peirce’s use of the term ‘trichotomy’, note that

intervenes between two secondnesses to create thirdness, an explicitly ‘extuitive’ term having the potential to be both necessarily transforming and necessarily constraining. At its simplest and purest, it performs the function of a mirror with a clarity that supports more and more elaborate *indicative* entanglements. Developing this interpretative potential leads us first, though, to Peirce’s semeiotic, and then to his tyctic.

1.2 Semeiotic

Peirce’s early conception of the thought-sign stands at the opening of a lifelong struggle to capture the nature of sign-structure, a struggle that yielded a dense, difficult, but ultimately inconclusive system, an adjunct to logic that he called ‘semeiotic’. There is an innate confusion over whether the object is to develop algebraic tools as a logical end in itself, whether it is to anatomize nature holistically in less formal but nonetheless rigorous ways, or whether it is to analyse the linguistic support for logical discourse in the limited sense of the rhetoric in which logical arguments are presented. Peirce’s semeiotic would these days be recognized as being interstitial between symbolic logic, linguistics, and biosemiotics, but it is couched in material likely to take a specialist in any of these fields well outside their comfort zone.

There is an eroticism, a performative sense of rhetorical complexification (*symplokeē*, or *complexio*) about the semeiotic that continues to prove seductive, but it is a somewhat unrequiting temptation. The scholar wants to be able to say with confidence, “famisign means this” or “delome means that”, but seldom does Peirce assure his reader of solid ground. Indeed, a remark he makes in reply to James’s previously cited advice is a general cautionary:

But as you know that my style of ‘brilliancy’ consists in a mixture of irony and seriousness, —the same things said ironically and also seriously, I mean... (1992b, 27).

The erotic metaphor extends to Peirce’s late development of the semeiotic. This was stimulated by a lengthy correspondence with Victoria Welby, initiated in response to a 1903 review he wrote of her book *What is Meaning?* It is less the fact of the relationship that makes the point, and more the observation that scholarship has been intent on ‘cutting in’, attending to Peirce and excluding Welby’s contribution.² While her services

Peirce refers to Welby’s tripartite distinction between sense, meaning and significance as a trichotomy (Cust 1931, 309), though hers appears not to have logical force (of the Peircean kind) behind it.

² The EU library’s copy of Cust 1931, the second volume of Welby’s correspondence, has only one borrowing before mine (2008) on the stamp sheet, dated 1982.

are acknowledged, such as her furnishing C. K. Ogden with the copies of Peirce's letters that eventually formed the basis of the appendix on Peirce in *The Meaning of Meaning* (Ogden & Richards 1944; cf. Nubiola 1997, 10), little account is taken of her own lengthy letters of reply. The 'cutting in' tends to exclude materials that are difficult to grasp (both literally and figuratively), but which contribute support without which the whole is more likely to fail. For instance, on Nubiola's account (1997, 20), Frank Ramsay influentially adapts the type/token distinction from Peirce's explication in the Welby correspondence, but omits the third (or rather, first) term 'tinge or tone' (Peirce 1998, 488). J.L. Austin (1975, 98) adopts 'rheme' (a first) and 'pheme' (a second) but not the third, 'delome' (Peirce 1998, 490).

An early difficulty with Peirce's explication of semeiotics was the distinction between interpreter and interpretant in his first writings on what he at that time (1866–9) called 'thought-signs'. An interpretant is an idealization of the particular instance of interpretation that the personalized term 'interpreter' implies; it represents the capacity to interpret. Only towards the end of his late exchanges with Victoria Welby does he make the significant concession of specifying a *human* interpretant:

I define a sign as anything which is so determined by something else, called its object, and so determines an effect upon a person, which effect I call its interpretant, that the latter is thereby mediately determined by the former. My insertion of "upon a person" is a sop to Cerberus, because I despair of making my own broad conception understood (1998, 478).

The interpretant is the thirdness to (first) sign or representamen and (second) object. Thomas Short, in a paper that addresses the widely-acknowledged incompleteness of Peirce's semeiotic, summarizes the early exposition as follows, stressing that Peirce's original contribution to a line of analysis stretching via Kant and Locke back to Aristotle, was the shifting of emphasis from individual thought-signs to the interpretive process:

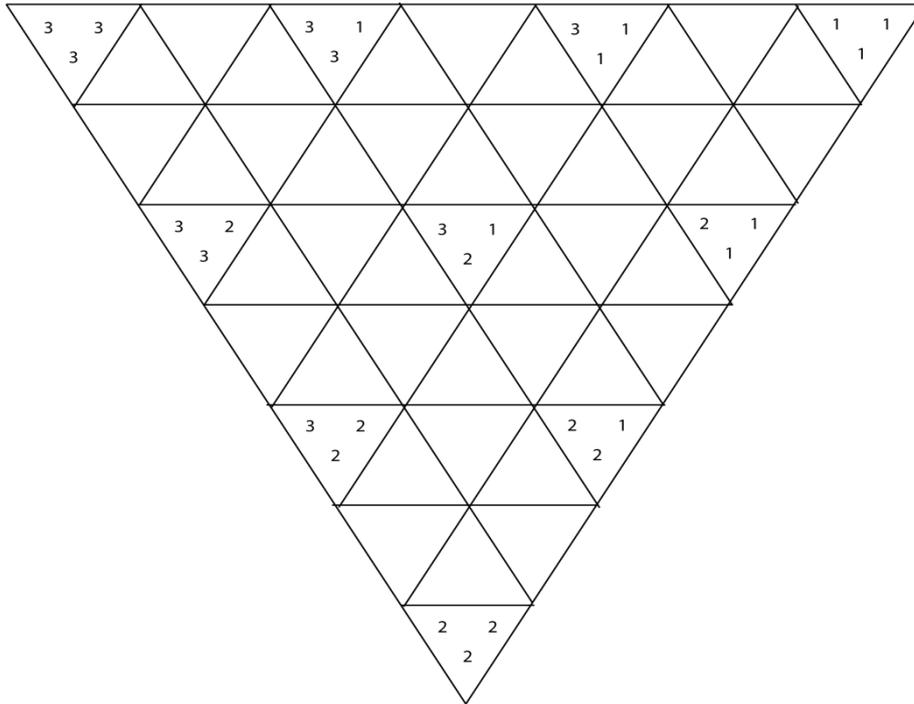
If this same sort of analysis applies to each thought, then every thought is both a sign and an interpretant. Hence, each is but a moment in an infinite *regressus* and infinite *progressus* of thought-signs. That thought begins and ends in time is accounted for by its being a continuum, packing an infinity of infinitesimal thoughts into a finite flow of thought. Among much else, this entails that there is no cognition not determined by a previous cognition, hence, that none is determined directly by its object. If no cognition is determined directly by its object, then there is no intuitive knowledge (Short 2004, 215).

The chief weakness of the early semeiotic was its failure to account for the presumed capacity of the interpretant to claim the cognitive foreground. This is connected to Peirce's position on 'intuition', which he regarded as an essential component of the Cartesian introspective method. The semeiotic, both early and late, seeks to generate an

apparatus (ironically reminiscent of Bergson's cinematograph) that can account for human consciousness as a vehicle moving through an infinity of sign potential. The idea that cognition can emerge *ex nihilo* during immediate contemplation must be false, he believes. Thus, Peirce states, 'the term *intuition* will be taken as signifying a cognition not determined by a previous cognition of the same object, and therefore so determined by something out of the consciousness' (1992a, 11).

In the late work on semeiotic, under way from around 1903, Peirce substantially develops his system so that this blemish is submerged in an inflationary currency of intricately circulating terms and categories. His attention was turning to the project of getting his theories into sufficient order for him to write and publish them in book form. For Peirce that did not mean 'a' book, of course: his Carnegie Trust prospectus envisaged a 36-volume work. The place of the semeiotic was modelled after that of Aristotle's *Categories*, the initial work of his *Organum*, and Peirce propounded a ten-fold classification of signs now based on three trichotomies, governed by a base distinction between Representamen (a term that he later concedes can be replaced with 'sign'), Object and Interpretant.

In the first trichotomy, concerning the nature of the sign, the early distinction between Quality/Relation/Representation becomes one between *Qualisign* (a quality that is a sign), *Sinsign* (where 'sin' represents singular iteration) and *Legisign* (a law that is a sign). The second trichotomy, concerning the nature of the object, is the most familiar: An *Icon* is likeness in the sense of simulacrum. Its relationship with its object is a matter of mere resemblance. An *Index* refers *necessarily* to its object. A *Symbol* relates to its object via laws that tend to cause the symbol to be interpreted as referring to the object in question. In the third trichotomy, concerning the nature of the interpretant, a *Rheme* is a sign of qualitative possibility; a *Dicent* is a sign of actuality or, again, iteration; an *Argument* is a sign of law (1998, 290–5). These three trichotomies yield ten classes of sign because, although there would be 27 possibilities in all, several are redundant. Every qualisign is an icon, every icon a rheme, every symbol a legisign, and every argument is a symbol (Preucel 2006, 57). Peirce, in a late P.S. to Welby, rendered these in a diagram, to which I append Preucel's gloss:



The number above to the left describes the object of the sign [2nd]. That above to the right describes its interpretant [3rd]. That below describes the sign itself [1st].

1 signifies the possible modality, that of an Idea.

2 signifies the actual modality, that of an Occurrence.

3 signifies the necessary modality, that of a Habit (Peirce 1998, 491)

Class	Key	Example
Qualisign-Icon-Rheme	1-1-1	The feeling of red
Sinsign-Icon-Rheme	2-1-1	Specific Diagram
Sinsign-Index-Rheme	2-2-1	Spontaneous cry
Sinsign-Index-Dicent	2-2-2	Weathervane
Legisign-Icon-Rheme	3-1-1	Diagram
Legisign-Index-Rheme	3-2-1	Demonstrative pronoun (e.g. 'this')
Legisign-Index-Dicent	3-2-2	Street cry
Legisign-Symbol-Rheme	3-3-1	Common noun
Legisign-Symbol-Dicent	3-3-2	Proposition
Legisign-Symbol-Argument	3-3-3	Syllogism

By 1908, the three trichotomies have become ten, and Peirce's system generates 59,049 (3^{10}) classes of sign, which, subject to the principles of connection he advances, render down to 66. Peirce's definitions are at times arbitrary or uncertain in their associations (he marks them as such). A generative principle emerges, a sort of evolutionary feedforward mechanism, which challenges the system's analytical valence.

In this period, between 1906 and 1908, while in correspondence with Welby, Peirce introduces the tone/type/token trichotomy, which he renames potisign/actisign/famisign. The new terms are inelegant, and after further mulling he considers reinstating the earlier ones, with 'mark' replacing 'tone' (1998, 488).³ Potisign relates to the notion of potential, as a matter of *positive* possibility. Actisign is simultaneously unique and transitory, received in the act of experiencing 'here and now', such that the same word printed in the same paragraph in two separate copies of the same book is *not* the same sign in terms of its immediate impact on the reader (482–4). Famisign, on the other hand, recognizes the multiple familiarity of that sign in its different contexts. An example he develops concerns the war memorial commonly found in US towns and villages after the Civil War. The configuration is recognizably similar—a centrally-located statue—but the implementation always local. To each bereaved citizen there is a personal story that threads a singular loss together with a communal and ultimately civic narrative bound in to the symbol of the statue (486).

Further, he introduces a new principle aimed at forestalling the infinite *progressus* by asserting that the process of sign-interpretation is end-directed:

... by this revolution of 1907, we break out of the circle of words, of words interpreting words and thought interpreting thoughts. The pragmatic distinction between meaningfulness and meaninglessness becomes this: meaningful speech and thought have ultimate logical interpretants, while nonsensical speech and thought, though they may always be translated into further thoughts and words, lack ultimate logical interpretants. Being interpretable by habits of action, meaningful speech engages with the nonverbal world: for example, assertions may be acted upon and tested against the consequences of those actions (Short 2004, 229).

The notion of 'habit' is important. For Peirce, who uses the word frequently and normatively in relation to his category of thirdness, the allusion is to a classical distinction between habit (*exis*) and disposition (*diathesis*). According to Fleming's *Vocabulary* (1860), disposition is 'the arrangement of that which has parts'; it 'gives a

³ This first term might benefit from a designation appropriate to the sensory organ, so that auditory signs are tones, visual ones tinges and so on. 'Mark' seems a hylozoic stage beyond this immediate apprehension, suggesting that a judgement has already been made.

colour to the whole character of the man... His thoughts run in a particular channel, without his being sensible that they do so'. Habit is more narrowly defined as being the appropriate transliteration of the greek *exis*, though the 'abusive' additional English sense of custom or use is already noted by Monboddo (1779, p. 26). Fleming continues: '*habit* is a certain constitution, frame, or disposition of parts... by which every thing is fitted to act or suffer in a certain way'. In Liddell & Scott's definition of *exis* there is a clearer emphasis on embodied practice.⁴ For Aristotle, as Stefania Bonfiglioli (2008) points out, a habit is a particularly stable species of disposition, which in turn is

First of all, a quality, then ranked under a category admitting contraries; secondly, a relative (*pros ti*), because a disposition is always said to be disposition of something else or in relation to something else (118).

There is a potential confusion, however, to be found in the similarity of *diathesis*—a species of secondness in Peirce's terms—and the rhetorical term *taxis*, which also translates as 'disposition', and which is more in the nature of a Peircean thirdness.

As a result, far from breaking out of the circle of words, Peirce's gesture seems almost theological, seeking to lock the semeiotic inside a teleological loop whose extent is only obscured by the underexplored nature of the extended divisions his fertile imagination brought forth. A better term might be '*fundamental* logical interpretant'—bottom up, rather than top-down, but that way lies the primordial.

In the relationship between his logic and his semeiotic there is an impetus to construct, which meets an impetus to analyse, to seek bottom, from the semeiotic standpoint. The third element still lacks definition, however; it concerns a sense, coming between top and bottom, of 'moving through'; though this is a mobility governed by probability.

1.3 Tychic

Chance and probability are fundamental to Peirce's thought, and central to his legacy. His term 'tychism' is from the Greek for 'necessity, fate... *chance* regarded as an impersonal cause' (Liddell & Scott). The deductive logic that underpins rational enquiry valorizes reliable replication, and reliable replication in turn validates deductive logic. Inductive reasoning—generalizing from the particular—is more familiar and more practical, but also more hazardous. Peirce, in tackling this problem, contributed

⁴ Lewis & Short's Latin Dictionary, Liddell & Scott's Greek Lexicon, and other similar resources, are collected in Tufts University's Perseus Digital Library database, www.perseus.tufts.edu

significantly to the development of the primary Aristotelian mode of *anagoge*, usually rendered as ‘abduction’. Although Peirce was satisfied that the distinction between inductive and abductive was important and worth pursuing, a clear-cut distinction eluded him. Nevertheless, he was firm in his view that the abductive—the only intellectual modality in which original ideas are created—rests on chance subject to mathematical law.

The relationship between probability and pragmatism as he conceived it is close, and there is necessarily some overlap in discussing the two. For Peirce, probability is an empirical matter with clear empirical procedures for fixing content. In his *Popular Science Monthly* article ‘The Probability of Induction’ (1992a, 155ff), Peirce elaborates John Venn’s pioneering work on statistical sampling and the logic of chance. Peirce characterizes the distinction between probability and chance as a distinction between subjectivity and objectivity:

Probability and chance undoubtedly belong primarily to consequences, and are relative to premises; but we may, nevertheless, speak of the chance of an event absolutely, meaning by that the chance of the combination of all arguments in reference to it which exist for us in the given state of our knowledge. Taken in this sense it is incontestable that the chance of an event has an intimate connection with the degree of our belief in it (158).

However, for the event to have any status at all, it must be empirically grounded: ‘probability, to have any value at all, must express a fact. It is, therefore, a thing to be inferred upon evidence’ (159). This is where the connection between logic and method is made explicit.

The imperative that drives the distinction between inductive and abductive arises from the Trichotomic. In the last paper of the *Popular Science* series, ‘Deduction, Induction, and Hypothesis’ (1992a, 186ff), Peirce develops the distinction by introducing a room where there are number of bags containing different kinds of beans. On finding some white beans on a table, he characterizes the exploratory options as follows:

Deduction

Rule.—all the beans from this bag are white.

Case. —these beans are from this bag.

∴ Result. —these beans are white.

Induction

Case.—these beans are from this bag.

Result.—these beans are white.

∴ Rule. —all the beans from this bag are white.

Hypothesis

Rule. —all the beans from this bag are white.

Result. —these beans are white.

∴ Case. —these beans are from this bag. (188)

In the deductive mode it makes no difference how many beans there are in ‘this bag’, because we know that all the beans in the bag are white. Nor does it make any difference how big the bag is. In the inductive mode, though, we can easily see that our confidence in the induction depends on the ratio of sample to whole.

In the Hypothesis example, the inference is neither necessary nor probable; the size of the sample is again of no consequence. The inference is a guess, but not a wild guess—the chance of making a successful guess is constrained in a minimal way by the environmental variables that contribute to its framing. If there were only one bag, the guess would be altogether more secure than if there were ten bags. The precise nature of the difference between the inductive and hypothetic examples is difficult to establish, but in the first there is only one bag, whose volume and therefore contents are presumably finite. In the third, the number of possible bags from which the sample might be taken is not specified, and presumably cannot be specified conveniently. The distinction, then, is between closed and open operational contexts—and conceivably between tractable and intractable logical problems. Alternatively, a potentially fruitful connection can be made with the commonplace terminology of belief and desire, where belief is understood to be a world-to-self relationship, and desire a self-to-world relationship corresponding respectively to the inductive and abductive modes.⁵

Later, in notes for a Johns Hopkins lecture, Peirce makes an interesting distinction concerning the place of chance in his thinking compared to the evolutionary theory advanced by Spencer:

Herbert Spencer and many other evolutionists hold that the operation of chance is an important factor in the development of self-consciousness. But they all admit other primordial elements, the conservation of energy and the like, to be necessary factors. Whereas my principle is that [chance] holds a place in nature independent of every accident of matter (1992a, 222).

⁵ Parenthetically, it is worth pointing out a pragmatic distinction between bags and urns. Often these syllogisms are represented in terms of balls in urns, subliminally evoking unhurried and uncompromised Grecian elegance. Beans in sacks convey an altogether more transient and commercial encoding in which Peirce’s professional practice of scientific method becomes distinctly relevant. As the historian Stephen Nihm notes (2007), the practice of adulterating bulk commodities was widespread in the emergent United States. An 1859 reform committee found, among other things, that ‘Hundred-pound bags of coffee labeled “Fine Old Java” turned out to consist of three-fifths dried peas, one-fifth chicory, and only one-fifth coffee.’

Peirce does not make a direct analogy between beans and ideas, but there is an implicit connection. In ‘How to Make Our Ideas Clear’, he pays attention to small and trivial decision-making, implicitly making the case for a cognitive scalability that striates nature from the primordial to the material:

If, for instance, in a horse-car, I pull out my purse and find a five cent nickel and five coppers, I decide, while my hand is going to the purse, in which way I will pay my fare. To call such a question Doubt, and my decision Belief, is certainly to use words very disproportionate to the occasion. To speak of such a doubt as causing an irritation which needs to be appeased, suggests a temper which is uncomfortable to the verge of insanity. Yet, looking at the matter minutely, it must be admitted that, if there is this least hesitation as to whether I shall pay the five coppers or the nickel (as there will be sure to be, unless I act from some previously contracted habit in the matter), though irritation is too strong a word, yet I am excited to such small mental activity as may be necessary to deciding how I shall act (1992a, 128).

The allusion to habit reprises the problem identified at the conclusion of the previous section, but here the trajectory is seemingly reversed. In general, Peirce’s use of the term ‘habit’ gives him a familiar and convenient means of accessing the probabilistic language of logic he developed from (in particular) Venn. In ‘Man’s Glassy Essence’, he writes of a ‘law of habit’ which has the ‘peculiar characteristic of not acting with exactitude’ (1992a, 345). Were it not for the statistical background, this formulation would be curiously oxymoronic. Instead, Peirce is able to draw on an emerging ecological vocabulary, citing James’s explanation of habit in terms of plasticity, meaning a limited flexibility in the face of environmental variability. Subsequent developments in the theory of probability have developed this perception significantly, notably in the heuristics of George Pòlya (*cf* chapter 9.3 below).

A century later, we can see that Peirce’s tychism anticipates modern biology’s view of genomics as probabilistic molecular attunement to local environmental conditions. Bergson wrote of the evolutionary process of accumulating options; Peirce’s tychic trichotomy substantiates an aspect of this accumulation that feeds forward into the concept of pragmatism. The secondness, ‘synechism’, asserts continuity. (The alternative secondness referenced previously, ‘anancism’, asserts mechanical necessity.) The organism is initialised with a minimal set of attunements, and accumulates its options either in a phylogenetic trajectory or an ontogenetic. In the former, the class of organism is the subject—vertebrates evolved from invertebrates, and so on. In the latter, the individual organism is the subject. The traverse from embryonic state to maturity may be short (a matter of hours or days), or it may be long (as in the case of humans, for whom the process takes years).

Where the individual organism is the subject, then the third term of Peirce's trichotomy, 'agapism' takes over. Here we encounter an unusually mystic dimension of Peirce's thought, because the term is chosen for its particular resonance with a theological dimension of the concept of love concerning the early Christian doctrine of the self-sacrificing love of God for humanity. One aspect of medieval scholasticism that Peirce particularly approved of was its unselfish devotion to truth and knowledge as an end in itself, divorced from the modern bourgeois necessity for establishing property rights over one's own thought in distinction from that of others. He was keenly aware that the philosophical trends of his day were being harnessed to acquisitive, self-interested individualism. Though recognized by the 1890s as 'social Darwinism', Peirce was at pains to minimize Darwin's contribution to this movement, highlighting instead what he saw as Herbert Spencer's rhetorical acyrologia.

He is particularly critical of the same mechanistic bent in Spencer that offends Bergson; like Bergson, Peirce finds his refutation in the very evolutionary theory that Spencer advances. The difference between Peirce and Bergson is first that Peirce rests his case on the laws of probability, and second that he complements this with an explicitly social continuation of the mechanistic element—which he regards as a part, and not the whole, of a satisfactory evolutionary theory.

For Peirce,

Love is not directed to abstractions but to persons; not to persons we do not know, nor to numbers of people, but to our own dear ones, our families and neighbors. 'Our neighbor,' we remember, is one whom we live near, not locally perhaps, but in life and feeling (1992a, 353-4).

The analogy he develops is between the conventional, domestic notion of an extended family, and communities of scientists whose numbers and whose social practices tend to resemble the extended family, although the prosthetic support afforded by intersubjective technologies virtualizes the experience. This sense of agapism more closely resembles Aristotelian *philia* than the overtly sexual *eros*. The Aristotelian sense is a matter of wishing something good onto another so that the other may share the experience of its goodness. It is in this spirit that Peirce notes the frequency with which significant discoveries were being made simultaneously by spatially remote but intellectually similar specialists—Leverrier and Adams (predicting the discovery of Neptune), Rankine and Clausius (mechanical theory of heat), Wallace and Darwin (evolution) are among the examples he gives (370-1).

Noting (per Brent 1993) that in family and social life Peirce was a borrower and not a lender, there is a second sense in which the notion of evolutionary love is apt, but which Peirce overlooks or discounts—he merely speaks of Empedocles as having set up a foundational opposition between passionate love and hate (1992a, 352). However, *eros*—which we might characterize as ‘addictive love’—bears usefully on the matter of localizing attention to the specific objects of pursuit and enquiry. Regarding *eros*, the idea that Empedocles’ relationship between opposites is intended to represent productiveness and innovation is developed by Bonfiglioli (2008). She points out that Aristotle uses *synthesis* and *symplokeē* (weaving) in similar ways, and traces this usage to Plato:

Symplokeē is a very rare word in Plato’s works. Its first occurrence is in the *Symposium* (191c4), where it appears within the famous mythical tale by Aristophanes on the nature of Eros. More precisely, this occurrence has to do with the probable first perception of opposition: the contrariety between male and female, whose *symplokeē* permits generation to happen (112).⁶

1.4 Pragmatic

The tychic trichotomy thus lays the foundation of Peirce’s theory of action. The term ‘pragmatism’, which he coined in his Harvard days, had acquired a currency that began to alarm him because its appropriation was causing it to lose specificity. Peirce, who felt that it was proper for a philosopher to coin neologisms in order to maintain a one-to-one relationship between word and meaning, coined a new term in response, ‘pragmaticism’. He set about substantiating this in the two 1905 papers published in the *Monist*, ‘What Pragmatism Is’ and ‘Issues of Pragmaticism’ (collected with a number of drafts for a projected third paper in Peirce 1998). This is the pragmatism Richard Rorty (1961) enlarges upon, remarking that the correspondence theory of truth, logical positivism and verificationism emerge from the broader pragmatism as nominalist concepts to which Peirce was explicitly opposed.

What, then, is Peircean pragmaticism? In ‘Issues of Pragmaticism’ (1998, 346ff), Peirce identifies four principal contributory factors: the Metaphysical Club; Kant; Scotch Common Sense; and medieval scholastic realism. The last of these invests Peirce with the essentialism that distinguishes him from the emerging pragmatic tradition. Most immediately present in Peirce’s mind was the influence of the Metaphysical Club’s doubt about Cartesian doubt. This club was a short-lived, ironically-named association

⁶ According to Liddell & Scott, in the Ionian dialect *eros* means ‘wool’.

of Harvard classmates, including Peirce and James, whose discussions (moderated by Chauncey Wright, an early American advocate of Darwin) prompted Peirce to write a paper (now lost) which circulated among the group to general approbation. This paper helped form the basis of the *Popular Science Monthly* essays. Hence James's muddled citation (*cf.* Dewey 1916, 709): the idea was germinating in these essays, but the term was not, at that stage, broached.

The 'maxim of pragmatism', as Peirce later termed it, was given in the second of these essays, 'How to Make Our Ideas Clear':

Consider what effects, which might conceivably have practical bearings, we conceive the object of our conception to have. Then, our conception of these effects is the whole of our conception of the object (1992, 132).

In the 1903 Harvard series, this statement has become the rhetorical focus of the first lecture, though Peirce here assumes that the audience shares a common understanding of the term's meaning.⁷

On Dewey's (1916) account, the *idea* of pragmatism came to Peirce from reading Kant's *Critique of Pure Reason*, while the *name* comes from the same author's *Critique of Practical Reason*. Peirce himself stresses the laboratory-centred nature of his own life in experimental science, with its philosophical debt to the Bacons Roger and Francis. In 'What Pragmatism Is', he writes that the thought of some philosophers—alongside Kant he names Spinoza and Berkeley—sometimes finds resonance for him with his own laboratory experience. He puts the problem with Kant like this:

...*praktisch* and *pragmatisch* were as far apart as the two poles, the former belonging in a region of thought where no mind of the experimentalist type can ever make sure of solid ground under his feet, the latter expressing relation to some definite human purpose (1998, 332–3).

Peirce rejects Kant's separation of instinct, thought and purpose, arguing that the latter two in particular cannot be distinguished. This, he says, 'determined the preference for the name *pragmatism*' (*ibid.*).

Peirce also rejected the notion of *ding an sich* ('thing-in-itself') as an *a priori* of perception, saying: 'The Kantist has only to abjure from the bottom of his heart the proposition that a thing-in-itself can, however indirectly, be conceived' (334). The nature of belief, its

⁷ In their commentaries on the 1898 Harvard lectures, Kentner and Putnam suggest that the socializing of Peirce's thought in this public arena may have been an important factor in generating a sense of pragmatism as a movement (Peirce, 1992b, p. 36). James characterized those Harvard lectures as 'flashes of brilliant light relieved against Cimmerian darkness' (Peirce 1998, 133).

relationship to judgement, and the emergence of the phenomenological concept of intention is the contextual metier for Peirce's 1905 series. However, while the influence of Kant is pervasive, here as elsewhere in Peirce's writing, it is also elusive. In the two volumes of *The Essential Peirce*, for instance, there is a single, short, unpublished paper on Kant highlighting his importance in the formulation of the trichotomic. In contrast, the common sense and scholastic aspects of pragmatism receive extended discussion in 'Issues of Pragmatism'.

In his Harvard lecture 'Pragmatism as the Logic of Abduction' (1998, 226ff), Peirce presents three 'cotary' propositions (from '*cotis*', whetstone, in order to 'put the edge on the maxim of pragmatism'). First, adopting the Stoic maxim, 'there is nothing in the intellect that is not first in the senses', he understands by '*intellectus*' the 'meaning of any representation in any kind of cognition, virtual, symbolic, or whatever it may be';

The second is that perceptual judgements contain general elements, so that universal propositions are deducible from them in the manner in which the logic of relations shows that particular propositions usually, not to say invariably, allow universal propositions to be necessarily inferred from them.

The third cotary proposition is that abductive inference shades into perceptual judgement without any sharp line of demarcation between them; or in other words our first premisses, the perceptual judgements, are to be regarded as an extreme case of abductive inferences, from which they differ in being absolutely beyond criticism (*loc. cit.*).

Now, William Hamilton, glossing Reid (1863, p. 756ff) adduces a number of ways in which the term 'common sense' may be understood: one refers to a class of experiences which have it in common that they are received via the several sensory organs—touch, hearing, sight and so on; another is to take a different normative perspective where it refers to a sensory resource held in common between people, the assumption being that when I see red, so do you. Fleming, in his *Vocabulary*, mixes these, as in his citation of Harris's 1783 *Treatise on Happiness*:

As every ear not absolutely depraved is able to make some general distinctions of sound; and, in like manner, every eye, with respect to objects of vision; and as this general use of these faculties, by being diffused through all individuals, may be called common hearing and common vision, as opposed to those more accurate energies, peculiar only to artists; so fares it with respect to the intellect.⁸ There are truths or universals of so obvious a kind, that every mind or intellect not absolutely depraved, without the least help of art, can hardly fail to recognize them. The recognition of these, or at least the ability to recognize them, is called *nous koinos*, common sense, as being a sense common to all except lunatics and idiots (1860, 96).

⁸ Cf. Dennett & Clark on florid representation, 6.1.1. The novice sees red; the expert sees scarlet, vermilion etc.

An alternative, more recent term is naïve realism, the pejorative connotations of ‘naïve’ being subsidiary to its etymological root meaning ‘native’ (similar to the root of ‘pagan’), located in a presumed natural state of attuned but unacculturated relationship with the local environment. It is distinct from scientific realism, which ‘asserts that the nature of the unobservable objects that cause the phenomena we observe is correctly described by our best theories’ (Ladyman 2007). Typically, though, Peirce distinguishes three senses of ‘science’: classical knowledge-for-certain; enlightenment systematised knowledge; and modern heuritic science, of which he says: ‘in the mouths of scientific men themselves “science” means the concrete body of their own proper activities, in seeking such truth as seems to them highly worthy of life-long devotion’ (Peirce 1998, 372). Peirce’s position, then, is more akin to *structural* realism, where we ‘commit ourselves only to the mathematical or structural content of our theories’ (Ladyman, *op. cit.*).

Although there are disadvantages to a stress on the primacy of common sense—notably a socio-political connection to conservatism and the appeal to religious faith which contextualizes the passage from Harris cited previously—its philosophical virtue is its economy regarding the normative sensory state, in contrast to Cartesian doubt. Early on, in the *Popular Science* series, Peirce writes:

When Descartes set about the reconstruction of philosophy, his first step was to (theoretically) permit scepticism and to discard the practice of the schoolmen of looking to authority as the ultimate source of truth. That done, he sought a more natural fountain of true principles, and professed to find it in the human mind; thus passing, in the directest way, from the method of authority to that of apriority ... The distinction between an idea *seeming* clear and really being so, never occurs to him. Trusting to introspection, as he did, even for a knowledge of external things, why should he question its testimony in respect to the contents of our own minds? (1992a, 125)

This mistrust of unmediated introspection is important as it suggests not a transition from authority to apriority, but rather indicates the displacement of authority from the exterior and supernatural ascription familiar in the middle ages to the human-centred discourse familiar in modernity. Peirce, though, recognizes two problematic issues with doubt. First, it is out-of-equilibrium when compared to belief, and thus not an *initial* state. Second, there is the problem of scale that we encountered in the horse-car episode cited previously (see p. 26 above).

Peirce elaborates Critical Common Sensism in two directions in ‘Issues of Pragmaticism’ (1998, 346ff), first in relation to the Scotch (*sic*) Common Sense school and second to the scholasticism of Duns Scotus. He discusses a series of distinctive characters that sets his Critical version apart from the Scots’. However, characteristically, he does not begin with an exposition of his predecessors’ ideas. Immediately he states that, as well as

indubitable propositions there are indubitable inferences, but these inferences are indubitable in the sense of being acritical. ‘Critical’ here means the binding of a relation of necessity specific to Peircean secondness; ‘acritical’ thus means a state of knowledge prior to the application of such process. The term ‘reasoning’, he argues, ought to be reserved to fixations of one belief by another that are deliberate and self-controlled. He recognizes, however, that the stimulus for such deliberation is in some sense external to reason, though not external to sensory flux.

Second, he notes that the Scots thought it feasible to draw up a complete list of humankind’s indubitable beliefs that would hold good from Adam forth. Under the influence of Darwin, he recognizes that his own set of indubitable propositions changed from year to year. This feeds the third observation, which is that the putative original beliefs only remain indubitable so long as the affairs they relate to remain ‘primitive’—something the Scots failed to recognize (347–9).

The fourth issue is important, and links to the scholastic debate. Peirce insists that ‘the acritically indubitable is invariably vague’ (350). He criticizes logicians for failing to analyse vagueness, and launches an extended etymological meditation on the question of precision versus prescission:

If we desire to rescue the good ship Philosophy for the service of Science from the hands of lawless rovers of the sea of literature, we shall do well to keep *prescind*, *presciss*, *prescission*, and *prescissive* on the one hand, to refer to dissection in hypothesis, while *precide*, *precise*, *precision*, and *precisive* are used so as to refer exclusively to an expression of determination which is either full or made free for the interpreter. We shall thus do much to relieve the stem “abstract” from staggering under the double burden of conveying the idea of prescission as well as the unrelated and very important idea of the creation of an *ens rationis* out of an επος πτεροεν [winged word] (352).

Essentially the distinction is between cutting *off* (*prescind*) and cutting *down* (*precide*); the notion of the ‘winged word’ calls to mind Bakhtin’s terms *raznorecie* (rendered in a variety of ‘literal’ meanings, among which ‘the state of being in contradiction’ is particularly apt here), and *slovo*, the intrinsically lambent utterance (Beebee, 1989, pp. 163–4); (Fox, 2005)), which has the Peircean sense of necessary secondness.

Fifth, unlike other critics of Cartesian doubt, Peirce has a plan that we can see effecting a link between Baconian induction as personal practice and Foucauldian rhetoric as social practice—a large leap, but a justifiable one. Peirce says that he is not content to doubt; but makes a practice of planning a programme of enquiry by which he can examine whether the grounds for doubting are valid. This programme may take months of effort—which brings it into the realm of professional practice—before the author is

prepared to declare his result and pronounce his belief indubitable or otherwise (1998, 353).

Regarding the dialogue with scholasticism, Peirce revisits an example that he gave in his *Popular Science* series. There he envisaged a diamond mysteriously materializing inside a boll of cotton wool, and then being consumed by fire before anyone could bring tests to bear. The question of whether it really exhibited such properties as would authenticate the claim that it was a diamond, he previously said, 'would be merely a question of nomenclature'. In his mind was the *raznorecie* of the diamond in another rendering of Bahktin's term—'multi-thinged-ness', where each 'thing' is itself subject to compositional assembly. However, he criticized his prior self for the use of the word 'merely'. The properties constituting the notion of 'diamond' include hardness; a crystalline composition that is susceptible to cutting in certain specific facets; the optical property of refracting light in a particular way and so on. Each of these properties can be assayed, each being inseparable from the others in defining the object as 'diamond'. Peirce wants to insist that the specimen really is hard, in the event that fire destroys it before it can be brought to assay. Real, that is, in the scholastic sense—which involves Peirce in an extended discussion of the concept of necessity in relation to the indeterminacy of the future. This in turn reflects his interpretation of the scholastic debate between nominalism and realism.

Rorty says that Peirce used the term 'nominalism' more or less pejoratively, to dismiss a range of doctrines that he considered to be reductionist and/or deterministic. Nominalists believed that things Peirce recognizes as vague could be reduced to 'real', discrete entities. Peirce insists that such things as Intelligence, Intention, Habit and Meaning are not reducible to discrete entities (Rorty 1961, 199). Some confusion is due to the word 'thing' having both a precided and a prescinded sense. That is, its German etymology recognizes the oral, social process of debate by which a thing becomes a settled, precided particular as well as the normative prescinded usage in which that debate is (literally) taken as read. For Peirce, contained in the word 'diamond' is a set of practical actions by which the doubter may relate the particular specimen to the various universal concepts that converge to establish the singularity of this specific *concept* of diamond. This is what he means by the practical consequences entailed by a conception; this is how he precides the scope of the pragmatic maxim. However, such a definition is only possible, concludes Edward Moore in a paper on Peirce's scholastic realism, 'if one believes that concepts are real, that is, if he believes that the concepts have a real external counterpart' (1952, 416).

This is a key, fundamental problem. Recalling the second of Peirce's departures from Scotch Common Sense, it is the problem of the succession of indubitables. By what means do new indubitables arise, and old ones fade away? If old ones fade away, were they not real after all? This, after all, is at the core of our question about the nature of creativity. For Peirce the additional problem is to reconcile the seemingly arbitrary nature of the creative act with the systematized epistemic mechanism of his logical system. An additional problem for us, via Peirce's scholastic dimension, is whether he is deferring—subliminally or otherwise—to an exterior, supernatural causative force in order to do so. At first blush, there does not seem to be enough in his conception of hypothesis to account successfully for the function he ascribes to it.

1.5 Methodeutic

Here we return to the logical category that Peirce variously calls hypothetical, retroductive, or abductive. Now, though, we find the term 'hypothetical' obstructive. Any reasonable construal recognizes that content governed by the term is already substantially assembled, yet the term 'working hypothesis' suggests minimal commitment. There is too much breadth in the term for it to be helpful *at this point*. Recall, then, the third cotary proposition, given in 'Pragmatism as the Logic of Abduction' (see p.30), which says that abduction shades into perception as though the latter materializes from the former by some process of spectral attunement or calibration. The nature of that distinction, or that process, has remained elusive. As a preliminary discussion, I want to dwell on the term 'heuristic', and correlate it with Peirce's notion of 'methodeutic'. This is an underdeveloped strand in Peirce's thought—not only in his own work, but in subsequent commentaries. It is germane to the schism between analytic and continental philosophy that emerges with Pragmatism; it is germane to the formulation of the sociology of knowledge as an epistemic corollary to the practice of natural science; and it is germane to the complementary development of a philosophy of technology.

Evidence for the claim that this line of enquiry is underdeveloped hinges first on the relationship between Peirce and Hegel, on which there is little commentary—apparently because scholars have taken Peirce at his word regarding his derogatory opinion of Hegel.⁹ An alternative view sees Hegel as the philosopher Peirce feels himself to be the

⁹ See Stern 2007 (n3) for what I take to be a thorough review of the available literature on Peirce's Hegel.

most in competition with; his disparagement can therefore be regarded, in contemporary argot, as ‘trash talk’. After the realization that there is more to Peirce’s relationship with Hegel than has hitherto been credited, it follows that questions arise regarding the impact of Peirce’s critique of Hegel on readings of Marx’s relationship with Hegel.

In relation to Hegel and Marx, the distinction Peirce makes is between the historical method (in the philosophical sense) associated with Hegel, and what he calls the analytic method. He argues that the former ‘studies complex problems in all their complexity’ without ever reaching satisfactory conclusions. He recommends instead that what should be done

...is at first to substitute for those problems others much simpler, much more abstract, of which there is a good prospect of finding probable solutions. Then, the reasonably certain solutions of these last problems will throw a light more or less clear upon more concrete problems which are in certain respects more interesting (Peirce 1931, 27).

It is to this method, he says, that modern physics owes its success. However, transferred to philosophy it is an approach that seems to beg questions that ought to be addressed to the indubitables on which the enquiry is founded, unlike Bergson’s differentiating method in which nothing is *a priori* at cost of not knowing where to start—or end.

There is an implicit assumption on the one hand that the first step of an enquiry, the abduction or the hypothesis, is necessarily minimal in content. On the other, simultaneously, is an idealism regarding contentfulness that grants the enquiry its imprimatur of worth—and this, it turns out, is assayed by the interpretative community: this is the heterogeneous socio-technical device analysed in actor-network theory (*cf. infra*, 2.2.1) and not merely the pooled voice of an interest group.

What, then, does Peirce mean *exactly* by methodetic? The first thing to point out is its position in his modern trivium. Grammar, in the medieval model, falls in with his semeiotic but is here called stehiologic (after Hamilton, meaning the doctrine of elements); logic, his core concern, he designates ‘critic’ in this context, while methodetic concerns the way these relate to the interpretant. Remember that—apart from that late concession, the ‘sop to Cerberus’—Peirce did not regard the interpretant and individual human subjectivity as coterminous. There are three drafts of a definition in his 1902 Carnegie application (the application as a whole running to seven drafts). In draft B, he writes:

In methodetic, it is assumed that the signs considered will conform to the conditions of critic, and be true. But just as critical logic inquires whether and how a sign corresponds to its intended *ultimate*

object, the reality; so methodetic looks to the purported *ultimate* interpretant and inquires what conditions a sign must conform to, in order to be pertinent to the purpose (1902).

In draft A, he stresses that ‘since the whole business of heurctic, so far as its theory goes, falls under methodetic, there is no kind of argumentation that methodetic can pass over without notice’ (*ibid.*). In draft D,

...to discover is simply to expedite an event that would occur sooner or later... Consequently, the art of discovery is purely a question of economics. The economics of research is, so far as logic is concerned, the leading doctrine with reference to the art of discovery. Consequently, the conduct of abduction, which is chiefly a question of heurctic and is the first question of heurctic, is to be governed by economical considerations (*ibid.*).

Heurctic is another term that Peirce inherits from Hamilton, meaning ‘The branch of logic which treats of the art of discovery or invention’ (OED). But what do these matters have to do with rhetoric? The reference to economical considerations is an important clue. It is a gesture that simultaneously salutes the scope of Spencer’s ambition and points forward in time to the Vienna Circle’s aspiration to theorize a unified science. In Peirce’s hands the speculation—in terms of its being an *economic* question—remains unpursued, although the general sense (previously referenced) of science being defined as the corporate practice of scientists is instructive. As Latour (1987) argues, the rhetorical practice of science is closely bound to the mobilization of resources.

Regarding the heurctic, just as the distinction between sensory inputs in common, and shared experience of sensory input held in common, needs teasing out, so too the mirror distinction between conversation and rhetoric is a social-brain issue in need of further exploration. It is all very well to cite the practice of scientists in defining science, but we need to ask *how* they go about practicing science.

Abduction, the traditional philosophers’ term for the logical mode Peirce identifies with originary development, means ‘to lead away from’, whereas ‘induce’ means ‘to lead into’, with a subsidiary sense of persuasion. Laid beside each other, there is a sense that the motions pull in opposite directions—one towards, the other away—where similarity of motion seems desirable. The Greek term is *apagoge*, which means to draw off or lead away. Like related terms, *epagoge* (bringing on or to) and *paragoge* (leading by or past), there is a military flavour in which the subject of the term is corporate action: not just drawing off an individual, but drawing away part of an military formation so that the remaining part is more vulnerable to attack. Other senses of *apagoge* are appropriate, too: in chemistry, when concentrating a solution by fractional freezing, one *draws off* the concentrate.

All of these senses suggest that there is something left over that will be returned to, some kind of residue. The distillate may be of intrinsic value, but the question of how it is productively recombined remains. One answer is to adopt the simple inverse of abduction, which is adduction—‘to lead towards’, but without the sense of persuasion that clinches the idea of ‘leading into’. This is my preferred term, but we should recognize that in this most conjectural of modes, *both* abduction and adduction are in play, complementing each other. I prefer ‘adduction’ because the experience of improvising at the piano instructs me that the equipment at my disposal significantly shapes the outcome. There is a strong sense in which certain gestures inevitably lead *toward* others; recollection of what has gone before—taking away and returning, in real time—is imperfect.

Peirce makes explicit a methodological issue in relation to these processes that otherwise went unmentioned in contemporary thought. The fixation of belief really does include the material–semiotic *reification* of belief. The procedure that leads from adductive event to inductive or deductive resolution involves, for modern humans, an equipmental relationship with the local environment:

A psychologist cuts out a lobe of my brain (*nihil animale a me alienum puto*) and then, when I find I cannot express myself, he says, “you see, your faculty of language was localised in that lobe.” No doubt it was; and so, if he has filched my ink stand, I should not have been able to continue my discussion until I had got another. Yea, the very thoughts would not come to me. So my faculty of discussion is equally localised in my ink stand (CP 7.366, cited in Skagestad 2004, 248).

This is a key insight, which regards introspection as initially an intersubjective relationship with one’s prior self. Peirce develops this theme in ‘The Law of Mind’, part of the 1892 *Monist* series (1992a, 312ff), which relates ‘idea’ to ‘concept’ through his synechist account of continuity. There is a passing resemblance, in his initial exploration of the word ‘idea’, to Bergson’s exploration of memory in *Time & Free Will*, which suggests a common link to Spencer. Writing on the ‘individuality of ideas’, Peirce says:

taking the word ‘idea’ in the sense of an event in an individual consciousness, it is clear that an idea once past is gone forever, and any supposed recurrence of it is another idea. These two ideas are not present in the same state of consciousness, and therefore cannot possibly be compared (313).

Some caution is due regarding the precise meaning of the word ‘consciousness’ as Peirce uses it. Our multifaceted modern approach to the complexity of cognitive theory and experimentation is a rich speculative environment. The entry for ‘consciousness’ in Fleming’s 1860 *Vocabulary* (109–13) stresses the etymological root meaning ‘joint knowledge; a knowledge of one thing in connection or relation to another’. Hamilton notes (and OED tends to confirm) that the word is a neologism from around the 16th

century, when it had a specifically social sense in which knowledge of a given datum is shared in the ‘common sense’ sense discussed previously.

Peirce continues by asking how a past idea can be present:

Can it be present vicariously? To a certain extent, perhaps; but not merely so; for then the question would arise how the past idea can be related to its vicarious representation (1998, 314).

Foreshadowing the peristaltic relationship between intension and detente that Deleuze derives from Bergson, he notes three elements that constitute an idea—its intrinsic quality; the energy it brings to bear on other ideas; and its tendency to bring other ideas along with it (325). He continues:

The insistency of a past idea with reference to the present is a quantity which is less the further back that past idea is, and rises to infinity as the past idea is brought up in the coincidence with the present. Here we must make one of those inductive applications of the law of continuity which had produced such great results in all the positive sciences. We must extend the law of insistency into the future (326).

This he connects to synechism by asserting: ‘that ideas can nowise be connected without continuity is visually evident to one who reflects upon the matter’ (327). Less evident, but important, is the connection between this expression of Peirce’s with his prior research work on the gravitational attraction of celestial bodies, where the visibility of the evidence is indirect.

In drawing to a characteristically provisional conclusion, Peirce turns to the manifestation of this expression in the human individual, in a discussion of ‘personality’ which, for him, is defined as ‘some kind of coordination or connection of ideas’ (331).

This notion of coordination pushes personality beyond ‘immediate self-consciousness’:

... it implies a teleological harmony in ideas, and in the case of personality this teleology is more than a mere purposive pursuit of a predetermined end; it is a developmental teleology. This is personal character. A general idea, living and conscious now, it is already determinative of acts in the future to an extent to which it is not now conscious (331).

‘Teleological’ is perhaps an odd word to find in the Peircean universe, being at odds with his anti-determinist position. Indeed, Peirce goes on to claim that his thought does not exclude the possibility of a ‘personal creator’. However, he stresses that ‘were the ends of a person already explicit, there would be no room for development, for growth, for life; and consequently there would be no personality’; the position that places mechanism over growth he styles ‘pseudo-evolutionism’ (*loc. cit.*). This scope that Peirce provides for the plasticity of personality, gathered together with the provisional nature of the evolving universe as he conceives it, locates the pragmatist intellect in a dynamical context to which it must continually respond and adapt.

By his own lights, though, there is an outstanding issue arising from his definition of methodeutic. The distinction between analytical and socio-historical methods is a distinction between a method of secondness and a method of thirdness, but there is no method of firstness. There ought to be a method of firstness, and this is probably an introspective, or intuitive method that is clearly distinct from the analytical method, and distinct from a putative, third, socio-historical method. He doesn't bother with this, presumably, because the same criticism, 'complex problems in all their complexity' applies to both. However, a transpersonal, auctorial dimension of enquiry as rhetorical practice requires further attention. The next chapter develops a methodological perspective on the institutional nature of the socio-historical method via actor–network theory, while the chapter that follows complements this by paying further attention to the problem of introspective reports via heterophenomenology.

2 Acts of institution

Austin's account of performative utterances cannot be restricted to the sphere of linguistics. The magical efficacy of these *acts of institution* is inseparable from the existence of an institution defining the conditions (regarding the agent, the time of place, etc.) which have to be fulfilled for the magic of words to operate. As is indicated in the examples analysed by Austin, these 'conditions of felicity' are social conditions, and the person who wishes to proceed *felicitously* with the christening of a ship or of a person must be *entitled* to do so... (Bourdieu 1991, 73)

Peirce's theory of action implicitly respects the institutions of scientific practice, but, apart from the remark about economic context in Methodeic draft D, he leaves the nature of the institution unexamined. Nevertheless, the link previously adduced between induction in the scientific tradition and rhetoric as critiqued by structuralist sociologists is vestigially signposted and in need of more detailed mapping. The notion of institution to be pursued, though, incorporates elements of semiotics and sociology that remain characteristically Peircean. Our objective is to define two terms: *dispositif*, which can conveniently be termed 'a story in the process of being told'; and the obligatory passage point, which can be termed 'the subject of that story in process of being disclosed'.

As the citation above suggests, the route passes through Austin's concept of performativity. Some preliminary remarks are warranted, though, in respect of Bourdieu's criticism of Austin and others who seek to locate performativity explicitly in the structure of language and not in the institutional conditions governing its use. Bourdieu is right, and I will argue that Austin's project was tending towards sociological realization prior to his death. However, there are other 'flavours' of performativity that impinge on Bourdieu's critique and its reception, which should be distinguished from Austin's.

The sociologist Harold Garfinkel's signature concept, ethnomethodology, is a useful term in the operationalizing of scholarship on performativity, and has become so closely associated with the topic via fields such as discourse pragmatics that it is worth pointing out that Garfinkel does not use the term directly. Though a rough contemporary, he did not draw on the ordinary language philosophy developed at Oxford by Austin and colleagues in formulating ethnomethodology.

Garfinkel's methodology lent important theoretical perspective to the sociologists who developed actor-network theory. Briefly, the principle is to pay attention not to what people say they do, but rather to observe them as they *perform* actions. Retrospective accounts filter, edit, and discard information that may have a material bearing on the topic of enquiry, and do so on the basis of unacknowledged tacit knowledge of interlocutors' shared beliefs. However, as Garfinkel notes:

The ‘relevant other persons’ for the scientific theorizer are universalized ‘Anymen.’ They are, in the ideal, disembodied manuals of proper procedures for deciding sensibility, objectivity and warrant. Specific colleagues are at best forgivable instances of such highly abstract ‘competent investigators’ (1967, 275).

Similarly contemporaneous with Oxford philosophy, a corresponding distinction emerged between performance and competence, articulated by Chomsky as a development from the distinction in Saussurean semantics between *langue* and *parole*, and developed by Greimas as an adjunct of narrative theory. The distinction turns on the same problem in the scholastic analysis of abstract particulars that Peirce grapples with, and which Austin indirectly tackles too. Competence refers to the system governing the instantiation of a phenomenon, while performance refers to the process by which instantiation comes about (Schleifer 1987, 82). Schleifer notes an important difference between Chomsky’s formulation and that of Greimas, indirectly connecting Chomsky to Peirce because of the latter’s stress on semeiotic as a *logical* system. Greimas was intent on developing Saussure’s goal of semiology as ‘a science that studies the life of signs within society’. This would be ‘a part of social psychology and consequently of general psychology’ (*ibid.*, 83).

Austin’s distinction between constative and performative speech finds him poised between the logical analysis of signs in a broadly post-Peircean manner, and the analysis of institutional processes of self-replication grounded in the performance of a traditional method for training competent administrators that reaches back to classical Greece.

2.1 Oxford Performativity

As Oxford educated the British empire’s colonial administrators, so too for a time did ‘Oxford Philosophy’ rule the world. The period in question runs from about 1935 to about 1970, though its heyday—coinciding with the intellectual maturity of its principal figures—spanned the late 1940s to the early 1960s. Oxford was then the philosophical centre of the English-speaking universe, and a striking feature of the practice of philosophy at that place and time is its orality. Speaking in *Logic Lane* (Chanan, 1972), Isaiah Berlin remarks:

Philosophy thrives on discussion, on dialogue, on conversation, and if we could convince each other, that’s all we wanted. The reason why so comparatively little was published was that if we could convince each other in our little discussion groups, or in tutorials, this was enough; people didn’t really seek a wider audience, nor did they feel that there was one.

John Langshaw Austin is an extreme case in point. Neither of his books—*Sense and Sensibilia* and *How to Do Things with Words*—were prepared for publication by him, both being the conjectural reconstructions of his colleagues Geoffrey Warnock and James

Urmson urged into print in the aftermath of Austin's premature death. The few papers Austin published are generally associated with occasions at which they were orally given. Moreover, as an oral performer of philosophy, he was almost peerless. In this respect, though, there were two Austins. While leading his clan, his attitude to opponents—Ayer in particular—was competitive and destructive. In his grooming circle, though, Austin was collegiate and constructive; acute, lucid and inspiring.

It was A. J. Ayer who set the agenda for Oxford philosophy of the period, with the publication in 1936 of *Language, Truth, and Logic*. On Ayer's account (Chanan, 1972), interest in the work of Cambridge philosophers Moore, Russell and Wittgenstein—never mind personal contact with those individuals—was frowned upon. Ayer's mentor Gilbert Ryle, however, was different. At Ryle's recommendation, Ayer visited Vienna and attended meetings of the Ernst Mach Society, a group of around twelve influential thinkers, including Rudolf Carnap, Herbert Feigl, and, at one time, Ludwig Wittgenstein. Ayer had planned to spend the time in Cambridge with Wittgenstein, but Ryle reasoned that he would be better off hearing a range of views rather than (a highly singular) one.

Language, Truth, and Logic was the result of this visit, introducing to English-speaking philosophy the so-called verification principle. This divided all 'meaningful' statements into two classes. Statements of fact—statements descriptive of the world—were deemed meaningful on condition that they were testable; statements of logic were held not to be descriptive of the world, but instead concerned methods of description. Everything else—the whole of metaphysics and a great deal of traditional philosophy besides—was excluded as strictly meaningless. The verification principle provided a clearly stated, logically articulated doctrinal position that focused discussion; in doing so it had the effect of creating a new sense of professionalism. Political philosophy was an immediate casualty. In Berlin's opinion (*loc. cit.*) this was a field that had anyway fallen into discredit owing to the inflated Hegelian language that had become the currency of discourse.

The fierce Oxford debate about the verification principle was not about what was explicitly excluded by way of ethical, moral and political matters. Rather, it was about whether the principle was correct with respect to what *was* included. The way Austin went about attacking verificationism was to attend to the way in which statements descriptive of the world used words. In a typical passage from *Sense and Sensibilia*, he asks:

...of how many people really, who know quite well where they live, could it be said that they have at any time *verified* that they live there? When could they be supposed to have done this? In what way? And why? What we have here, in fact, is an erroneous doctrine which is a kind of mirror image of

the erroneous doctrine about evidence we discussed just now; the idea that statements about ‘material things’ *as such* need to be verified is just as wrong as, and wrong in just the same way as, the idea that statements about ‘material things’ *as such* must be based on evidence. And both ideas go astray, at bottom, through the pervasive error of neglecting the *circumstances in which* things are said—of supposing that *the words alone* can be discussed, in a quite general way (1962, p. 118).

This is the public Austin in action: *Sense and Sensibilia* was compiled from lecture notes for a series Austin gave repeatedly in the post-war period, and the attack on Ayer is remorseless. That aggression should not obscure the intensity of Austin’s gaze on the underlying problem; Ayer offered a convenient (and resilient) means of personifying it.

It is relevant to mention, in respect of the developing professionalization of philosophy, that Ryle was by this time organizing the postgraduate study of philosophy in a systematic way. On Ayer’s account, though, Austin sought disciples whereas Ryle didn’t. Following his wartime experience as an intelligence officer (an organizational role, contributing among other things to the lengthy preparations for D-Day), Austin set about organizing the younger dons at Oxford as a kind of military general staff. They were set to particular problems in the use of language, analysing the way in which particular words were used. By the 1950s, the term ‘Oxford philosophy’ was associated with what Austin and his circle were doing.

For Ayer, the extent to which the linguistic approach depended on Austin’s authority is shown by the fact that it did not survive his death. Ayer’s criticism is widely echoed, that the analysis of ‘ordinary’ language usage was ultimately futile—in the philosophical sense that it led nowhere. Despite his evident residual distress at the wounds Austin inflicted on his personal *amour-propre*, and the equally evident relish with which he takes the opportunity to land a few after-the-bell blows of his own in the course of his contributions to *Logic Lane*, Ayer expresses nothing but the highest respect for Austin’s central achievement, the discovery of performatives. These are statements like ‘I promise to do so-and-so’ that are not descriptions of facts but are statements in which one engages one’s self. Such ‘performative’ statements enact; they effect change, development or consequence by indissoluble predication on the embodied maker of the statement.

2.1.1 How to do things with words

In *How to do things with words* (1976), Austin’s provisional conclusions on performatives are presented somewhat in the style of an evolving drama, in three acts. The book is largely based on the William James Lectures Austin gave at Harvard in 1955, and some characteristics of that oral mode of presentation are inherited. The audience is assumed

to be attentive and competent, but not able to flip back to previous pages when an argument becomes obscure. In the interval between lectures—to which some people may return faithfully, while others drift in and out—life goes on and details are forgotten. Hence there is a certain recapitulatory rhythm from chapter to chapter. The title is a characteristic piece of Austin meiosis—a title that may seem colloquial and generalized is in fact precise and specific in its remit.

In act one (approximately chapters I through VII) we encounter first the distinction between constatives and performatives.¹ Constative is to be used in preference to ‘descriptive’, but broadly speaking this is the realm of ‘statements descriptive of the world’. Performatives do not describe the utterer in the act of doing something, or state that the utterer is doing something. The utterance is the act itself—to say something is to do something. However,

Besides the uttering of the words of the so-called performative, a good many other things have as a general rule to be right and to go right if we are to be said to have **happily** brought off our action (14, emphasis added).

This is the famous happiness axis, which is opposed—or rather, orthogonal—to the verification axis. A series of conditions, essentially social in nature, are necessary in order for the performance to have a ‘happy’ outcome. For instance, the prevailing institutional conventions assumed by the utterer must be shared by the witness. It is worth pointing out that the verification axis runs not from ‘true’ to ‘false’, but deductively from certainty to uncertainty; true and false are at the same (certain) end. The gamut from happiness to unhappiness is an analogous progression from order to disorder, mindful of the Bergsonian distinction in which disorder is merely another kind of order, albeit an undesirable one.²

In act two (approximately chapters VIII through XI), Austin introduces a distinction between locutionary, illocutionary, and perlocutionary acts. He opens chapter VIII wondering about the senses in which to say something *is* to do something, or *in* saying something we do something, or *by* saying something we do something (94). Locutionary acts are the act of saying something—presumably something comprehensible and

¹ Several subsequent writers on performativity, including Latour, use the Wittgensteinian term ‘ostensive’ in preference to Austin’s ‘constative’, however *Hinweisende* more accurately translates as ‘indicative’, which parallels Austin’s distinction more closely.

² There is another way of looking at happiness that is more forgiving of dimensionality: in the neurochemistry of reward, there is a sense in which happiness is an expression of continuing satisfaction that sustains the subject’s attention. Its antonym is not so much ‘*un*-happiness’ as ‘*non*-happiness’.

referential, but without force or consequence. Illocutionary acts involve the performance of an act *in*, rather than *of*, saying something, while perlocutionary acts involve the performance of an act *by* saying something.

Something of the distinction can be glimpsed in the first example Austin gives (101–2). The speech act in question is ‘shoot her!’ However, to understand its effect under the conditions Austin proposes it is necessary to adjust viewpoint from the utterer to the confidant holding the gun (though we might whimsically suppose that the addressee is Cupid, armed with bow and arrow). In the case of a locutionary perception of utterer’s intention, the speaker informs, in a parental sense: “this is a bow, if you put an arrow here, it will go there”, and so on. The confidant becomes aware that the opportunity and means are available; beyond that, any subsequent action is the confidant’s own responsibility. In the case of an illocutionary perception, utterer is reported, by using the words ‘shoot her’ to have urged, ordered or encouraged the confidant to take advantage of means and opportunity. We might say in this case that responsibility is transferred from utterer to confidant. In the case of a perlocutionary perception, the confidant ascribes responsibility to the utterer for the decision to shoot: utterer succeeded in *persuading* the confidant to act. Here, responsibility remains with the utterer, but is shared paronymically between utterer, confidant and target.

To get a flavour of the orality of this example, let us imagine a speaker lecturing on the topic who chooses to illustrate the point by indicating that the imaginary Cupid should fire at one member of the audience in particular. Nervous laughter rustles through the disinterested part of the audience; the target blushes; some immediate neighbours whose immediate social relationships might seem challenged by the gesture exchange uncomfortable glances, while for others the incident serves to confirm pre-existing suspicions; third parties with amorous ambitions of their own are obliged to re-evaluate their estimations based on the evidence that the microtheatrical event provides.

Austin goes on to declare that his intention is to focus on illocutionary acts, using the other two categories for contrast. John Searle (initially a student of Austin’s) follows this line in *Speech Acts* (1969). Since Searle’s work has come to be regarded as definitive, we might hazard that, by extension, what people nowadays mean by performative speech (to the extent that they reference Austin) is, in the main, the generation of illocutionary detente. Being transactional, the illocutionary is easily tractable within the confines of another Viennese concept—methodological individualism—to which Searle (2005) subscribes, whereas perlocutionary force is an altogether more problematic

reconciliation. You could not *experience* the example given in the previous paragraph merely by reading about it subsequently, even if the characters had names personally familiar to you. The perlocutionary is inescapably and irreducibly *oral* and immediate in character.

Act three is just getting under way in chapter XII, where Austin introduces some speculative classes of illocutionary force. Verdictives are, as the name suggests, judgements or evaluations, though not necessarily final ones. Exercitives are the exercising of powers, rights or influence. Commissives are undertakings, commitments, or declarations of intent. Behabatives, a miscellaneous group, are social behaviours such as congratulating, apologizing or cursing. Expositives are somewhat reflexive, being expressions of otherwise invisible processes, such as saying ‘I assume’, ‘I concede’ or ‘I postulate’ (151–2). These categories are the product of intensive labour on the part of Austin and his general staff, poring over dictionaries and analysing their content. However, Austin finds them provisional and unsatisfactory.

2.1.2 Words, things, and *auctoritas*

Owing to his untimely death, these conclusions remained provisional and unsatisfactory. Various Süßmayrs continued and completed his work as best they could, but the trajectory of his investigation was incompatible with the epistemic regimes current in the early 1960s. We can recognize, with hindsight, that there was a distinctly sociological dimension to the project that in the present day would require radical cross-disciplinary collaboration to operationalize as a research programme. Back then, the assumption was made, reasonably enough, that the subject of *How to Do Things with Words* was words; and as Ayer remarked (Chanan, 1972), the analysis of language in the way Austin approached it had been exhausted.

Given the normative definition of ‘language’ adopted by Ernst Gellner in his energetically muddled critique of linguistic philosophy, *Words and Things* (1979), this is undoubtedly true. Gellner’s principal target is Wittgenstein, professional courtesy presumably restraining his fervour with respect to his Oxford foes. His complaint against an obsessive triviality that leads to ‘philosophy by filibuster’ (192–7) has some merit; his complaint against the Eleusinian practices of the Oxford school, though, mingles personal animus with public principle. In Gellner’s version of the ethos Berlin characterized with approval (*cf.* p. 41 above),

Their communication ... requires a special atmosphere, a special willingness and a special preparation. It is true that the members of the movement have published, but not soon and not

much and not willingly; and it has always been made clear that a perusal of such publications is wholly insufficient for an understanding of a true significance of the ideas contained in them. ... The authoritarian, capricious, messianic and exclusive characteristics of Wittgenstein's practice are well known (264–5).

Gellner exemplified the disciplinary evolution of the period, being first a professor of philosophy at LSE and then of social anthropology at Cambridge. Another exemplar, another author of 'Words and Things' (published in English as *The Order of Things*) was the philosopher, psychologist, sociologist and historian Michel Foucault.³ Stressing the seriality, the synechism, of linguistic production, Foucault says that 'language is an *analysis* of thought: not a simple patterning, but a profound establishment of order in space' (2002a, 91). He continues:

General grammar is the study of verbal order in its relation to the simultaneity that it is its task to represent. Its proper object is therefore neither thought nor any individual language, but discourse, understood as a sequence of verbal signs.

This statement illuminates a normally overlooked word in Austin's title, 'things', and the social processes that constitute *thinging*. Berlin says that Austin was concerned with the nature of human *thinking*; attention to syntactic structure was merely an essential preparatory step (Chanan, 1972). To put the matter slightly differently, both 'thing' and 'word' are from Anglo-Saxon/Germanic roots, the two terms echoing the debate in protestant theology about the distinction between *authoritas rerum* and *authoritas verborum* as a problem in translating 'the word of god'. 'Thing' originates in the custom of deliberative assembly; 'word', more speculatively, derives from Indo-European roots conflating the sense of 'a man' and 'I shall speak'. 'Think' derives again from North European sources, conflating 'to seem, appear' (*think* v.¹) and 'to cause (something) to seem or appear (to oneself)' (*think* v.²) (OED).

Austin's ultimate objective is to reach the deep level of abstraction where semiosis is bound to utterance to give it prosthetic extension, fusing *think* and *thing*. The grammatical net he casts over the linguistic form he approximates as 'first person singular present indicative active' (1976, 64) can be seen as an elaborate attempt to scaffold the translation process by which the homeostatic immediacy of the performative in language can reach beyond the present. One dimension is intention, another is signification, and meaning is a co-creation that must precariously and provisionally negotiate the scaffolding as it moves between **actants**.

³ Foucault's *Mots et les Choses* was first published in French in 1966. Apparently the title '*L'Ordre des Choses*' had already been used twice by contemporary structuralists.

Austin's conception of 'ordinary' language requires attention, however. Paul Feyerabend (1963) takes a critical position, citing Austin's paper 'A Plea for Excuses':

Our common stock of words embodies all the distinctions men have found worth drawing, and the connexions they have found worth marking, in the lifetime of many generations: these surely are likely to be more numerous, more sound, since they have stood up to the long test of the survival of the fittest, and more subtle . . . than any that you or I are likely to think up (50–1).⁴

This aligns Austin with the Scottish Common Sense notion of indubitability that we encountered previously in Peirce (above, p. 31), suggesting that words in themselves are a collection of acritical propositions and acritical inferences. For Feyerabend this leaves no scope for language to evolve; the word-hoard should be regarded as being in some way nomadic. He develops this argument into a claim that the prevailing view of our ability to acquire introspective knowledge is incorporated in the language being used to describe such knowledge. This language is used 'instrumentalistically' to project into the world certain peculiarities of our way of constructing knowledge. According to this interpretation of Cartesian theory, 'the world consists in two domains: the outer, physical world and the inner, mental world. The outer world can be experienced, but only indirectly; the inner world can be directly experienced . . . and thus knowledge gained within it is absolutely certain' (61). The conservatism of 'ordinary language' is, perversely, too low a price to pay for circumventing this objection, as we will later discover (*cf.* 3.1 below).

The solution to Feyerabend's problem is social. The nature of the 'happiness' Austin sets as the condition by which a performative outcome is achieved is not a simple and straightforward matter of personal contentment, but rather the product of the kind of brokering William Foley (1997, pp. 5–11) discovers in present-day Polynesian oral cultures. There, Foley says, what a word means is communally established in the immediate, oral context of its utterance. In more abstract, Peircean terms, there is implicitly a trichotomic of happiness concerning respectively the satisfaction of personal intention; the satisfaction of mutual intention; and the satisfaction of contextual consent.

A contextualizing fact about Oxford philosophy connects close interest in classical concepts of the public good with the contemporary function of training state administrators (Oxford retains a tradition of furnishing Whitehall with senior civil servants and Westminster with politicians). The medium of political discourse is, of

⁴ [J.L. Austin] *Philosophical Papers*, ed. Urmsen and Warnock (Oxford, 1961, 130) [Feyerabend's citation].

course, rhetoric. With that in mind, it is worth dwelling briefly on the concept of *auctoritas*, a term that captures the amalgamation of word, character and context in the development of rhetorical trajectory. It is as true in Westminster as it is in Polynesia that the question of ‘who speaks?’ has a bearing on how a statement is understood. In a paper called ‘Auctoritas, Dignitas, Otium’ (1960), Balsdon notes that this favourite concept of Cicero’s evades strict definition. Auctoritas was vested in the Senate, but its exercise depended on the performance of individual senators.

Anyone who spoke in the Senate gave *consilium* [counsel]. A senior senator who spoke early in the debate spoke with *auctoritas* and, **if things went properly**, made the side on which he spoke the winning side (43, emphasis added).

According to Lewis & Short, *auctor* means ‘he that brings about the existence of any object’. In transference it is frequently interchanged with ‘actor’, and it is also the source of the modern ‘author’. In its classical sense, though, ‘bringing about the existence’ did not necessarily mean a personal intervention in the manufacture or construction of an object, but rather the initiation and direction of such labour as necessary. Balsdon goes on to link *auctor* to the Greek *axioma*, rendered by Liddell & Scott as ‘that of which one is thought worthy’, and, in its scientific sense, ‘that which is assumed as the basis of demonstration, self-evident principle’. The Perseus database shows that the word often appears in conjunction with *hegemonia*, ‘leading the way’. However, as Balsdon notes, *axioma* links back to *dignitas*, which has an interesting relationship with *auctoritas*: ‘The two words were very closely linked, the one static, the other dynamic. *Auctoritas* was the expression of a man’s *dignitas*... In politics a man’s *dignitas* was his good name’ (45).

2.1.3 What did Austin mean by ‘happy’?

Noting Balsdon’s phrase ‘if things went properly’, I want to return to Austin’s question of ‘happily’ bringing off our actions, and ponder exactly what Austin might have meant by this. On the face of it, the orthodox, quotidian sense is perfectly adequate. But etymologically, the word ‘happy’ turns out to be intriguingly Peircean: ‘coming or happening by chance; fortuitous’, says OED. Fleming’s *Vocabulary* cites Coleridge to the same effect, adding that as well as *eusoia*, ‘the sum total of the pleasure which is allotted or happens to a man’, there is, ‘more religiously’, the alternative *eudaimonia*—favourable providence (1860, 215). Eudaemonics figures in Jeremy Bentham’s utilitarian calculus, where it is ‘the *object* of every branch of *art*, and the *subject* of every branch of *science* ... *Eudaemonics* may, therefore, be termed the *Common Hall*, or *central place of meeting*, of all the *arts* and *sciences*’ (1816, 173–4).

We know that Austin had a close interest in Aristotle's concept of *eudaimonia* because there is a paper on the subject in his slender archive. 'Agathon and Eudaimonia in the *Ethics* of Aristotle' (1967) is a response to a 1935 paper by Harold Pritchard, one of Austin's mentors. Pritchard argues that Aristotle uses *agathon* (generally translated as 'good') to mean 'conducive to our happiness', and maintains consequently that every deliberate action stems, ultimately, from the desire to become happy. Austin says that *agathon* has several meanings in Aristotle; and that, moreover, the meaning Pritchard suggested was not among these. He finds Pritchard's argument resting on an unstated premise, that 'happiness' (Pritchard's translation of *eudaimonia*) means a state of feeling pleased.

Austin further finds Pritchard to have been 'misled' in translating *eudaimonia* as happiness, although this is a matter of nuance rather than outright error. He notes (1967, 26–7) Aristotle's threefold distinction between synonym, homonym and paronym, the latter being an instance where a word has connotations that are partly similar and partly different. For example,

When we speak of a 'healthy exercise' the word 'healthy' has a connotation which is only partly the same as that which it has in the phrase 'a healthy body' (27).

Earlier, remarking that *eudaimonia* is 'certainly quite an unchristian ideal', he says nevertheless

That *eudaimonia* did mean life of *activity* of a certain kind is almost certainly the correct analysis (19).

At this point we need to pay closer attention to the construction of the word *eudaimonia*. Conventionally translated as 'happiness', *eudaimonia* breaks down to 'good spirits', the spirits being subtly external. According to OED, *daimon* means 'a supernatural being of a nature intermediate between that of gods and men; an inferior divinity, spirit, genius (including the souls or ghosts of deceased persons, esp. deified heroes)' cognate with the Biblical (and especially early Christian) notion of angel, and distinct from the inwardly-directing *daimonion* claimed by Socrates as his guide and apparently misrepresented by his accusers as evidence for the presence of a malevolent spirit. (Svenbro (1999, p. 50) suggests that the distrust of fellow Athenians for Socrates' *daimonion* is due precisely to the fact that no one else could hear it.) In present-day usage the word *daemon* crops up in computer operating systems, where it refers to programs that perform background administrative tasks. We could ascribe these 'good spirits' to an appreciation for the regard in which the individual is held by others—in other words, those who hold good opinions of the happy one personify an ongoing polyphonic dialogue whose outcome yields 'good spirits' subtly blended into a singular experience.

As is characteristic of Aristotle, *eudaimonia* lies between clearly opposable concepts. Elsewhere it might be courage that lies between timidity and foolhardiness. Here, happiness lies somewhere between the entirely individual and the entirely public—although the self-indulgence of individual consumption is nevertheless embedded in a network of social obligation and consent if this is to be a sustained state of gratification. However, there is a supplementary interpretation that Austin’s attention to paronym alerts us to. The etymology of *ploutos*, according to Liddell & Scott, derives from ‘wealth in corn’, ‘probably from “*pleo*” in an early sense “flow”, “abound”, as *phortos* from *phero*’. We can posit that hedony is entirely an immediate excitement of gratification; wealth is a presumption of a continuing flow of gratification, while contemplation accepts the desirability of both but acknowledges the necessity for directive reason to be applied to maintain the individual’s access to both.

The connection I want to make is with the social brain hypothesis and related cognitive aspects of human mutuality, on the assumption that illocutionary and perlocutionary language-use evolved prior to the invention of writing. In Aristotle’s milieu, we tend to forget, those who could read and write constituted the minority. The clan-oriented organization techniques associated with Sparta (Ober, 1998) and their associated economy of means of the kind lauded by Socrates in *Protagoras* (1999, p. l. 2204ff), are identifiable characteristics of a predominantly oral culture.

In particular, the happinesses induced in consumption are (at least in part) social pleasures intimately bound up in the negotiation of status. If there is a circulation of obligation grounded in performative exchanges of mutuality and trust—especially asymmetric, perlocutionary exchanges—then some attention to the means by which asymmetry is sustained is due. Strum and Latour (1999) argue that baboon communities are engaged in a perpetual negotiation of social relationships, while human communities use extra-somatic means to simplify and extend relationship networks. I use the term ‘intersubjective technology’ to characterize this as the skilled experience of mutuality via material–semiotic displacements. Austin’s connection between ‘thing’ and ‘word’ helps us trace the specifically perlocutionary force behind this phenomenon back to a simpler, oral milieu where the animation of objects with semiotic meaning is more clearly a performative social practice.

We are not yet ready to develop the concept of ‘intersubjective technology’, but we have the basis for an understanding of the performative dimension of knowledge-holding. What we need to add, in order to develop Austin’s perspective, is a more explicitly

sociological grounding for the analysis of modern scholarly practice and apparatus. To orient ourselves, let us first revisit the link between Austin's and Foucault's attention to the place of words in the performance of communication.

2.2 Signature and apparatus

Michel Foucault opens *The Order of Things* (2002a) by noting the rich taxonomic vocabulary of resemblance already available by the sixteenth century.⁵ He chooses four terms in particular to develop and discuss: *convenientia*; *aemulatio*; *analogy*; and *sympathies* (19–28). *Convenientia* concerns adjacency. 'Places and similitude become entangled' (20); resemblance acts in space 'in the form of a graduated scale of proximity' (21). *Aemulatio* finds *convenientia* freed of its spatial binding, enabling it to function at a distance (21). The relationship between objects so conjoined need not be (and mostly is not) a relationship of equality, so that one may act on the other (22). *Analogy*, Foucault notes, was already known to the Greeks. He says that its usage has 'probably become different now' (24), but in context it is difficult to determine whether by 'now' he means the sixteenth or the twentieth century. He finds *convenientia* and *aemulatio* superimposed in *analogy*, giving it enormous power to act, but also enormous power—by modern lights—to err. He cites, for instance, the analogy between animal and plant that sees the plant as an animal living upside down, with its head beneath the soil (24). Finally, sympathy 'plays through the depths of the universe in a free state. It can traverse the vastest spaces in an instant' (26). Such is its power that, were it not counterpoised by *antipathies*, sympathy would reduce the world to homogeneity.

Foucault continues with a discussion of 'signature', by which means the apparatus of resemblance is bound to that which is resembled. Being accustomed to the English pronunciation of the word, it is easy to overlook the 'sign' contained within the gesture. A signature is not just a binding, but an *act* of binding; in a sense, an *authorization*. The terminology erects a virtual library; understanding this of Foucault helps explain the function of Velasquez in his argument, establishing a visual metaphor for the changing sense of order brought about by the birth of the book as we know it today. Intriguingly, the authorities he cites in chapter two are all early-modern, but in their antecedence is a

⁵ Actually he doesn't *open* with it. It is merely Anglo-Saxon impatience that rushes through the dilatory vestibular material to find the argument 'beginning' there, discarding the meditative preface on the 'Chinese taxonomy' found in Borges' essay 'The Analytical Language of John Wilkins', and the opening chapter's discussion of Velasquez' painting *Las Meninas*.

Neo-Platonist strand in which the recruitment of nature to support authoritative performance is rooted in oral practice.

The foregrounding of the book-as-signature brought with it the backgrounding of rhetoric-as-performance, and the concomitant minimization of performance-as-signature. For medieval scholars, knowledge was intimately—physically and physiologically—bound to the practice of wisdomcraft. The exercise of rhetoric was intimately linked to the exercise of memory, the latter being a privileged resource in the absence of material means of storing knowledge. Of course scribal culture *supported* oral performance, but the practice of writing was at the hub of an extended ritual enactment of society.

Modern practice retains its relationship with embodied wisdomcraft. Paul Feyerabend recalls ‘defending absurd ideas with great assurance’ at a Kraft Circle meeting in the late 1940s, in an autobiographical appendix to *Against Method* (1993, pp. 254–5). His assurance was conferred by a theatrical training; the conclusion he reached was that the rational substance of arguments is in tension with semiotic factors regarding their presentation in the impact they make. This disquiet is representative of a shift in emphasis in the mid-twentieth century from an interest in scientific *method* towards an interest in scientific *practice*. Curiously complementary is the concept of tacit knowledge developed by Michael Polanyi (1958); (1966), where the verificatory prowess of scientists is inscribed in the social processes constituting their acculturation. Feyerabend and Polanyi stand either side of a symmetrical demarcation problem that simultaneously concerns the relationship between science and pseudoscience, and the relationship between observation and theory. The problem is that epistemic adjustment in one element has a reciprocal impact on the balance of the other, and this dynamic tends to overthrow the homeostatic, ‘common-sense’ view of nature as semantically stable, simply ‘out there’ waiting to be discovered.

Feyerabend favoured the notion of semantic instability, and his critique sought to understand how this might be viable in the laboratory. In fact, his anarchic view has a certain unacknowledged parity with Peirce’s concept of abductive logic—that is to say, it posits educated guesswork constrained by a probabilistic field. On the question of anarchism, Feyerabend is misunderstood: he didn’t say that scientists *should* be anarchistic in method; merely that they *are* (seen in a historical perspective *cf.* Feyerabend 1993, 17–19). In Feyerabend’s view, science advances by the proliferation of theory, theoretical pluralism furnishing potential falsifiers. Controversially, he argued

against the idea that theories are compared with one another primarily for their ability to account for the results of observation and experiment. Instead, he believed that social and aesthetic factors significantly influence theory-choice. The anthropological term 'lekking', normally associated with male displays of prowess, is to the point.

Thomas Kuhn shared Feyerabend's position on semantic instability. He arrived at the theory published in his seminal *Structure of Scientific Revolutions* (1996) after following a trail from history to philosophy and sociology, though the historical perspective in question is, initially, specific to the theoretical physics in which he was researching a PhD at the outset of his journey. Social science being methodologically young by comparison to physics, Kuhn was exposed to animated disagreements about the nature of legitimate problems and methods. This prompted him to reflect and doubt whether his native discipline had better responses to these issues (1996, ix–x). From these observations coalesced a concept that has become familiar both in the language of scholarly enquiry and in the vernacular:

Attempting to discover the source of that difference led me to recognise the role in scientific research of what I have since called 'paradigms.' These I take to be universally recognised scientific achievements that **for a time** provide model problems and solutions to a community of practitioners (x; emphasis added).

Although this statement is significant for its broaching of Kuhn's signature term, it is the controversial yet easily-missed clause 'for a time' that gives the statement its force.

Some took the implication of this clause to be that scientific 'truth' is no less or more a faith than any other kind of faith, that science is a 'subjective and irrational enterprise'. Responding to these criticisms, Kuhn refines his definition of paradigm in a postscript published in subsequent editions:

On the one [sociological] hand, it stands for the entire constellation of beliefs, values, techniques, and so on shared by the members of a given community. On the [philosophical] other, it denotes one sort of element in that constellation, the concrete puzzle-solutions which, employed as models or examples, can replace explicit rules as a basis for the solution of the remaining puzzles of normal science (175).

Reconciling Kuhn's stronger, philosophical definition with the positivist philosophy of science advanced especially by Karl Popper and Imre Lakatos is one of the achievements of David Bloor's *Knowledge and Social Imagery* (1991) that makes this book as significant a staging post as Kuhn's in the development of a fully reflexive science. The real foundation for that claim of significance, however, is Bloor's articulation of the

Strong Programme in the Sociology of Knowledge.⁶ Bloor argues that the natural sciences are as dependent on such social factors as tradition, convention and personal prestige as any other field. In consequence, the prevailing supposition among sociologists of the early 1970s that the content of scientific knowledge—as distinct from the circumstances of its production—is beyond the grasp of sociological method is mistaken (1991, 1). He goes on to set out four principles that together constitute the Strong Programme:

- 1 [The Programme] would be causal, that is, concerned with the conditions which bring about beliefs or states of knowledge. Naturally there will be other types of causes apart from social ones which will cooperate in bringing about beliefs.
- 2 It would be impartial with respect to truth and falsity, rationality or irrationality, success or failure. Both sides of these dichotomies will require explanation.
- 3 It would be symmetrical in its style of explanation. The same types of cause would explain, say, true and false beliefs.
- 4 It would be reflexive. In principle its patterns of explanation would have to be applicable to sociology itself. Like the requirement of symmetry this is a response to the need to seek for general explanations. It is an obvious requirement of principle because otherwise sociology would be a standing refutation of its own theories (7).

Note that although Bloor begins by speaking of knowledge in the round, by page five his topic has become ‘knowledge, including scientific knowledge’, and by page seven, scientific knowledge exclusively. This is connected to the question, ‘What makes the Strong Programme strong?’ It is a rhetorical claim of strength, made for reasons that are now historical but nonetheless intriguing, in light of the emphasis both Feyerabend and Latour place on the notion of ‘trials of strength’ as central to the scientific method. The four principles are presented as *a priori* conditions. Presumably they emerged from the flux of scholarly attention, having first been hypothesized, analysed, reformulated and so on. The process of locating what Callon will call ‘obligatory passage points’ has been enacted, and these principles are the result. Here, though, they are not OPPs separately or collectively, but rather they constitute a vestibular apparatus. One is obliged to enter the text through them. It is an efficient arrangement, but not a reflexive one—at least, not within the confines of that particular volume.

In respect of the causal principle, the second sentence seems entirely superfluous, except that it hints at acquiescence in respect of the major difficulty faced by sociologists attempting to tackle cognitive aspects of social behaviour without engaging

⁶ Also known as the Edinburgh Strong Programme, acknowledging the institutional role the sociology department of the University of Edinburgh played in bringing Bloor together with Barry Barnes, Steven Shapin, Steve Woolgar and Donald MacKenzie among others.

cognitive science. The impartiality principle is the one that promises a fruitful connection to Dennett's heterophenomenology, which I will develop in the next chapter. It bears, too, on the symmetry principle, a major bone of contention between Bloor and the Mine School. Here the parallels between ANT and embodied mind ontologies suggest that, if ANT fails with respect to the symmetry principle, it fails (*pace* Bloor) in not taking it far enough.

2.2.1 Actor–network theory

Although bound up in complex epistemological debates and—dare one suspect—personal animosities, the acrid exchanges between Bloor and Bruno Latour conducted in the pages of *Studies in the History and Philosophy of Science* essentially resolve to this question (Bloor 1999a, 1999b; Latour 1999a). What Latour does is to effect a radical performative shift in the terms of the strong programme with the consequence that its principles demand (for Latour) that non-human artefacts be granted equivalent status with the human observer. What Bloor advances as a criticism—‘Latour makes no systematic distinction between nature and beliefs about, or accounts of, nature... It is as if he has difficulty telling these two things apart’ (Bloor, 1999a, p. 87)—Latour embraces as doctrine: ‘Yes, I have great difficulties in convincing myself that it is useful to create an artefact to get at the facts’ (Latour, 1999a, p. 122).

There are two modulations entrained by this shift. The first, the key advance that Latour's approach encapsulates over Bloor's, concerns the mobility of the observer—and it is significant that the book that epitomizes this, *Science in Action* (Latour 1987), is intended to be a textbook. Latour organizes his text around a series of ‘rules of method’, the first of which states:

We study science *in action* and not ready-made science or technology; to do so, we either arrive before the facts and machines are black boxed or we follow the controversies that reopen them. (258)

The black box is Latour's version of the paradigm. The real point, however, is in the stressed modifier ‘*in action*’. Adapting Garfinkel's ethnomethodology, Latour's guiding principle is to observe what **actants** do, rather than depending on actors' accounts of what they have done.⁷ Interestingly, too, the immobile hierarchy that Kuhn sets up with

⁷ The actant/actor distinction is a difficult one. In *Science in Action*, Latour says: ‘...both people able to talk and things unable to talk have spokesmen. I propose to call whoever and whatever is represented **actant**.’ (1987, 83–4, emphasis inherited). Callon (1986b) uses the term ‘actor’, but notes (n. 21) that he uses it in the sense of ‘actant’. What emerges is a distinction between ‘actant’ as narrative function and ‘actor’ as embodied individual. See further discussion below.

‘scientists’ at the apex, ‘engineers’ beneath them, and ‘technicians’ beneath engineers, becomes an altogether more dynamic web of interests, career paths and mobilized resources as Latour follows the various actants while they go about their work. Latour typically interrogates chains of associations, as in the case drawn from his work on Pasteur that is raised in the course of his debate with Bloor. Pasteur’s approach to the problem of fermentation is compared with Liebig’s then-dominant paradigm.

Latour comments that chains of associations include psychological, ideological, cognitive, social, and material entities, many of which are non-human agents. Each element takes the meaning given to it by the adjoining elements in the series (1999a, 124).

Pasteur's association chain

Paris	biology laboratory	<i>greyish stuff</i>	rationalism
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Liebig's association chain

Munich	chemistry laboratory	ferment by-product	anti- vitalism
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The second modulation flows from the first, operationalizing a deliberately unstable reflexivity that permits hypothesis to keep pace with data:

The strategy in any research program is to distribute topics and resources in the most intelligent and fecund way—and, I would add, to move fast and to change tack often enough to maintain the strategic aim through many empirical moves (Latour 1999a, 122).

Latour’s colleague at the Paris *Ecole des Mines*, Michel Callon, coined the term ‘*acteur-reseau*’ to frame the arc resulting from such procedures. The term—especially in its English rendering as ‘actor-network theory’—has become widely recognized, and its source in Greimasian semiotics correspondingly obscured. In the process, it has undergone a semantic evolution similar to Peirce’s ‘pragmatism’, something that has become a locus of critique for Latour. In ‘On recalling ANT’ (1999b), he finds four terms to criticize: ‘actor’, ‘network’, ‘theory’, and the hyphen. In particular, there is dynamic potential in the French ‘*reseau*’ where ‘network’ tends to suggest all the shortcomings of Austin’s ‘constative’ language.

Indeed, ANT as it is first introduced (Callon 1986a, 19–34) attempts to be a theory of the constative, and a reductionist one at that. Callon writes that ‘Simplification is the first element necessary in the organization of an actor-world: indeed it is the inevitable result of translation’ (28). However, it is not clear here that it is the *performance* of simplification that is at issue—not yet clear, I think, to the author. Seen from outside the programme, from the present (c. 2008), actor-network theory really *is* a theory: it is a

hylozoic theory of rhetoric, one that symmetrically—and pragmatically—grants a voice to non-human actants.⁸ We should take care not to hyphenate, but instead conjoin: the hyphen makes a compound noun and renders the result as a constative object; joining the terms with an en dash creates a symmetrical, reciprocal and dynamic relationship. Not actor-network but actor–network.

The major Callon contribution of the period (marking a significant evolution over 1986a) uses the term ‘actor-network’ just once, in a footnote in his seminal paper on scallops, fishermen and scientists, ‘Some elements of a sociology of translation’ (1986b). The story begins with a number of out-of-focus premises concerning the life-cycles of French and Japanese species of scallop, the local geography of St Brieuc Bay, and the regional fishing industry. With these are aligned social, economic and political trajectories—including those of two groups of scientists: the natural scientists investigating the lifecycle issue, and the social scientists studying the *dispositif*.

Callon’s first theoretic move is to align with the Edinburgh Strong Programme (3–4). He sets out three principles: agnosticism, symmetry, and free association. Agnosticism assumes that the initial, nebulous state of enquiry finds its subjects acting abductively, feeling for connections and solidifications. He argues that the sociologists, studying the process, should be in the same abductive frame of mind. The generalized principle of symmetry extends Bloor’s principle, as we have already noted. Bloor is willing to eliminate the explanatory distinction between expert human and non-expert; Callon proposes that the continuity of register should extend to all aspects of the problem, human or material. Free association translates Bergson’s procedure of differentiating between genuine and false problems by granting elements the closely-observed liberty to seek their own solutions:

Instead of imposing a pre-established grid of analysis upon these, the observer follows the actors in order to identify the manner in which these define and associate the different elements by which they build and explain their world, whether it be social or natural (4).

Callon’s second move is to align the operationalization of a Strong-Programme enquiry to the structuralist semiotics of (in particular) A. G. Greimas. His term ‘actant’ is significant in this respect, and requires a brief review. The structuralists are not directly cited in the 1986a volume; as far as I can tell, the authors’ collective principal

⁸ Hylozoic, but not panpsychic; *cf.* further discussion in chapter 5.4.

semiolinguistic source is Françoise Bastide, who is little published in English. Greimas & Courtes' *Semiotic Dictionary* is cited in Callon 1986b, in a footnote.

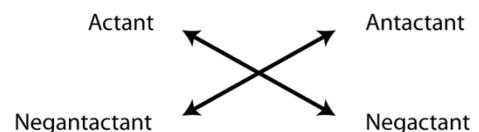
On Schleifer & Velie's account (1987, 1126–33), Greimas, following Propp, is primarily interested in analysing folk tales—treating these as a primitive form of narrative that is nonetheless distinctively 'literary'. Propp proposes a seven-fold typology of actant: hero, sought-for person, villain, false hero, helper, donor, dispatcher. Greimas simplifies this to subject, object, opponent (fusing villain and false hero), helper (fusing helper and donor), sender, and (a new type) receiver. The distinction between actor and actant is a matter of fusion or syncretism. An actor is taken to be a discrete individuation, but not a person since, under narrative analysis, a person cannot be said to be 'individual'. An actant is a provisional, conceptual entity articulated for the purpose of focusing the narrative. In 'Toward a theory of modalities', Greimas (1987, p. 125) writes of the modality of *being* (and *doing*): 'It must be understood that the terms used are semiotic terms that have no relation whatsoever with the ontological concepts to which they can be compared'. How can he be so sure? Because, like Peirce, his argument can be traced to Scholastic interpretations of Aristotle. The semiotic/ontological distinction suggests, though, that he is committed to a stronger or more extreme realism than Peirce. Peirce would not, I think, find this distinction acceptable because it places the legitimacy of the sign outside or beyond the scope of the first cotary maxim (*cf.* p.30 above).

The actant is a consistent narrative role that individual actors adopt in the course of narrating. In Greimas' scheme, the actant's narrative trajectories are 'exploded' into 'at least four' actantal positions on a square derived from Aristotle's square of oppositions as the scholastic tradition developed it:

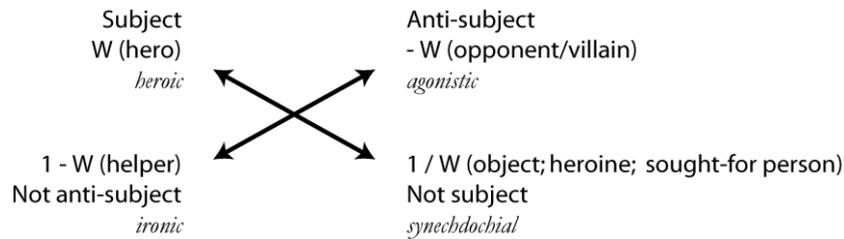
Aristotle/Boethius/Apuleius:
(Béziau 2003)

All men are white A	No men are white E
Some men are white I	Not all men are white O

Greimas:
(Schleifer & Velie 1987)

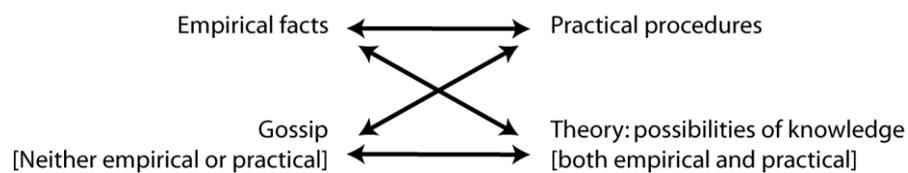


Referencing Levi-Strauss's Boolean notation, Schleifer & Velie gloss this as follows, applying the concept to Greimas's 'subject' (the authors' own gloss is also represented in italics):



Finally, a gloss that connects Callon's use of Greimas to the significant fraternal influence of Latour & Woolgar's *Laboratory Life* (1986). Schliefer (1997) draws on this to further an argument about interdisciplinarity between the humanities and the social sciences:

Latour & Woolgar (1986), according to Schliefer (1997, 557):



Béziau (2003) notes that European languages tend to have primitive names for three of the corners, but not the fourth, so that we find correspondences for 'all', 'some', and 'no', but not for 'not all'. This observation may correlate with Havelock's claim about the difference writing makes to the philosophical methods of Plato and Aristotle, to be explored in part three. For the moment, though, the implicit trichotomy highlights an intriguing 'not all': not only does the square of opposites not crop up in Peirce (so far as I can tell), but Peirce's semeiotic does not figure in Greimas's semiology to any significant degree.

Callon's negotiations yield what he calls 'four moments of translation'. These are 'problematization', 'interessement', 'enrolment', and the 'mobilization of allies'. In the first stage, there are interests (actant vectors) but no 'interessement' (coordination among actors). The function of 'problematization', then, is to create a locus of 'narrative gravity' which establishes a narrative dynamic that moves through the narrator. Because narration is an actant function, its practice may be shared between mutually-interested actors—in this case, the marine scientists who have seen the Japanese scallop husbanding techniques and who want to investigate the possibility of translating that practice to St Brieuc Bay:

They determined a set of actors and defined their identities in such a way as to establish themselves as an obligatory passage point in the network of relationships they were building. This double

movement, which renders them indispensable in the network, is what we call problematization (Callon 1985b, 6).

In this process, the researchers identify three principal actants: the scallops; the fishermen; and fellow scientists. The scientists do not know a great deal about the lifecycle of the local species, *pecten maximus*—especially the question of how and when they anchor themselves. The scientists are assumed to be interested in furthering their knowledge. The fishermen fish until there is no stock to fish, but they are assumed to be interested in restocking the bay. The scallops—assumed to be interested in reproducing—normally appear as adults, at the point of harvesting. Will their larvae adapt to the Japanese technique of providing a shelter? By identifying one or more ‘obligatory passing points’, the researchers consolidate the narrative trajectories through which the actants pass. In this case, the OPP concerns the anchoring of *pecten maximus*. All actants’ interests pass through this issue.

Initially, though, these interests are not indexed. Callon says of the second moment of translation, *interessement*, that to be interested is to be interposed. Clearly, though, *interessement* is a performance and not a mere state of affairs. Moreover, it is an attitude of contention—a trial of strength, to use a favourite Mine School conception, that references Feyerabend’s incorporation of social and aesthetic influences on hypothesis formation (see p. 53):

Interessement is the group of actions by which an entity ... attempts to impose and stabilize the identity of the other actors it defines through its problematization (1986b, 8).

In the St Brieuc case, the ensemble of techniques reified in the towline constitute an *interessement* device that extracts larvae from their context. Collectors are attached to the towline, which is tethered to anchored floats. The collectors are fine-mesh bags containing media that allow larvae to enter and anchor while affording protection from currents and predators. The material dimension, though, is complemented by the semiotic:

The devices of *interessement* create a favourable balance of power: for the first group, these devices are the towlines immersed in St. Brieuc Bay; and for the second group, they are texts and conversations which lure the concerned actors to follow the three researchers’ project. For all the groups involved, the *interessement* helps corner the entities to be enrolled. In addition, it attempts to interrupt all potential competing associations and to construct a system of alliances (10).

The third moment of translation is the most arduous. *Interessement* identifies and tests vectors, aligning some while minimizing or excluding the implicatory capacities of others. While an ensemble of techniques may now be reified in the *interessement* device, what has not yet been reified is the ensemble of actants. Enrolment seeks

commitment, and here the distinction between actant and actor becomes particularly striking. What is sought is the commitment of an actant-role to the vector that has been identified with its potential contribution. This may either conflict with an actor's interests or fail to be a sufficiently significant element in that actor's role-repertoire to impress the necessity of participation upon it. In the St Briec case, it is the scallops which prove to be the most difficult actors to negotiate with; their enrolment proves to be the lengthiest and most difficult task. Identifying the most effective medium for the bags, for instance, involves testing straw, broom, vegetable horsehair or nylon at various depths. However, in the course of these negotiations, a scientific premise comes into question: do the scallops anchor in the larval stage in the first place? The St Briec results were not achieving success rates comparable with the Japanese example. By contrast, the fishermen watch and wait. They are prepared to accept the conclusions reached by the researchers, but contribute nothing during this process except their consent (10–12).

Nevertheless, the emergence of results begins to transform the epistemic standing of the initial hypothesis. Callon notes the researchers' wry view that 'bona fide discoveries miraculously unveil precursors who had been previously ignored' (12), but his citation extends this beyond scientific literature search:

Dao: '... Our experience suggests that in general it is when the work has been done that tongues are loosened and we start to get information. For example, the fishermen had never seen scallops attached by a byssus. But since we have revealed that they are fixed in this way, they know where these are to be revealed, that they are fixed in this way, they know where these are to be found and they know where they were before. I believe that much the same thing is true for scientific information' (n44).

By this seemingly organic process, we can see the transition taking place from Peirce's abductive modality to the inductive.

The fourth moment of translation endorses this transition when it has been happily brought off. Callon calls it the 'mobilization of allies'. Still the representatives of *pectens maximus* remain troublesome. Yes, the anchorages are not accidental, but they are few in number. Are these anchored larvae reliable informants? The ones that do not attach themselves at no time contradict the assumption that those which do attach themselves are the true representatives of scallop behaviour. In this respect the anchored larvae resemble the representatives of the scientific community—only those with a close interest in the topic follow the reports closely enough to make an informed contribution—and the representatives of the fishermen.

This particular tale is not one with a happy ending. After the initial tentatively promising results, subsequent work proves less successful. The larvae no longer anchor in the nets; effectively they exhibit dissent against the scientists' preliminary conclusions. Worse, after the initial informants reach a state of maturity, certain fishermen mirror this dissent by ignoring the consensual apparatus negotiated with their representatives. In short, they take the young scallops, trading potential long-term gain for immediate, short-lived benefit. At the same time, the scientists' confidence in the initial hypothesis comes under pressure. It becomes doubtful whether the obligatory passing point identified at the outset is, after all, obligatory (15–17). The process of differentiating problems is unable, in this case, to fasten onto a set of enrolments capable of transforming the initial hypothesis into a satisfactorily durable *dispositif*.

2.2.2 Local equilibrium and *dispositif*

The distinction between 'actant' and 'actor' gives us the beginning of a theory of 'narrative gravity' (a term of Dennett's to be developed in part two), but if we are going to deny that a discrete notion of 'self' is at the centre of it (and we are), then what are we going to put in its place? To begin with, we need to understand the issue at stake regarding obligatory passage points in relation to (for instance) Bloor's vestibular principles. They (the OPPs) may implicitly stand at the gates waving you in, so to speak, but paradoxically they arrive late; they possibly got there only a little before you! For the purposes of epistemic construction, vestibular architecture is important and indispensable, but at the point of active epistemic enquiry—where science is 'in action'; where knowledge is in evolutionary flux—scholars are working to the last minute, always under pressure to put on the next show. While the show is on, obligatory passage points and the vestibule are one and the same. If one can either not get in, or else get in without paying, then its stability breaks down. While stability lasts, though, we can consider this to be a local equilibrium.

The term I want to use for this, *dispositif*, originates in Aristotle's *Rhetoric* as *taxis*, but has acquired a dynamic semiotic valence in poststructuralist theory. Jean-Louis Baudry first made a distinction between *appareil de base* and *dispositif*, where the former refers to all the machinery involved in producing and showing a film, while the latter—echoing Plato's cave—'concerns only the projection as it involves the interpretant' (Baudry 1978, 31 cited in Kessler 2007, 8–9).⁹ For Foucault, the term first appears in *The History of*

⁹ Kessler cites the original French; the gloss is mine.

Sexuality (1976). He uses it to signify a dense, shifting, often conflicting heterogeneity of materials, institutions and actors (Foucault 1980, 194–5, cited in Kessler 2007, 2).

Dispositif is often translated as ‘apparatus’, but Kessler (2007) notes that beside the more or less mechanical arrangement implicit in Aristotelian *taxis*, ‘a *dispositif* also implies a field of forces acting upon a technological, social, legal etc. context or environment’ (1). This suggests an interesting and valuable affinity with Austin’s concept of the performative. The relationship between *dispositif* and *interessement* constitutes a sort of ‘perlocutionary lens’ acting to focus and guide the subjectivity of the mobilized.

The nature of the affinity is this: Austin is interested in the scalability of perlocutionary force. For example, the Queen can ‘name this ship’, but I cannot. I can *call* it anything I like, but everyone else will call it by the name the Queen gave it—hers is a speech-act (given the right circumstances); mine merely an act of speaking. I can, however, name my child with the assurance that (in normal circumstances) my child will keep that name in perpetuity; ironically I have more influence over my child’s name than I have over my own. The *dispositif*, too, is scalable by virtue of the chains of enrolled consent that constitute it, and the duration of these allies’ *interessement*.

A preliminary definition of my term ‘intersubjective technology’, then, addresses this perlocutionary lens to the links of the chain, which, in accord with Callon’s extension of Bloor’s symmetry principle, are symmetrically composed of dynamically interacting human and non-human, material and semiotic elements. In his gloss of Foucault’s usage of the term, Gilles Deleuze (1992) stresses this dynamism:

... a social apparatus [*dispositif*] consists of lines of force. It could be said that they proceed from one unique point to another in the preceding lines; in a way they ‘rectify’ the preceding curves, they draw tangents, fill in the space between one line and another, acting as go-betweens between seeing and saying and vice versa, acting as arrows which continually cross between words and things, constantly waging battle between them.

This is a metaphor that appeals to a physicist’s reading of nature, suggesting the visual image created by iron filings sprinkled over a magnetic field. By itself, though, this metaphor is of limited value:

Foucault, for his part, was concerned that the social apparatuses which he was analysing should not be circumscribed by an enveloping line, unless other vectors could be seen as passing above it and below it (*ibid.*).

The danger here is that the emerging picture comes to resemble a curiosity of condensed-matter physics, spin glass. There, metal atoms’ electrons have spin that creates a magnetic field, influencing the fields of their neighbours, but, unlike in iron where the spins align to constitute a polarised field, each atom’s spin is random,

continually impinging on the randomness of the others—a state that physicists call ‘glassy’. In practice, a degree of stability, of tolerance for the prevailing local spin inclination, leads to ‘local equilibrium’, though locality is—of course—in constant flux (Waldrop 1992, 138–9). Among the moments of translation that Callon lays out, which of them does local equilibrium resemble? Is local equilibrium sustained solely by the attention-span embracing the issue under examination? For that matter, what is the platform capable of sustaining a sense of narrative as it passes through the *dispositif*? Surely the traditionally singular notion of the subject is imperilled?

John Law, the third principal actor–network theorist, addresses this problem in a paper that highlights some of the paradoxical consequences of the approach (1997). Referencing a paper on the UK Cervical Smear Programme (Singleton & Michael 1993) that highlights a fascinating ambivalence in the performance of expertise by GPs, Law points out that the theorist’s stories do not add up, and that attempting to force them to do so would betray the integrity of these stories—the way the theorist chooses to tell the story is part of the story. He argues, in consequence, that

...we are witnessing a shift in the character and the role of narrative in STS writing, and especially in the character and role of chronological narrative. ...we need to attend to lots of little stories, and then to the patterns that subsist between those stories, patterns that will often not reduce themselves to the chronology of narrative, patterns that do not form a chronological narrative—because there is no narrative.

The consequence of this is not to abolish obligatory passage points. Instead, the implication is that it is necessary to envisage a more fluid, **polyphonic** conception, one that may involve ‘pragmatic passage points’ as well as the obligatory ones, points that recruit selectively and temporarily, but which are ultimately expendable.¹⁰

A sense of this operationalization of pragmatism can be found in a term coined elsewhere by Law (1987), the ‘heterogeneous engineer’. It usefully binds embodied intention to actant vectors in an envisaged polyphonic relationship between materials, conventions, existing technologies, resource-holding interest groups and so on, each of which must be engineered by the focal subject. Once a narrative process has been initiated, the structure in which the performance takes place has a catalytic effect on the course the performance follows, polarizing the relationship between actants and witnesses, granting the former the privileged position of directing that course within constraints to which all have been recruited.

¹⁰ To be clear, the modulation from ‘obligatory’ to ‘pragmatic’ is mine, not Law’s.

Encounters with works of art may be considered to simulate, or to perform a safe enactment of, moving through *dispositif*. Nowhere is that connection more evident than in media theory where modern discourses concerning the boundary between fiction and reality are at their most acute. Passage points provide stability; they literally *point* (though we also need to be aware that they *literally* point. That is to say, they engrain, and are engrained by, literacy in ways that we will need to deconstruct in part three). By locating the performance of cognition within the *dispositif* we have potentially liberated it from a range of constraints associated with classical notions of the scientific method. There is even a case for calling the *dispositif* a device for harnessing cognitive practice—implicitly, therefore, for managing the production cycle that yields useful work.

3 Rorty, elimination and meiosis

So we turn to the problem of introspection, which has stalked us from the outset. Peirce was critical of common-sense indubitability, as you will recall. One of the problems posed by this criticism is one that later resurfaced in the work of Daniel Dennett, and acutely concerns us as we pursue the theorizing of the actant in part two. How, exactly, can a subject be certain of introspective knowledge? In his pursuit of a science of consciousness, Dennett engaged with German phenomenologists, notably Husserl, but rejected the privileged status they grant to introspective knowledge. He formulated his 'heterophenomenology' as a 'third-person' science of consciousness, based on the principle of treating subjective reports as evidence that must nevertheless be correlated, as is proper to the scientific method, with other evidence.

The course that led Dennett to his formulation reflects intriguingly on the previous discussion of obligatory passage points. As we will see shortly, Dennett 'passed' through an important body of work, notably the contribution of Richard Rorty, apparently without realizing its significance until some time later. Not only is this interesting in itself, but it becomes the more so when the connection between Rorty and Peirce is explored. Rorty is well known as a latter-day exponent of pragmatism. Among his supervisors in his student days was Charles Hartshorne, one of the early editors of the Peirce papers. Rorty may well, therefore, have been familiar with a particular paper of Peirce's, one that we have already passed through, 'The Pragmatic Maxim' (1998, 133ff). If we wondered whether Dennett might have been influenced by it, the answer would appear to be: 'indirectly, yes'. It is the first of the 1903 Harvard lectures, in which Peirce discusses the idea of phenomenology as a science:

The science of phenomenology is in my view the most primal of all the positive sciences. That is, it is not based, as to its principles, upon any other *positive science*...

... nevertheless [it] must, if it is to be properly grounded, be made to depend upon the conditional or hypothetical science of *pure mathematics*, whose only aim is to discover not how things actually are, but how they might be supposed to be, if not in our universe, then in some other (144).

This grounding, in other words, is in an aspect of Scholastic realism that survives the decline of the indubitable, with the proviso that nature, in 'making up rules as it goes along' (as it might seem from a human perspective) as the universe evolves, may bring about some future amendment that we cannot foresee.

Rorty's tactic, in turning to Peirce, prefigures his later critical position in respect of the analytical tradition:

I want to suggest that Peirce's thought envisaged, and repudiated in advance, the stages in the development of empiricism which logical positivism represented (1961, 197–8).

He develops the point by drawing a comparison between Peirce and the course of Wittgenstein's philosophy, which turned from an early interest in verificationism to a later interest in language. He cites Wittgenstein's slogan 'don't look for the meaning, look for the use' (198) as being a restatement of Peirce's pragmatic maxim. Considering experience and rigour to be mutually repugnant, Rorty says that 'nominalism' and 'reductionism' are forms of a single error. In a series dubbed 'the incorrigibility papers', he develops a critique of introspection that brings into focus a constructive alternative to nominalism and reductionism. This has been called 'eliminativism', but the term has become synonymous with 'eliminative materialism'—a derived, and radical, claim concerning the ambition to supersede certain 'common sense', or folk-psychological, ways of accounting for the phenomena of consciousness with terms couched in elementary biological, chemical and physical causes and effects. At its most radical, this programme seeks to decouple consciousness from the human vehicle.

I use an alternative term, 'meiosis', which preserves the force of Rorty's argument without endorsing (or otherwise debating) the more radical claim associated with it. In rhetoric, meiosis refers to ironic belittling, such as calling an arsonist a 'naughty boy'. To interpret the speaker's meaning, one has to reconstruct the enormity of the event to which it is related in order to recognize the imperfect match between speaker, subject and event. In biology, meiosis is the process by which chromosomes in a cell are reduced by half prior to the formation of gametes. Both usages have a sense of 'explosive reduction' (where 'explosive' entails rapid reversibility with limited predictability).

3.1 Eliminativism, incorrigibility, and introspective mistakes

In 'The case for rorts' (1996a), his contribution to *Rorty and his Critics*, Dennett refers to a body of work that he calls 'the incorrigibility papers'. These are three papers by Richard Rorty (1965, 1970, 1972), but it seems appropriate to add to this body the significant papers that Rorty references in building his argument: Cornman 1962, Feyerabend 1963, Putnam 1964, Sellars 1965, and Cornman 1968. Perhaps because 'the reigning methodology in that brand of analytic philosophy ignored the sorts of questions that would have provoked the relevant discussion', Dennett says that the importance of these Rorty papers 'have never been properly appreciated by philosophers of mind',

... myself included (of all people). I say 'of all people' because Dick Rorty has always drawn explicit links between his ideas and mine, and has played a major role in drawing philosophers' attention to my work. If anybody was in a position to see the virtues of his position, it was I, and while I can now retrospectively see that I did indeed subliminally absorb his message and then re-invent some of it in my own terms (without sufficient acknowledgement), I certainly didn't proclaim my allegiance to, or even deign to rebut, clarify or expand upon, those claims (Dennett 1996a, 1–2).

With these remarks in mind, it is worth attempting to reconstruct a kind of 'audit trail' that leads through these 'in corrigibility papers' to the concept of heterophenomenology Dennett broaches in the early 1980s. We can begin with the logical behaviourism of Dennett's Oxford mentor, Gilbert Ryle, in which a distinction between the workings of the mind and the actions of the body is denied. Although behaviourism was already in decline in the early 1960s, it retained the attraction firstly of insisting that psychology be considered a natural, empirical and objective science, and secondly of refusing to entertain unexplainable Cartesian or Lockean ideas about such things as images or intentions (Nelson 1989, 306). The place of behaviourism was being taken by a cognitivist modulation, the 'identity theory' proposed in the late 1950s by (among others) the Vienna Circle veteran Herbert Feigl, which held that mental events can be directly correlated with physical events in the brain. In a paper that has been identified as germinating the concept of eliminative materialism, Feigl's sometime associate Paul Feyerabend asks whether materialism will give a correct account of human beings, and rehearses the familiar objection:

The following reason is put forth why this question must be put in the negative: human beings, apart from being material, have *experiences*; they *think*; they *feel* pain; etc., etc. Hence a materialistic psychology is bound to fail.

The most decisive part of this argument consists in the assertion that experiences, thoughts, etc. are not material processes (Feyerabend 1963, 49–50).

The 'in corrigibility papers' represent a concerted effort to find the means to develop an understanding of experience that *is* compatible with materialism.

Feyerabend claims that the prevailing view of our ability to acquire introspective knowledge is incorporated in the language being used to describe such knowledge, and that it is literally inconceivable, from this perspective, that such a thing as an introspective mistake might be made:

When I am in pain, then there is no doubt, no possibility of a mistake. This certainty is not simply a psychological affair, it is not due to the fact that I am too strongly convinced to be persuaded of the opposite. It is much more related to a logical certainty: there is no possibility whatever of criticizing the statement (56).

Feyerabend argues that from the materialist perspective, 'it *is* then possible to test statements of introspection by physiological examination of the brain, and reject them

as being based upon an introspective mistake' (56), noting further that 'there are many facts which are inaccessible, *for empirical reasons*, to a person speaking a certain idiom and which become accessible only if a different idiom is introduced' (52–3). This is the basis for Feyerabend's anticipation of heterophenomenology:

To solve the problems arising from this apparent inaccessibility of processes in the living brain we need only realize that the living brain is already connected with a most sensitive instrument—the living human organism. Observation of the reactions of this organism, introspection included, may therefore be much more reliable sources of information concerning the living brain than any other 'more direct' method (55).

Recast in Dennett's terms,

... *at the outset*, heterophenomenology is neutral, leaving the subject's heterophenomenological worlds bereft of any priming stimuli—that is how it seems to the subjects, after all—while postponing an answer to the question of how or why it seems thus to the subjects. Heterophenomenology is the beginning of a science of consciousness, not the end. It is the organization of the data, a catalogue of *what must be explained*, not itself an explanation or a theory. (This was the original meaning of 'phenomenology': a pretheoretical catalogue of the phenomena theory must account for.) And in maintaining this neutrality, it is actually doing justice to the *first person* perspective... (Dennett 2003, 9).

This method, as conceived by Dennett, is radically impartial with respect to the truth or falsity of data points as perceived by the subject:

And what kind of things are beliefs? Are they sentences in the head written in brain writing? Are they nonphysical states of dualist ectoplasm? Are they structures composed of proteins or neural assemblies or electrical fields? We may stay maximally noncommittal about this by adopting, at least for the time being (I recommend: for ever), the position I have defended... that treats beliefs from *the intentional stance* as *theorists' fictions* similar to centres of mass, the Equator, and parallelograms of forces. In short, we may treat beliefs as *abstractions* that measure or describe the complex cognitive state of a subject... (*ibid.*, 2).

He is willing, in other words, to treat pieces of subjective evidence as 'pragmatic passage points', in a sense that continues the notion of the obligatory passage point from the previous chapter—a continuation that I will pick up in part two.

In respect of the language in which negotiations are conducted, and the terminologies developed in order to advance such negotiations, Feyerabend despatches the defects of the 'ordinary language' position crisply:

Every interesting discussion, that is every discussion which leads to an advance of knowledge, terminates in a situation where some decisive change of meaning has occurred. Yet it is not possible, or it is only very rarely possible, to say when the change took place (1963, 58).

This sense of succession is at the core of the eliminativist position (and the principle of meiosis), and is picked up by Rorty:

There is simply no such thing as a method of classifying linguistic expressions that has results guaranteed to remain intact despite the results of future empirical inquiry (Rorty 1965, 25).

Examples in the history of science, such as phlogiston or caloric fluid, exemplify the way in which grammars develop and vocabulary progresses as more economic and flexible interpretations of nature emerge in response to empirical enquiry.

Initially, Rorty is out to show that mental privacy is not fatal to the identity theory. In part this is related to Sellars' suspicion that identity theory is either interestingly flawed or uninterestingly true (Sellars 1965, 430). Restricting himself to the parity between brain-states and sensations, Rorty makes a distinction between a 'translation' form and a 'disappearance' form. The translation form involves the adoption of 'topic-neutral' language, a terminology adapted via Smart from Ryle, for whom words such as 'if', 'or', 'not', 'and', & 'because' are topic-neutral because hearing them tells you nothing about the topic of conversation. Smart narrowed the sense to neutrality between physicalism and dualism, where terms such as 'going on', 'occurring', 'intermittent', 'waxing', 'waning' are topic neutral with respect to the imperatives of one or the other doctrine (Smart 2004).

The disappearance form is the prototype of eliminativism. Beyond the example of the vocabulary of 'caloric fluid', which gave way to 'mean kinetic energy of molecules', Rorty elaborates his discussion in terms of a culture that explains disease in terms of demons, discerned by shamans under the influence of hallucinogenic drugs. It is conceivable, he concludes, that saying 'nobody has ever felt a pain' might come to seem no more absurd than saying 'no one has ever seen a demon', should our state of knowledge develop terminologies that make it seem normal to say 'my C-fibres are firing' instead of 'my leg hurts'. For this change to occur, though, it is not sufficient merely for knowledge to advance—we understand that temperature is 'caused' by the kinetic energy of molecules and not by caloric fluid, but we still find it convenient to speak of temperature. There needs to be a positive advantage to be gained from making the change (1965, 29–37).

Satisfied that the disappearance form is at least sufficiently tenable to warrant further thought, Rorty sets about tackling the problem posed to identity theory by the privacy of sensation. Although broached in the 1965 paper, this theme is developed more fully in 1970. Here he sets about isolating the features that thoughts and sensations have in common with each other but with nothing physical, in furtherance of the materialist cause. First he distinguishes between 'mental entities', events such as occurrent thoughts and sensations, and 'mental features' that more recent terminology recognizes as enactive (that is, arising in dynamic environmental interaction), such as beliefs, desires,

purposes, intentions, motives; or features with a physiological dimension such as emotions and moods (1970, 406–7). Implicitly, Rorty is essaying a Peircean distinction between ‘consciousness’ and ‘mind’ (‘that great dumping-ground of out-dated entities’, as he elsewhere puts it), where ‘features’ differ from ‘entities’ by virtue of their capacity for contextualization. Features are critical whereas entities are acritical, in Peirce’s logical sense of critical. There is, though, a subliminal sense that the ability to distinguish a mental event is already dependent on communicative faculties that enable the report to be made.

The problem of how to put language to one side, even if only temporarily and provisionally, is very much to the point in respect of heterophenomenology, and we shall return to it. Having denied ‘intentionality, purposiveness, nonspatiality, introspectibility, privacy as incommunicability, privacy as special access, and privacy as unsharability’ as marks of the mental (414), Rorty settles on incorrigibility:

Mental events are unlike any other events in that certain knowledge claims about them cannot be overridden. We have no criteria for setting aside as mistaken first-person contemporaneous reports of thoughts and sensations, whereas we do have criteria for setting aside all reports about everything else (413).

As Wittgenstein put it, ‘it makes sense to say of other people that they doubt whether I am in pain; but not to say it about myself’ (1967, a246). Wittgenstein, in the ‘private language’ passage of *Philosophical Investigations*, is more concerned with the problem of what constitutes a report. To draw out the problem, we can observe that a cat or a dog, when accidentally trodden on, will yelp; they do not yelp *in that way* unless caused to do so, and a human becomes accustomed to interpreting yelps, yowls and so on in relation to their *likely* cause. This response would seem to satisfy one definition of a report, though the directness of cause and effect renders it hermeneutically banal. Evidently it is the possibility of intervention and deceit—intentional or otherwise—that has accumulated in the course of evolutionary divergence that attends the question of incorrigibility. Correction, after all, is a social engagement that strongly implicates pointing—which, as we will see in part two, is a uniquely human capability.

Feyerabend recapitulates Peirce’s remark to the effect that the ‘original’ propositions of Critical Common Sense ‘are indubitable in the sense of being acritical’ (Peirce 1998, 347):

The first question which arises in connection with this argument concerns the source of this certainty of statements concerning mental processes. The answer is very simple: it is their *lack of content* which is the source of their certainty (Feyerabend 1963, 56; emphasis inherited).

Feyerabend draws attention to an interesting case of the analytical glass being half-empty while the introspective glass is half-full. From an analytical point of view, lack of content means lack of referent, a deficit in inferential resources with which to isolate and triangulate semantically functional states. From the introspective point of view, the same lack of referent is what gives rise to interpretative feedback. For an obvious instance, the pain of a foot trodden on is not like the pain of a sprained ankle, though both the bodily origin of the sensation and its name is similar—‘pain’ is an acritical term that covers both episodes. Pains that have no immediately obvious cause require skilled interpretation, leading ultimately to c-fibers and the rest of the physiological apparatus.

This is where the significance of Rorty’s enquiry for the heterophenomenological project becomes apparent. Rorty asks:

Did the meaning of ‘thought’ change when people came to make noninferential reports of their own thoughts? ... Would it change if cerebroscopes came to be regarded as offering better evidence for what someone was thinking than his own introspective reports? (415)

Although the term ‘cerebroscope’ is used here in a semi-jocular fashion, it usefully classes a group of technologies that have revolutionized scholarship in the broad field of mind, brain and consciousness. It is less a case of ‘offering better evidence’ than offering the grounds for comparing verbal and non-verbal reports, and for building hypotheses on the basis of findings. In the matter of yelping pets, for instance, a range of physiological markers would now be used to indicate stress reactions in circumstances where animals would previously have been classed as ‘dumb’. The first distinctive feature of heterophenomenology, then, is that it treats language as one cerebroscopic tool among several—one that can be examined cerebroscopically, to boot. The second distinctive feature arises from the way language is then used introspectively by the heterophenomenologist: the heterophenomenologist is better able to formulate hypotheses capable of withstanding scientific enquiry than heretofore.

3.2 How Rorty abolished the mind

A worry remains that the price of Rorty’s triumph over incorrigibility—marking off ‘mental entities’ from ‘mental features’—is a high one. While the focus has been on identifying the unique property or properties of ‘the mental’, it is becoming apparent that there is a co-definitional problem in defining just what constitutes ‘the mark’. If the pursuit of ‘the mark’ obliges us to put aside matters of interest that are not amenable to the style of enquiry being adopted, we may find it more productive to set aside the terminology altogether. (The ‘mental’ is what phenomenologists study, and ‘marks’ are

what anthropologists, say, study.) For Rorty, the problem is that of using mental faculties to define mental faculties. Even when circumscribed with the elaborate care that Rorty brings to the matter, there is (at the very least) the ghost of a begged question remaining to be exorcised. This, I think, is the ultimate point that Rorty wishes to make.

At this point, another dimension to heterophenomenology that Dennett does not explicitly enumerate seems relevant. As a consequence of Dennett's multiple drafts model of consciousness, terms such as 'multi-modal' and 'multi-layered' are also appropriate so that 'heterophenomenology' characterizes a more nuanced, 'polyphonic' perspective. In place of problematic distinctions between mind and body, or between mind and consciousness, we can envisage accounts that marshal distinct physiological elements such as the neurochemistry of reward, proprioception, and neuronal action-understanding, to find that the distinctively human emerges from the richness of their interaction, which might by turns be harmonious or dissonant. 'The mental' then might be regarded as being analogous to 'white' light, an energy spectrum that amalgamates a range of wavelengths, either end of which are beyond human visual perception.

The comprehending use of simple and fruitful language to account for complex, difficult and time-consuming realities turns out to have a lot in common with the primitive evolutionary idea of 'fight/run away'. Given that attention is a scarce resource, we may at certain times use language appropriate for an exhaustive explanation of the contributory circumstances relevant to a particular event—where that explanation contributes in some way to rewarding development, for instance. At other times, that same event might be described and dismissed by the quickest means possible. To humans, such disposals are perfectly normal, but in offloading the mental load to semiotic resources in the environment—to autonomous *noemata*—can humans install plausible discretion? Rorty comments on this dimension of a discussion of computing machinery that unfolded in parallel to the functionalist paradigm:

It is tempting, perhaps, to think that we can distinguish between the machine's beliefs and its utterances by distinguishing between its program and its performance and thus between 'programming errors' and 'machine errors' (1972, 212).

Here Rorty is alluding to questions raised by Hilary Putnam (1960), concerning the distinction between mistakes, errors, faults, algorithmic flaws and so on, in machines and their makers, which he (Rorty) compares with a passage of Dennett's (from an early work, *Content and Consciousness* (1972)) that makes equivalent distinctions between physical and logical states in humans, concluding that 'it makes no sense to suggest about a report of either that a mistake ... was made' (Rorty 1972, 209). Dennett in turn

glosses Rorty somewhat broadly, calling ‘a mind’ a control system whose self-reports are incorrigible, and asking whether there could be such a control system:

One of Rorty’s shrewdest observations is that our underlying materialist skepticism about this very possibility is the chief factor that propels us towards dualism and other mysterious doctrines.

Dennett continues:

It does seem at first blush as if the states and events in any material or physical control system would have to be exactly as knowable by ‘third persons’ as by their ‘owner,’ and if this is so, then no such states and events could be thoughts and sensations. It seems to follow that in any purely material entity, first-person privilege would evaporate, at which point there would be nothing left to anchor the mental at all (1996a, 3).

The account that Dennett gives of the possible route by which ‘people’ may come to eliminate their belief in ‘mind’ is curious, since an outcome that would need to be accomplished at an individual level is represented instead as being a modulation at a phenotypic, or cultural, level. We may very well ask, ‘which people?’ The answer surely would never be ‘everyone’; even if it were to become a cultural norm among adults, the naïve preference for mind-talk among children would continue to be a convenience such adults would be obliged to adjust to. Is it, then, worth pursuing this line of enquiry? Dennett later remarks that:

Many are deeply skeptical of anti-metaphysical moves such as Rorty’s suggestion that a linguistic convention of incorrigibility accounts for the existence of minds, but what they tend to overlook—and what Rorty himself has overlooked, if I am right—is that the existence of such a convention can have effects over time that make it *non-trivially* self-fulfilling (10).

There are two possible routes forward arising from this identification of a productively self-fulfilling convention. One is the orally-inflected, second-person relationship, fashionably characterized in the Bantu term ‘ubuntu’, meaning (approximately) ‘I am because you are’. What makes it possible to conceive of one’s own incorrigibility, paradoxically, is the oral experience of others’ incorrigible reports. The reliability of *these* enable the construction of the self-fulfilling consequences Dennett envisages. The other possible route is an abstract, third-person relationship sustained by material substitutions for the second-person relationship, out of which non-triviality emerges. The former, second-person formulation corresponds with a heuritic conception of performativity, while the latter, third-person dimension is implicated in stigmergic performativity and the ‘grandparent’ account of intersubjective technology. These are threads that will recur as my argument develops, ultimately finding resolution in the concept of the Work-Maker discussed in part three. The immediate business of part two, though, concerns the operationalization of enactive performativity—or rather, the performative modulation of the enactive.

Summary

The central concept of part two, and of the thesis—‘polyphonic consciousness’—is like Peirce’s interpretant, but not quite the same thing. It is like the structuralist *dispositif*, but it is not quite the same thing as that, either. Further, the *dispositif*, emerging as it does from Aristotelian disposition, is like the interpretant but not quite the same thing. What we carry forward into part two, then, is a conflation of these two styles of disposition, the interpretant/*dispositif*. To the extent that this is an individuated entity (which is not far, unsurprisingly, since the formulation is intended to resist commonsense individuation), it is an entity that marshals and harnesses processes of individuation in ways that will require further delineation in parts two and three. Before proceeding, though, let us review part one.

Our broad orientation has been to epistemic questions regarding the means by which we may proceed, and the grounds from which we depart. In Peircean terms, part one deals with secondness, with relationships of necessity, and with the stipulations that support the fixation of belief. Peirce clearly had an appreciation for the institutional dimension of knowledge production, whether that term is taken to imply curation or innovation. This social dimension, though underdeveloped in his own writing, is complemented by later structuralist analysis, which, in turn, benefits by being aligned to the Peircean apparatus. There is a clear continuity in the emphasis on rhetoric and performance highlighted in the Oxford, Edinburgh and Mine School ontologies.

Peirce’s contribution to the evolving argument is substantial, and difficult to summarize, but we can highlight three aspects of his work in particular: the categories; chance; and abduction. The categories are the foundation of his semeiotic. It is convenient to simplify somewhat, and refer to firstness as being broadly phenomenological; to secondness as being broadly epistemological; and to thirdness as being broadly sociological. In simplifying, we eliminate definitional problems that arise from engaging with the varieties of degeneracy he identifies, at cost of tolerating a degree of vagueness regarding such things as disciplinary boundaries.

Chance, in Peirce’s hands, is no longer an intractable and arbitrary frontier in the pursuit of knowledge, but rather an empirical topic subject to clear methods and procedures. Its *philosophical* valence (in this mathematical form) remains, perhaps, under-developed. In part three, it becomes clear that part of the reason for this is the degree of specialization necessary to fully grasp the mathematics involved. Nevertheless, Peirce’s thinking on chance permeates his commitments, the connection between methodetic and

entanglement being expressed through his theological notion of brotherhood among scientists, which vestigially anticipates certain aspects of social brain theory.

Ironically, the chance aspect of trial and error—the conception of the way natural science proceeds that prevails in the present day, following Popper and allies such as Polanyi and Feyerabend—would not have seemed a fully satisfactory settlement to Peirce. His theory of abduction, nevertheless, is difficult to grasp as an alternative. Additionally, his line of argument is founded in an essentialist tradition that analytic practice has sought systematically to minimize if not eliminate altogether. Abduction, and its corollary, adduction, is pitched at the ambient end of the cognitive spectrum. It concerns what attracts attention in the first place, what germinates a thought process insofar as such a process is to be deemed ‘rational’—that is, approximately, consisting in an array of mutually supporting components, however ill-defined the notion of ‘component’ might be at this point.

That the array of mutually supporting components need not necessarily be a somatic resource is an idea that challenges ordinary, common-sense notions of cognition as a purely phenomenological experience. There are two dimensions of extra-somatic resource that need to be distinguished. The first is rhetorical, and is vested in those with whom the cognizer interacts. Because of the shared nature of this resource, it is by no means obvious that any distinction is necessary, but Austin’s analysis of perlocutionary language-use makes it clear that this sharing should not be allowed to beg the question. However, the necessary equipment (to be explored in part two) was not available to Austin and his colleagues. Symmetrically, the second dimension of extra-somatic resource concerns the capacity of the interpretant/dispositif to respond to its environment in a specifically hylozoic manner. In the radical view of actor–network theory, nature participates actively in this rhetorical traffic. Symmetrically too, however, the equipmental question is left unasked by sociologists of knowledge.

Social brain theory, and in particular the variant I will explore—which I call ‘the extended social brain hypothesis’, lends substance to the vestigial articulation of the interpretant/dispositif that part one has outlined. As stated, this development revolves around a concept that I call ‘polyphonic consciousness’, which is an evolution of Daniel Dennett’s ‘multiple drafts model’. In order to seed this development, part one concludes by forging a connection between Dennett’s operating method (heterophenomenology), via Rorty, to the specifically Peircean variant of pragmatism with its moderate essentialism, which Peirce called *pragmaticism*.

Part Two: Performativities

4 The extended social brain hypothesis

The Extended Social Brain Hypothesis is drawn from three principal sources: one is sociological, one is philosophical, one is psychological. We have already encountered the first two of these, although in the philosophical case what we have done so far is to establish a back-story concerning ‘common sense’. Part two engages with contemporary issues in the philosophy of mind, drawing on a variant identified in particular with Andy Clark, the **extended mind**. This is a minimal-nativist, vehicle oriented approach to the analysis of cognition whose interest for our purposes lies in its stress on the role of environmental cues in ‘fast and frugal’ hypothesis generation.

We have already reviewed the sociological perspective, **actor–network theory**, in part one. This hylozoic ontology treats the relationship between agent and environment as a systematic articulation of semiotic (meaning, in this context, disembodied) rhetoric, neatly complementing the extended mind. The psychological perspective is introduced as the **social brain hypothesis**, though its status has matured to the point where ‘theory’ can be substituted for ‘hypothesis’. It developed out of ‘theory of mind’ stories about human evolution, which superseded the technical intelligence hypothesis by arguing that brain size is correlated with social complexity rather than an aptitude for practical skills such as digital manipulation.

I will advance three claims in part two, under the ‘extended social brain hypothesis’ (which *is* hypothetical):

There is no subjectivity without intersubjectivity. That is to say, as an evolutionary matter, it was necessary for the empathic capacities to evolve before the sense of self we identify as human could emerge.

Intersubjectivity is critical to human communication, because of its role in interpreting intention. While the idea that human communication requires three levels of intentionality carries analytical weight, I argue that the inflationary trajectory is wrong as an evolutionary matter. The trend is instead towards increasing powers of individuation.

The capacity for tool-use is emphasized less under the social brain hypothesis, but the importance of digital manipulation needs to be reasserted as part of a mature ontology.

For the most part, these claims are pursued in chapters 6 and 7. The notion of consciousness supporting them is developed in chapter 5, and the social brain hypothesis is introduced later in the current chapter.

4.1 The limits of methodological individualism

In *Economy and Society*, Max Weber argued that social phenomena must be explained by showing how they result from individual actions, which in turn must be explained through ‘methodological individualism’—that is, in reference to the intentional states that motivate the individual actors (Heath 2005). Later, Hayek and Popper among others seized upon the concept as a means of refuting Marxian historical materialism. In truth, the claim that invoking the term ‘methodological’ insulated the theoretical issues from ideological inflection was constitutive of the very ideology that motivated its promulgation. When we find John Searle, then, endorsing methodological individualism in his 2005 paper ‘What is an Institution?’, some associations pull into focus. Searle, of course, is the heir of J. L. Austin, but his work on Austin’s legacy focuses on *speech* acts, and on illocutionary acts in particular. Human intentionality, however—and in particular Austin’s notion of the perlocutionary—seems to demand the acknowledgement of an intrinsically social semiotic level. The notion of an institution goes beyond that, strongly suggesting the kind of extended material–semiotic entanglement theorized in part one as the *dispositif*. The distinguished economist Kenneth Arrow suggests an emergentist approach that endorses this perception, and which is worth looking at in a little more detail.

The case Arrow (1994) states is that, on close inspection, most standard economic analysis rests on social categories that are absolutely necessary to the analysis and are therefore not merely figures of speech that could be eliminated at the expense of brevity. Historically, the issue first appears in economic literature with the Austrian Carl Menger in the 1880s. Menger argues that a ‘national economy’ is the outcome of individual economic efforts, or the ‘singular economies in the nation’ (2). It follows that all social interactions are interactions among individuals, whose role is analogous to that of the atom in chemistry. An army, for instance, is composed of individuals, and any analysis of its functions must rest on the way individuals give or respond to orders (3). For Hayek, as it had previously for Edmund Burke, ‘this leads to a principled rejection of deliberate changes in society, for the existing institutions, having arisen by so many individual choices, embody the wisdom of the ages’ (3). In this respect, institutions resemble Austin’s ‘ordinary language’. Though emergence may account for the

institutional nature of social phenomena that exhibit no obvious relationship to the individual motives constituting them, there is no principled way of distinguishing between an emergent phenomenon at one level and an atomic phenomenon at another. Emergence remains a concept in want of precise definition.

Arrow focuses on the issue of price. Prices are determined by social institutions commonly called markets, which equate supply and demand (4). Economists model the effects of individual choice-acts in game theory, but the recurrent problem is: where do individuals (for this purpose an individual corporation suits just as well as an individual human) get the information to support a rational decision? For each individual to maximise their return, they need to have information available that enables them to evaluate the likely returns of their competitors. They also need to evaluate the effects of their own decisions on those returns which, once they enter the marketplace, feed back as effects that cause competitors to make adjustments of their own. We have a problem in respect of information-gathering and resource allocation.

The conventional way that economists approach this problem is with the concept of externality, which Arrow calls social interactions that are not mediated through the market (5). Externalities are costs or benefits accruing to third (external) parties in a transaction, often from the use of a public good. In other words, the first and second parties do not bear all of the costs or reap all of the gains from the transaction. The prime example is information, especially technical knowledge, but Arrow finds it striking that neither Hayek nor his socialist opponents seem to have been concerned with *changes* in knowledge (6). The appearance of a new product or technical phenomenon is *eo ipso* a communication about itself and thus an externality. Even if the precise know-how entailed in making the appearance take place is withheld for one reason or another, mere appearance is informative. For example, while there was great secrecy about the building of the first atomic bomb, the fact of its explosion demonstrated that it was possible to make such a device. This information was more valuable than any details of manufacture, and could hardly be kept secret (7).

Ultimately the question of where change and innovation comes from turns into a version of the old chicken-and-egg question. In language that economics has borrowed from biology, the question is posed as an arbitration between the respective merits of exogenous and endogenous analyses of growth. More accurately, the exogenous view—that new knowledge accretes to the economy as a natural and inevitable process like the growth rings of a tree—was a convenient accommodation made in the pioneering

model of growth developed by Robert Solow in the 1950s. The endogenous view—that new knowledge arises from the skills and practices of individuals (propagating rhizomatically like grass), whose endeavours are harnessed by investment decisions within the economy—was developed by Arrow among others, building on the foundations laid by Solow (7–8). Arrow winds up with a paradox, one that has become familiar. Knowledge has both a personal and a public aspect:

Methodological individualism has indeed one major implication for information acquisition, ironically one not very compatible with neoclassical paradigms, particularly not with rational choice. Information may be supplied socially, but to be used, it has to be absorbed individually (8).

Both terms—personal and public—are too loose to fasten an argument to, but the social brain hypothesis offers a mediating path on which we can build.

4.2 Theory of the social brain

What is this ‘information’ of which Arrow speaks? How does ‘*inform*’ relate to ‘*perform*’? Where in the evolutionary process does whatever it takes to make the distinctive cognitive modulation of sensory process from data to information arise? Whiten and Byrne, introducing the first volume of *Machiavellian Intelligence* (1988), couch their introductory discussion in terms of traditional definitions of intelligence. Sometimes the term is used to mean the ability to solve problems, sometimes the ability to learn, or sometimes the ability to make sense of a novel conjunction of events (4). Since on Byrne’s 1997 account some degree of technical intelligence (in monkeys) precedes social intelligence (in apes) in a way that suggests a principled relationship, a useful point of departure is Robin Dunbar’s patient evaluation of competing hypotheses that seek to correlate the evolution of large brains with potential environmental factors.

Dunbar’s paper, ‘The Social Brain Hypothesis’ (1998), distinguishes six potential ways of accounting for large brains, which fall into four categories:

1. Epiphenomenal explanations that simply correlate large brains with large bodies, with superior information-processing capabilities emerging opportunistically. These explanations fail the cost test (in reference to the increasingly steep energy cost of maintaining a large brain) because the evolutionary stability of animals with comparable body mass does not show a correlation with their brain sizes.
2. Ecological hypotheses that in all likelihood have *some* bearing:
 - a. Fruit harvesting imposes greater cognitive demands than grazing.

- b. Brain size constrains the size of the mental map, thereby constraining range size and navigational competence.
 - c. Extractive foraging, such as nut cracking and root digging, draws in features of both a. and b. above.
3. Social hypotheses that see brain size as a constraint on the size of social network, impinging on memory for relationships, or on the maintenance of a repertoire of social strategies.
4. Developmental hypotheses that focus on length of gestation, and duration of immaturity, in order to correlate brain size with reproductive success (179).

In order to arbitrate between these competing hypotheses, Dunbar seeks measures that will enable him to evaluate the validity of comparisons between widely differing body sizes and habitat types. He settles on the ratio between medulla and neocortex, which in insectivores is approximately one to one. In prosimians the neocortex is about ten times larger than the medulla; in anthropoids 20–50 times larger, and in humans as much as 105 times larger (180).

Six lines of evidence support the ascription of fundamental importance to the skilled management of social relationships. First, Dunbar finds stratification in the anthropoid primates, such that prosimians, monkeys, and apes show distinct gradings that suggest a social nexus that places increasingly complex demands on the respective individuals. Second, the observed use of tactical deception correlates with neocortex size. Third, male rank correlation with mating success is negatively related to neocortex size, suggesting that brain power trumps physical prowess. Fourth, although total brain size correlates with gestation length in mammals, neocortex size does not; rather, the latter correlates with duration of immaturity, suggesting that the need for social learning pressures the limits of genetic encoding. Fifth, grooming clique size, a surrogate variable indicating alliance size, correlates well with relative neocortex and social group size in primates, including humans. Sixth, the areas of the primate brain responsible for executive function (neocortex and striate cortex) are under maternally rather than paternally imprinted genes, whereas the converse is true for those parts of the brain most closely associated with emotional behaviour. This suggests a relationship with the more intense cognitive demands of social life in matrilineal female-bonded societies (184–6).

Noting that human cultural evolution, in the last 250,000 years, has comfortably outpaced anatomical evolution, Dunbar (1993) infers that our present-day brain size reflects the group size prevalent at that prehistoric stage. That assumption permits him to seek plausible correlates in present-day human society by which he can test the theoretical outcome of projecting the medulla/neocortex relationship onto human group size. This is the projection that yields the famous Dunbar Number of 150 (147.8, to be exact). To place this figure in some kind of context, he points out that ‘the various human groups that can be identified in any society seem to cluster rather tightly around a series of values (5, 12, 35, 150, 500, and 2,000) with virtually no overlap in the variance around these characteristic values’ (1998, 187). Using terms such as ‘grooming circle’, ‘social network’, ‘camp’, ‘clan’ and ‘tribe’, he compares group sizes between a variety of hunter-gatherer and settled horticulturalists from Australia, Africa, Asia, and North and South America, finding that ‘clans’ really do gravitate around the figure of 150 members (see also Dunbar 2003, 164–6; Stiller, Nettle & Dunbar 2003).

The difficulty in Dunbar’s account is that for humans to sustain this group size by the same means as monkeys and apes, it is projected that it would be necessary to spend approximately 45% of their time engaged in grooming.¹ Since we do not, the question arises: how do we sustain our social bonds with relatively minimal expenditure? Dunbar notes the neurochemical role of grooming in the release of endorphins, which promote states of relaxation, enhancing individuals’ sense of community while beneficially influencing their immune systems, and possibly triggering the release of oxytocins, leading to the generation of a sense of ‘euphoric love’. In other words, group cultural practices act *in loco parentis*, so to speak, exploiting the brain’s architecture to generate the desired neurochemical effects economically.

4.3 Mind–tools: as inside, so outside

Briefly, Dunbar’s story draws on traditional ‘theory theory’, or ‘theory of mind’, whose explanatory force is immediately challenged by Rorty’s abolitionist position; simulation theory is a modulation of ‘theory theory’ grounded in a particular feature of neural architecture, the Mirror Neuron System. Simulation theory, though, still requires the simulator to *do* something (and tends to be articulated from a methodological individualist perspective), while the parsimonious story I propose is more in the nature

¹ Figures and implications presented by Dunbar during a seminar at Edinburgh University, 13 February 2009.

of a vehicle theory, drawing on the foregoing with the addition of Clark-style minimal nativism:

Instead of building in large amounts of innate knowledge and structure, build in whatever minimal set of biases and structure will ensure the emergence, under realistic environmental conditions, of the basic cognitive modules and structures necessary for early success and for subsequent learning. (Clark 1993, 185)

Jonathan Opie introduces the notion of a vehicle theory of consciousness, grounded (like Clark 1989 & 1993) in parallel-distributed-processing computing architectures, to supersede what he calls process theories of consciousness:

A vehicle theory places consciousness right at the focus of cognition by identifying it with the explicit representation of information in the brain. Classicism can't support such a theory because it is committed to the existence of explicit representations whose contents are not phenomenally conscious (Opie 1998, abstract).

Following Rorty, the alternative is to take an anti-representationalist stance, meaning 'there are no final answers to the traditional questions about knowledge, truth, and representation' (Boros 1998). This entails concern for the stipulations by which *stability* is achieved, sustained, and (where necessary) superseded—hence a stress on individuation as a process.

These perspectives—theory theory, simulation, and vehicles—will recur and intermingle during the next three chapters. Before getting started with that, some preliminary remarks about language are in order, because 'language' is a natural term that stands in for a number of competing perspectives on the topic at issue.

Dunbar muses that understanding the intention behind a speech act is crucial to successful communication, remarking that without these abilities it is doubtful that literature would be possible. To state it thus is to get cause and effect the wrong way round, however, snagging language with an overly narrow and possibly under-theorized definition in the process. No human population has been discovered that does not have language. When we say that we cannot imagine *modern* human life without language, though, it is in the sense that we understand language to be deeply implicated in the achievement of modernity, because the term simultaneously represents oral communication and a deeper sense of order. The puzzle is to make a connection between the two conditions, and to find a way to account for the latter in a way that retains plausible connections with, but makes principled distinctions from, the former.

Rather than using the term 'language', I prefer to use the twin terms 'intersubjective technology' and 'the technologizing of intersubjectivity'. The former (already introduced

briefly in part one) recognizes that the individual DNA regime is able to perform differentially according to its accumulated semiotic skill set, and the neologism represents the pooled ensemble of action possibility. The latter is a direct modulation of Walter Ong's 'technologizing of the word' (1982), and recognizes that the value of such an individually-held resource depends on the environment in which it is deployed, an *evolving* environment that places a premium on flexibility and adaptability.

Perhaps the hardest part of building an argument for the technologizing of intersubjectivity as an endogenously driven social process is accounting for the phenomenon that Andy Clark has termed 'the paradox of active stupidity' (1999, 6/29). Briefly, the problem concerns the idea that humans set about actively making the world a better place to think in. Nicholas Humphrey expresses the same paradox in slightly different terms, suggesting that 'subsistence technology, rather than requiring intelligence, may actually become a substitute for it':

Provided the social structure of the species is such as to allow individuals to acquire subsistence techniques by simple associative learning, then there is little need for individual creativity. ... Indeed, there might seem on the face of it to be a negative correlation between the intellectual capacity of the species and the need for intellectual output. ... Studies of contemporary bushmen suggest that the life of hunting and gathering, typical of early man, is probably a remarkably easy one. The 'affluent savage' (Sahlins 1974) seems to establish a *modus vivendi* in which, for a period of perhaps 10 million years, he could afford to be not only physically, but intellectually lazy (Humphrey 1988, 16–17).

This puzzle neatly ties up with the problem posed by Herbert Simon (1978) regarding the best strategy for dealing with an excess of information when attention is the scarce resource. Clark (1997, 180ff) uses the term 'scaffolding' to capture the institutional constraints employed to minimize the necessity for choice-acts to occasion deep thought.

Simplifying the mental landscape—including cognitive sculpting afforded by such faculties as memory—can be accomplished by recruiting and preserving intersubjective technologies through neural path dependencies that are continuous with the 'external' environment. The somatic boundary, from this perspective, is more apparent than real. The problem, from the perspective of an analyst seeking to reconstruct the processes by which these path dependencies become established, is to locate the point in the evolving relationship between organism and environment when the principle under scrutiny becomes established and stabilized.

Andy Clark, in 'Minds, Brains and Tools' (1999), makes a slight but telling shift that reinstates the observed capabilities of the environment in a coupling with those of the

subject (which is not necessarily human). In an imagined dialogue, Clark asks and Dennett answers:

Q/ What are minds made of?

A/ Tools for thinking.

Q/ Who or what *uses* the tools to do the thinking?

A/ No-one, nothing. The tools-are-us.

Q/ Intentionality, aboutness, content and consciousness: can all these really be brought into being by grab-bags of useless tools?

A/ Yes (Clark 1999, 2/29).

This mind–tool ontology dissolves the somatic boundary. In respect of the list of terms just advanced, we need not expect to find solutions to their respective epistemological challenges entirely within our own bodies. The problem is, however, to find the means to explain *skilled engagement*. We require a clearer understanding of the terms ‘mind’ and ‘tool’. Whether it is necessary or wise to make a functional distinction *in this context* between the brain and the body’s other organs is a separate question, which need not detain us. The theme I want to develop, following on from part one’s exposition of the dispositif and of meiosis, concerns the transparency of the somatic boundary. This will require close attention to the nature of ‘function’ and its relationship to ends and intentions, which will entail a return to my Austinian question about happiness. To contextualize all of this, however, we need to attend to the nature of consciousness, the medium through which these problems are normatively expressed.

5 Polyphonic consciousness

Previously we established a useful distinction between two senses of ‘common sense’, one referring to the common product of sensory input experienced by the individual, the other referring to the shared experience of this product among individuals. I distinguish not two but four species of common sense. In addition to the sensory and psychological, I argue for a third (semiotic) and fourth (cultural) kind. The first three correspond to the Peircean categories. The fourth is supported by an extension of Peircean chance, and could be called Polyà semiotics. (This dimension is further explored in part three.)

The polyphonic model sets out to reintegrate these. The idea, essentially, is that under polyphony, discrete strands of content mutually support each other. In music, voice-led melody, functional harmony and measured pulse is found in a mutually supportive relationship in renaissance and early modern polyphony. In the polyphonic model of consciousness this idea of mutual support characterizes each of the strands—sensory, psychological, and semiotic—that separately articulate the aspects of ‘common sense’ previously distinguished. Importantly, it *also* characterizes the relationship *between* these three aspects. Sensory polyphony refers to the integrated phenomenal inputs (to the extent that speaking of ‘inputs’ does not beg questions). The matter of shared experience, though, can be split on Peircean lines so that we have a psychological polyphony, which is a secondness (albeit a crude one, indexed by conspecifics), and a semiotic polyphony, which is a thirdness—sensory polyphony, obviously, being a firstness.

What makes each of these polyphonic, and what makes their mutual relationship polyphonic, will take some explaining. To begin with, ‘Polyphonic consciousness’ is an evolution of Daniel Dennett’s ‘multiple drafts’ model that takes the ‘white light’ of consciousness to the prism. Polyphony implies, first of all, several ‘thingings’ happening simultaneously. Further, each of these ‘things’ has antecedence and consequence and is thus the subject of continuity in the Peircean sense discussed in part one. In music, the ‘thing’ is equivalent, normatively, to an individuated, quantized element called the ‘note’; in this polyphonic model of consciousness, the equivalent of a ‘note’ is the passage point, given semiotic articulation by the mind–tool.

Assembling this argument is going to be a long and difficult process, extending beyond this chapter to the following two. The present chapter falls into three parts. First I review Dennett’s multiple drafts model, and present the outline of the polyphonic

modulation. Next, I elaborate the sensory and psychological dimensions of polyphonic consciousness. Finally, I develop the semiotic dimension, paying close attention to the relationship, in Clark's 'Minds, Brains and Tools', between Gibsonian **affordance**, Heideggerian **equipment**, and Dehaenian **code-switching**.

5.1 Dennett's multiple drafts model of consciousness

Dennett's multiple drafts model is presented in *Consciousness Explained* (1991) as a solution—or riposte—to dualist approaches to the problem of defining mind and consciousness. His approach has been to distinguish two complementary lines of enquiry, 'a theory of content or intentionality—a phenomenon more fundamental than consciousness—and then, building on that foundation, a theory of consciousness' (Dennett 1994).

Dennett invokes the 'Cartesian theatre' to model the supposition that somewhere in the brain is a physical centre (1991, 101–10) where *deloma* takes place. (*Deloma* means 'making known to one's self, and is the root of Peirce's sign-type 'delome'.) In its place he proposes a more materially realistic alternative, the 'multiple drafts' model, in which the perception of mental activity is the outcome of multiple parallel processing of sensory input under constant 'editorial revision' (111). Descartes wanted to claim that somehow the mind arrives at *deloma* in advance of the body, as though the body is there to witness the performance of the mind. Dennett adduces two examples to refute this claim.

In Grey Walter's precognitive carousel, patients had electrodes implanted in their motor cortex in order to test the hypothesis that certain kinds of cortical activity were the initiators of intentional actions. The subjects were given a slide-show with a button to activate the carousel. In fact, the button was a dummy, the carousel instead being activated by the amplified signal received from the subjects' implanted electrode. The subjects reported that it seemed as though the slide projector was anticipating their decisions, because the carousel would advance before they actually pressed the button (167).

Benjamin Libet's 'case of backwards referral in time' is one that has stimulated a considerable volume of commentary. Libet compared the time course for a sensation induced by direct stimulation of the somasensory cortex with the time course for the same kind of sensation induced in the 'normal' manner—in this case, a mild electric pulse applied to the hand. When initiated simultaneously, the expected result was that

the patient should report that the sensation which travelled via the nervous system from the hand would take longer to ‘arrive’, or be rendered conscious, than the sensation directly induced in the cortex. According to Libet’s data, the reverse was in fact the case; patients reported that the pulse applied to the hand ‘arrived’ first. Even when he staggered the impulses so that the direct cortical stimulus was initiated in advance of the distal stimulus, patients continued to report that the hand-stimulus ‘arrived’ first (153ff).

The issue of ‘neuronal adequacy’ has a bearing on the subsequent debate: for either stimulus, there was a delay of about 500 milliseconds before the patients’ consciousness registered an event. The argument advanced by Libet and others was that the temporal incongruity reported in these results had the consequence of affirming the dualist hypothesis and undermining materialism. Dennett (to cut a long story short) does not agree, arguing instead that the interval between stimulus and its registration is evidence for the resolution of the perceptual issue by parallel distributed processing of the raw sensory data.

On the one hand, there are editing procedures in play that tend to reorganize memory, causing the story to shift as time goes by. Dennett calls this mode ‘Orwellian’, after the revisionist practices of the Ministry of Truth imagined by Orwell in his novel *Nineteen Eighty-Four*. In contrast, Dennett posits a ‘Stalinist’ mode, where evidence that suits the desired outcome is marshalled and presented at a kind of show-trial, such that from the historical point of view of the Orwellian mode, we could not know what was true in the first place.

‘Stalinist’ and ‘Orwellian’ are part of the problem of realizing *deloma*, and the terms neatly exemplify the way in which the idea of narrative gravity can help us understand this problem. The terms bring things into focus in the manner of the perlocutionary lens discussed in part one: the authorial act of citing these terms obliges the witness to engage with the author’s intention in doing so. However, the witness’s interpretative resources do not necessarily match the author’s. In this case, the names that Dennett chooses—Orwell and Stalin—are both pseudonyms, which may account for a certain discomfort entailed in this instance of Foucauldian discursive practice. There are a variety of issues that fall under the term ‘Orwellian’, not least the notion of surveillance familiar from Foucault’s own work. Few writers, furthermore, have more pervasively shaped perceptions of the nature of Stalinism than did Orwell. Similarly, but differently, the show trial is by no means the preserve of Stalinist Russia (*cf.*, for instance, Carey 1998).

A specific objection to the idea of a ‘Stalinist’ modality in consciousness concerns another of Orwell’s observations about Stalinist Russia (in *Animal Farm*) that is relevant to forthcoming discussions of the problems of framing, namely the assumption that any failure within the system must be the fault of external sabotage. The computational model of mind was founded in the same determinist mould as the historical materialism that in Orwell’s parable now seems extreme and absurd. Some caution, then, is appropriate when recruiting computational metaphors for the explanation of mental processes.

A problem that arises here is the tendency to conflate attention and consciousness. Since attention is by and large a serial phenomenon, the assumption is made that the consciousness that supports attention must be serial too. Jonathan Opie (1998, 44) suggests that there are two ways of examining the serial experience of consciousness: one is to regard it as a serial stream ‘containing only one conscious content at a time’. The other, taking account of evidence such as Dennett’s, is to treat it as a dynamic fusion of distinct components. Opie dubs the former ‘monophonic’ and the latter ‘polyphonic’, with reference to medieval vocal music. The idea is to treat consciousness ‘not as a matter of physical oneness, but as a matter of harmony or coherence’ (54). He goes on to invoke multi-track recording technology as a metaphor for the model he endorses, where the agent has the means to attenuate or suppress elements in the overall mix in real time.

5.2 Sensory polyphony

What, then, does the term ‘polyphonic’ add to Dennett’s ‘multiple drafts’? The multi-stranded view I will propose benefits from mutual support whose valence can get lost if one element is detached and analysed in isolation. To amplify Opie’s characterization, polyphony is a texture in which several lines or voices sound simultaneously, in distinction from a texture where a single (monophonic) voice sounds, or in which a prominent voice is supported by one or more subsidiary, supporting (homophonic) voice. As the literary theorist Mikhail Bakhtin uses the term, polyphony suggests a kind of rowdy democracy, where voices compete for the reader’s attention so that interpretation is more actively a matter of continuing evaluative judgement than it might be in a more orthodox narrative where the reader is engaged in a relationship of trust with a singular, authoritative voice (Dentith 1995, 42). This, I think, is a reasonable approximation of Dennett’s model.

Bakhtin's usage is by analogy to the musical sense, in which the simultaneous sounding is actual and necessary. However, it is not enough merely to speak of events happening simultaneously. It is the way in which musical elements—pitch, pulse and melos—interact and support each other that matters here. These elements can and do interact satisfactorily without providing the support for extended rhetorical discourse. By analogy, classical and medieval painters were able to create approximations of perspective without access to the mathematical tool developed by Brunelleschi in the early 15th century.

The archaeological suggestion made by Roger Wibberley (2004a, 2004b) is that the 16th century reformation of tuning practice enabled a shift from a performers' art to a compositional (i.e., technologically engaged and remote) one. This occurred for two connected reasons. First, the pre-existing Pythagorean tuning system taught as part of the medieval quadrivium was highly somatic: that is, the rules for adjusting the relationship between one pitch and another had to be internalized and deployed in the act of performance. Second, the system intensified certain unpleasant dissonances. Under the reformed system, palliated dissonances became a discursive resource used to sustain a relationship with the notion of resolution, a concept that was expanded, as a result, from a singular point of stability to become a device of overarching structure.

The significance of this evolution in tuning practice concerns the function of meiosis. Most simply put, tuning is a term associated with optimization—especially where a lot of components are required to work successfully with each other under duress, as in an internal combustion engine. Etymologically, via 'tone', the word inherits the senses of 'stretching, tension, raising of voice ... exertion of physical or mental energy' (OED). This seems somewhat at odds with the familiar musical sense of being 'in tune', in which mastery over pitch is so fundamental to successful performance that the stresses entailed in achieving such mastery can easily be overlooked. The point of the polyphonic analogy is that it was not until the sixteenth century (approximately) that a tuning system emerged that was capable of supporting the functional harmony that we now take to be 'normal'. This system, perfected by Adrian Willaert as Wibberley (*op. cit.*) argues, was a simplification that permitted new kinds of complexity, an outcome of Rortian meiosis as discussed in part one. Rather than the medieval vocal model that Opie references, then, I would point to a particularly dense example of Bach 'on a good day', his intensely wrought 'St Anne' fugue BWV 522, in which five independent voice-led melodic lines are marshalled into a broader rhetorical shape by functional harmony supported by metrical coordination.

Such musical structures are neither ‘natural’, nor are they ‘artificial’. Rather, they are facilitated by the capacity to fashion nature into durable patterns. Crucially, the ability to conceptualize durability rests on intersubjectivity. It is because these resources are fashioned—*hand-made*—that the language of tools and technology is appropriate to the problem of understanding the relationship between the material reality of their existence and their subjective efficacy. The musical elements can each be organized and technologized. In respect of pulse, for instance, the practice of a West African drummer differs from that of a North Indian tabla player, who differs again from a European orchestral percussionist. The differences can be articulated in terms of an individual instance of performance, a single beat, being fixed in place by its institutional context—the apparatus that gives each genre its signature. In polyphonic consciousness, the various strands of sensory experience that are moulded into perception, reason and computation—the somatic faculties we tend to represent as quintessentially human—are similarly amenable to deconstruction and technologizing.

Cerebral structure is already present in Dennett’s model, and this structure is environmentally situated. However, little account is taken—at this point—of a social dimension intervening to create elements of the conscious experience under analysis. We cannot simply add ‘the social’ to the picture without being able to give a principled account of what the social dimension adds to a theory of consciousness. The argument through (though not necessarily of) Dunbar is that intersubjectivity precedes subjectivity. In other words, subjectivity is inconceivable without the potential for correlation (the positive sense of ‘what it is like’). If we wish to understand this complex phenomenon, we need to eschew the attractive short-cut afforded by the artefact of language—partly because it is as difficult to say *precisely* what language is as it is to say what consciousness is; we might suspect, further, that these two problems are intertwined.

Polyphony, to reiterate, involves not only stuff happening simultaneously, but it posits discrete, principled continuities, and implicates each of these in the co-creation of an apparently singular continuum whose antecedence and consequence depends on sustained coordination. One source of this insight is a simple analogy developed out of post-Turing research on mechanical computation, and relates to communication protocols. Computers, in the early days, were solitary, craft-built machines. Although an individual machine’s architecture generally followed the standard logic of the stored program and the separation of instructions and data, individual implementations varied. Once it became desirable to connect machines, a set of protocols evolved. Now we

have the Transmission Control Protocol/Internet Protocol, or TCP/IP for short. It is a layered suite of protocols—physical, data link, network, transport, presentation, session, application—with each layer providing a service to the layer above it, while each and all are implemented in the same single serial stream of binary digits.

The brain expresses an embodied physics that can be compared to this idea of layers exchanging services. In some degree, the brain performs this expression in any organism that possesses a brain, so that our definition of certain organic structures *as* a brain is in consequence of their capacity to perform in this way. A small range of resolutions have been found to be optimal for the gathering of environmental data:

- Touch is the basic, ‘original’ sensitivity to the immediate environment. It has several constituents: mechanoreception responding to pressure and vibrations; thermal reception; kinesthetic reception, or proprioception, monitoring our bodily disposition in space; and nociception, the sense of pain. Common to these is distribution throughout the body, whereas the remaining sense organs are all localized in the head:
- Smell and taste operate at the molecular level. That is to say, the cognitive reception of such data is initiated by the chemistry of molecular interaction.
- Sound is an emergent property of matter at the molecular level, being the manifestation of energy transmitted in the form of waves through fluid medium.
- Light, insofar as it answers wavy questions, is like sound except that the wavelength is much shorter and the frequency much faster, affording a much higher resolution and greater distance than the others; in terms of the processing resources needed to realize those benefits, these advantages are costly.

This embodied physics addresses the idea of polyphony as it applies to the singular organism’s experience of common sense. Rather than regarding one strand as being directly equivalent to a TCP/IP layer, the senses provide services to each other non-hierarchically.

Next, in order to get a sense of human sensory polyphony in an evolutionary context, we need to ask who or what has access to such services, and consider a variety of outlooks. We can envisage a multi-storied assemblage (not vastly different, in fact, from the scheme in Aristotle’s *De Anima*) that can simultaneously accommodate the breadth of a Churchland-style ecumenism and a Chalmers-style chauvinism. For Paul

Churchland, ‘the dynamical cognitive profile that constitutes consciousness has been the possession of terrestrial creatures since at least the early Jurassic’ (cited in Dennett 2006, 204). The Jurassic is the point of emergence for early mammals; presumably the somatic configuration Churchland has in mind is mammalian. Others, notably the proponents of quantum consciousness (principally Roger Penrose and Stuart Hameroff), go considerably further back along the line of last common ancestry:

Based on an upper limit of hundreds of milliseconds of sustained quantum coherence, the Orch OR model predicts a lower limit for consciousness at the level of about 300 neurons (e.g. small worms and urchins). A single-celled paramecium, while clever, seems unlikely to sustain sufficient quantum coherence to reach threshold for OR reduction (up to one minute would be required), and is thus unlikely to attain conscious experience (Hameroff 1998, 126).¹

David Chalmers, on the other hand, insists that the ‘hard problem of consciousness’ is missing from the story as Dennett presents it:

...an organism is conscious if there is something it is like to be that organism, and a mental state is conscious if there is something it is like to be in that state. Sometimes terms such as ‘phenomenal consciousness’ and ‘qualia’ are also used here, but I find it more natural to speak of ‘conscious experience’ or simply ‘experience’ (Chalmers 1995).²

So we have:

- Penrose’s Orch-OR liberalism (organisms as simple as the earthworm, but not simpler);
- Churchland-style ecumenism (mammals, emotional regulation; intersubjectivity);
- Chalmers-style chauvinism (introspective humans);

Most interestingly, we also have

- Gramsci’s political humanism, in which consciousness is something to be raised by humans behaving intentionally in particular, organized ways.

This last view informs the specifically technological aspects of modern consciousness that I discuss in part three. However, the idea here is that the tools we routinely use in the performance of consciousness have been carefully and patiently installed in us by

¹ Orch OR is an abbreviation of Orchestrated Objective Reduction, a theory that posits a specific form of quantum computation underlying neuronal synaptic activities. The proposed quantum computations occur in structures inside the brain’s neurons called microtubules.

² The paper, Facing Up to the Problem of Consciousness, appeared in the *Journal of Consciousness Studies* 2(3):200-19, 1995. Cited here is a version posted on Chalmers’ personal website.

others, and that this immersion in learning and acculturation is neither topic-neutral nor an externality in the matter of understanding human consciousness.

5.3 Psychological polyphony

Connecting sensory polyphony to the capacity of human organisms to experience a shared, consensual common sense requires a similar psychological polyphony. This is where the mind–tool ontology comes in. Dennett remarks that ‘words are tools for making more tools’ (1998, 6/10), a statement that we will need to interrogate at length in the next two chapters, with the same corrective as that applied to Ong’s ‘technologizing of the word’. For the moment, though, let us pay attention to the relationship between ‘words’ and the idea of narrative gravity foreshadowed in chapter 2.2.1. It arises usefully in the preamble to Dennett’s articulation of ‘multiple drafts’ in *Consciousness Explained*:

Consider the advantages of adopting the tactic of interpreting [Conan Doyle’s] texts as ...generators of a *theorist’s fiction* (which might, of course, prove to be true after all). The reader of the novel lets the text *constitute* a (fictional) world, a world determined by fiat by the text, exhaustively extrapolated as far as extrapolation will go and indeterminate beyond; our experimenter, the heterophenomenologist, lets the subject’s text *constitute* that subject’s *heterophenomenological world*, a world determined by fiat by the text (as interpreted) and indeterminate beyond. (1991, 81)

Dennett continues, ‘Heterophenomenological objects are like centres of gravity or the equator, *abstracta*, not *concreta* ... They are not idle fantasies but hard-working theorists’ fictions’ (95–6).

Dennett builds an analogy with the practices of fictioneers, comparing things that can be claimed to be ‘true’ of Sherlock Holmes’ London with things that cannot. We can say that Holmes lived in Baker Street, but not that he was a devoted family man (79–80). However, the assertion that there are no jet aircraft in Holmes’ London, is less firmly grounded. Conan Doyle may not have imagined aircraft, making the assertion about jets literally true, but other contemporary authors may have imagined aircraft in London—there is a spacecraft in the roughly contemporaneous London in which Jules Verne sets *From the Earth to the Moon* (albeit fired by a gun)—so Conan Doyle might have imagined Holmes imagining an aircraft and discounting the notion. It would have been a vague notion, to be sure, but that is the point.

The rhetorical style of Holmes adventures is such that the theorist can follow the salty fictional trajectory in comfort and safety; Holmes’s superior deductive skills are part of his charm. However, this Holmes persona is not ‘a’ text, but more of a gravitational phenomenon that emerges from a series of texts—not only those created by Conan

Doyle, but also by a series of actors (in the ordinary theatrical sense) and scriptwriters reinterpreting the originals. The idea of London, correspondingly, is inscribed in a series of iterations and interpretations in which Holmes's London is (approximately) one among many. Moreover, the Conan Doyle text is itself an ensemble of such gravitational phenomena. By analogy with Callon's obligatory passage point (OPP), we can deploy it as a pragmatic passage point (PPP), a device of moving-through in a similar way to the OPP, but with an important difference. The OPP tends to emerge relatively late in the process of enquiry, and represents a point of transition from abductive to inductive, where a number of hypotheses held by a number of actants converge and become a single, shared hypothesis; a stable perlocutionary array. By contrast, the heterophenomenological object being used as a PPP is more likely to be posited early in the process, and may well be eliminated entirely before the work is complete. Nevertheless, it shares with the OPP the potential for different epistemic trajectories to converge before moving through.

Returning, then, to the theme of psychological polyphony, I want to turn to a heterophenomenological object that is almost totally the inverse of Dennett's Conan Doyle, being (one might say) unreliable, charmless, and incoherent. Why? First, because the text in question presents with rich concision the model I want to use; second, because extracting this model from its context serves to exhibit the idea of intersubjective technology in action; third, because there are certain similarities between its author and Peirce, regarding the relationship of their personal performances of society to that of their *oeuvre*. In the narrative gravity analogy, such a text is more in the nature of a perlocutionary singularity; it is something *like* a mind-tool, but (presumably) more complicated. As a PPP, this text would be traversed differently by a historian, a philosopher, a psychologist or a novelist, but each of these actants would (hopefully) find themselves attuned (for different reasons) to the rhetorical service it is being asked to provide.

The text in question is William S. Burroughs' novel *The Western Lands*, specifically an early passage in which he introduces the Egyptian 'hierarchy of souls' (1988, 4–5). It is intriguing—in the same way that it is intriguing of Holmes's London—that something more or less true (in the sense of being historically authentic) should arise in a work of fiction. Correlated with the orthodox scholarship of Erik Hornung (1992, 167–85), Burroughs' scheme *is* more or less authentic, though his hierarchical arrangement owes somewhat to later influences, such as Aristotle's *De Anima* and the Hindu *Chakra* system. Particularly interesting, in relation to our pursuit of a distinction between

sensory and psychological ‘common sense’, is his simplification of a difficult aspect of Egyptian thought: he notes that the upper three souls ‘are eternal’ and ‘go back to heaven for a new vessel’. We can recast this in secular terms as a distinction between the somatic and extra-somatic properties of the individual. This resembles the orthodox notion of body–mind dualism closely enough to make its relevance clear while at the same time offering a fresh perspective on problems such as Chalmers’ ‘what it is like’ formulation cited above.

What problems are the seven souls the answer to? Generally speaking, Foucault’s vocabulary of resemblance and signature offers a useful perspective. Connected to that capacity to act remotely through time and space, though, is a peculiarity of the Egyptian climate that intervened significantly in ‘ancient’ funerary practice. Rather than decaying normally, buried cadavers could be subject to desiccation and natural mummification. When uncovered (‘reborn’) through climatic intervention, conjecturally, this phenomenon focused speculation about the nature of death and the possibility of a persistence of personality beyond—an otherwise common but vague facet of oral cultures—speculation that seeded the fabrication of a rough psychology. As a technology of mummification developed, so too did a literature—notably the Pyramid Texts (dating from around 2400 BCE), the Coffin Texts, the so-called Book of the Dead, and the Book of Breathings.³ What is striking about this rough psychology—as parsed by Burroughs—is its resemblance to a variety of present-day perspectives on problems in consciousness studies.

One thing I want to stress about these centres of narrative gravity is that rather than exhibiting hierarchy, they provide services to each other. Hence their relationship is polyphonic in the musical and not merely the literary sense.⁴ I do not claim that the seven form an exhaustive list, nor should any of these ‘lights’ be regarded as indivisible. To the contrary, since the polyphonic notion is suggested as an analytical approach rather than a realization, it is likely to be scalable to finer grains of detail from this interpretation of what we might call the molar illusion.

³ The term ‘book’ is misleading, because the texts mutated constantly around relatively stable themes.

⁴ Musicians in the north Indian traditions use the term ‘light’ where we might use the word ‘note’ as the gravitational focus. The sense suggests the light that attracts the moth, and the note a point of stability such as at the centre of a Lorenz attractor.

Sekhu: the remains—Dennett’s robots or Chalmers’ zombies. Although these two thinkers use the stated terms to pursue contrary lines of argument, their paths cross at this fundamental notion of material reality universally founded on the replicative property of DNA.

Khaibit: the shadow (Noë *et al.*)—human physiology conserves configurations that have succeeded in a variety of environments foreign to our own. Taking locomotion to be implicated in the ground-floor level of consciousness, Alva Noë says that ‘perception is not something that happens to us, or in us. It is something we do’ (2006, 1). He goes on: ‘To be a perceiver is to understand, implicitly, the effects of movement on sensory stimulation.’

Ka: the double—mirror neurons (Rizzolatti *et al.*). The mirror neuron system’s functionality corresponds more to the idea of rehearsal and shadowing than to the kind of precise replication that mirroring implies. It seems to be implicated in operationalizing the kind of intersubjectivity that dawns in mammals and which justifies the breadth of Churchland’s reach.

Ba: the heart—emotion (Damasio). The basic stand/run away instinct is stabilized by an increasingly elaborate attunement to the physiological states we are accustomed to calling emotions. Antonio Damasio (1995, 2000) has shown how important a role emotions play in the regulating and management of cognition. These emotions are implicated in the experience of the ‘gut feeling’ Dennett speaks of.

These four ‘lights’ are explicitly somatic and enactive. That is, our account of their relationship to each other is focused on their role in enacting bodily consciousness. They are closely bound to the services provided by sensory polyphony. The remaining three ‘lights’ exploit these enactive modes, but project their services out into the environment in a process of reciprocal feedback and performance. Hence they constitute a performative modulation of the enactive, and operationalize the intersubjective experience of psychological conspecificity:

Khu: the guardian angel – experience/acclimation/education. The achievement (or not) of performativity, in Austin’s sense of a happy or unhappy action, depends on attunement to social environmental contexts in a way that harks back to the Aristotelian concept of *eudaemonia*, whose literal meaning ‘good spirits’ can be regarded as the essence abstracted from the actual people performing the actual feedback received in context. Looked at from a different perspective, we can see the idea of a sense of place

as being composed of a spatial, mapping dimension, a temporal, historical dimension, and a metaphysical dimension that more closely concerns one's personal orientation to the social dynamics of one's immediate environment. Let us say that the outcome, and continuing expression, of these processes is *skilled engagement*.

Sekem: energy, power, light – reward neurochemistry. Here we can connect Austinian happiness with Damasian emotional states through recent (cerebroscopic) work by Read Montague & colleagues on the neurochemistry of reward (Montague et al., 2006). The brain needs to represent available choices in terms that enable the calculation of differential value, evaluating both near and distant reward potentials—near or far, that is, in both spatial and temporal senses. Following Gomart's work on addiction, (2004, 85), the organism establishes 'dependability', becoming a functional member of society and not someone who is diverted from performing society towards instead performing self-indulgence. Regarding the self-absorption associated with creative practice, the practitioner, and society, must mutually (though not necessarily contiguously) evaluate near and distant reward potentials.

Ren: the director – the confluence of hylozoism and the demiurge; the technologizing of intersubjectivity. The sense that these enactive and performative constituents are subject to a coordinating discipline is difficult to resist. *A fortiori* it is difficult to resist making an appeal to language (at least to oral language) as the means by which coordination is operationalized. However, as I have already argued, Dennett's heterophenomenology invites us to include language as one kind of evidence for the functionality we seek to understand, and therefore to consider its semiotic basis in the physiological attributes of the organism. After all, as Tomasello *et al.* remark,

saying that only humans have language is like saying that only humans build skyscrapers, when the fact is that only humans (among primates) build freestanding shelters at all. Language is not basic; it is derived. It rests on the same underlying cognitive and social skills that lead infants to point to things and show things to other people declaratively and informatively, in a way that other primates do not do, and that lead them to engage in collaborative and joint attentional activities with others of a kind that are also unique among primates (Tomasello *et al.* 2005, 690).

Whether we want to call this kind of intersubjective exchange a technological artefact is—at this point—moot. Some might wish to reserve to the concept of technology an explicit intentional dimension. Others might be willing to acknowledge that the key characteristic differentiating technology from naïve tool-use is a path-dependent lock-in that in time privileges certain types, or even brands, of tool over others. Thus the emergence of distinct languages and semiotic systems is accounted for under the term 'technology' whether originally guided by intention or not. Nevertheless, granting that

the term ‘intersubjective technology’ may be appropriate at some level of analogy, to go further would be to imply that first subjectivity had to become technologized, which would be a harder claim to substantiate. That would be to suppose, however, that subjectivity preceded *intersubjectivity*, evolutionarily speaking. There are grounds to suppose that it was the other way around, so that subjectivity is a technology that intersubjectivity affords. For present purposes, it is useful to be able to conceptualize consciousness as a suite of capabilities that, in concert, supports the progression through intention to what I am calling ‘recombinant intentionality’—an intentionality that is supported by shared, skilled interventions in the environment.

5.4 Semiotic polyphony

Hence the notion of semiotic polyphony. Like psychological polyphony, this is a notion with ancient roots—the pre-Socratic doctrine of hylozoism, ‘which sees in nature a living force and regards its processes and continuous alterations as spontaneous developments of life’ (Hammond 1895, 402). Heraclitus even anticipates the significance of thermodynamics in present-day autocatalytic notions about the nature of life:

The principle of fire, which is the concrete correlate of the metaphysical notion of life, is for Heraclitus the ultimate essence. This is in constant mutation and activity; the world is a process. There is nothing stationary, no fixed Being; all is Becoming, and this is figured forth in the restless, mobile, altering, and consuming fire (*ibid.*, 404).

The idea of harnessing and quantizing this flux through the concept of the mind–tool has definite attractions, but these entail hazards.

As Jeffrey Goldstein points out, the hylozoic view, which finds life and therefore continuity in all matter, spares us the need for the ‘magical’ addition of *élan vital* (2003, 297). The cost, however, is an appeal to a primordialism that displaces rather than solves the problems at issue. Goldstein discusses Varela’s autopoiesis and Goertzel’s self-generating cognitive systems as exemplifying the seductiveness of hylozoism:

Like Varela’s hylozoist strategy of explaining organic referential closure by appeal to an algebra of self-referentiality, Goertzel hylozoistically explains cognitive referential closure through the positing of a primordial self-referentiality in the form of hypersets (304).

Unfortunately,

...although both autopoiesis and self-generation may be plausible models of referentially closed systems, as far as viable models of emergence go, they are seriously deficient for they amount to emergents emerging by their own bootstraps! (305)

Because the phrase “all the way down” recurs hereabouts, the term ‘quantize’ occurs as a provisional solution to the quest for closure on the assumption that the quantum-

mechanical world is adjacent to the bottom of “all the way down”. There, Max Planck discovered that ‘a quantum of energy is indivisible. An oscillator cannot receive a fraction of a quantum of energy; it must be all or nothing’ (Kumar 2008, 26). It is not indivisibility that is relevant to the model of semiotic polyphony I propose to elaborate, although it is conceivably the end envisaged in functional enquiry. Rather, it is the emergence of a particular problem associated with the observation of quantum phenomena—the uncertainty principle, which states that it is not possible to measure beyond a finite degree of accuracy certain pairs of observables such as position and momentum *simultaneously* (*ibid.*, 385)—which pursues the problem of ascribing function “all the way up” and everywhere else besides.

In order to develop Dennett and Clark’s notion of the mind–tool as the ‘note’ articulating semiotic polyphony, we will need to pay close attention to the meanings of both terms, ‘mind’ and ‘tool’. Although Rorty has already to some extent counterfeited the question as it relates to ‘mind’, retaining the common-sense usage has residual value in illuminating the term’s political dimension. What we mean by using the term ‘mind’ has certain interesting similarities both with what we mean by using the term ‘institution’, and with the notion of *dispositif* discussed in part one. I will pursue the parallel in section 5.4.2 below. The uncertainty issue arises in relation to the nature of the tool, the exploration of which entails attention to the concept of function. Clark (1999) cites one of two papers by Beth Preston that jointly argue for a pluralist theory of function, which I will characterize as a relationship between ‘system function’ and ‘selected function’, the former being causal and atemporal, the latter being temporal and acausal. Preston’s thinking enables us to be permissive in our definition of a tool so as to refuse a somatic boundary between found (or made) objects in the environment, the exploitation of physical attributes such as hands, and abstract constructs supported or scaffolded by these resources.

In part one I argued that “The relationship between *dispositif* and *interesement* constitutes a sort of ‘perlocutionary lens’ acting to focus and guide the subjectivity of the mobilized” (p. 64). The useless tool model depends on the transitive performance of perlocutionary lenses, which, composed in arrays, enable the interpretant to ‘fetch’ a dynamic interpretation of experiential flux in real time. Just using the term ‘tool’ implies that a performative dimension has been foundational in its conception. Adopting a typo found in Clark’s manuscript, we can say that tools-are-*use*. I prefer the term ‘environmental coupling’, however. When Andy Clark asks of Daniel Dennett: ‘could it really be mind-tools *all the way* down?’ (1999, 2/29), I have no difficulty replying,

without feeling contradictory, “yes, it is environmental coupling all the way *up*”. This is peripherally a matter of one tool being coupled to another, but what is coupled “all the way up” is a relationship between ‘system function’ and ‘selected function’ that I will elaborate presently. I represent this parity with the en dash joining the terms ‘mind’ and ‘tool’ in a from–to relationship. In Clark’s paper ‘mind-tool’ is a hyphenated compound noun.

In developing his mind–tool argument, Clark draws on three perspectives that supplement the notion of parity just advanced. Via Preston he adduces the Heideggerian notion of equipment; he draws on James Gibson’s notion of affordance (which would have been useful to Preston); and he brings in Stanislaus Dehaene’s work on the human capacity for mathematical intuition. Between them, these perspectives help to build an alternative, or rather corollary, story to the overly neat idea of higher-level intentionality endorsed by Dennett and also by Robin Dunbar, which will carry us forward into the next chapter. To get there, though, we need to develop Preston’s pluralist theory of function.

5.4.1 What is a tool?

5.4.1.1 Selected function and system function

Recalling the modalities Dennett proposed in *Consciousness Explained*, the Stalinist and the Orwellian, the former might be regarded as ‘proto-nominalist’ and the latter as ‘proto-essentialist’, making the point between them that both dynamics are in play. However, having first found Dennett’s labels unsatisfactory, the task of abstracting terms that replace them with reusable theoretical passage points suggests not the straightforward opposition between two terms, but rather a polyphonically interwoven relationship between three: the **spectral**, the **temporal**, and the **ordinal**.

I first abstracted a pair of concepts, the ordinal and the adaptive, in place of Stalinist and Orwellian. These seem to fit neatly with Clark’s discussion of code-switching in the context of human numerical cognition (1999, 13/15). In extended dialogue with Dehaene’s work, Clark cites research carried out with English/Russian bilinguals where subjects were trained and then tested in tasks, firstly with the training and testing taking place in the same language, and then with the training being done in one language and the test presented in the other. The researchers discovered that where the tasks required exactitude, subjects’ performances between the two modes of presentation showed significant difference, but where the tasks required only an approximation, the mode of

presentation showed no difference. This lends support to the view that exact calculation is language-dependent; approximation is visuo-spatial, and non-verbal. The idea of ‘ordinal’ is linked to this notion of exactitude, and ‘adaptive’, correspondingly to that of approximation, although it may be felt that the assertion of a human viewpoint begs an important question regarding the nature of function.

Regarding the ordinal, there are a number of similar terms etymologically related to the Latin root *ordō*, which together constitute the general sense-area:

order ...classical Latin *ordō* regularity of procedure, established method or practice (cf. *extraordinem* out of order), sequence, succession, orderly arrangement, disposition of troops

ordinary ...common to a large number of people (1615), which does not exceed the ordinary level, average (1675), everyday, non-technical, of modest social standing (1864) and their etymon classical Latin *ordinarius* regular, orderly, customary, usual, arranged in regular lines or courses (OED)

I choose ‘ordinal’ because it shares the somatically-centred sense of continuing evaluation conveyed by the two definitions above, specifically in the context of Catholic ritual, where it is counterposed by the ‘proper’—a matter whose significance will become apparent in due course. At the same time it has a specific technical meaning:

ordinal, a. and n.² ... 2. Marking position in an order or series; applied to those numbers which refer something to a certain place in a series (e.g. first, second, third, etc.)

Ordinality is a *tendency to find order*, more loosely a tendency to attune discrete items to form a singular narrative progression. Although this idea fits the native human mind well, the more important context is in basic physics: a *closed* thermodynamic system tends toward a state of perfect disorderly equilibrium, in which material elements are distributed in consequence of the statistical tendency of the system to pass randomly through all possible arrangements (the so-called ergodic hypothesis: Kauffman 1995, 9–10). The universe is supposed to be such a system, but our solar system is not. What can happen in an *open* system of Earth’s scale, given material diversity and the sustained throughput of energy, is that local equilibria can temporarily skew the progress from low to high entropy. From a human perspective, such equilibria can be immensely durable: the sun has been there, physicists tell us, for a few billion years, and will still be there in a few billion years’ time. In the same way that mind–tools are conceived as affording relationships that fit our physical equipment, so too does the kind of order we find tend to fit the equipment we find it with.

The adaptive seems to be a process of mediation between early drafts of ordinal hypotheses, operationalizing the editorial process that Dennett posits in his ‘Orwellian’ mode. We are most confident of functional ascriptions, however, once the tuning has

been done. It is the realization that, from certain perspectives, tuning is *never* finally ‘done’ that urges the necessity of a further distinction between the temporal and the spectral. The insight is related, once more, to the musical allegory—this time, to the harmonic series and Pythagorean tuning. The harmonic series is a straightforward functional property of vibration. Vibration, in turn, has been exploited in natural history as a sensory resource that humans and others use to capture information about the local environment. The point of interest is the relationship between exactitude and approximation in the way humans exploit this native facility in the practice of music-making and the extended cultural experiences that revolve around it.

On a modern equal-temperament piano keyboard, cycling through a sequence of fifths leads, after twelve steps, back to a pitch that is mathematically similar to the fundamental. That is, it is identical apart from its octave displacement. But if you take a string and divide it in three, then repeat that process of division twelve times, you end up not with the mathematically similar pitch but an ordinary, close-but-no-cigar similarity, displaced from the original fundamental by an interval known as the Pythagorean comma.⁵ The implied conclusion is that any musical tuning system—including the Pythagorean—is derived. There is no ideal system of which any other system is a corruption. Tuning in the musical sense refers to the establishment of a dynamically derived equilibrium—a spectral accommodation—rather than an intrinsic ‘perfect’ property of acoustic physics.

That brings us to the first of Beth Preston’s papers (1998a) where she analyses Ruth Garrett Millikan’s distinction (1984, 1993) between system function and proper function. This distinction illuminates the relationship I propose between the spectral and the temporal, but first we need to review the issue. Preston glosses Millikan’s argument thus:

... biological traits, language devices, and tools are alike in three very important respects. They all have functions that they sometimes fail to serve; they all have forms that are ... arbitrary in relation to their functions; and they all have *proper functions*—that is, there is something specific they are supposed to do, even though they may never perform this function, or may be temporarily coopted for some other use (215).

⁵ The ‘syntonic comma’ discussed by Wibberly (*op. cit.*) is the smaller difference between a major third made from four justly tuned perfect fifths (e.g. from the viola’s C string to the violin’s E string), and from two octaves plus a major third (equivalent to the relationship between fundamental and fourth harmonic), where ‘just intonation’ is a tuning where intervals’ relationships are governed by whole-number ratios.

Preston goes on to note that the function of artefacts is held to be so transparently obvious [among function theorists] that no one has bothered to examine the matter at any length. The problem for design-oriented accounts of function-ascription is to draw the function–accident distinction in the right way (218). It has no bearing on the ‘proper’ function of the heart—which is to pump blood—that it makes a noise in doing so. Nevertheless, to a skilled listener, the noises a heart makes can have characteristics that enable the listener to draw specific conclusions regarding the health of the owner, giving the heart an additional diagnostic function. The theorists’ solution to this is to consider the heart’s function to belong to the circulatory system for the purposes of pumping blood, and also to a putative diagnostic system if and when it is used in this way.

The weakness of system function as a concept is that it transfers the specifically human blend of teleology and intention to the arena of natural history. Things—especially machines—made by humans have system functions because they are designed in that way. The temptation to transfer the idea of ‘design’ to nature is strong, and to some extent justified, but it brings with it the presumption of ‘a designer’. If we want to resist the latter, we ought to resist the former. The notion of proper function offers an avenue of escape, but one with its own hazards.

The relationship between the heart’s blood-pumping and noise-making is a recurrent trope in the literature, probably because the noise-making attributes have attracted our attention in a variety of ways for longer, historically, than have the purely functional pumping attributes. Eliminating these various metaphysical attributes is obviously necessary in a purely biological account of function, but, equally obviously, the word ‘heart’ then becomes a passage point that simplifies a number of material trajectories such as the function of stem cells in building the organ, and abstract trajectories such as the function of rhythm. Once these trajectories open their multiple paths, it is less easy to establish that the *proper function* of ‘the heart’ is to pump blood.⁶

⁶ Millikan had earlier used the term ‘selected function’, adopting the later term presumably for grammatical reasons beyond the etymology of the respective terms—it is more fluent to speak of ‘derived proper function’ than ‘derived selected function’ since ‘derived’ and ‘selected’ joined in this way would make the second term seem a half-pleonastic second thought. I believe that the original term expresses the evolutionary issue in a more satisfactory way, since ‘proper’ implies teleology, however much the theorist might protest that it is professionally understood not to do so.

Addressing the problem of failure-to-function, Larry Wright (1973) is concerned that a functional account should draw the function/accident distinction in the right way. The fact that a belt buckle deflected a bullet, he argues, doesn't make it the belt's function to deflect bullets. In this artificially simple example his case is reasonable, but a parallel in poker argot is instructive: a 'gut-buster' draw is one that the player is statistically unlikely to fill; in the event that it is filled, it is the opponent whose gut receives the blow. Although it is a statistically unlikely outcome, it is nevertheless a *statistically* possible—i.e. rationally repeatable—outcome. In Wright's example, the relationship between the relative properties of the bullet and the buckle (density, tensile strength and so on) give a *functional* account of the outcome that is similarly rationally repeatable, while the question of why the wearer put on the belt (and became exposed to flying bullets) will remain a question about *intention*. This is an important distinction (though not one that Wright makes), because, as Preston notes, Millikan's goal is a functionalist account of intentionality (223). To twist this slightly, what is sought is a functionalist account of *intentionality* that incorporates *risk*, and is therefore not merely correlative in an indexical sense, but fully ordinal, in the Peircean sense of thirdness.

Wright's concern foreshadows the difficulty that the concept of exaptation introduces. An adaptation is presumed to be a feature 'built' by selection for its current role, whereas an exaptation is a characteristic that emerged for other purposes or no purpose at all, which has been 'coopted' to its current role—it is an evolution of Gould & Lewontin's 'spandrel effect' (Preston 1998a, 226–7; Gould & Vrba 1982). There is something unsatisfactory about the legalistic presumption that clear and unambiguous priority and relative weight can be established and ascribed in complex systems at the root of the problem Preston seeks to uncover. Is it the function speaking, or the theorist? James Gibson remarks that

A wildcat may be hard to distinguish from a cat, and a thief may look like an honest person. When Koffka asserted that "each thing says what it is," he failed to mention that it may lie. More exactly, a thing may not look like what it is (Gibson 1986, 143).

In the human domain, making functional ascriptions runs the hazard of misreading skeuomorphic phenomena. These are instances where form is preserved but function is changed. Generally speaking the preserved form is semiotically rather than semantically functional: a fibreglass boat hull might be shaped to look like a clinker-built wooden hull, purely to 'sell' the item to a prospective owner who might want the 'authentic look' but not the authentic price. However, the QWERTY layout of my computer keyboard, though *mechanically* redundant, retains a functional connection with the old typewriter

keyboards through lock-in mechanisms such as the teaching regime in which I learned to touch-type (*cf.* 9.3 below). It is a skeuomorphic eigenvector.

The solution suggested by Preston is that both a system-function and a selected-function account of the focal matter is necessary for an adequate general theory. Here the point of the ordinal/temporal/spectral distinction emerges: selected function is *acausal* and *temporal*; system function is *causal* and *atemporal*. In other words, the way in which relational performance of contributory factors is expressed in time has a critical bearing. Ultimately, the approach to a satisfactory settlement is likely to require an abductive interplay between the two; a spectral attunement or *spectral binding*. Note that the claim is not that there are two *kinds* of function, selected and system. Rather, the claim is that analysis of function leads ultimately to a point where certainty about one of these two functional aspects must be secured at the expense of certainty about the other.

In both cases there is an assemblage of lawful material relationships under analysis, but we need to pay attention to the emphases that differentiate one approach from the other. Stories involving **selected function** tend to be found in natural history, where we assume that there has been a once-and-only selection event that ‘caused’ the phenomenon under observation to stabilize (though an ‘event’ might last thousands of years). Moreover, there was something ‘random’ about the particular environmental circumstances. This is an issue that scales from the behaviour of sub-atomic particles to deep layers of Polyà-locked variables, and correlates with Peirce’s stress on the firstness of chance. Stories involving **system function** tend to be found in contexts where the human perspective is central, in particular where relationships between working parts are intentionally ordained. Here, physical laws of cause and effect predominate, and are taken to govern the model so that in any iteration the prescribed set of relationships will reliably reproduce their performance. Although an iteration is expressed through time, the explanation is made in *movie* time.

Referencing the 1926 debate between Einstein and Bergson (Bergson 1999), C-time is the fundamental, universal *constant* related to the speed of light. S-time is the *subjective* experience of the passage of time, what can be termed ‘somatic metre’. Not only is the human body (like other organic bodies) highly rhythmic in its coordination, but it is attuned to numerous external periodicities such as the diurnal, lunar and annual cycles. Human S-time is also sensitive to the attunements of other humans, both in short-term entrainments such as musical performance, and in long-term, ingrained intersubjective

coordinations such as speech. Although this experience of time is governed by, and exists in, C-time, the variability of expression, both between individuals and within individuals, enables humans to become aware of the possibility of the third kind of time, which I call ‘movie-time’ or M-time. This too is derived from C-time, but on the face of it the capacity to edit, re-run, reverse, juxtapose and randomly jumble causal fragments—sometimes voluntarily, sometimes accidentally—is a distinctively human capacity, especially when deliberately bound to environmental signs sculpted to afford cognitive support. It is likely, however, that many such fragments of extended causality have been jumbled and randomly juxtaposed over the course of evolutionary history.

Bergson did not argue his point with Einstein in this way, and his cinematographic analogy was intended to be a criticism of nominalist mechanism rather than an endorsement. The allusion to film theory affirms a philosophical connection that has evolved out of his work (including Deleuze’s contribution to the theory of the *dispositif*) perhaps in spite of Bergson’s original intent. If the distinctions between C-time, S-time and M-time seem excessively sharp, perhaps it is useful to correlate the progression with the way Platonic *symploke* impinges on Peircean agapism (cf. 1.3, especially the concluding paragraph). In other words, it is a progression towards an increasingly rich temporal expression of semiotic *entanglement*.

5.4.1.2 Tools, affordance and equipment

Something is still missing, however, and perhaps it is best understood in terms of the gravitational pull between functional elements in the context of action planning. Let me tentatively label this pulling as ‘fetch’. In part this concept draws on Deleuze’s naturalistic interpretation of Bergson regarding intension, which he represents in terms reminiscent of muscular contraction and relaxation (1988, 18–19; 75–6). Here I want to stress that the elements that gather in the Deleuzian notion of intension are not elementary particles, but nodes of semiotic valence infused with hylozoic potential. In part, too, ‘fetch’ draws on the anthropology of the gift, specifically the Maori concept of *hau*. The routine gloss is ‘wind’, but John Frow (1997, 109–10) reports Tamati Ranaipiri explaining that the term’s meaning is more a matter of metaphysical force of obligation—a sense of push to intension’s pull.

Fetch is a sort of supervenient double-entendre composed of the simple go-get sense of fetch, and a more obscure, metrological sense that relates wind speed, duration and direction to distance over water in accounting for the size of waves. Fetch is the distance over which the wind blows from the same direction. A larger fetch makes

bigger and longer waves, other things being equal. In a sheltered location, waves will be much smaller and shorter, which can make them quite steep. Fetch, then, conflates the necessity of doing with the impact of doing it. Significantly, from the perspective of developing a functional account of intention, this sense of fetch needs to be inferred from the context in which it arises. It is effectively the lens through which the causal-atemporal system function must pass in order to take the sense of acausal-temporal selected function. To put it more simply, fetch refers to the simple human performance of cognition in M-time.

What the term is useful *for* concerns the problem of analysing intention. Although that is a topic for the next chapter, the groundwork begins here by using the term to operationalize the relationship between the notion of a tool and that of affordance. So far, we have taken apart and reassembled the term ‘function’, but paid no attention to the term ‘tool’. As Preston argues, the term has been somewhat taken for granted by functional theorists. What is a tool? There is a question that links the social to the ecological hypotheses reviewed by Dunbar (*cf.* 4.2 above). How far ahead can primates plan action? The notion of fetch addresses the assembly of elements constituting an arc of intensional duration that can be conceived in terms of a direct relationship between plan and action. It is an issue that brings into focus what is at stake in the shift from an entirely somatic modality to one scaffolded by extra-somatic resources. At the outset, the advantage conferred by the incorporation of extra-somatic resources may be slight but nonetheless telling.

The performative modulation of the enactive posited previously left out the problem of understanding the relationship of consciousness to mind. Implicitly, though, if the *dispositif* story is to carry weight then mind, perhaps as a higher-resolution version of consciousness, needs to *move through* the performative and into language. To understand Austin’s performative in this way is to reconfigure it as a sort of linguistic analogue to the so-called ‘lizard brain’, a primitive antecedent that has been subjected to meliorized stochastic elaboration. As we saw, ‘perlocutionary’ is the term Austin coins for the class of utterances in which change is effected in the witness to the satisfaction of the speaker—common examples are persuading or frightening—where the witness ascribes responsibility to the speaker (1976, VII). The idea that the speaker must first gather and filter the thoughts that substantiate the utterance is what connects it to Peirce’s *deloma*, the moment of making something known to one’s self. The utterance is an act of fabrication, but in being an act it is part of a performance and therefore difficult (if not impossible) to atomize—or rather, to bring to a close.

As previously remarked (p. 47), Austin's performative can be seen as an elaborate attempt to scaffold the translation process by which homeostatic immediacy can reach beyond the present. One dimension is intention, another is signification, and meaning is a co-creation that must precariously negotiate the scaffolding as it moves between actants (Foley 1997, 5–11). The scaffolding is not, of course, neutral, and that is where the 'mind–tool' ontology comes into its own. As Andy Clark puts it:

The idea that external items can augment and scaffold both behavior and thought is pretty evidently true, and arguably of deep importance. ... the way such tools work is by affording the kinds of inner reasoning and outer manipulation that *fit* our brains, bodies and evolutionary heritage. (1999, 3/15)

The concept of affordance recruited here has been adapted from the work of psychologist James Gibson to help with the analysis of tool use in non-human primates by capturing 'action possibilities' available objectively in the environment. It arises referentially in relation to a body of thought that is concerned with making a distinction between objects that may be useful, and objects that have been purposively shaped to be useful.

Observing a chimpanzee probe a termite mound with a branch and then eat the insects that it manages to pull out, we are disposed to categorise this behavioural tactic as tool-use. But if a cat uses that same branch to sharpen its claws, is the branch still a tool? We are creeping up on the problem of intentionality and the confusingly related problem of the forming of intension: the chimpanzee's selection criterion is more stringent than the cat's, for whom texture alone is sufficient to afford the necessary sharpening utility, and for whom a variety of shapes and sizes will do. Moreover, sharp claws are handy no doubt, but we do not suppose that the cat conceives the sharpening teleologically with the purpose of preparing for a specific hunting expedition. The chimpanzee, however, selects a branch that is the right size to fit holes in the termite mound, and does not do this by trial and error but rather seems to have a preconceived sense of suitability criteria. Recalling Dunbar's gradient difference between monkeys and apes, we can compare the chimpanzee's tool use with that of Capuchin monkeys. These can learn, in experimental conditions, to break open nuts with a stone, and to prise out the kernel with a stick. However, they repeatedly lose the distinction and start trying to break the nut with the stick, or to prise out the kernel with the stone (Byrne 1997, 296–7). Somewhere between the cat and the ape is a transition from affordance to tool, but again the relationship is one of modulation.

Gibson introduced the term 'affordance' (1966), (1982), (1986) to capture a dynamic relationship between animal and environment that no previously existing term satisfied.

Although there is a degree of similarity with *aretē*, the classical term identifies an essence that was supposed to exist independently of any given iteration. Gibson's term was coined in response to a notion in Gestalt psychology which held that the 'valence of an object was bestowed upon it by a need of the observer, and a corresponding tension in his field' (1982, 409).

In contrast, the *affordances* of something is assumed *not* to change as the need of the observer changes. The edibility of a substance for an animal does not depend on the hunger of the animal. The walk-on-ability of a surface exists whether or not the animal walks on it (although it has links to the locomotor capacities of that species of animal, its action system) (*loc. cit.*).

For instance, while the probing potential of the branch referenced previously is available to the chimp but not the cat, its probing affordance is available independently of either animal's capacity to exploit it.

When we come to adapting this perspective to the nature of the tool, a problem arises. A bird may use a stone as an anvil to break the shell of a snail, or it may, in effect, use the snail as the anvil and the stone as a hammer. In both cases, we are content to treat these behaviours as being analogous to tool-use. But what if a larger bird ingests the stone and uses it, in its crop, to assist with the digestion of food. Is that still tool use? The same relative durability is being exploited in each case, so why should the crossing of the somatic boundary implicitly change our sense of function?

Clark develops this transparency, referencing Beth Preston (1998b) and ultimately Heidegger, by refusing an inside/outside distinction, instead endorsing 'a function-based account in which bodily parts (e.g. hands) and biological cognitive elements (e.g. biological memory) end up on a par with rakes and shopping lists' (7/15).

Here, then, is a point to ponder: does Dennett's story imply the breakdown of the distinction between 'thinking with a tool (e.g. English)' and 'thinking in a code' (e.g. Mentalese)?

... One cost of such a breakdown looks likely to be the consequential lack of any clear distinction between the tools and the user.

Instead, a loose coalition of tools (or 'skill-supporting components') together support the range of flexible engagements and responses characteristic of intelligence and thought. (*ibid.*)

'Skill-supporting components' is a happy way of putting it, though it recruits the sense of coalition perhaps too readily, leaving a question concerning the location of the point of intervention where appropriation, the reflexive step beyond affordance, may lie. Maybe the story looks something like this: given an incorrigibly self-contained initial move that we can call adductive inflation, skill obtains in the appropriate application of inductive deflation (or meiosis); skill-supporting components, therefore, impinge on this process by guiding the subject towards the right inductive course at the right time.

Unfortunately, meiosis can also be construed in terms of distillation, a process that yields essences—abstractions that inherit the vagueness of the medium from which they are distilled. Yet these abstractions appear capable of being exploited as though they are material objects in the conventional sense of a tool-object. It would be useful to conceive terminology that effects a reliably reproducible material–semiotic link, some kind of multiplanar *transaffordance*.

The price of such a link is, to paraphrase Clark, the breakdown of the somatic boundary. For some this is an elimination too far (see, for example, Fodor 2009); fences make good neighbours. However, there is good reason to pay up: Preston’s (1998b) case builds on a Heideggerian language of equipment to critique the standard ethological definition of tool use, which, she argues, ‘involves itself in insuperable difficulties precisely because it adheres to individualistic assumptions’ (514). The notion of semiotic polyphony, by stressing the mutual support that separate narrative trajectories afford each other as they develop and express themselves, identifies the emergent ‘tool’ with the ‘pragmatic passage point’. A problem with Aristotelian hylomorphism is that the master narrative trajectory is open and ultimately, therefore, unfinalizable. Preston’s reading of Heidegger points towards a means of accommodating the many partial closures we experience at the human scale within this open narrative.

‘Equipment’ renders the German *Zeug*, widely translated as ‘stuff’, which Heidegger uses in a way that embraces pejorative connotations—such as ‘litter’—available under the term (Heidegger 1962, 97–8).⁷ Everything has *Zeug*-potential; the term is neither singular nor plural. However, practically speaking, ‘everything’ is the *local* environment, the *Umwelt*, where things are ‘ready-to-hand’. Preston (1998a, 237) discusses the knife—a familiar implement in the function literature—as a tool that affords digging (when planting out seedlings), or screwing (in the absence of a screwdriver), or crushing (when peeling garlic), in addition to whatever cutting excellence the knife may have. Regarding this item as a thin-strip-of-metal-attached-to-a-handle is uneconomic, cognitively speaking. The term ‘knife’ quickly identifies general characteristics and some sense of ‘proper’ usage. Trusting this proper name to exhaust the totality of the item’s valence, however, is uneconomic in a different way. Insisting on its knifeness may deny the user the item’s utility on the occasions when it could be used as a screwdriver. Categorizing

⁷ Heidegger traces his usage to the Greek *pragmata*, ‘things’, which have to do with ‘concernful dealings, *praxis*’ (1962, 96).

the knife as a skeuomorph when it is used ‘improperly’ seems uneconomic in a third way, since it depends on there being a ‘proper’ implement to use for which the knife has been skeuomorphically substituted.

Equipment, then, is intermediary between nominal rigour and pure flux in a way that accords with Peircean thirdness, because it signifies a regime in which item and user are bound economically to relationships with other items and users. Heidegger says:

Equipment—in accordance with its equipmentality—always is *in terms of* its belonging to other equipment: ink-stand, pen, ink, paper, blotting pad, table, lamp, furniture, windows, door, room. ... What we encounter as closest to us ... is the room; and we encounter it not as something ‘between four walls’ in a geometrical spatial sense, but as equipment for residing (*loc. cit.*).

Preston develops the point by enumerating ways in which Heidegger deals with binding:

Heidegger mentions three basic types of assignments: assignment to the work produced by using the equipment (its ‘towards-which’ in Heidegger’s terminology); assignment to the user (its ‘for-the-sake-of-which’); and assignment to the raw material (its ‘where-of’) (1998b, 529).

Further, ‘there is a relationship of mutual constraint between the “towards-which” and the “where-of” of any item of equipment’ (532), and this sense of attunement feeds into theorizing the composition of bound relationships.

5.4.1.3 Individuation

There is an incipient problem in Heidegger’s ‘ready-to-hand’ (*Zuhanden*), concerning the suspicion that the ‘hand’ element begs a question about *Dasein* (Being, which is Heidegger’s organizing concept). Is ready-to-hand something available only to hand-havers? Surely a hand is just like a knife in this respect? The abstraction of Heidegger’s language generally succeeds in avoiding such questions, but the hand’s dual implication in pointing (indicating intention, *cf.* Burroughs’ ‘Director’, p. 100 above) and manipulation requires further analysis. Preston notes the relationship in Heidegger between ready-to-hand and present-at-hand, saying that

An entity is ready-to-hand when it is encountered by *Dasein* in terms of its functionality. An entity becomes present-at-hand when this functionality is ignored in order to encounter the entity ‘objectively’ in a detached, theoretical way. On Heidegger’s view, presence-at-hand is a secondary mode of encounter, parasitic on first encountering the world as ready-to-hand (534, fn15).

Present-at-hand resembles the notion of transaffordance mooted previously, in that the entity is contemplated in terms of its action possibilities (which include inaction). The entity’s singularity is deceptive because the context remains that of equipment, but now the plurality of equipment becomes apparent. In some sense, the difference between ready-to-hand and present-at-hand is the difference between improvisation and

composition. However, we remain in need of means to theorize the reproduction and reiteration of encounters with *Zeng*.

Preston references Benjamin Beck, enumerating four conditions that between them constitute, for Beck, tool use:

- An object (the tool) must be used to do something, or alter some condition of the environment or the user.
- The object must be external and unattached to the user.
- The user must hold or carry the object in the process of using it.
- The user must be responsible for its effective orientation at the time of use (523).

Unfortunately, this handsome order breaks down under scrutiny. We have already considered stones that may be used as hammers, as anvils or that might alternatively be swallowed. When a human uses stones as missiles, they appear to fit Beck's definition while the stones are ready-to-hand, but not for any longer than the duration of the throwing event. They change back to being a stone, and may never be used as a missile again. This is not why the stone-as-missile seems not to be a tool, however. A stone used as a hammer, by comparison, may similarly be used only once, but in this case the connection between user, tool, and further items in the local environment, begins to exhibit the characteristics of a story. Its presence-at-hand is a matter of conjectural rather than physical encounter. Not only is there a semiotic *chain*, but the organism's capacity for storing and communicating this chain becomes one of its defining characteristics: it is the story-ness that contains the tool-ness, not the individual links in the semiotic chain.

Interestingly, Preston points to research suggesting that clearly worked stones in the archaeological record, which have previously been interpreted as tools, may in fact be the precise inverse—the discarded remnant of an item that functioned as a tool until its usefulness wore out (519–21). The conclusion she ultimately draws is that

... it does not matter whether you try to individuate tool use individually or non-individually; in *neither* case is it possible to delimit any such behavioural category in a satisfactory fashion (527).

This owes in part to a generative tendency that is incipient in extensional semantics. Preston's contemplation of the shoe as an item of equipment (543) shows how quickly an array of affordances becomes apparent, really through the act of asking the question: what is a shoe? The towards-which, in Heideggerian terms, is always found in the dynamic engagement between organism and environment that lends definition to the organism—or dispositif—by continually dispensing with that-which-is-not-engaged.

In the philosophical tradition, the problem of individuation is associated with questions about essence and substance that lead again back to Aristotle, where we encounter difficulty. Essence is from the Latin rendering of the phrase $\tau\omicron\ \tau\iota\ \eta\nu\ \epsilon\iota\nu\alpha\iota$, which Lukasiewicz regards as ‘an ancestor of Kant's *Ding an sich*, and a relative of Heidegger's *Nichts*.’ (Lukasiewicz, Anscombe, and Popper 1953, 72).⁸ He cites Ross, who renders the Greek thus: “‘The answer to the question what was it to be so-and-so.’ ... “only those things have an essence whose account (*logos*) is a definition (*orismos*)” (73). In other words, the Aristotelian term closely and unsurprisingly resembles Peirce's pragmatic maxim. An essence has triangulation as the mechanism by which the fixation of belief is achieved. It is therefore the focal part of a story, the aboutness for so long as that focus remains thereabouts. It has the intriguing quality of being at once precise and vague.

There is a sense, though (and this is the difficulty) that something remains unchanged as a story evolves, and *that* is where the essence is; the problem is to find the right language with which to state the obvious. Popper, in the same symposium, points out that

There appears to be a sense of the word “individual” in which only organisms, or only higher organisms, are individuals. While an individual brick may be said to have lost its unity, or its self-identity, if a considerable piece has been knocked off, Socrates' unity or self-identity as an individual appears to remain the same after an amputation (104).

An intriguing thing about ‘essence’ is its relationship to some notion of ‘way of life’ that attaches itself to the seeker of essence—a social *symploke* not available to the brick. Something of this persists in Peirce's concept of abduction, but historically it is entangled with the practice of certain religious sects—notably the essenes, but also the Cathars—who discard material aspects of living in the quest for spiritual satisfaction. Such satisfaction is found in the realm of knowledge, hence the association between such religious practice and the practice of scholarship. The matter of abduction enters the picture because the sense of something intangible, a ‘towards-which’ just out of intellectual grasp, guides enquiry. Distillation, one of the drawing-off senses of *apogoge*, fuses matter and story in continuing performance. As an example, Oregon craft distiller Steve McCarthy (2009) explains his recreation of a French *eau de vie* made with spruce buds:

I struggled with getting the intense spring conifer aroma of the Douglas Fir, the citrus flavor, and the emerald green/chartreuse color of the buds to reveal themselves in the same batch. We'd get the color we wanted, but not the aroma; or we'd get the color, but at ... a strength that made it undrinkable. And when we brought the proof down, we would lose the color.

⁸ *Nichts* being notness, I presume (*cf. nichtheit*). Anscombe (*ibid.*, 86) doubts Lukasiewicz on this point.

This went on for 15 years... Then, a couple of years ago, with the help of a new employee, Daniel Ruiz, we finally got flavor, color and aroma to come together at 95.46 proof. We have a beautiful light green, ridiculously aromatic, robust eau de vie of Douglas Fir.

What appears significant here is the triangulation sought between aroma, flavour and colour. This necessity for triangulation guided the distiller's experiments, and ultimately yielded a 'formula'—a set of procedures by which the desired result could be reproduced. The story requires the drinker's complicity, though, to be complete. For the semiotic polyphony to amount to a semantic episode, the customer needs to experience a sense of 'tree', of 'forest', 'spring', and so on. These simple terms translate, through the extended process of experimentation, into complex procedures involving specialized knowledge in various fields—and then back again into the relative simplicity of the 'formula'.

The intervention of the second distiller is a further point of interest. One explanation for his contribution could simply be that extra hands multiply the number of trials possible in a given time and season, increasing the chance of finding a viable formula. The other, more likely explanation is that the process of *mutual* communication, of explaining the problem(s) and planning approaches to finding solutions, had the effect of filtering out 'doesn't matter'—this is as true if the second person was an apprentice with no knowledge at all as it is if he brought, say, expert theoretical knowledge of organic chemistry.

We can summarize this in a simple, partly Heideggerian, partly Peircean, partly Foucauldian schema, that falls in, additionally, with the Peircean categories and the hylozoic view of nature:

First: the name, the stuff

Second: the formula or algorithm (the proper name, which has been out into the world and returned as a set of discrete relationships)

Third: the signature (the performance binding the name to the formula)

In practice, a human organism is out in the world for the duration of its human-ness, and that set of 'out-nesses', that set of transaffordances, seems to have some bearing on our comprehension of the human-ness so involved. (Peirce wrote that the 'rational meaning of every proposition lies in the future' (1998, 340).) Being precise about an organism's individuality, though, brings us back to where we started in pursuit of function and the significance of the heart. The development of radical surgery

techniques adverted to by Sorabji (1964, 291) quickly led to organ transplantation, which in turn led quickly to the discovery of rejection.⁹ The immune system was found to treat the organs of another person as not-self, and to mobilize ‘natural defences’ to protect the host body from intrusion. However, the process of developing an understanding of the way the ‘immune system’ performs this mobilization has more recently come to problematize the idea of a self/non-self distinction.

The intense debate represented in two series of papers, one in *Theoretical Medicine and Bioethics* 19 (1998), the second in *Seminars in Immunology* 12 (2000), is a classic instance of ‘science in action’ (Latour 1987; 164ff below). At its conclusion, Langman & Cohn (2000) summarize:

There is an obvious and dangerous potential for the immune system to kill its host; but it is equally obvious that the best minds in immunology are far from agreement on how the immune system manages to avoid this danger (343).

They continue:

Some [contributors] regarded self as an essentially fixed state that lasted from the embryo to the adult, while others regarded self as ever changing throughout life (*ibid.*).

Enlarging on the problem, the philosopher Moira Howes first remarks on the different senses of teleology in play between name and algorithm. Many of the terms used in describing immune function are conveniently teleological in the former sense while the explanations behind them are either algorithmic in the second sense, or else the name stands in for an algorithmic explanation yet to be discovered (Howes 2000, 249–50).

Noting that

One of the assumptions that most derailed accounts of self-identity in analytic philosophy is the assumption that there must be one necessary and sufficient criterion capable of accounting for the identity of the self over time (254).

As a result,

The assumption that any real self must be discrete is a difficult one to dislodge. Nonetheless, an indiscrete view of the self has its merits, some of which are relevant to the situation in immunology. A view of the human self as overlapping and multi-factorial makes the most sense given our actual experience of self in the world (*ibid.*).

The indiscrete self is a sort of rhizomorphic surfer, harnessing multilayered platforms of equipment, affordance, semi-closures and incomplete return. If the immune system is not to be seen as a self/non-self arbitrator, though, what is it? In search of a germline

⁹ In fact these techniques and discoveries were already under way in the 1940s; Schaffner (1998, 428) suggests that rejection was theorized at this time, before it was observed.

explanation that conserves immune function through evolutionary history, Anderson & Matzinger present the ‘danger model’, arguing that

If we view these [evolutionary] pressures as a response to danger, rather than as a general xenophobic aversion to nonself, we can step back and see the vertebrate immune system as an extended family of communicating bodily tissues that allows an individual to be an environment as well as to live in one, ignoring nonself that is harmless and welcoming nonself that is useful (Anderson & Matzinger 2000, 237; see also Matzinger 1994).

5.4.1.4 Review

Before continuing with the symmetrically disconcerting question of what, after Rorty, we might mean by ‘mind’, a brief summary of the terminology reviewed or introduced in pursuit of a definition of ‘function’ is in order. The specified task was to define ‘tool’, a task that cannot be accomplished without a definition of ‘function’. The reason for this anti-teleology concerns the mind–tool ontology articulated by Clark (1999), which is found to rest in part on Preston’s (1998b) discussion of Heidegger. This discussion, in turn, complements a separate discussion (Preston 1998a) of Millikan’s theory of proper function which, to cut a long story short, is embedded in deep philosophical history.

In particular, the relationship between functions, ends and intentions is deeply engrained in traditions reaching back to the Greeks. A particular challenge in this regard is the task of disentangling pre-Christian Greek thought from that of its medieval interpreters, where the latter permitted certainty about ultimate, exterior cause to normalize the context of debate. One consequence of this disentanglement is to find the Platonic notion of *demiurge* to be a cumulative and disinterested marshalling of material more akin to the Dennettian idea of consciousness supervening on the interactions of billions of DNA robots than the intentional (and malevolent) creature of medieval dualistic heresy.¹⁰ A recurring theme that emerges is a conflict between a notion of ‘folk name’ and ‘algorithm’ in which the former is frequently taken either to stand in place of tediously detailed explanation, or to stand in place of research and theorization yet to take place.

If the question of function is associated with the story to be told about the entity at issue, a problem arises concerning the order in which the events of the story take place. What this boils down to is that we can either be certain of one parameter (precedence in

¹⁰ ‘we are robots made of robots—we’re each composed of some few trillion robotic cells, each one as mindless as the molecules they’re composed of, but working together in a gigantic team that creates all the action that occurs in a conscious agent’ (Dennett 2001, 2).

time) or the other (what the entity does), but not both *simultaneously*. The ultimate reason for this is that the individuation of the entity is necessarily provisional and unfinalizable because the pursuit of individuation leads inexorably to primordial vagueness. However, it is convenient and productive to adopt a plural notion of function that gives precedence either to causality or to temporality according to the demands of the task at hand. ‘Selected function’ (later to be called ‘proper function’ by Millikan) prioritizes temporality because natural selection recognizes a degree of randomness (supported by probabilistic mathematics), so that ‘cause’ is in part merely a matter of temporal priority (though see 9.2 below for further reflection on the nature of ‘cause’). System function prioritizes causality because the explanations it seeks are ‘best fit’, where fitting is directed by a process of enquiry that is necessarily design-led. This design process exploits human capabilities that include, crucially, an orientation to time that is first somatic (i.e. attuned to bodily rhythms and environmental circuits) and second cinematic (capable of all kinds of rerunning, editing, jump-cutting and so on). Combining these two aspects of function is a ‘deep procrustean’ reconciliation between matter (the ordinal) and time (the temporal) continually mediated through (spectral) attunement.

Deploying this perspective in pursuit of the nature of tools, we find that ‘tool’ is a folk category, frequently an attractively simple means of articulating complex relationships but vulnerable to skeuomorphic appropriation and reinterpretation. In part, the definition of a tool involves *what else* it might be used for, by which means the definition introduces unwanted (unanalysed) intentionality. To circumvent this defect, we call in aid first Gibson’s concept of affordance, which articulates the action possibilities incipient in the environment with a symmetry that challenges inside/outside distinctions. Second, we call on Heidegger’s language of equipment, a plurality of mutually supporting entities in the local environment. Lurking in Heidegger’s ‘*zūbanden*’, though, is a similar unanalysed intentionality, concerning the double entry of the hand-as-manipulator and hand-as-indicator.

Thirdly, we call in the idea of individuation as a performative phenomenon that implicates the code-switching capacities analysed by Dehaene. Switching between approximation and precision is effected, in part, by exploiting body parts (such as fingers) and local environmental resources (things pointed to). However, a connection needs to be made between this analysis of individual situated performance and the social brain model. The latter stresses the roles of significant individual others in the immediate environment affording communicative feedback. The term ‘fetch’

conveniently encapsulates the ordinary performance of oral resolution, of ‘finitizing’ in real time, exploiting in addition to the immediately available data such rhythms and routines as may have been tuned in to, learned or ingrained in both near and distant history.

5.4.2 What (pace Rorty) is a mind?

Both the ‘extended mind’ and the ‘social brain’ stress the organism’s relationship with its immediate environment. We have seen how the former problematizes the inside/outside distinction that enables us to conceive a distinction between organism and environment at all. Now, building on that disconcerting breach with the familiar folk notion of self, it is time to return to the definition of another folk notion, ‘mind’. Previously I suggested that human performativity is a modulation of enaction, the latter being taken to be a rich, polyphonic account of strictly somatic capacities in relation to an unproblematically external environment. (Much enactive philosophy deals with visual cognition, where the externalness of stimulus is not controversial, whatever else might be.) I want, now, to pursue the performative modulation through territory that we are accustomed to associating with the concept of mind, linking it to the prevailing topic of consciousness.

In waking, we are able to do ‘thick’ things (we might alternatively say, ‘we are able to move through enactive intensions’) like making a cup of coffee or telephoning a friend, without bringing to mind the individual steps—without assembling the necessary tools and ingredients from an explicit list, or recalling each individual number in the sequence.¹¹ Consciousness, here, seems to imply a prosody of thought supporting, by analogy with the prosody of oral language, the mental administration of semantic content. Some of the content of speech is conveyed purely by the quality of sound—anger sounds angry, and questions sound like questions, irrespective of the language being spoken. So, by analogy, the content of the intension is—partially, at least—created by its enactment.

¹¹ Note: Gilbert Ryle’s ‘thick description’, advanced in his lecture ‘The Thinking of Thoughts: What is ‘Le Penseur’ Doing?’, (http://lucy.ukc.ac.uk/CSACSA/Vol11/Papers/ryle_1.html, accessed 5-4-09) influenced the anthropologist Clifford Geertz in the 1970s, and, through Geertz, Stephen Greenblatt’s formulation of New Historicism. Discussion of Grice in the next chapter amplifies the matter, though not through this particular trajectory.

In *Kinds of Minds* (1996, 107–56), Dennett proposes a fourfold categorization, which he calls stages in the evolution of consciousness: successively, the Darwinian, the Skinnerian, the Popperian and the Gregorian.

In the **Darwinian** model, function is entirely governed by the genome, although there is scope for phenotypic plasticity—meaning that the organism can accommodate limited shaping by the environment as it matures.

The **Skinnerian** model sees a development in the organism's relationship with the environment so that behaviourist learning can equip it with options. This can improve the genotype's flexibility, but also makes it more subject to luck.

Popperian minds permit hypotheses to die in place of the organism that invents the hypothesis. Whereas Skinnerian minds are the subject of trials imposed by the environment, Popperian minds are capable of simulating the consequences of behaviour before executing the act. This improves the organism's relationship with chance. However, this internal selection process can function without explicit representation.

With the **Gregorian** mind, a relationship has developed in which the organism actively shapes the external environment in order that the environment should support the inner means by which it (the organism) makes choices with respect to the environment. The ability to make tools is key to realizing the Gregorian mind. Tools encode knowledge, and they facilitate the organization and transmission of knowledge between conspecifics.

Perhaps this scheme privileges the technical intelligence hypothesis regarding the evolution of the human brain. Certainly, contention over the respective merits of the technical and the social brain hypotheses is germane to the problem of understanding just what a mind *is*. Dennett remarks that 'the fundamental purpose of brains is to produce future' (1991, 177). The extent to which this claim is differentially true of brain, mind and consciousness is potentially illuminating. It is easier to credit Dennett's Darwinian organism with consciousness than it is with a mind, precisely because it appears to fail the test of 'producing future'. Future just happens to the Darwinian organism.

At the other end of the scale, an observation by Richard Gregory regarding Dennett (*inter alia*) gives pause for thought. Gregory says Dennett discusses 'from the basis of detailed knowledge of neurophysiology and brain anatomy how the mind can be brainy'

(1998). Surely, though, it should be the other way round: Dennett should be discussing how the brain can be *mindy*? It is an interesting counterposition. Informally, colloquially, a brainy mind would seem to be an improvement in the area of calculation and computation. A mindy brain would seem to be an improvement in the area of tracking, more particularly keeping multiple track of the possible outcomes of transactions involving multiple actants. The difference is subtle, but involves an inversion that Gregory goes on to discuss, in which the brain is held to project hypotheses onto the world rather than being implicated in the receipt of projections from the world as the classical Humean model proposed.

Recall the consonance between the term *dispositif* as used by the actor–network theorists and Peirce’s interpretant. A suite of social configurations developed by the public policy theorist Fritz W. Scharpf throws interesting light onto Dennett’s kinds of minds. These styles of social aggregation help disclose the relationship between ‘mind’ and ‘institution’, and also the poietic scaling implicit in Dennett’s scheme. They are not identical to the notion of *dispositif*—and Scharpf does not use the term—but, via Dennett, they suggest a set of modulations that I call ‘tuned dispositifs’. Tuning negotiates a spectrum in which performative skill, offline craft skills, and artefactual semiotics (the fact of tuning conventions built in to the material design of the instruments in use) combine to create the satisfactory total effect.

Colloquially, ‘mind’ resembles a community of memory, while ‘reason’ resembles a society of representations. This community/society distinction is an echo of the *Gemeinschaft/Gesellschaft* analysis associated with the 19th century sociologist Ferdinand Tönnies, but refracted through Scharpf’s work on actor constellations (1997, 69–115; 135–45). For Tönnies, the distinction was between a sense of individuality subordinate to the collective interest of the constellation on the one hand, against, on the other hand, a sense of self-interest that differentiates the individual’s relationships with discrete elements of the constellation. There is a sense, therefore, in which the latter is implicitly tool-using in the naïve sense whereas the former need not be. Scharpf is interested in the relationships between aggregates of individuals acting corporately, which he theorizes using economists’ modelling techniques:

‘Actor constellations’ are meant to represent what we know of the set of actors that are actually involved in particular policy interactions—their capabilities (translated into potential ‘strategies’),

their perceptions and evaluations of the outcomes obtainable (translated into ‘payoffs’), and the degree to which their payoff aspirations are compatible or incompatible with one another (72).¹²

Talk of capabilities, perceptions and evaluations is compatible with the language of intention that we will discuss in the next chapter, where aspects of Scharpf’s perspective will help further develop the issues under consideration. The succession of organizational paradigms he posits, whose relationships are effectively policed by the ability of the organization to impose discipline on the individual member, represent the context in which intentional dynamics play out. These are: anarchic field; minimal institution; network; regime; joint-decision system.

The term ‘field’, in the **anarchic field**, follows Dahl & Lindblom’s work on systematising ‘basic social processes’ in the 1950s. They introduced the term to show that mutual adjustment and ‘spontaneous field control’ among independent actors may lead to a form of ecological coordination even without *a priori* order. In the absence of a preexisting relationship, or of specific obligations, individual actors are free to use any strategy within their capability, and they are constrained only by physical limitations and by the countermoves of other actors. They might communicate and conclude agreements but they are also free to break such agreements if it suits their interests (98). In terms of independently-functioning bio-minds in Dennett’s scheme, the anarchic field would be pre-Darwinian. (Of course, the principles of selection still apply to organisms of this kind.)

Minimal institutions are minimal with respect to the cognitive powers of the individual organism. Of the global laws of nature operating, only those locally and immediately relevant bear on a particular situation. Actors’ choices are minimally—and exogenously—regulated by the institutions that protect certain interest positions against unilateral violation. These are the constraints presupposed by economic theories of market transactions among strangers (98–9); it is interesting to note that in these terms, actors have no opportunity to exercise rationality, unless blindly obeying the laws of nature is considered rational.

Networks parallel the Skinnerian capacity for simple trial-and-error learning, and Scharpf’s account additionally maps routes to niche-finding and stabilization. Scharpf distinguishes between relationships from which low-cost exit is possible, and

¹² Though Scharpf’s ‘actors’ mobilize structuralist ‘actant vectors’ as discussed in chapter 2.2.1, he appears to conceive them as holistic beings rather than abstractions.

relationships among actors who cannot avoid dealing with each other. The former type relates to the Skinnerian modality where a successful trial leads to reinforcement but not substantive change, since operant conditioning can be completely erased. In Scharpf's latter case, differential cooperation is likely to lead to actors sorting themselves into opposing coalitions. An incipient consequence in this circumstance is the phenomenon of 'negative coordination', in which one group will decline an improvement in their circumstances for fear that their consent will yield an even more beneficial improvement for other groups, to their own ultimate disadvantage.

The prevailing characteristic of networks that establishes their superior efficiency over the minimal institution is their ability to reduce the transaction costs of negotiated agreement. The risk of opportunism is moderated by two mechanisms: a deeper sense of future, and higher visibility of transactions to relevant others. As a consequence, the existence of a network influences the interactions that take place among its members by promoting feedback stability, by making some interactions more likely than others, by enabling some interactions that would not otherwise have been possible, and by developing outcomes to favour one or another of the actors (136–7).

For Scharpf, a **regime** is a purposefully created normative framework. Actors participate on the basis of explicit undertakings by which they a) respect certain interest positions of other parties, b) share certain substantive goals, and c) follow certain procedures in their future interactions. Common to a range of examples discussed by Scharpf is the observation that outcomes are determined not by the regime itself but by the subsequent interactions of parties committed to observe its rules, once the regime has been established. The regime stands or falls by the effectiveness of these continuing (rhizomorphic) outcomes (141–2).

For Dennett, the characteristic mode of the Popperian mind is its ABC learning style. ABC stands for Associationist/Behaviourist/Connectionist, but implies a question-begging rationality of which Popper would conceivably approve, and of which the strong programme in the sociology of knowledge does not. The problem is that Dennett conflates two modalities—we might call them respectively the Turingian and the Dawkinsian—which both have a pre-Gregorian legitimacy, but which pull in opposite directions.

The Turingian concerns the notion of robotic transparency (cited above, fn. 10, p. 119), but the Dawkinsian mode fits more comfortably with Scharpf's notion of regime. Dennett argues elsewhere that Turing reconfigured Cartesian and Kantian questions

about cognitive performance as an engineering problem by asking ‘How could we make a robot that had thoughts?’ (Dennett 2001; Turing 1950). The relevant Dawkins argument is the theory he develops in *The Extended Phenotype* (1982), though the first and perhaps most telling aspect of his argument (in relation to present business) occurs almost as an afterthought—although it is an argument with which we have already become familiar.

Remarking in his final chapter that he has not attempted to give a rigorous definition of the term ‘organism’, Dawkins posits that ‘the organism is a concept of dubious utility, precisely because it is so difficult to define satisfactorily’. The term ‘actor constellation’ captures the essential nature of phenomena such as the siphonophore, where the term ‘organism’ may with equal justification apply to the schema or to its constituent zooids. Each zooid is a discrete entity, and most zooids are specialized so that they lack the ability to survive on their own. But their integration with each other is so strong that the colony attains a singular character (the Portuguese Man o’ War is an example). Inversely, some plants are able to propagate themselves from severed portions of a parent, which urges a distinction between the ‘ramet’, or unit of clonal growth, and the ‘genet’, the unit that develops from a single-celled zygote (253–4). The British politician Margaret Thatcher once famously declared that there is no such thing as society. From Dawkins’ point of view, it might be argued that neither is there any such thing as an individual.

One of the key factors Scharpf identifies as perpetuating the more intensively tuned forms of dispositif—the regime and the joint-decision system—is the relatively high cost of defection or renegotiation. Dawkins coins a term—meliorization—that admirably captures the point of view of the individual organism as it negotiates its local problem-space. From a root meaning ‘better’, meliorization is a process of passing through a succession of better immediate alternatives, distinguishing it from the notion of optimization in which a deeper teleological oversight would be required (46). What sustains the accumulation of ABC learning (as Dennett styles it) in Dawkins’ meliorizing account is a form of irreversibility, but unlike the notion of irreversibility that sustains the concept of technology (more properly understood as quasi-irreversibility; see 9.3 below) this is strong irreversibility, concerning the logic of instruction theory (the Lamarckian idea that acquired characteristics are passed on in virtue of having been acquired) versus selection theory (the Darwinian idea that characteristics pass through, or fail to pass through, in virtue of selective pressure). Dawkins distinguishes two forms of the central dogma, appropriate respectively to molecular genetics and embryology:

The first is the one stated by Crick: genetic information may be translated from nucleic acid to protein, but not the other way. ...the other central dogma... [is] that the macroscopic form and behaviour of an organism may be, in some sense, coded in the genes, but the code is irreversible. If Crick's central dogmas states that protein may not be translated back into DNA, the central dogma of embryology states that bodily form and behaviour may not be translated back into protein (174).

Instruction theory enters the picture with modern humans, although in reality it is still selection theory that does the genetic work. Humans, in the course of developing subjectivity, developed a reflexive relationship with the environment, specifically with regard to organisms in the local environment that could be recruited to mutual advantage. An example is the domestication of dogs (Hare & Tomasello 2005), in which the question is raised whether in fact a kind of co-domestication operated, such that the behaviour of certain people preferentially developed as they responded to the behaviour of certain wolves. There is no route 'back' to wolfhood for the modern dog, though this does not mean that the dog's future survival is dependent on its relationship with humans. I think this example makes clear the relationship between *dispositif* and the non-human element in the actor-network. Nevertheless, it is worth pointing out that on Dawkins' account this kind of extended phenotype relation, in which the genetic interests of one organism are non-trivially bound up with the corollary interests of other organisms' genes, is a recurring theme in nature.

So we reach the modulation envisaged by Dennett in conceiving the Gregorian mind. In Scharp's scheme, this corresponds with the **Joint-decision system**, which describes constellations where parties that cannot prosper through unilateral action realize that joint, harmonious action is to the mutual benefit of each. 'Mutual benefit' does not really capture the valence of this configuration, although mutual benefit is obviously the immediate attraction that recruits participating actors. Rather, valence lies in the elusive sense in which addition gives way to multiplication:

Such constellations may arise naturally from physical adjacency or functional interdependence, when goals of a particular kind or beyond a certain order of magnitude cannot be attained without collaboration (143–4).

To use terms like 'magnitude' and 'goal' introduces a sense of teleology or determinacy that perhaps begs the question. Where does a sense of magnitude, and of future, come from?

On the other side of the community/society distinction I posited previously is a corresponding distinction, or rather a suitable correspondence, concerning memory and representation. This may be the place to look for an answer to the teleological problem. Here is an important cognitive shift decisively effected by the intervention of mind–

tools, according to the Dennett–Clark analysis, and here is the point of couching this discussion in explicitly social language. How exactly the brain manages memory and representation, in biochemical terms, is to a degree unimportant; we can black-box the question. But if it is necessary for these mind–tools to be installed as a matter of social process and, *a fortiori*, if this is necessary because there is a correlation between the performance of society and the desirable expression of specific genes that are active in the development of the immature brain, then it follows that the benign portrayal of this field of scholarship as impartially and disinterestedly engaged on behalf of humanity as a whole is in fact underpinned—scaffolded—by an elaborate social structure whose corporate input is critical and needs to be accounted for.

Evidence presented by Matt Ridley (2003, 214–6) regarding the developmental contribution of the gene FOXP2 suggests that this kind of genetic transaction is indeed implicated in the longitudinal development of social competence. Its significance is that its trace leads both to the fine motor control of the larynx and to the management of gesture, grasp and touch. Ridley (167–70) also cites a variety of evidence suggesting that systematic exposure to language prior to the onset of puberty is essential for the acquisition of competence. In cases where the FOXP2 gene is not defective but environmental constraints have impeded full cerebral development in childhood, it is exceedingly difficult for the subject to repair the deficit later in life. Making a mindy brain, then, becomes transparently a project of acculturation and attunement. This is not passive attunement, however: the individual performance of attunement is a small contribution to the continuing performance of the *dispositif* that actively structures the theatre in which the performance takes place.

5.5 Summary

In the next two chapters, more attention will be focused on the ways in which social attunement is effected. In the next chapter, the focus is on second-person, oral issues relating to the expression of intentionality. In the chapter that follows, the focus is on the third-person entanglement of individual and group intention via material–semiotic realization. Before we set off, though, we should briefly review the claims made so far about the first-person, somatic dimension.

Our starting point was Dennett’s Multiple Drafts model of consciousness, supported by Dunbar’s Social Brain Hypothesis, and the Dennett–Clark Mind–Tool ontology. The polyphonic model builds on multiple drafts by suggesting that the human experience of consciousness is an emergent phenomenon arising in real time out of the coherence of

multiple parallel cognitive processes. What my version offers over Opie's is a more precise sense of polyphony, resting on an early-modern, rather than medieval & renaissance interpretation where voice-leading, functional harmony and measured pulse afford mutual support, enhancing the rhetorical capacities of the medium.

Transferred to human cognition, I argue for a Peircean polyphony of polyphonies. Supporting a polyphony of firstness (sensory, somatic), secondness (psychological, enactive/performative) and thirdness (semiotic) is, in each case, a constitutive polyphony. In the case of sensory polyphony, the mutually supporting elements are the 'frequencies' to which our sensory organs are attuned. In the case of psychological polyphony, the elements are less clearly defined, and are articulated epistemically—for convenience using a mythological model to indicate the confluence of scholarly trajectories implicated. While these are clearly not as well defined as the sensory elements, they have the virtue of incorporating methodological polyphony, especially in relation to individualist, social and institutional perspectives.

Regarding semiotic polyphony, the core issue is the individuation of function. If functional ascription is the equivalent of the musical term 'note', by which any polyphonic composition is articulated, then functional ascription is found to require a notion of functional coupling in which the term 'coupling' refers not to the functional elements so engaged, but rather to the reconciliation of selected function and system function, where the former is temporal and acausal while the latter is atemporal and causal. The term I have coined for the human oral performance of this dynamic process of reconciliation is 'fetch'.

6 Intention, intersubjectivity and implicature

Andy Clark rates language as the ‘tool of tools’ among mind–tools (1999, 6). ‘Language’, though, is a term as vague and various in its meaning as ‘mind’. Its secondness and thirdness is deeply and recursively entangled, making it difficult to analyse. However, Tomasello’s stress on pointing as a uniquely human attribute gives us a useful collocation of two trajectories. One aspect of human pointing concerns intersubjectivity. There is no point in pointing other than to communicate, hence to engage the subjectivity of another regarding one’s own intentional state. I claim, in short, that **there is no subjectivity without intersubjectivity**. The other aspect is that pointing requires fine motor control, hence the relationship between hand and equipment in Heidegger’s ‘*zuhanden*’. The distinction I am seeking to make is between language use as an oral performance and language as an algorithmic apparatus in which speaking plays little or no executive role but hand-use *does*.

This chapter is mostly concerned with the former—the physiology of oral performance, and issues arising—while the next chapter deals with the algorithmic extension of performativity. What carries us forward into the substance of the present chapter from the previous one is the relationship between Dennett’s notion of narrative gravity, my notion of fetch, and the drive towards individuation in its ‘folk’ sense of settling or satisfying a query. There are grounds for equating the *centre* of gravity with *dispositif*, and considering the indiscrete self to be articulated through interrelating engagements with the designs and intentions behind the semiotic cues presenting themselves for sensory experience. Hypothetically, the first step is for intention to be affirmed in the absence of the manipulator; the second step is for the structural integration of this manipulative modality to realize an increasingly complex semiosphere.

Recall that Dunbar elaborates the concept of ‘mind-reading’ in terms of nested intentionality, a topic that had germinated in the ‘Machiavellian intelligence’ hypothesis that preceded the social brain. In his 1998 paper he reports that tests on humans show oral management of deep intentionality to be difficult to accomplish. ‘Deep’ means the ability to keep track of intermediate intentions of others where, for instance, A believes that B wishes to interrupt C’s conversation with D; and that {A or B or C believes that} D would prefer to engage in conversation with E:

The high error rates at these levels do not reflect a memory retention problem: All subjects pass the tests that assess memory for the story line. Moreover, the same subjects show considerable competence on reasoning tasks that involve causal chains of up to the sixth order. The difficulty seems genuinely to be something to do with operating with deeply embedded mental states (1998, 188).

Both Dennett and Dunbar invest in the idea that hierarchical *orders* are implicated in the progress towards the remote ascription of intention. Implicitly, what is envisaged is an inflationary progression in which extra layers of intentionality are added to a singular substrate. Second-order intentionality is built on first-order; third on second and so on. I think this is wrong as an evolutionary story. It confuses the selected function of intention with its system function. The evolutionary trajectory leads the other way, from an indeterminate and approximating relationship with the immediate environment in which conspecifics play a minimal role, to a code-switching relationship where indeterminacy and approximation support rapid hypothesis generation, where conspecifics and local equipment support a higher degree of precision. This perspective rests on four things in particular:

- Dehaene's conclusion that precise mathematics is language-infected, while approximate math is visuo-spatial (Clark 1999, 23–7);
- Dunbar's 'grooming circle', the small, socially stable locus of oral conversation. The grooming circle is at its most stable with between three and five participants, with larger numbers of participants tending to lead to breakdown and smaller circles forming;¹
- My observation of poker players, who frequently find third-level 'mind-reading' difficult, especially in situations where more than two players are involved in a hand;
- My own 'musical' input, noting first that music has ordinal characteristics that entitle it to be called 'a mathematics' as well as the rhetorical characteristics that often find it dubbed 'a language'. This turns it into something resembling Clark's 'bridging manipulada' (*ibid*, 20), something that perhaps effects the code-switching or constitutes its prosody. Further, four-part diatonic harmony is (normally) made out of three notes sounding simultaneously (one note being doubled), and string quartets exhibit the ideal realization of classical four-part harmony.

In the first half of this chapter I will enlarge on the somatic aspects of intention with a view to reconciling the evolutionary story about human intentionality with the analytic story about the value of human intentionality as a creative force. In the second half of

¹ The fine detail of this—circles of five break down after approximately a minute—was received in conversation with Prof. Dunbar, February 2009.

the chapter, I will seek to disentangle what I consider to be a second-person deployment of intentionality from a third-person deployment, with a view to further developing the latter in subsequent accounts of technology and creativity.

6.1 The actuarial stance

We should first review the status of intentionality and its place in Dennett's philosophy.

According to Dennett, the apparatus of belief/desire psychology provides, not a causal theory, but a schematization of behaviour. Using this apparatus amounts to adopting a particular explanatory stance: the *intentional stance*, which involves ascribing beliefs and desires according to a *rationality assumption* (roughly that an intentional system will mainly believe true things, and mainly desire what is good for it). From this viewpoint, all there is to being a believer is being *reliably predictable* from the intentional stance (Opie 1998, 8).

The goal, from the cognizer's point of view, is to find the most economical explanation for a phenomenon. The simplest is to adopt the physical stance, of which Dennett says:

...if you want to predict the behaviour of the system, determine its physical constitution (perhaps all the way down to the micro physical level) and the physical nature of the impingements upon it, and use your knowledge of the laws of physics to predict the outcome for any input (1987, 16).

In fact you do not even need to use your knowledge of the laws of physics, remembering that a highly serviceable physical model is implemented in our bodies at the enactive level. 'Law', thus used, can be taken in its social sense as a regulatory instrument that is the provisional outcome of the accumulation of observed phenomena. Its meaning is contiguous with 'common law' as it is understood in the UK and USA, and beyond that with the notion of orally-sustained lore. In consequence of its provisional nature, there are times when this approach fails:

Sometimes in any event, it is more effective to switch from the physical stance to what I call the design stance, where one ignores the actual (possibly messy) details of the physical constitution of an object, and, on the assumption that it has a certain design, predicts that it will behave *as it is designed to behave* under various circumstances (16–17).

In other words, the design stance is effectively a 'black box stance'—while the subject of attention is presumed to function in a certain way because of the way it is made, it is not necessary to 'read the manual'. However, there is a significant advance in a 'designed' system over a physical system in that its failures have a semiotic differential over its successes. I put two slices of bread in my toaster. Two minutes later, the bread pops out again. The hermeneutic load is minimal: the bread is now toasted, and I can go and eat it. Suppose, though, that the bread pops out white and untoasted. *Then* I am obliged to analyse the situation and locate the cause of the failure.

In the TV comedy *Fawlty Towers*, there is an episode ('Gourmet Night') in which Fawlty gets out of his broken-down car and thrashes it with a branch, fulminating about the number of warnings it has been given, treating the car as though it *intended* to break down. The comedy depends on the viewer's understanding that machines do not have intentions:

Sometimes even the design stance is practically inaccessible, and then there is yet another stance or strategy one can adopt: the intentional stance. Here is how it works: first you decide to treat the object whose behaviour is to be predicted as a **rational** agent; then you figure out what beliefs that agent ought to have, given its place in the world and its purpose. Then you figure out what desires it ought to have, on the same considerations, and finally you predict that this rational agent will act to further its goals in the light of its beliefs (17, emphasis added).

If the design stance is the equivalent of a black box, then the intentional stance may seem to resemble a Russian doll of black boxes inside black boxes where rationality is at odds with economy. In evolutionary terms, the emphasis on economy prevails over the temporal depth entailed by the practice of reason, so the costs and benefits of the trade-off need to be accounted for. Access to the presumed-rational party's decision processing is dependent, on Dennett's account, on language. However, since we have no difficulty ascribing beliefs and desires to domestic pets on the one hand, and are inclined to ascribe certain performances in humans to design, or 'the way we are made' (such as the tendency for young males to fight, for instance) on the other, accounting for the special place of language requires a modifier.

To accomplish this, Dennett introduces the notion of orders of intentionality. A first-order intentional system may have beliefs and desires, but not beliefs and desires *about* beliefs and desires. A second-order intentional system has intentional states about other intentional states, both its own and those of others. Dennett gives examples like 'x believes y expects x to jump left' or 'x fears that y will discover that x has a food cache' (243). In other words, we have here more than simple about-ness, aboutness that has temporal or environmental immediacy. It is the next step that becomes characteristically human; we could call it the language layer: 'x wants y to believe that x believes that he is alone' (*ibid.*). It is not so much that language is *necessary* in order to articulate this level of belief, but rather that it is hard to imagine how it might be possible to articulate without language. Certainly, when it comes to fourth and higher orders, the necessity for registers—storage of some kind, or scaffolding—becomes apparent, as in this sixth-order example given by Robin Dunbar (1998, 188), where names function as registers: 'Peter knows that Jane believes that Mark thinks that Paula wants Jake to suppose that Amelia intends to do something'.

From the observer's point of view, making evaluative distinctions between Dennett's physical, designed and intentional explanations is a progression that entails increasing degrees of risk. Because these distinctions are somewhat arbitrary, with the so-called 'design stance' being especially problematic in light of the distinction between selected and system function explored in the previous chapter, I propose a single term 'actuarial'.² It corresponds to Dennett's progression quite simply, by being actuarial with respect to individual objects (in the case of the physical stance); with respect to equipment (*Zeug*, in the case of the 'design' stance); and with respect to organic systems, subject to further discriminations to be elaborated shortly.

The question that now arises is whether intentionality is the mark of the mental (abductively speaking) in virtue of the subject having an intention, or is it rather the case that a further step is necessary, that the subject should be able to *reify* that intention in some way in order for the observer to deem that an intentional mental performance has taken place? To put the matter differently, observing that third- and higher-order intentionality is hard to sustain points to an entangled relationship with *Zeug*. Without material-semiotic scaffolding, I argue, without the technologizing of intersubjectivity, these higher levels are simply not available to the interpretant.

Actually the idea is more complicated than that. I call the basic version of third-order intentionality as analysed by Dennett and Dunbar 'bucket brigade intentionality', after the classifier algorithms developed by John Holland in his simulations of economic behaviour, where a payoff is passed back along a 'bucket brigade', reinforcing the trajectory that led to the payoff for the benefit of future iterations (Waldrop 1992, 188–9). I call the fancy, de luxe version 'recombinant intentionality'. This variety is sustained in and through scaffolding, by entanglement in equipment. By analogy with recombinant DNA, which is the creation of artificial DNA sequences by blending material in a manner that would not occur naturally, 'recombinant intentionality' involves the conscious, intentional manipulation of intention. I will develop this concept further in the next chapter.

² With reservations: the Latin root merely means 'account keeper'. Since the term has become associated with the analysis of risk for insurance purposes, it recruits the mathematics of probability, effecting a Peircean link.

6.1.1 Interpretation and understanding

A concomitant of stance-taking is the notion that the attitude struck is part of a narrative rather than a freestanding ‘lightbulb moment’ in which everything suddenly becomes clear. As such, the actuarial dimension becomes clear as the notion of certainty gives way to the notion of confidence. ‘Belief’ is a folk term, and although it is often coupled with ‘desire’, the two terms have distinct valences. According to Dennett,

An implication of the intentional strategy, then, is that true believers mainly believe truths. If anyone could devise an agreed-upon method of individuating and accounting beliefs (which I doubt very much), we would see that all but the smallest portion (say, less than ten percent) of a person’s beliefs were usable under our first rule [concerning the relevance of sensory data to belief formation] (1987, 19).

One cannot easily substitute ‘desire’ for belief and speak of ‘true desirers mainly desiring ...’ what? Truth? Happiness? Goodness? What is a *true* desire? Recognizing that belief and desire are commonsense terms, we should be careful not to regard them as orthogonal to one another, despite a sense that the former concerns a world-to-self relationship while the latter concerns a self-to-world relationship.

Truth and falsity is a matter of confidence on a scale of diminishing certainty, where, at the point of maximum confidence and maximum certainty, truth and falsity are equivalent. Hence the notion that Austin’s ‘happiness axis’ is orthogonal to this ‘verification axis’, and that ‘belief’ is found fixed at their intersection. The move Dennett makes in a footnoted distinction between belief and opinion is a useful advance:

... once one makes a distinction between belief and opinion ... according to which opinions are linguistically infected, relatively sophisticated cognitive states—*roughly* states of betting on the truth of a particular, formulated sentence—one can see the near triviality of the claim that most beliefs are true (*loc. cit.*).

The word ‘opinion’ is aligned with the Platonic notion of *doxa*, in which the weight of a given opinion accumulates through the property of being communally shared (Havelock 1963, 234ff). While there is no question of doubting the ‘linguistic infection’ attending opinion, there is an ambiguity between the communal and personal usages that requires resolution in order to move beyond the oral to the literate. Havelock suggests that the appropriate Platonic term for the formation of personal opinion is *phronesis*, but that does not really disconnect the public from the personal, since the notion of ‘good judgement’—a personal virtue no doubt—has no meaning without a relationship to the public, or at the very least a sustained and ongoing relationship with one’s local environment. A better approximation can be found in the term ‘delome’, previously

adopted from Peirce's semeiotic, which stands in relation to 'rheme' and 'pheme' as 'discourse' stands in relation to 'word' and 'sentence'—though perhaps 'syntagmic', 'syntactic' and 'semantic' are closer to the progression he envisages:

...I sometimes use the term *Delome* (pronounced deeloam, from *δηλωμα* [a means of making known]), though *Argument* would answer well enough. It is a sign which has the Form of tending to act upon the Interpreter through his own self-control, representing a process of change in thought or signs, as if to induce this change in the Interpreter (cited in Ogden & Richards 1944, 285).

Peirce's term is not about opinion as such, although it bears on the way in which an opinion may become apparent to its user.³

Subsequent to *The Intentional Stance*, Dennett has taken other approaches to the same issue. For instance there is 'florid representing', which appears in 'Making Tools for Thinking'. The distinction he wants to make is between 'true believers' and 'genuine understanders'. Because beliefs are normally true in the naïvely tautological sense, this distinction concerns moving beyond belief-loops, stepping outside them and querying them. Representation seems a good candidate, though florid representing seems to spiral instead of looping: 'it seems you can't engage in florid representing without knowing and appreciating that you're engaging in florid representing' (Dennett 2000, 2/10).

What is (a) representation? It turns out that the Latin *repraesentatio* carries a meaning additional to 'exhibiting, manifesting', which is 'a cash payment' (Lewis & Short); or, more urgently, under *repraesento*, 'to pay immediately or on the spot; to pay in ready money' (*ibid.*). Although the Scholastics discarded this monetary sense (Lagerlund 2004), it reminds us of the transactional property of a representation and invites the thought that a better term than 'florid' might be 'fungible'. Indeed, 'function' (*functio*) derives from *fungi* (to perform official functions), where the individual *in fungi vice* acts in place of another in the sense of being in place by virtue of the task required as opposed to being in place in virtue of the individual's unique *dignitas*. Cash tokens are the everyday familiar example of a fungible article, but with this idea of cash comes the idea of deferral and associated trajectories of simulation and implicature.

³ Delome correlates neatly with Heidegger's *gelichtet*: 'When we talk in an ontically figurative way of the *lumen naturale* in man, we have in mind nothing other than the existential-ontological structure of this entity, that it *is* in such a way as to be its "there". To say that it is 'illuminated' ["erleuchtet"] means that *as* Being-in-the-world it is cleared [gelichtet] in itself, not through any other entity, but in such a way that it *is* itself the clearing.' (1962, 171). The translators note that 'Lichtung' is used in the sense of 'a forest clearing' rather than as 'clarification'.

The fact that understanding is transactional—generally speaking—deepens the problem, though not unhelpfully. What it means to understand is frequently a matter of satisfaction, which is an emotional constraint often bound up in social interaction. At the same time, to understand is implicitly to withhold or foreclose curiosity, which lands us straight back in the realm of belief. However, humans—some of us, anyway—are not content with understanding; we wish to move beyond understanding or rather to exploit our current holdings productively. It is an account of this productivity that is sought, in which the terms constituting ‘florid representing’ contribute an operational sense of how thinking happens. Both terms (‘florid’ and ‘representing’) are vague, though, and combining them does not lend clarity.

Because he contrasts it with a possible version called ‘pastel representing’, Dennett appears to be using ‘florid’ in a cultural rather than botanic sense. Clark, on the other hand, contrasts it with a possible ‘wilting representation’ (1999, 5/15), which advances (or more accurately retreats) from the botanic sense. The cultural sense, associated particularly with the European baroque, is of flamboyant, decorative flourish. But pursuing the pastel comparison, the issues would be twofold: first, using the same pigments, oil paints and pastels differ in the permanence of the medium; second, oil paint permits finer detail. Both are germane to the problem of understanding the operationalization of continuity, but nothing about these intrinsic qualities helps understand *what* is being perpetuated.

In its botanic sense, florid derives from flowering—the advertising of gametes, or of media conducive to the goal of matching gametes. Successfully florid plants go on to produce seeds, which go on to produce new plants. Although cross-pollination can take place, gametes are normally fairly loyal to their own kind, and the ecosystem locks in to a slowly modulating stability. Wilting, here, is the natural stage that follows flowering, unless the organism as a whole has been caused to wilt by an environmental crisis of one sort or another. The transferred idea is that something of the purpose of the flower remains although the flower itself, and any memory of its actuality, have gone. This echoes the nature of the transaction in Austin’s perlocutionary speech act, and gives conceptual operationalization to the Barnesian performer whom we will encounter in part three.

Transforming the concept of representation into a mind–tool entails a move that leans simultaneously on the idea of representation as selected function (that is, a ‘nouny’ usage in which the representation stands for the stuff it represents), and on system

function (that is, a ‘verby’ sense in which representation is the performance of re-presenting). If we take as granted the computational function of the brain in resolving mind–tool equations, the question is whether the organ is a sort of art museum containing a bunch of representations (pictures and their sensory analogues, however you want to parse the notion of, say, a ‘smell-picture’) or whether it contains a repertoire of enactive routines that enable its host organism to ‘catch the rhizomorphic wave’ when the environment re-presents an opportunity to do so. Re-presentation in the second sense is a property of the environment that the organism is adapted to exploit. Dennett’s *Kinds of Minds* can perhaps be reconfigured as an enumeration of the organism’s plasticity with regard to these environmental re-presentations.

Adopting enactive terminology, we can say that the performance of representing becomes a matter of pre-enacting, enacting, and re-enacting (the latter both physically and virtually). Simulation theory stresses the ‘act’, while vehicle theory attends to its environment. Representations, then, become ‘props’ that can span a performative spectrum ranging from simple exploitation of affordance to active participation in the effecting of recombinant intentionality (see chapter 7.3 below for further discussion). Understanding this spectrum requires a nuanced account of intentionality that ranges from the dawn of higher-order intentionality in the evolutionary antecedence, through a sense of what is innate in humans, and on to a sense of how scaffolding supports and extends those innate capacities.

6.1.2 Emotion and intension

Let us begin by asking how far back along the evolutionary family tree would we identify a common ancestor whose behaviour *requires* an external observer to adopt the intentional stance in order to interpret it? We have already established that the apparent behaviour of relatively simple mechanical devices *can* be accounted for from the intentional stance, though we don’t *believe* that such devices have intentions. By what metric do we understand biological organisms to be simple or complex? Let us adopt a working hypothesis. The junction I suggest is the one between ectothermy (for convenience, the reliance on the environment for warmth) and endothermy (the ability to regulate body temperature).⁴ The latter, broadly embracing birds and mammals, is

⁴ We might call this the ‘Churchland boundary’, with reference to the discussion of consciousness in the previous chapter. The broad terms ectothermy and endothermy correspond to the crude categories ‘cold’ and ‘warm’ blooded.

expensive to maintain relative to the former. It takes a significantly higher food intake relative to body mass to sustain an endothermic system when compared to the requirement of an equivalent ectothermic system.

Suppose that the brain evolved, in endothermic systems, to sustain the expensive organism in the style to which it has become accustomed—to improve the efficiency of evaluative procedures relating action to sensory data. The supposition that follows is that new capacities in the hormonal management of the richer biochemical system needed to be accommodated by supplementing the pre-existing reptilian brain structure. While the phenetic outcome of this adaptation—emotion—may not be new, exactly, there does appear to be a qualitative difference, a scaling-up.

Speculatively and loosely, an intention can be thought of as the coordination, or threading together, of distributed neural excitations, following Damasio's enumeration (2000, 50–3). He (talking specifically about humans, of course) names six primary emotions: happiness, sadness, fear, anger, surprise, disgust. There are additionally a number of social emotions (embarrassment, jealousy, guilt, pride, for example), and he adds to the conventional enumeration what he calls background emotions, such as well-being or malaise, calm or tension. While he points out that the processing sites occupy 'a fairly restricted ensemble of cortical regions, beginning at the level of the brain stem and moving up to the higher brain' (51), it is not clear whether the 'social emotions' occupy distinct regions, or are derived functions of the primary regions. We may conclude that these secondary emotions are woven from relationships among the primary, and that the primary are shared with other creatures, following his remark that

notwithstanding the reality that learning and culture alter the expression of emotions and give emotions new meanings, emotions are biologically determined processes, depending on innately set brain devices, laid down by a long evolutionary history (51).

But, to repeat the question posed earlier, how far back among the last common ancestors is it useful to go? Again, the endotherms seem rich in emotional response when compared to ectotherms. The justification for walking this border is that the question of the nature of a frog's thought on the one hand, and the lion's potential candidacy for rudimentary second-order intentionality on the other, has occasioned debate in the literature.

In the case of frogs, Clark (1992, 74–6) and Dennett (1987, 103ff) are responding to arguments raised by Stephen Stich and others, ultimately going back to a paper on frog vision published by Lettvin et al. in 1959. Dennett cites Stich:

Ought the frog to believe that there is an insect flying off to the right? Or merely that there is some food there? Or perhaps should it only have a conditional belief: if it flicks its tongue in a certain way, something yummy will end up in its mouth? Suppose the fly is of a species that causes frogs acute indigestion. Ought the frog to believe this? Does it make a difference how many fellow frogs he has seen come to grief after munching on similar bugs? [1981 pp. 60-61] (106)

Stich obviously regards these propositions as absurd; Dennett seems unwilling to abandon the frog to the design stance so easily, even while asking ‘Does any frog so much as *want to find lots of insects today?*’ (108) His hunch is that the difference between froggy beliefs and human beliefs would essentially be a matter of scalability (112).

The idea that we may grant the frog the barest of *intension* develops in arguments that Andy Clark makes in the course of responding to criticisms of the Parallel Distributed Processing (PDP) model in AI. Here, he discusses the requirement of systematicity posited by Fodor & Pylyshyn as an essential component of linguistic competence. That is to say, a system capable of saying ‘Mary loves John’ would be able as a matter of principle to say ‘John loves Mary’:

... it is certainly true that an animal might be able to respond to *aRb* and not to *bRa*. But my contention is that in such a case (*ceteris paribus*) we should conclude *not* that it has, say, the thought ‘*a* is taller than *b*’ but cannot have the thought ‘*b* is taller than *a*’. Rather, its patent incapacity to have a *spectrum* of thoughts involving *a*, *b*, and the taller-than relation should defeat the attempt to ascribe to it the thought that *a* is taller than *b* in the first place. Perhaps it has a thought we might try to describe as the thought that *a-is-taller-than-b*. But it does *not* have the thought reported with the ordinary sentential apparatus of our language (Clark 1989, 145).

Thus, if you can *really* think *Fa*, and *really* think *Gb*, you must (as a matter of stipulation) be able to think *Fb* and *Ga*. But a frog may be able to have the proto-thought ‘there is a fly over there’ and some other types of proto-thought and yet be quite incapable of having any other kind of thought about flies. And what this shows ... is that it lacks the concept of a fly. Thus, the content of the frog’s experience cannot be a *conceptual* content... (Clark 1993, 74).

The implication is that at the frog level of cognitive competence, it may be worthwhile to encapsulate actions—seen from the frog’s perspective—in terms of intension. That is, to gather the receptor cues, effector cues, and their cerebral coordination, inside a single stretch and call that a ‘thought’. We can do that while denying (since there is no evidence to support the hypothesis) that the frog is capable of any sort of extension—any means of making comparisons between these ‘thoughts’.

Accounting for the frog’s behaviour in this way is equivalent to ascribing that perception of its behaviour to the design stance. The question, then, is what would be the value of shifting from the narrative-rich concept of intention to the design-rich concept of intension? Over what range of instances might it be useful? And—a question of a different kind altogether—can the raid on terminology developed for enquiry in the field of logic be justified?

The value of the shift is to render the matter of narrative more precise, since narrative seems to be the exclusive domain of human communication. In any case, it is not so much a shift as a fine-tuning, the simplest category of case that falls within the intentional stance. The range will be instances whose behaviour is

- i) too complex to be reliably accounted for from the design stance,
- ii) is nonetheless predictable within a sufficiently narrow range of possibilities for a working hypothesis to be formed by the observer on the basis of imputed belief and desire, and
- iii) which cannot (at least in the case of non-linguistic animals) be corroborated with accounts told from the subject's perspective.

The implication of iii) is that we are looking for a point where the term 'intension' can realistically be coupled with its logical correlate 'extension' as the locus where narrative brings coherence to intensional flux. What we have in this correlation looks rather like an abstraction that matches the functional coupling paradigm discussed in the previous chapter, a point where a relationship between organism and environment is enriched, perhaps by the development of the means to model the environment internally and to test outcomes against that model before selecting a best fit for a particular circumstance.

To ease the discomfort of this appropriation, some equivalence can be suggested between intension and Saussure's term 'syntagm', derived from Greek roots meaning 'with' and 'to arrange'. Thus it denotes an arrangement of semiotic items distinct from the more precise concept 'syntax', meaning 'orderly or systematic arrangement of parts or elements' (OED). For Saussure, the syntagm is a primitive unit of meaning, a molecular formation compared to the atomic nature of the sign, but primitive and unbound.

Ruth Garrett Millikan has developed a 'biological' sense of intension, meaning a set of properties associated in the minds of language-users with a given term. To elaborate, the sanction is indirect, coming via Jay Rosenberg's (1987) review of Millikan (1984):

It follows, then, that where 'intension' is interpreted as something like a set of properties "associated" in the minds of language-users with a term and thereby serving as a "criterion of application" for that term reference or extension is not determined by intension. "Rather, it is routed through the history of the term which determines the proximate Normal explanation for proper functioning of its interpreter devices or programs" (p. 104). Intension is, indeed, a "third aspect of meaning", but only in a low-grade and secondary kind of way (433).

More recently, Millikan has written that Fregeian ‘sense’ was the name for what she now calls ‘semantic mapping’, while ‘intension’ stood for what she now terms ‘conception’ (2005, 54; 72–5). For Millikan, intension (or conceptualizing) performs a stabilizing function that participates in the operationalization of meaning, which is necessarily a transaction between the private and the public, and, further, an intentional gesture. Its biological sense draws in the Bergson-Deleuze notion of intension, an accumulative trajectory whose concomitant is a discharging trajectory termed *détente*. Deleuze’s interpretation (1988, pp. 18–19; 75–6) suggests a naturalistic resemblance to breathing, but a more apt simile would be with peristalsis, the propulsive flexing that normally ushers food through the gut (and occasionally sends it the other way). Deleuze puns on the logical and emotional connotations of intensity; Damasio’s work points us to a physiological correlation between the logical and the emotional through vagus nerve elevation (Yoffe 2008) and the neurochemistry of reward referenced previously (p. 100).

6.1.3 The emergence of intersubjectivity

Recall the working hypothesis that sets a cognitive boundary at the level of sustaining a warm blood economy. With it came Damasio’s enumeration of ‘primary’ emotions: happiness, sadness, fear, anger, surprise, disgust. Which of Damasio’s catalogue of emotional states would we ascribe to frogs? Fear, perhaps, but coupled with surprise; a couplet that simply corresponds to the basic ‘run away’ mechanism common throughout the animal kingdom. Happiness? Sadness? Probably not. Could we conceive of an angry frog? A disgusted frog? Probably not. Of course, in part our inclination to make these ascriptions to animals depends in part on whether the perceived emotion is recognizable in human terms. Hence Burns’ famous address to a mouse, ‘Wee, sleeket, cowran, timrous beastie,/ O, what panic’s in thy breastie!’ works because there is enough about the mouse’s behaviour that seems familiar to make the comparison register, albeit in conjunction with the registering of bathos. Could we conceive an angry mouse? For that matter, are there any circumstances in which an angry dog is not angry because of some human intervention?

A small worry in respect of animals and intention concerns the etymology common also to intension that connects the word, via the stretching of a bow and the presumed release of an arrow, to a correlation between explicitly predatory behaviour and the fixing of attention. If this is a legitimate behavioural antecedent for the emergence of oral language and the primitives of rational thought, it can only be part of the story; let us, nevertheless, pursue it further. To put the matter at its vaguest, there seems to be a

continuum of increasingly rich attention measured—*faute de mieux*—by quality of eye contact. Our frog seems fairly impoverished in the quality of its eye contact, registering little sign of drawing intelligent conclusions from the sensory data it receives. A domestic cat seems to do rather better; a prosimian such as the slow loris better again; and best of all there are the chimpanzees and gorillas, whose quality of eye contact seems to intimate a degree of empathy little short of human.

Domestic cats are interesting because their behaviour is familiar to a lot of people, most of whom will be inclined to account for the things that cats do in the language of belief and desire. Many of these things, from the point of view of the ethologist, resolve to easily-understood instances of design. For example, forepaw kneading, salivation, and tail-raising when the back is stroked: all of these reflexes can be observed in feeding kittens. However there are times when the things that cats do really seem to be best described as ‘thinking’, or evaluating the desirability of a goal compared to the hazards entailed in achieving it.

In ‘Making Tools for Thinking’, Dennett relates an anecdote about lions hunting in Amboseli Park, Kenya, observed by the ethologists Robert Seyfarth and Dorothy Cheney:

One lion stepped forward into full view of the wildebeests, which all turned, with some nervousness, to eye her cautiously, ready to bolt the moment she made her move. While lion A held the herd’s rapt attention in this fashion, lion B crept off to the left, circling around into position in a shallow ditch, unseen by the herd. Meanwhile lion C crept around to the right, more or less on the opposite side of the small herd from lion B. Once in place, lion C leapt out and gave chase. The herd bolted away, of course, and stampeded right over the ditch where lion B lay in wait. Lion B merely had to leap up to catch and bring down one animal, providing supper for all (2000, 1/9).

This apparently coordinated cooperation seems to be a significant advance, if it is the case that the individual lions are capable of understanding the situation from the point of view of the others, however vestigially. (Obviously, as Dennett jokes, they don’t meet beforehand to plan, agree tactics, draw diagrams and so on.) The lion perhaps has a second order of intension that enables it to imagine what it would do if it were in the position of one of the other lions, and to imagine how the herd of wildebeest might behave in response. Alternatively, in the way that it has become a commonplace that a fish’s knowledge of hydrodynamics is encoded in the shape of its body, and likewise a bird’s knowledge of the principle of lift and drag is encoded in its wings, it may simply be that the lion’s knowledge of the group dynamics performed by the herd of wildebeest is similarly engrained in its genome—or rather their respective genomes, since the wildebeest are not neutral bystanders. However, as I have argued, the reason

we observe few convincing candidates for second-order intentionality in nature is that the concept rests on a false premise.

The trajectory we should be seeking is towards the capacity for individuating discrimination. When a human sees a heron perched in a distant tree, or a bluetit in a nearby bush, the capacity for discrimination is implicit in the choice of noun. Assuming that the visual arc occupied by the two birds is similar, what does a domestic cat see; and how? The question is posed because a cat seemingly ‘knows’ that it cannot catch the heron because it is too big even if it were not too far away. That it can catch the bluetit seems to be enactively coded, so that the bird’s proximity and characteristic movement style cues the cat’s predatory reflexes. No discrimination is made between bluetit, coal tit, great tit and so on; there is no question of one kind of catchable bird being more *desirable* than another.

If Dennett’s lions are parsing intensions, it is still a long way from there to full-scale narrative-inflected intention, and still some way beyond *that* narrative level of achievement—which can be regarded as universally human—to the art-mediated narratives characteristic of modern, urban, civil society. I use the term ‘art’ here in its broadest possible sense to mean ‘that which is made’ as opposed to ‘that which occurs naturally’. It is not readily apparent that this latter shift has any *extra* input from the intentional stance, but it is perhaps the case nevertheless that there is something systematic about the way our cognitive apparatus is fine-tuned by the artefacts surrounding us, something that ought to fall within the remit of the intentional stance to accommodate. There is, after all, a hint of hylozoism in Dennett’s *design* stance, at least insofar as items so perceived really *are* designed.

6.1.4 Intersubjectivity and the shared manifold

The progression by which quality of eye contact appears to correlate with richer cognitive faculties is a simple way of expressing the concept of empathy. Oddly, Gallese (2001) notes (and OED confirms), the word ‘empathy’ enters the English language fairly recently, from the German *Einfihlung*. Intersubjectivity arrives at about the same time, but along a less reliable etymological route that takes in a concept of interdisciplinarity imagined in Carnap’s quest for a universal scientific language as well a psychological sense that is similar to that of empathy. In recent years the terms’ meanings have gravitated towards a role in understanding the role of mutuality in sensorimotor neurophysiology—that is, the place of the other in action understanding.

Let us begin with eye contact and the related topic of gaze direction. Human eyes are structurally dissimilar to other primates in having distinctively pale and elongated sclera (whites of the eye) that ease the interpretation of gaze direction (Kobayashi & Kohshima 1997). The importance of mutual gaze to the relationship between human neonates and their caregivers focuses attention on the richness of prelinguistic communication, and focuses attention on the antecedence of this richness. There is no smooth or simple progression. Hare & Tomasello report that dogs are more likely to avoid approaching forbidden food when a human's eyes are open than when they are closed, but chimpanzees do not make this differentiation spontaneously (2005, 440). Indeed, the interpretative capacities of chimpanzees may be at the level of postural heuristics rather than 'seeing' as humans understand the term. Povinelli & Barth report that chimpanzees prefer to gesture to a conspecific facing towards them but with eyes closed, rather than another who is turned away but looking back over its shoulder with eyes open (in Tomasello et al 2005, 713).

Tomasello argues that many of the aspects of human language that make it such a powerful cognitive tool are already present in the act of pointing. Firstly in being collaborative, secondly in requiring an evaluative sense of the collaborator's perspective. Thirdly, the motive for linguistic communication is already there in pointing, and fourthly in relating two fundamental components of linguistic communication—proposition and propositional attitude (Tomasello 2006, 17–19).

In a test where a human adult responds to an infant's gestures with a range of possible responses—'she wants me to look', 'she wants me to get excited', and so on—the response that most satisfied the infant was the response which demonstrated an understanding of a positive correlation between infant, adult and object. Tomasello interprets this result as showing that the sharing of interest is in itself rewarding for infants in a way that differentiates humans from all other species (*ibid.*, 7). In comparative tests, chimpanzees and human infants are presented with pointing data relevant to a foraging task. The chimps see the interpretation as one problem-solving challenge among several, whereas the humans understand that the gesture is 'meant for them', and helpfully relevant to the task at hand (4–5). Chimpanzees use gestures as one-way procedures for accomplishing ends rather than for sharing and coordinating intention. They do not engage in role-reversing reciprocal acts (12–13).

Apes do not point, Tomasello concludes, because:

- they do not understand communicative intentions

- they do not participate in joint attentional engagement as common communicative ground within which deictic gestures are meaningful
- they do not have the motives to help and to share
- they are not motivated to inform others of things because they cannot determine what is old and new information for them (i.e., they do not really understand informing, *per se*)
- they cannot imitatively learn communicative conventions as inherently bidirectional coordination devices with reversible roles (13-14).

The ability to create joint intentions and joint attention through collaborative interaction thus delimits the boundary of the theatre in which distinctively human cognitive skills are displayed (15).

Gallese's shared manifold hypothesis proposes a theoretical basis for linking the data Tomasello and associates have assembled with the neurophysiological action literature. The shared manifold is a kind of sensory slush fund that participants can draw on and use in the process of developing shared meaning. This connects with Fodor & Pylyshyn's requirement of systematicity (see above, p. 140), and some of the discomfort in that assertion attends Gallese's terminology too. Recall that if John loves Mary, then Mary loves John—a simple mirror condition that draws attention to the fact that its cerebral correlate has become known as the mirror neuron system (MNS). However, mature humans go far beyond this simple symmetry, understanding that while John loves Mary, Mary may not love John, or that the relationship might be between parent and child, or between child and pet.

In reality, the function of the MNS is nuanced, such that witnessing an action causes equivalent, though less intense, activation, while imagining an action causes activation that is less intense again. The subject is able to relate to conspecifics through correlated and reversible extensions resting, probabilistically, on knowledge of the other embodied in the self (Gallese 2001, 44). Gallese continues:

When we enter in relation with others there is a multiplicity of states that we share with them. We share emotions, our body schema, our being subject to pain as well as to other somatic sensations. At this point we need a conceptual tool to capture the richness of the experiences we share with others. I will introduce this conceptual tool as the *shared manifold* of intersubjectivity. I posit that it is by means of this shared manifold that we recognize other human beings as similar to us. It is just because of this shared manifold that intersubjective communication and mind-reading become possible (44–5).

At issue is not only the idea of intention as a useful way of articulating one's own objectives, and as a means of understanding the motivations of others. Where humans have the greatest edge over primates is in the ability to construct or reconstruct intention by inference from the failed, unrealized or undisclosed intentional acts of

others. This extension beyond mutuality extends also beyond the acts of conspecifics to the interpretation of acts and events in the broader environment. It should be stressed that these conclusions are founded on data gathered in experiments that focus on agent/object interactions. Control experiments show that characteristic MNS activity is not observed when the subject can observe only the agent, or only the object—it is the relationship between the two that stimulates the MNS response (34–5).

It is interesting to note that toddlers can observe a human performance of an intended but unsuccessful action, and then enact the successful completion of the same action. When instead a mechanical device demonstrates the failed action, the ability to infer successful completion disappears. An embodied link must be established, Gallese argues, between the observed agent and the observer in order that the intended goal is understood and subsequently re-enacted. Action observation, he says, implies action simulation. ‘Although we do not overtly reproduce the observed action, nevertheless our motor system becomes active *as if* we were executing that very same action that we are observing’ (36–7, emphasis inherited).

Gallese proposes that the key benefit of the MNS is in the area of ‘understanding’, a mutuality operationalized in the sensorimotor system by modelling a performative equivalence between what conspecifics are observed to do and what the observer *could* do (39):

This *implicit, automatic, and unconscious* process of motor simulation enables the observer to use his/her own resources to penetrate the world of the other without the need for *theorizing* about it, without the need to necessarily use *propositional attitudes* (41).

One consequence of the theory Gallese and his colleagues put forward is to invite a reconfiguration of traditional ‘what it is like’ questions in phenomenology such as Thomas Nagel’s well known query, ‘What is it like to be a bat?’ (1974). On Nagel’s account, the fact that an organism has conscious experience at all, irrespective of form, means that there is something it is like to be that organism (436). We can see that there may be neurophysiological preconditions that underpin the evaluation of ‘what it is like’, if that formulation is to be regarded as a strong test. The implication of MNS theory is that language in the human sense is not one of these preconditions, even while the presence of the MNS may be a necessary precondition for language in the human sense.

6.2 The fetch of an intention

We can further embellish the term ‘fetch’ now. It is an organic (and therefore complex) scaling up of the input side of function. Where stance-taking might be taken to be a

rational and static analytic practice, fetch has the dynamism necessary for an organism to respond in real time and update its abductive status. It is convenient, linguistically, to speak of the ‘fetch of *an* intention’, but the polyphonic model has not suddenly turned monophonic: intentions are both plural in virtue of their evaluative nature, and in virtue of their compositionality. We need to analyse both. Regarding compositionality, I will develop a perspective (Grice’s implicature) that offers useful insights into the informal logic of abduction. I contend, however, that in relation to the evaluation of intention, there is a longstanding failure to distinguish between second- and third-person perspectives.

Epistemic issues regarding the disciplinarity of psychology, sociology and philosophy overlap here, much as they were overlapping at the time of Austin’s zenith (*cf.* 2.1.2; Grice 1989, 173). Recent interdisciplinary work by Joshua Knobe considers the problem of attributing intention to outcomes that are peripheral to the goal of an action. One view is that it is always wrong to say that a side-effect was brought about intentionally, while another holds that it may, in the right circumstances, be realistic to make the claim of intentionality (2003, 190). Knobe sets about the problem by explicitly incorporating social science methodology to the study of intention, suggesting that in situations involving multiple intentions, people (ordinary users of language, interviewed in public spaces) are far more likely to ascribe intention when an anticipated negative side-effect is the outcome of a specified primary objective than when an anticipated positive side-effect is the outcome.

For example, where ‘corporation *x* intends to maximize profit with its new product line, and making this product will harm the environment’ people (82% of them) are willing to say that corporation *x* intended to harm the environment, but in the case where ‘corporation *x* intends to maximize profit with its new product line, and making this product will help the environment’, people (77%) will not say that corporation *x* intended to benefit the environment (191–2). The difficulty here is perhaps in assuming parity between ‘harm’ and ‘help’. It is easy to imagine how a harmed environment may impact directly on one’s self, because harm implies damage of some kind and therefore an ideal state before the damage has been done. If the environment is already in this ideal, unharmed state, maybe it is less clear either how helping it will make it more ideal, or how such an improvement will impact on the witness.

In a second example, Knobe personifies the actions in a military operation, where in one version the side-effect is that troops will be placed in the line of fire, and in the

other version they will be removed from it. He asks whether, in the first case, the commander should be blamed, and in the second case commended. Again, respondents were much firmer in attributing blame than praise. In this case, though, respondents might have been acting in the capacity of literary critic as much as social commentator, since the ‘positive’ story requires pleonasm to make it equivalent to the ‘negative’ story. Where the sergeant protests: *but sir, if we do that then I will be putting my men in the line of fire!*, cause, effect and lines of responsibility are clear. However, when the sergeant protests: *but sir, if we do that then I will be taking my men out of the line of fire!*, this hardly seems plausible dialogue (192–3). We may conclude from this that language is better equipped for evaluating hazards than benefits, or alternatively that discriminating between neutral and positive outcomes and attributing their cause is statistically disadvantaged by the sheer potential volume of information that would need to be processed.

6.2.1 Implicature

Some philosophical entanglements with intention may bespeak no more than an attempt to detemporalize, to fuse system and selected function, or to substitute transmission for communication. Dennett says:

Grice ... and other philosophers ... have developed an elaborate and painstakingly argued case for the view that genuine *communication*, speech acts in the strong, human sense of the word, depend on at least three orders of intentionality in both speaker and audience (1987, 243).

Paul Grice was a colleague of Austin’s, one more clearly engaged with the philosophical conundrums that arise from treating oral language in its immediate, performative environment as the primary evidence available to heterophenomenological enquiry. Grice foreshadows Dennett’s multiple drafts model in his argument that the meaning of a word (he uses the construct ‘non-natural sign’ to extend beyond word to intentional gesture and action) is derived from speakers’ meanings by that word in individual instances of uttering it, in much the same way that Foley found communication to emerge in the act of *communicating* (engaging in intersubjective semiotic exchange, *cf.* p. 111 above). For Foley, observing the linguistically mutable and diverse New Guinea region, drafting is a shared endeavour (of which more in part three), hence a communal practice. The same is true of Grice’s linguistic world, but his analysis (generally speaking, a variant of the natural/non-natural distinction) is in need of clarification.

Grice’s distinction between natural and non-natural meaning is apparently drawn from G. E. Moore, for whom ‘natural properties are ... construed nominalistically as simple

particulars' (Hochberg 1962, 366–7), while non-natural properties are apparently compositional in some underdetermined way; they are 'not substantial'; and further, 'Only non-natural properties are universals' (*ibid.*, 370).⁵ For example, the statement 'these spots mean measles' has its natural meaning in virtue of the statement's subject's medical condition. Either the patient has measles, in which case the statement is true, or the patient (or doctor) is mistaken, in which case the statement is false. However, the statement can also refer to the matrix of dots making up the individual letters of the words comprising the statement. The latter version is doubly knavish because it represents an oral expression in writing where the written form can be true but the spoken form cannot (except at deep algorithmic remove, such as the synthesized voice of a robot programmed in binary code, which is still a digital simulacrum of the human form). The point, anyway, is that in the second case, the statement can be true of the dot matrix, and still be false with respect to the patient about whom the statement is written.

Michael Hancher comments that for Grice, 'the universal "type" meaning, or set of such meanings, for a given word is an abstraction from the "token" meanings that speakers mean for the word in specific instances of use' (1978, 1/8). Grice doesn't use these deracinated Peircean terms. Moreover, the natural/non-natural distinction brings us again to the system/selected plurality of function. Hancher argues that in 'conventional' semantics, the token is derived from the type, and that Grice inverts this. In reality, neither way round can claim precedence because of the functional question. Type is equivalent to system function; token to selected function; while Peirce's forgotten term of firstness, 'tinge', is integrative at cost of meaninglessness. Grice is interesting because of his work on the performative, bartering aspect of intentional traffic represented by these terms. The misapplication of the Peircean categories can be remedied with beneficial consequence, an outcome that will help illuminate, in turn, the Peircean notion of continuity.

In his William James lectures (*Logic and Conversation*, 1967, in Grice 1989), Grice treats the topic of implicature at length. These are conversational junctures where the speaker's meaning is scaffolded by context, but not entirely foreclosed by that scaffolding. Grice's first example finds two people (A & B) conversing about a third,

⁵ Forty years on, Hochberg reports (366), Moore accepted Broad's criticism and deemed the argument 'utterly silly and preposterous'.

who has recently taken a job with a bank. B says: 'he likes his colleagues, and he hasn't been to prison yet' (1989, 24). The second clause might imply that C is vulnerable to temptation, or it might imply that his new colleagues are a bunch of rogues. Since C is known to both A and B, they probably share an assumed implication one way or another, one that requires no further elaboration. However, someone overhearing the conversation would not be able to judge without further information.

Grice adduces his 'Cooperative Principle' to generalize from this: 'Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged' (26). He fortifies this principle with four maxims, which interlocutors are recommended to adopt: the maxim of quality (be truthful); of quantity (be economically informative); of relevance; and of manner (be clear). These conventions constitute a kind of oral scaffolding fabricated, one might say, from good-will. This scaffolding is minimally coercive—coercive by consent—but there are instances of implicature where the speech-act itself is intended to coerce. The speaker wishes to lead the interlocutor to form a particular conclusion, in a similar way to Austin's perlocutionary act, and in a way that exemplifies the connection between speech-act and mind-tool.

In 'Meaning' (1989, 213ff), Grice introduces the Avaricious Man.

I have a very avaricious man in my room, and I want him to go; so I throw a pound note out of the window. Is there here any utterance with a [non-natural meaning]? No, because in behaving as I did, I did not intend his recognition of my purpose to be in anyway effective in getting him to go (219).

We need to query the grounds on which the described behaviour can be counted rational. The major premise seems to be that money is to humans as sticks are to dogs. The minor premise is that philosophers do not chase money as assiduously as other humans. Therefore, the avaricious man is to conclude that Grice, in throwing the money from the window, is indicating that he does not regard his visitor as a *bona fide* philosopher (how humiliating!).

The example reappears, in more elaborate form, in a later paper, 'Utterer's Meaning and Intention' (1969). As a preliminary, Grice gives the following definition of occasion-meaning:

- "U meant something by uttering x" is true iff, for some audience A, U uttered x intending
- (1) A to produce a particular response r
 - (2) A to think (recognize) that U intends (1)
 - (3) A to fulfil (1) on the basis of his fulfilment of (2) (151).

The series of counterexamples Grice discusses in further refining this definition are all performances rather than statements. The torturer intends (by tightening the thumbscrews) that the victim understand that he should volunteer the required information (152). The customer intends (by placing precisely the right sum of money on the counter) that the shopkeeper should understand that the customer wishes to purchase a particular brand of cigarettes (though in this example, the customer's intention is in fact scaffolded by the habitual performance of regular purchase presumably 'trained' by prior use of the voice) (153). The bridge player A should understand from the nuance of his opponent B's smile (which, the example asserts, is subtly but conspicuously false) that B intends A to understand that B's hand is weak—B apparently being required to perform social subordination in favour of A (154).

The return of the Avaricious Man introduces a number of intriguing puzzles, including the need to resolve simultaneous intentions:

The utterer U is in a room with a man A who is notoriously avaricious, but who also has a certain pride. U wants to get rid of A. So U, in full view of A, tosses a five-pound note out of the window. He intends that A should think as follows: "U wants to get me to leave the room, thinking that I shall run after the £5 note. He also wants me to know that he wants me to go (so contemptuous was his performance). But I am not going to demean myself by going after the banknote; I shall go, but I shall go because he wants me to go. I do not care to be where I am not wanted."

...A feature of this example seems to be that though A's leaving the room was intended by U to be based on A's thought that U wanted him to leave the room, U did not intend A to *recognize* that U intended A's departure to be so based. A was intended to think that U's purpose was to get him to leave in pursuit of the £5 note (155–6).

The functional elements appear to be these: two actors; a room with a door and a window; a currency token (the £5 note). The drama revolves around the function of the £5 note, because of the way in which a singular but non-accidental selected function is derived from the 'normal' system function. Confusion arises, though, not because A is conflicted in how to respond, but because of several embedded ambiguities concerning the actors' status as performers and witnesses.

First, we should insist on a distinction between audience and witness. Audience is usually plural, but in this example must be singular (otherwise, U could not be assured that the effect of his action would be felt by A and only by A). In that case, the word 'audience' could be acceptable if the action it witnesses is 'normal'—that is, the effect of the action, and its motivation, is reliably repeatable in front of multiple singular audiences. To further assess this reliability, we then need to query the viewpoint from which the story is told. Implicitly, again, it must be U's viewpoint (as it was when Grice first conceived him), since any third-party presence would cause a difficulty with respect

to Grice's definition of occasion-meaning by introducing an audience that is simultaneously singular and plural. The asymmetry in available personal information corroborates the assumption that we share U's viewpoint—A's characteristics need no further substantiation since their evaluation constitutes the opinion of U.

U intends that A should follow a highly elaborate process of reasoning, on Grice's account, rather than choosing between several equally elaborate processes of reasoning. Something in the picture must focus all participants' attention on the semiotics necessary to effect this course, and in Austin's terms we must be seeking something in the nature of a perlocutionary speech act. The next question is whether the perlocutionary force is vested in U, in the £5 note, or whether it is an emergent property of the constellation. In the event of a £5 flying through the window of its own accord—blown by a momentary gust of wind caused perhaps by the opening of the door—the note's perlocutionary force is capable of causing A to leave the room in pursuit. If this minimum condition is not true then the rest of the apparatus cannot follow. What perlocutionary force, then, does U contribute in order that A should leave the room because of the £5 yet not in pursuit of it? Surely it makes a difference whether U is a peer of A's—a fellow professor, perhaps. This, again, is implicit: imagine two socially asymmetric counter examples. In one, U is the leader of a political party and A is a newly-elected representative; in the other U is the son of A. In the former case, other means of causing the subordinate to leave the room, entailing the reinforcement of that subordinacy, can easily be imagined; in the latter case, a verbal reproach from A might be anticipated. U may very well find himself sent from the room to recover the note himself.

The condition U allegedly wishes to achieve—A leaving the room but not pursuing the £5 note—would be achieved with equal satisfaction if the piece of paper U threw from the window merely resembled a £5 note from the distance at which A could observe it; implicitly, though, U intends to recover the £5 note after A has left, otherwise why would it matter which of the two outcomes (A pursues the £5; A leaves the room but does not pursue the £5) U achieved? Since the recoverability of the note is contingent on the outcome, further conditions can be inferred: the window does not open onto a busy street; it is likely to be at ground-floor level; the weather is likely to be clement.

What if A entered the room precisely because U was known to throw £5 out of the window whenever A entered the room? To know that A is 'avaricious' but 'proud' requires an evaluative matrix of some depth and substance, but we know little about U

except that he possesses a £5 note that may or may not be superfluous to his needs. To say that A seeks out U whenever he is hungry would be as reasonable an interpretation as any other (perhaps A has an accomplice waiting outside the window). Another plausible explanation for A leaving the room is that, on witnessing a behaviour that many people would regard as eccentric or unbalanced, he has gone to phone a doctor. Grice does not say that U is successful for whatever reason. A might not, in fact, have left the room at all.

Ultimately at issue here is the confusion that arises from conflating second- and third-person conceptions of audience. The former tends to be provisional and discovered in the moment, whereas the latter suggests by the presumption of substitutability (any audience subset will be equally competent to understand the performance) that a performance can be repeated. It is useful to separate the orality of *communication* (in which meaning emerges from the interaction of the interpretative community) from the technologized, institutionalized meaning that is capable of more or less reliable *transmission*. The problem facing the second-person A witnessing U's performance in casting a £5 note from the window is to discover, with precision, the depth of the fund of meaning vested in the gesture and to determine the correct course of action that should follow from separating and reassembling his second- and third-person experience of the moment. He needs to assay the *fetch* of U's intention, to infer some sense of U's action-planning.

6.2.2 The (second-person) fetch of an intention

The 'correct' interpretation of an intersubjective event may very well depend on the tacit assumption of mutually-shared accumulations, otherwise negotiation is necessary. In the torture example, the victim may understand the form perfectly and be completely willing to give the interrogator the information that is sought. But because he does not in fact possess the information the interrogator believes he possesses, the victim is subjected to further extremes of misery because he has no means of communicating this deficit. Failures of intersubjectivity arise when the fetch of an intention is misinterpreted owing to incompatibilities in the participants' respective reservoirs of tacit knowledge—one such repertoire being the acquisition of 'literacy'.

Faced with Grice's intractably complex trains of implicature, economists (and political scientists) use statistical modelling techniques, the best known being game theory. An informal example, from the game of poker, illustrates how the evaluation of third-level intentionality is difficult to do: at showdown, player A needs to have formed 1) an idea

of what player B has; 2) an idea of what player B believes player A to have; and 3) an idea of what player B thinks player A believes player B to have. If that is not complicated enough, either player must also evaluate whether the other is capable of thinking so deeply in the first place, because, in the same way that you cannot put a weak player on a hand, nor can you put a weak player on a thought (Sklansky 1999, 237–9). While knowledge of odds, a memory for cards seen and opponents’ prior play are all assets, computation needs to be done ‘in the head’, and in the moment—without recourse to pencil and paper or a calculator.

Formal game theory models decision-making in interactive environments, where rewards and costs depend on choices made by others; most frequently these models represent dyadic, or second-person interaction. Poker is a pure conflict, or zero-sum game, in theoretical terms, because one player wins at the expense of the other. More interesting and realistic situations can be modelled in which outcomes—sums—are variable; certain decisions may have positive or negative outcomes for both parties. The numbers can become as unfathomably large as any vocabulary fairly quickly, but in practice a repertoire of a few simple instances tends to recur in the literature. Given two players, and ordinal preferences weighted from one to four, it is possible to identify seventy-eight distinct ‘games’; if restrictions on preferences are relaxed, this rises beyond sixty-four thousand (Scharpf 1997, 79–80).

Out of the seventy-eight games, four have become well-known. These are ‘assurance’ (or ‘the hunt’), ‘battle of the sexes’, ‘prisoner’s dilemma’, and ‘chicken’. It is interesting

		Column	
		C	D
Row	C	4 3	4 1
	D	1 2	3 2

		Column	
		C	D
Row	C	1 4	1 3
	D	3 2	4 2

		Column	
		C	D
Row	C	3 4	3 1
	D	1 2	4 2

		Column	
		C	D
Row	C	3 4	3 2
	D	2 1	4 1

1 – untransformed grids, from the left: ‘assurance’, ‘battle of the sexes’, ‘prisoner’s dilemma’, ‘chicken’. (Scharpf 1997, 75)

to review these as models of the intentional stance in practice, paying particular attention to the transformative effect that an evaluation of ‘fetch’ can have. Additionally, these transformations bring dynamism to the ‘tuned dispositifs’ discussed in the previous chapter, hence the continuing liaison with Scharpf.

In **Assurance**, cooperation entails catching a high-value quarry that requires two hunters (a stag), but each hunter may instead choose to hunt a smaller quarry that requires only their own skills to catch—a hare. If they cooperate, then both achieve their maximum payoff. If one ‘cooperates’ but the other defects, then the defector catches the hare while the cooperator catches nothing; if both defect, then both catch the hare (there being only one stag and one hare), which is of less value jointly than it is individually. This models the role of perception and mutual predictability in social interaction. If Row cannot trust Column’s understanding of the situation, defection is optimal because the second- or third-best payoffs are both preferable to the fourth, even if Column acts from the same uncertainty—where both would end up with their second-worst outcome, sharing the hare (73–4).

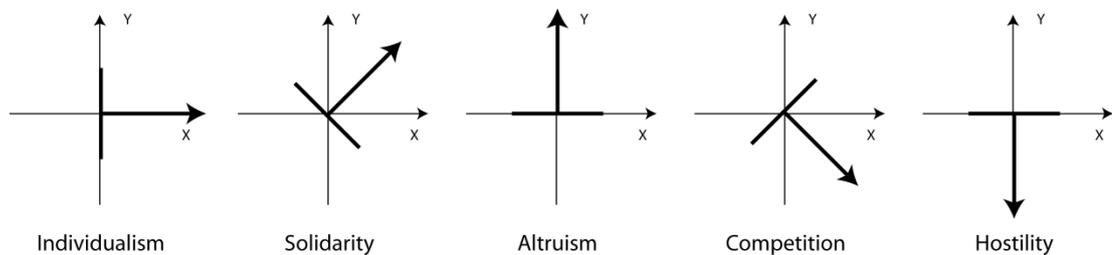
The **Battle of the sexes** models situations where participants are inclined to cooperate, but cannot benefit equally from doing so. The problem is that ‘agreeing to disagree’ is the next worst solution, so that one participant must *intend* to cooperate while the other intends not to. Without coordination, the optimal solutions can only be achieved by chance, since there is no rational basis on which to evaluate the other’s likely behaviour. Since both parties prefer the less attractive of the two coordinated outcomes to either of the rational noncoordinated outcomes, agreement is likely to be negotiated, but communication and negotiation will not under all conditions lead to outcomes that are socially superior to unilateral and self-interested action (74–5).

By contrast, in the **Prisoner’s dilemma**, the rational choice is to cooperate with the other player, but a higher payoff is available to the first player if the second player goes along with this but the first player chooses not to. If the players cannot trust each other and both choose to defect, both receive their second-worst payoff. Prior communication could enable players to coordinate their responses to the deal on offer, but the rather obvious hazard is that such an agreement is not only not binding, but should one player break it unilaterally, the other is in the worst possible position to wreak revenge. When played experimentally, with iteration, players typically reward or punish each other by employing a simple tit-for-tat strategy such that any defection is met with defection in the next game, while cooperation is met with renewed cooperation. However, this stability breaks down in multi-actor constellations. Where unilateral defection is a dominant strategy for each individual actor, typically the outcome is that several participants defect, leading to collectively sub-optimal outcomes. The only endogenously available sanction—to punish defection by defecting one’s self—cannot so easily be targeted to the offender (76). **Chicken** is like the Prisoner’s Dilemma, but

joint defection now has the worst outcome for both players. There is thus pressure to cooperate, especially in iterated games where repeatedly punishing a defector with defection will systematically harm the retaliating defector. If iterated games are also staggered so that the second player is responding to the action of the first, the first mover always wins (77–8).

Scharpf introduces the notion of **interaction orientations** to account for the roles that such factors as envy, mutual support or gloating may play in resolving game situations. The impetus arose from apparently anomalous laboratory results whose interpretation required theorists to look beyond failures of rationality (players being assumed not to have understood the games' structures). Thibaut & Kelley, pioneers of social exchange theory, found consistent explanations could be found that transformed a 'given matrix', which solely noted each subject's payoff, into an 'effective matrix' where weight can be given to each subject's perception of what the other will receive. The specific form of the transformation depends on the nature of the relationship between the players, where considerable variance can be observed as a result of either one player's personality traits or the other's previous behaviour (85).

In the following transformations, the general rule is the function $U_x = aX + bY$ where U_x is the total utility that is subjectively experienced by a player; X and Y are the 'objective' payoffs received by each player respectively; and a and b are parameters varying between -1 and $+1$.



2 - Standard transformations (Scharpf 1997, 86)

The members of the selected set of transformations tend to be 'social' in nature. Scharpf footnotes a further set that are possibly more appropriate to intimately personal interactions, but which tend not to impinge on the social sphere.⁶

⁶ The 'personal' transformations are: $U_x = -1X + 0Y$ (masochism); $U_x = -1X + 1Y$ (self-sacrifice); $U_x = -1X - 1Y$ (mutual destruction); $U_x = 0X + 0Y$ (indolence)

The **Individualism** rule ($U_x = X$) represents the assumption of self-interest maximization. Only personal gains and losses will be considered. The **Solidarity** rule ($U_x = X + Y$) defines the precondition of unrestricted cooperation. Both players value gains to themselves or to the other player equally. In the graphical representation, desirable outcomes are located above and to the right of the northwest/southeast diagonal, but outcomes can be located to the left of the vertical axis, where a real loss to the self can be justified by a larger gain to the other. In the **Altruism** rule ($U_x = Y$), the normative rule of the helping professions, a gain to the other player will be considered as a positive outcome, the self's own payoffs being considered irrelevant. This need not presuppose selflessness in the moral sense: In interactions with a patient, a doctor may act with exclusive regard for the patient's well-being precisely because remuneration is not affected by the outcome of the treatment.

Prisoner's Dilemma

3	4
3	1
1	2
4	2

Individualistic

0	3
0	-3
-3	0
3	0 *

Competitive

6	5
6 *	5
5	4
5	4

Solidaristic

Battle of the Sexes

3	2
4	2
1	4
1	3

Individualistic

-1	0
1	0 *
0	1
0	-1

Competitive

7	4
7 *	4
2	7
2	7 *

Solidaristic

3 – effective transformations. Cells marked * represent equilibrium outcomes (Scharpf 1997, 88)

In the **Competition** rule ($U_x = X - Y$), which describes the psychological mechanisms of a need to win, a gain to the self or a loss to the other will be equally valued—what matters is the relative gain. A gain that is overshadowed by a larger gain to the other will be counted as a loss, while a loss will be regarded as a victory if the other party's loss is greater. The **Hostility** rule ($U_x = -Y$), by contrast, describes the psychological mechanisms of hate. In the same way that an altruistic act confers benefit to the other irrespective of the self's gains, the self under the hostility rule considers any loss to the other as a gain to the self, the self's own gains or losses being deemed irrelevant (85–6).

The impact of these transformations on the original matrices can be striking. Both 'competitive' and 'solidaristic' transformations of the Prisoner's Dilemma simplify it substantially. The 'competitive' rule converts all varieties of constellations into zero-sum games. Cooperation—predicated on the notion of common interest—is ruled out, and negotiation, 'cheap talk' at best, is likely to be regarded as an attempt to deceive. The recommendation urged by theory in such circumstances is that a player should follow a 'maximin' strategy that will maximise the minimal payoff in the worst case. Thus, in the Prisoner's Dilemma the Row player should choose the bottom row—where the minimum payoff would be zero—rather than the top row, where it would be -3. Likewise, the Column player should choose the right-hand column. By contrast, 'cooperative' transformations convert all kinds of actor constellations into 'games of pure coordination' in which actors are only interested in coordinating their choices on a solution that produces the best combined payoffs. (87)

Both 'battles of the sexes' grid forms used by Scharpf are recognized by that name in the literature (Kilgour & Fraser 1988, 109); why he switches from one to the other is not clear. However, the dissonance draws attention to an imprecision behind the apparent clarity provided by the numbers. Suppose that the issue being modelled in these

grids is 'doing what he wants to do' versus 'doing what she wants to do'—a conventional battle-of-the-sexes scenario. In the former version, the coordinated responses correspond at worst (1,1) to both doing what the other wants to do (implicitly alone) and at best doing what each wants to do by themselves (2,2), while one partner defecting—going along with what the other wants—makes both happy, though the one who gets their way is obviously the happiest (clearly, *cf.* Knobe, there are multiple intentions involved here). In the latter version, the same story sees the stipulations rejigged so that the first and second options refer to the choice at issue. Both

p.75

2,2	4,3
3,4	1,1

p. 88

4,3	2,2
1,1	3,4

coordinating on the one or the other will make both happy, though differentially as before; failing to coordinate will make neither party happy.

6.2.3 The (third-person) fetch of an intention

What would happen to Scharpf's grids if we applied one kind of transformation to one party, and a different kind to the other, so that (for instance) the row player is attempting to behave competitively while the column player is playing individualistically, as we might imagine of Grice's £5 actors? We would probably have to say that the narrative valence of the construct had broken down, and for a fairly clear reason: a third dimension, by which the two actors arrived in the grid, has come into view. Previously, although implicitly present, this dimension was functionally irrelevant as though being viewed head-on. The symmetry of the grid neatly parodies the transactional capacities of the mirror neuron system discussed previously, but drawing in the historical dimension requires further neural theorization.

Recall the difficulty in reconciling the mind–tool ontology with the notion of representation raised previously (in section 6.1.1). For the brain to be able to fabricate mind-tools reliably but flexibly there is implicitly a cyclical relationship with the immediate environment, an environment that might very well have been shaped deliberately to foster certain cycles and to minimize or exclude others. In this rhizomorphic picture, it may be intention that furnishes an essential modulation, *overture*—the opening, priming, thematic statement that asks questions of the cycles and adapts to their replies. A particularly acute question concerns the role of mirror neuron physiology, and related empathic capacities, in the absence of conspecifics.

In 'The Brain's Concepts', Gallese & Lakoff (2005) argue that concepts are elementary units of reason, conventional and relatively stable, which must somehow result from neural activity in the brain. The broadly functionalist orthodoxy is that concepts are abstract, amodal, and arbitrary, made up of symbols and having such properties as productivity and compositionality. The trouble has always been that the symbol begs its own question. For a symbol to symbolize, it must already participate in its extension. Gallese & Lakoff propose that conceptual knowledge comes about as the consequence of embodied autopoietic potentiality, and that the sensorimotor system plays a critical role in operationalizing this. Imagining and acting, they stress, use the same neural apparatus, leading them to propose that '*understanding is imagination, and that what you understand of a sentence in a context is the meaning of that sentence in that context*' (455–6). For example, the action-concept 'grasp' gets its meaning—it's 'concept-ness', if you like—

from the parallel capacities of performing, perceiving and inferring the physical act of grasping. The same neural architecture participates in all three aspects.

Evidence accumulated since the 1990s shows that cortical premotor areas possess sensory properties:

They contain neurons that respond to visual, somatosensory, and auditory stimuli. Posterior parietal areas, traditionally considered to process and associate purely sensory information, in fact play a major role in motor control. The premotor and parietal areas, rather than having separate and independent functions, are neurally integrated not only to control action, but also to serve the function of *constructing* an integrated representation of (1) actions together with (2) objects acted on and (3) locations toward which actions are directed (459–60).

Just as the traditional notion of a ‘central meaner’ finds no place in Dennett’s multiple drafts model of consciousness, the old notion of supramodality—that sensorimotor integration is achieved at some ‘higher’ level where separate modules are brought together in a putative ‘association area’—is not sustained by research data. Rather, several classes of premotor and parietal neurons are inherently ‘multimodal’. The firing of a single neuron may correlate with either performing, perceiving or imagining an action, meeting Gallese & Lakoff’s proposed condition that an action-concept must fit both the performance and perception of the action. Multimodality is not consistent with the idea of strict modularity. Supramodality accords with a picture of the brain containing separate modules for action and for perception that require the assistance of a ‘central meaner’ to coordinate; multimodality denies the existence of such separate modules.

Instead of modules, Gallese & Lakoff adopt a notion of parameterization whereby the same substrate is capable of multiple phases of performance stabilized by sensory feedback. The cat’s transitions between walking, trotting and galloping are presented as an example: the step patterns for each are robust and discrete, licensing a distinction between the neuronal firing frequency (parameter) and settled pattern (value). Whether simulation plays a part in the cat’s transition from stalking (slow walking) to pouncing (short gallop) is a question that goes unasked (perhaps because the research cited was conducted in a laboratory). The transition has to be initiated at just the right time in order to maintain the element of surprise while minimizing the target’s scope for evasive action.

An action such as moving an object involves parameters for direction and force whose values determine where and how hard one pushes. If sufficient force is required, pushing comes to shoving—an act that requires a different motor programme: setting

the weight on the back foot, and so on. Gallese & Lakoff insist on a distinction between parameter structures and actions (real, observed and imagined). While action is dynamically and contextually adapted, parameters are fixed. This may be a firmer claim than absolutely necessary, made in order to maintain compatibility with the modular orthodoxy. They go on to claim that

...parameters and their values are accessible to consciousness, while anything below the parameter value level is inaccessible.

Similarly, language may express parameters and their values, but language cannot express anything below the level of parameter values (464).

By this somewhat creaky fiat, they make language an explicit element in their argument, resting on the notion of 'basic-level' category. In hierarchies such as furniture/ chair/ rocking chair, or vehicle/ car/ sports car, they claim that the characteristic of the 'basic' level is that it is embodied. This is somewhat in accord with the notion of individuation discussed in the previous chapter. The embodied has a simple familiarity that is analogous to the precided particularity yielded by Dehaene's code-switching. However, the underdetermination of the related universal (furniture, vehicle) has an implicit instability that affords, or even primes, the faculty of preciding.

What is interesting is the way in which artefacts support the extension of conceptualizations that are initially embodied. The deep question is whether artefacts exploit cerebral structure to effect a sustained and in some degree indelible translation in the brain, such that once technologized, the brain does not easily become de-technologized. If the answer to this deep question is 'yes, that is (more or less) what happens' then a second deep question arises: how many routes interweave, how many plateaux do the routes connect, and at how many levels? Is there only one outcome—the rational actor—or are there several stable configurations, each of which might be thought of as a troupe of actors performing the plays that their particular set of intersubjective technologies insist they rehearse?

The definition of 'technology' required by the question as parsed in the previous paragraph rests in large measure on the analysis of function and tool use from the previous chapter, allied to further attention to the Peircean understanding of chance that will develop in part three. Before we get there, though, we need to pay further attention to the fabrication of mind-tools. In particular, it is the capacity to harvest intersubjective, intentional and implicative transactions and to reify them in the absence of direct communicative interaction that concerns us.

7 Recombinant intentionality

Recombination is a term that applies to the shuffling of genes during ‘The formation by a sexual process of genotypes that differ from both the parental genotypes’ (OED). It is the means by which fidelity is highly conserved so that offspring closely resemble their parents without being clones of one or the other. It is theorized that the benefit of this is to afford protection against genes whose propagation would be detrimental to the genotype’s inclusive fitness (Haig & Grafen 1991; Grafen 2006).

The term ‘recombinant’ has come to mean a more specifically artificial intervention, where a genetic engineer might splice a gene from one species into the DNA sequence of another. Implicitly, this action may have effects and consequences besides or in addition to those sought. Although individual genes are chemically complex, they are compositional particulars. This makes it hazardous to draw an analogy with intentions, which cannot be regarded as compositional in the same way. Nevertheless, the distinction between ‘recombination’ and ‘recombinant’, applied to intention, echoes the arguments between Austin and Feyerabend for and against ‘ordinary language’: one privileges stability; the other, change.

The term ‘recombinant intentionality’ makes a similar modulation from ‘natural’ occurrence to deliberate action, with similar scope afforded for unexpected consequences. The key aspect of it, though, is the capacity for implementations of fungible (noun) representation to induce performances from intentionally-aware actors in the absence of the sign-maker. In simple terms, this chapter develops themes from the previous one, focusing on the material–semiotic realization of intention and implicature, complementing the third-person aspect to the fetch of an intention with a sense of ‘put’, giving specific emphasis to the role of the hand in *making* signs.

To begin with, let us reacquaint ourselves with two ideas that have emerged along the way. One is the passage point, which first occurred in chapter 2.2.1, and has mutated into a placeholding alternative to the notion of representation. The other is ‘movie-time’, from chapter 5.4.1, the idea that humans have the capacity to shuffle and rearrange ‘cognitive instances’ (a deliberately loose term) remote from the environment in which the original experience might have occurred. A simple, singular vehicle for these ideas is the term ‘anaphora’, though the simplicity is deceptive. The term has a rhetorical meaning, and also (in the form of ‘anaphor’) a more precise, derived linguistic term. The concept is valuable in part because of this capacity to show two complementary faces, one being oral and the other literate. It is able to take the

theoretical load of founding a scalable series of mind-tools capable of operationalizing ‘movie-time’.

Literally, anaphora means ‘carrying back’, and is thus animated with the state of evaluating or hypothesizing so that the term’s relationship with what has gone before becomes meaningful. Again, the distinct cognitive processes marshalled in acts of vocal communication, as opposed to manual communication, are dramatized in a single term; an implicative ‘towards-which’ is in tension with a hylozoic ‘where-from’. If ‘ordinary language’ is an equipmental hoard of common-sense indubitables, of unextended particulars, the anaphor further distils the attendant sense of fungibility. The mathematical term ‘eigenvector’ is a further, ultimate distillation of equipmentality, from which we can build out—technologize—and stabilize our relationship with environmental flux.

In the polyphonic model, the term ‘eigenvector’ most reliably characterizes the *sensory* strand, in terms of the faithfulness with which one conspecific can assume that the other shares a sensory experience. However, this sensory experience is shared (more or less) well beyond the human domain. Psychological polyphony is more obviously unique, but less reliably shared, owing to differences in gender and age (for instance) among conspecifics; semiotic polyphony is less reliable again, since it is dependent on the local environment. If you have never seen an olive, you need no word for ‘olive green’.

7.1 Footnotes to Plato

A familiar argument in the philosophy of the extended mind is that cognition in general, and human cognition in a particularly refined degree, uses the environment as one vast storage space. If we are to treat anaphor as a category of mind–tool that operationalizes an explicitly stigmergic mode of performativity in the environment so conceived, then we need to develop a sense of how we are able to index this storage space.¹ Historically, the thought that humans are a good deal more efficient at navigating search-space than traditional symbol-processing computers is one of the influences that prompted the emergence of parallel-distributed-processing models in the 1980s (Clark 1989, 1993; Opie 1998). In retrospect, this emergence complemented a model of computing operations based on the human capacity for precise individuation with one based on the

¹ ‘Stigmergic’ derives from *stigma* = sign + *ergon* = work, cf Clark 1997, 73–5.

capacity for approximation that was previously considered (if it was considered at all) to be waste material, the proverbial ‘doesn’t matter’.

Modern search algorithms exploit both dimensions. In approximate terms, the Google search engine indexes web pages by analysing patterns in the relationships *between* pages. This ‘nodes and authorities’ coupling works well, and is suggestive of a mind–tool category that may be transparent across the somatic boundary. In other words, the hypothesis-formulation that goes on inside the brain has its counterpart in the way natural and artificial semiotics feed and interact with sensory traffic. Authorities correspond to working hypotheses: as long as a hypothesis withstands scrutiny, it has authority; a hypothesis being inherently relational, it will inherently require a plurality of authority. Nodes, or foci, are provisional concentrations of data about data, and information can be inferred from the way in which these data relate to each other.

Although Google is perhaps the most familiar name among the pioneers of the technology in question, the search logic they implemented is discussed by Jon Kleinberg (1999) in a paper that serves as the foundation for arguments presented by Andy Clark in his (2002b) paper ‘Local Associations and Global Reason’, which addresses the problem of modelling hypothesis formulation. The underlying issue, the dynamic negotiation of authority, arises in Bruno Latour’s (1987) exploration of the social processes that underpin the accumulation of influence in the natural sciences. Developing the Foucauldian sense of signature as an act of authorization, Latour’s text draws on citation indexing, a field of scholarly endeavour consolidated in the 1970s as a technique for evaluating the worth of scientific papers, and a field that owes something to Peirce’s work on indices a century previously.

Latour cites Eugene Garfield as the authoritative source on citation indexing (algorithmic historiography, as Garfield calls it). Garfield identified the need, in the 1950s, for a means to evaluate contributions to the scientific literature in terms of the scholarship an individual work makes reference to. Citation indexing can reveal the currents of thought that carry forward the propagation of knowledge. Latour (1987, 21–62) explores the rhetorical dimension of the patterns revealed in citation analysis, noting:

The presence or the absence of references, quotations and footnotes is so much a sign that a document is serious or not that you can transform a fact into a fiction or a fiction into fact just by adding or subtracting references (33).

For the author of a paper, says Latour, the rhetorical tactic is to interrogate the prior literature in such a way as to make it as valuable as possible to the position being argued. Accomplishing this includes speaking with due humility; securing lines of communication to authoritative sources; aiding vulnerable allies; getting opponents to fight each other; undermining or neutralizing opponents. For any paper to survive as an authoritative source in turn, however, it needs to be able withstand exactly these tactics in the hands of others. At best, the new paper will become a classic like Einstein's or Turing's; if not then the best hope is for it to become a locus of debate; if the tone of the debate is harsh then the paper will probably join the forgotten; it may alternatively, survive in garbled form as other scholars help themselves to tangential ideas that may emerge; worst of all, the paper may be ignored entirely (37–41).

The force of Whitehead's famous remark that all philosophy is no more than a series of footnotes to Plato was to emphasize the futility of attempting to harmonize a synoptic ontology out of the widely divergent philosophical opinions accumulated over the centuries. It is interesting, though, that Plato himself makes extensive use of citation—more so than Aristotle, since citation fits the dialectic style so well: a good deal of knowledge about prior Greek philosophy comes either from Plato's writing or from research prompted by it.

7.2 The frame problem

The efficient navigation of search-space has been an abiding concern in Andy Clark's work. In *Microcognition* he remarks that the function of heuristic search methods 'is precisely to increase the *intelligence* of the system by reducing the extent of the search space it must traverse to solve a particular problem' (1989, 122). He goes on to identify the connectionist phenomenon of cross-talk as a specific type of 'creative error' characteristic of human thought processes. In connectionist simulations, retrieved data might be lightly garbled in the same kind of way that a human might mix up two similar telephone numbers. The source of the problem—superpositional storage, to cut a long story short—is also, he argues, 'the source of much of the power and flexibility of such systems. The tendency to generalize is one example of this' (123). From the classical perspective, which solely valorizes consistency in the performance of retrieval, cross-talk is regarded as a nuisance. From the connectionist perspective, the phenomenon begins to suggest that 'something else is there', something other than the explicitly-encoded data that is 'meant' to be there.

In *Associative Engines* (1993) the concern with heuristic search has developed into his signature concept of the embodiment of an organism's relationship with the distal environment:

Consider, however, a somewhat different range of cases: cases in which a system can in fact access certain information (i.e., generate an internal representation of it), but only in virtue of some wider processing environment than that constituted by its onboard processing and storage apparatus. For example, I may be able to further exploit the individual parts of some problem solution only if I am augmented by some external memory (paper and pencil), or I may be able to retrieve and deploy some specific item of information only in a particular external setting (one in which it is cued by a written reminder) (1993, 127–8).

A concrete domestic example furnished in *Being There* (1997) helps to develop the point. A classical approach to modelling the problem of locating a particular coffee cup might focus on properties such as shape and capacity. For the human, though, a property such as its colour might prime the search since colour is computationally cheap to detect. Because the human is sensitive to context too—a yellow blob near the kitchen sink, for instance, attracting the subject's attention—this search is context-dependent and non-generalizable; additionally it is, as Clark puts it, 'heavily agent-o-centric' (1997, 149–50). It is, however, much more efficient than the 'classical' method.

The problem is to isolate semantically significant content from the noise and rubbish that characterizes the global search space. Content involves reference, whether to objects, properties, or relations. The classical model builds content from, for instance, Fregean sense and reference, or from Russellian objects and properties, but effectively they are built from a self-contained, noise-free, rubbish-free base. For the environmentally-coupled model, '...representational contents of such states can often involve referential relations to external entities with which thinkers are causally quite unconnected' (Papineau 1994), and thus, conceivably, anything might be relevant. Noise and rubbish are the net remainder, but of course one person's noise is another's music; the problem of framing content in the first place is merely displaced.

This problem has emerged as a key issue, both in the Artificial Intelligence field, and in the various avenues of cognitive science that pursue a symbiotic programme with it. To this point, I have been using the term 'anaphor' fairly casually. The frame problem concerns just how, and under what conditions, something *becomes* an anaphor and, in that process of reification, becomes a pragmatic passage point with the capacity to

engross the interpretant in further refinement and resolution of an initial hypothesis.² As Clark puts it: ‘It is the puzzle of finding the *right* stuff (information, data) to consider (update, or use in reasoning) at the *right* time’, a puzzle that has Jerry Fodor ‘worried half to death’ (2002b, 3/16). Clark goes on to cite Fodor’s gloss of the problem as an issue in cognitive science:

The frame problem is a name for one aspect of the question how to reconcile a local notion of mental computation with the apparent holism of rational inference; in particular with the fact that information that is relevant to the optimal solution of an abductive problem can, in principle, come from anywhere in the network of one’s prior epistemic commitments (Clark 2002b, 4/16).

Fodor’s signature concept is the so-called ‘language of thought’ (LOT, or sometimes LOTH—the H standing for ‘hypothesis’), a compositional model in which ‘thoughts’, or propositions, are assembled according to theoretically tractable formal procedures, a model closely associated with the ‘classical’ approach to artificial intelligence mentioned previously:

A thought is depicted as a structure of internal representational elements, combined in a lawful way, and playing a certain functional role in an internal processing economy. ... Public language words pick out real inner representational complexes which are causally potent and thus capable of bringing about actions. ... What distinguishes an intentional action from a mere reflex is ... the fact that intervening between input and action there is, in the intentional case, an episode of actual tokening of an appropriate symbol string. (Clark 1994)

Clark finds the elegance of this seductive—hence his ongoing engagement—but he cautions against three potentially lethal pitfalls. The first objection is that LOT entails commitment to a strong nativism that requires all the potential resources necessary to operationalize this ‘language’ in mature specimens to be implicit in the individual organism from conception. Secondly, LOT entails a representational atomism that

² The Frame Problem, posed as an issue in artificial intelligence by McCarthy and Hayes in 1969, concerns how to express a dynamical domain in logic without explicitly specifying which conditions are not affected by an action. Folklore has it that the approach emerged at MIT in cross-pollination with a class Hubert Dreyfus was teaching on Husserl’s concept of *noema*.

The *noema* must contain a rule describing all the features which can be expected with certainty in exploring a certain *type* of object—features which remain “inviolably the same: as long as the objectivity remains intended as *this* one and of this kind. The rule must also prescribe “predelineations” of properties that are possible but not necessary features of this type of object: Instead of a completely determined sense, there is always, therefore, a *frame of empty sense*. (Professor Dreyfus kindly supplied this self-citation by e-mail 25-3-08)

There is, on the face of it, a correlation worth exploring between this aspect of Husserl, Peirce’s diamond, and Callon’s OPP. In rhetoric, a *noema* is ‘an obscure and subtle speech’ (Burton 2007), speech that gives up its meaning only at the expense of close and detailed contemplation.

restricts semantic structure; and finally, under LOT, globally sensitive information processing is an intrinsically intractable problem.

The first two of these objections, in classical AI terms, concern inflexibility in the face of environmental variables or alternatively combinatorial explosion stemming from *a priori* attempts to anticipate such challenges. The frame problem concerns the third objection; the frame problem is precisely where the orderliness of the language of thought hypothesis breaks down altogether. For the environmentally-coupled model, the problem is compounded: in the face of global plenitude, how to discriminate? The environmentally coupled organism may be able to devolve specific resources to fellow organisms and to the environment it shares with them. Further, the identification, negotiation and ratification of any given code need not occur until required. However, while the computational load may be theoretically tractable in a way that the classical model cannot match, the suggestion that Kleinberg's procedure offers the means for achieving such tractability, or at least a promising research direction, underlines the fact that the frame problem has not disappeared but has merely been displaced.

The algorithms discussed by Kleinberg suggest that all may not, after all, be lost. The domain Kleinberg's (1999) paper addresses—the World Wide Web—is virtually synonymous with the idea of unfolding action. Indeed, addressing the parameters of the problem initially, Kleinberg speaks of 'global' searching of the Web in terms that suggest a finite boundary between Web and not-Web, but later he cites the dynamism of the environment in terms that acknowledge its unfinalizability. Key to Kleinberg's argument is the observation that, while individuals impose local order on that corner of the Web for which they are personally responsible, the global organization of the set of pages that constitutes the Web as a whole is totally unplanned. Nevertheless, Kleinberg shows, the data inscribed in the decisions individuals make when creating links between pages in their local domain can be harvested and processed to yield valuable, informed search results.

Kleinberg identifies three classes of query, each of which poses a different problem for the search engine: specific topic queries, broad topic queries, and similar page queries. Of these, the first is held to be tractable within the limitations of classical database search techniques; it is the second and third, the broad topic and similar topic queries that Clark (2002b) focuses on. Although Kleinberg's technique operates on Fodorean syntactic elements, it operates on the relationships *between* discrete and sometimes disparate instantiations of elements that are sufficiently similar to fall within the remit of

the same query. This, Clark surmises, may give some theoretical purchase on the way that the brain manages broad-search tasks.

The nature of the core problem with broad topic queries is the sheer volume of material with potential relevance and thus the difficulty of identifying authoritative material. Kleinberg uses the example of ‘Harvard’. One day there were 52 million pages containing the word (today may be different; that is in the nature of the Web). By what means would one determine that the domain name `www.harvard.edu` ought to be among the authoritative responses, when, for the university, using the name Harvard would be equivalent to an individual talking about themselves in the third person? Similarly, the result for a search on ‘search engine’ might be skewed by the fact that the websites of prominent search engines do not use the term to describe themselves. This is where the analysis of relationship enters the picture. Kleinberg says: ‘Hyperlinks encode a considerable amount of latent human judgment, and we claim that this type of judgment is precisely what is needed to formulate a notion of authority’ (606).

Kleinberg’s procedure applies eigenvector-based heuristics to a fixed set of conventionally-indexed pages. In this context, ‘heuristics’ are context-independent algorithms that give satisfactory results in a variety of situations at cost of precision with respect to any particular situation. Conventional indexing assumes that a page containing a precise match for the query search string is the best match. Referring back to the initial outlining of the frame problem, the eigenvector corresponds coarsely to that which remains unaltered in the belief database after updating:

In mathematics, an eigenvector of a transformation is a non-null vector whose direction is unchanged by that transformation. The factor by which the magnitude is scaled is called the eigenvalue of that vector. ... “Eigen” can be translated as “own”, “peculiar to”, “characteristic” or “individual”—emphasizing how important eigenvalues are to defining the unique nature of a specific transformation. (Wikipedia entry on Eigenvalue, eigenvector and eigenspace, accessed 10 May 2006)

Given the number of pages containing the word ‘Harvard’, most of which probably have several hyperlinks encoded, links of themselves would seem only to invite combinatorial explosion. What contains and defeats this potential is the assumption that patterns of association may be determined by analysing the relationships at a deeper level:

Our model is based on the relationship that exists between the authorities for a topic and those pages that link to many related authorities—we refer to pages of this latter type as *hubs*. We observe that a certain natural type of equilibrium exists between hubs and authorities in the graph defined by the link structure, and we exploit this to develop an algorithm that identifies both types of pages simultaneously. (607)

hub pages ... are pages that have links to multiple relevant authoritative pages. It is these hub pages that “pull together” authorities on a common topic, and allow us to throw out unrelated pages of large in-degree. ...

Hubs and authorities exhibit what could be called a *mutually reinforcing relationship*: a good *hub* is a page that points to many good authorities; a good *authority* is a page that is pointed to by many good hubs. (611, emphasis inherited)

In the intrinsic mutuality of this coupling, and its on-demand dynamism, lies its power. If one performs a similarity search on a corporation in a competitive market such as the automobile industry (www.ford.com, let’s say), the resulting list defeats the natural tendency of each individual corporation’s website to avoid publicizing the products of its rivals, let alone providing hyperlinks leading to such rival products.

Clark sees parallels between this property of the global set of web pages and the connectionist approach, which stores data not in syntactic units but as weights distributed between nodes, blurring the distinction between processing and representation. First-generation connectionist architectures were far too simple to simulate *global* abductive inference, but Clark cites promising second-generation work:

These “control neurons” serve to open and close channels of activity, and allow for the creation of a kind of instantaneous, context-sensitive modular cortical architecture: control neurons weave functional models “on the hoof”, in a way sensitive to the effects of context, attention and so on. ... Related proposals include Edelman and Mountcastle’s work on “reentrant processing” in which feedback and feedforward pathways are used to control and co-ordinate activity in multiples sites, and Damasio and Damasio’s (1994) notion of “convergence zones”, which are neuronal populations which likewise initiate and co-ordinate activity in multiple neuronal groups. (2002b, 11/16)

A key property shared by these approaches is their distributed nature. Individual units by themselves have no syntactic properties. Such properties, when realized, are (more or less) the emergent consequence of units’ interactions. But these interactions are conditioned (as they are not in first-generation models) in part by the structure of their organization.

7.3 Sketching, stretching and etching

The application of Kleinberg’s algorithm, Clark speculates, might contribute to the expansion of second-generation capabilities to the point where the frame problem might be tackled. The underlying puzzle animating this train of thought is made plain when Clark draws a link, in his concluding remarks, with previous work in collaboration with Annette Karmiloff-Smith concerning the concept of representational redescription (RR). Karmiloff-Smith’s field is cognitive development. The prevailing view when she began to develop the theory of RR in the late 1970s was that developmental learning is accomplished through negative feedback—learning by one’s mistakes, to put it crudely.

RR does not deny that such mechanisms play an important role, but Karmiloff-Smith 'felt obliged to lay great stress on the fact that RR could also be internally and spontaneously generated' (Clark & Karmiloff-Smith 1993b), and could be the beneficiary of *positive* feedback too. Humans, as Clark elsewhere puts it, 'are compelled by endogenous forces to go beyond simple success in a domain and to seek a more abstract representation of the strategies which brought success' (1993, 77–8).'

The attraction, for Clark, of Kleinberg's algorithm, connects to the PDP approach to the problem of representation. According to Clark & Toribio (1994),

Classicists opted for a 'quasi-sentential' approach in which key contents were tokenable as strings of symbols, and were operated on by a 'read/write/copy' architecture. By contrast, connectionists opted for an architecture in which representation and processing were deeply intertwined, and strings of symbols participating in 'cut and paste' processing were replaced by episodes of vector to vector transformation in high dimensional state spaces (403).

RR would conjecturally figure in the progress towards ever richer dimensionality, securing regimes of semantic mapping and making them available for higher-level, computationally economical heuristics to exploit. However, Karmiloff-Smith's RR, for Clark (1993, *loc. cit.*), shares the failings of the Language of Thought: the elegance is seductive, but the theorization is not sufficiently robust to account for encounters with the real world of human interaction with the environment.

This is not surprising, given that the two terms Representation and Redescription owe their significance, in this context, to the meaning of the other. We have already rehearsed the difficulty concerning the ambiguity of 'representation' as noun and verb. In the case of verbal use, there is inevitably a performative dimension as the significance of the representation is being contested to a lesser or greater degree, whether in the enthymematic interpretation of a work of art, or in the rigorous examination of evidence in a laboratory or court of law. As a noun, the term has the parallel disadvantage of being pressed to service in any and every instance of experience that conjoins hermeneutics and semiosis. Schwartz (1994) raises two questions: 'What is it that distinguishes items that serve as representations from other objects or events? And what distinguishes the various kinds of symbols from each other?' In respect of the second question, Schwartz cites Peirce and later work by Nelson Goodman (1976), whose analysis falls in line with the code-switching scenario discussed previously.

In respect of the first question, Schwartz says that 'Representations, along with mental states, especially beliefs and thoughts, are said to exhibit INTENTIONALITY in that they refer to or stand for something else.' This statement makes explicit the coupling

between thoughts (the ‘structure of internal representational elements, combined in a lawful way’ as defined by Fodor’s LOT, *cf.* previous section) and the range of things we purposefully put there in the environment to remind ourselves of these thoughts.

Representational Redescription, as Karmiloff-Smith applies the term, refers to a set of staged learning outcomes broadly related to the childhood acquisition of language and literacy, and by extension the skills recruited to the dynamic management of thought. I will turn to this developmental-process aspect shortly. First, though, a specific and useful example of the instantiation of these skills in adulthood is provided by Andy Clark (2001a, 147–50; 2001b, 17ff), following research conducted by Van Leeuwen, Verstijnen and Hekkert into the practices of visual artists. These subjects’ practices are ‘heavily dependent on “an interactive process of imagining, sketching and evaluating”’ (147).

The focus of van Leeuwen *et al.* is the function of sketch-making in the creative process. Why do painters make preparatory sketches, rather than executing their conception directly and immediately to the frame? In fact van Leeuwen *et al.* over-commit to the notion of *abstract* art, and to the sketch: the same argument applies equally well, in respect of the specialized definition of ‘abstract’, in historical terms from Impressionism onwards in one sense, and as far back as any instance of extant sketchbooks such as Leonardo’s permit in another. Further, as Galenson (2001) points out, in the work of such artists as Paul Cezanne or Jasper Johns, one commitment to the frame should be regarded as the sketching of the next commitment to the frame with more theoretical weight than the banal conception of ‘artist’s thumbprint’ can capture.

What van Leeuwen *et al.* uncover is a sharp distinction between the capacity for manipulating abstract mental images—for *thinking about* images—and the way in which perceptive faculties parse incoming sense data. In particular, synthesis is easier to perform in real-time than analysis—while it is fairly simple to look at the letters D and J, and imagine them recombined to form the shape of an umbrella, decomposing complex forms into simpler components on the fly is much more difficult.

Certain forms of abstract art, it is then argued, depend heavily on the deliberate creation of ‘multilayered meanings’—cases in which a visual form, on continued inspection, supports multiple different structural interpretations. Given the postulated constraints on mental imagery, it is likely that the discovery of such multiply interpretable forms will depend heavily on the kind of trial-and-error process in which we first sketch and then perceptually (not imaginatively) reencounter the forms, which we can then tweak and resketch so as to create an increasingly multilayered set of structural interpretations. (149)

The relationship between iteration and environmental feedback, between externalizing and re-assimilating is, Clark stresses, integral to some forms of artistic cognition. Barbara Tversky suggests additionally that sketching is intrinsically analytical, *eo ipso* eliminating the irrelevant. Reconstructing the relevant, however, is a skilled activity: in an experiment where trained designers and laypeople were shown abstract, ambiguous sketches and asked to generate interpretations, the experts generated a greater number than laypeople were able to (Tversky 1999; 2002).

What usefully isolates creativity as a performance, in these terms, is precisely the focused, iterative attention—the element of intentional return. The defect in the convenient approximation of this procedure as ‘trial-and-error’ lies with the second term, ‘error’. It’s a determinist’s word. The term I would substitute is simply ‘feed’. Developing Karmiloff-Smith’s initial concern about failure-led learning, any ‘trial’ is subject to a range of feedback possibilities, from negative to positive, passing through no-feedback-at-all. Negative versus positive is a false opposition. What matters for a learning experience is that feedback occurs at all; more often than not the null feedback response is the norm. Rather than an opposition between positive and negative feedback, then, the appropriate modifier that fosters creativity is the idea of *feedforward*.

In information theory, feed-forward behaviour is predefined response to measured perturbation, especially when the state after perturbation is stable in such environments as gene regulation of growth. In this sense the sketch is a temporary eigenvector, enabling the experimental exploration of a local space that can subsequently be re-**sketched** as stability is established, **stretched** in the sense discussed in relation to tuning in chapter 5, or **etched** in the sense in which a product is finalized and presented for inspection. The product can be a work of art, and equally it can be the reporting of experimental data in a scientific paper. Feedforward, thus conceived, is a natural internal correlate to the hubs-and-authorities query model discussed above.

Marshall McLuhan, following I.A. Richards, uses the term ‘feedforward’ in a different way, meaning the anticipation in a speaker of the listener’s potential response to what is spoken. Given the continuity between this interactive discursive mode in the research of Simon Garrod (e.g. Fay, Garrod & Carletta 2000; Garrod & Pickering 2004), and his current work on meiosis effects in graphical interaction, the mental correlation suggested by McLuhan may connect fruitfully to the more technical sense.

7.4 Putting the I in eigenvector

We are evolving a definition of the individual subject's relationship with local search-space that establishes oral language and cognate semiotic schemes as the ordinal constituents of a relatively stable local network of referents that combine the economy implicit in stability with a degree of flexibility that enables the subject to develop adaptive hypothetical responses to perturbations in the local environment that fall outwith the hermeneutic scope of the referent network. It is not yet clear, though, to what extent this skill-set is the same thing as literacy. Trans-domain cognitive flexibility is regarded as the distinctive feature of humanity *tout court*, but some of the skills that facilitate the performance of representational redescription seem to depend explicitly on the acquisition of a set of mind-tools that correspond not to oral language but to literacy (broadly defined). We need to place RR in its developmental context.

We saw previously that current neurophysiological research in the area of intersubjectivity and the dual observation/action functionality of mirror neurons offers richly promising lines of theoretical development concerning long-standing philosophical problems such as the nature of intuition. We discovered, however, that while mirror neurons may help us understand the performative differential between humans and our nearest evolutionary relations, the explanatory power vested in intersubjectivity is sapped by the problem of conceptualization. Already, around the lower age range discussed by Clark and Karmiloff-Smith—three years—children (normatively speaking) have developed not only linguistic skills far in excess of any adult primate, but a proactive curiosity about their immediate environment and the manual dexterity to pursue that curiosity.

Gallese, Keysers and Rizzolatti (2004) make the same shift from first- to third-person that characterizes Dennett's move from phenomenology (the first-person experience) to heterophenomenology (the evidence reported to the researcher of others' first-person experience) when they state that:

A crucial element of social cognition is the brain's capacity to directly link the first- and third person experiences of these phenomena (i.e. link 'I do and I feel' with 'he does and he feels').

Implicitly, the 'he' in this citation is a present 'he', and we have to deal with an ambiguity between the sense of second- and third-person arising from the physiological context. I take it that in oral contexts, it is available to me to conceive a thought about another *both* as a 'you' thought and a 'he' thought—the former being perhaps the more sophisticated since it would implicitly be a communicative thought: "I think you think so-and-so, and

now let me corroborate my hypothesis by asking”. Where there is no other ‘he’ present, a distinction between ‘you’ singular second-person and ‘you’ plural third-person is unnecessary unless the context demands it.

There is an intermediate, second-person stage between the asymmetric intersubjectivity that characterizes the parent’s relationship with the infant, and the relatively independent early learning environment in which formal education begins. Asymmetry here concerns the natural sense of a reportable self, possessed by the parent and engendered in the infant. Rapidly, with the acquisition of language, the infant develops the ability to conceive of itself in the first person, passing through a stage of referring to itself in the third person because that is how it is accustomed to hearing its self referred to. It cannot acquire this in the same way as it can acquire the notion of ‘apple’, for instance, by imitation (Davie 2002, 10).

The foundation for this process, vocal exchanges in what I previously called somatic metre, might be thought of as an extended period of protocol negotiation or alternatively the acquisition of the prosodic substrate on which oral language is built. As Colwyn Trevarthen has discovered, exchanges between caregiver and infant have characteristics that go beyond mere similarity to the elements of poetry and music as they are familiarly understood in the adult world. The intriguing and compelling suggestion is that the cooperative intersubjectivity experienced by the infant is the foundation on which language and music are *directly* built.³

No source is more authoritative than an infant’s caregiver. The second-person stage, prior to acquiring a secure sense of third-person experience, is, I suggest, a distinctive period in which early language acquisition is governed by a shared attention regime in which the infant comes to understand basic things and relationships in a process supported by the cognitive enabling provided by mirror neurons. While vervet monkeys are observed to utter distinctive calls that are associated with particular kinds of predatory threat—leopard, eagle, snake—the monkey sounding the alarm does not point as it does so in the direction of the threat, nor does it engage individual others with intersubjective gaze (Cheney & Seyfarth 1988, 255–69; Dennett 1988, 182–201).

³ Trevarthen is a member of Edinburgh University’s Institute for Music in Human and Social Development scientific committee; his papers are somewhat elusive, but a good primer is Trevarthen 1979. The idea of intersubjective technology owes somewhat to his public presentations, both at Edinburgh University and at the ASA conference, ‘Creativity and cultural improvisation’ at Aberdeen in April 2005.

Although it is a large leap from vervet to human, linguistically speaking, the intensification of intelligence in the higher primates is not expressed in a form that has the recognizable specificity of proto-language. There is no smooth transition; understanding the ontogeny of human languages depends in large measure on the observable steps to acquisition in subjects—i.e. young children—whose reliability as informants is perhaps not as significant an advance over the vervets as might be desired.

In their paper ‘Joint attention and argument realization’, Barbora Skarabela and Shanley Allen (2004) present fascinating data that helps correlate issues in early language acquisition with the feedforward search-space model, additionally shedding light on how the capacity for abductive inference may be initiated. A recognized characteristic of infant speech is the tendency to omit arguments. Known information, in the context of a specific discursive instantiation, tends to be represented by general-purpose linguistic forms such as a pronoun or null argument, whereas new information tends to be expressed lexically. Theorizations developed to account for this phenomenon fall into three groups: grammatical, performance-process, and discourse-pragmatic. Both of the first two, Skarabela and Allen note, fail ‘to account for a noticeable difference between the much higher omission rate of first and second person referents and the much less frequent omission rate of third person referents.’ (8)⁴ Both of the first two, in general terms, are influenced by the strong-nativist theories of Fodor and Chomsky. Chomskyan linguistic performance, in this respect, is the heterophenomenological evidence for linguistic competence, a concept which ‘assumes that to acquire language is essentially to come into possession of knowledge of a biologically endowed code which is impervious (and prior) to reflexive shaping’ (Werry 2002, II, 12).

Skarabela & Allen show that joint attention is correlated with children’s realization of verb arguments. Specifically they observe that omission of arguments representing new

⁴ An interesting performance account cited by Skarabela & Allen presents a metrical explanation to subject omission that correlates nicely with Trevarthen’s work on infant intersubjectivity: ‘Gerken (1991) builds her argument on the observation that children omit weakly stressed syllables in their speech. Namely, in disyllabic words, children are much more likely to omit a weak syllable from an iambic foot than from a trochaic foot. Gerken argues that a similar pattern is observed on the sentence level, i.e. subject pronouns, that tend to occur at the beginning of a sentence, form an iambic foot with a strongly stressed verb, whereas object pronouns can potentially be the weak syllable of a trochaic foot. The results of an imitation task showed that children indeed omit subject pronouns significantly more frequently than object pronouns. In addition, the results showed that this account successfully predicts significantly more frequent omission of full lexical NPs from the subject position than from the object position.’ (7)

referents correlates with joint attention, whereas production of overt arguments representing new referents correlates with the absence of joint attention:

87% of arguments representing new referents were *omitted in the presence* of joint attention, whereas 71% of overt arguments representing new referents were *produced in the absence* of joint attention (2004, 36; emphasis added).

The conclusion suggested by this result is that richer joint attention leads to richer acquisition, but it is not entirely clear *what* is richer. The role of joint attention in vocabulary development has long been established, and richness of vocabulary is a desirable achievement, all other things being equal. But a repertoire of words requires grammatical marshalling. In this respect, the correlation between intersubjective engagement and argument realization is intriguing because plainly the infant already has a competence framework, however sketchy, that enables it to deploy its linguistic resources economically. This conclusion is borne out by the low number of outright errors that lead to communication failure reported in the dataset presented by Skarabela & Allen (26–31).

The significance of this in the broader developmental context is that, as Clark puts it, ‘evolution does not operate so as to “solve” a fixed problem. Instead, the problems themselves alter and evolve in a complex web of co-evolutionary change’ (1997, 93). After a discussion of the ‘learning to walk upright’ challenge as a complex of evolving solutions, he cites work on robotic walking simulation:

More interesting by far were the results obtained when sensory feedback was *intermittently* present during evolutionary search. Under these uncertain conditions, controllers evolved that could produce smooth walking using sensory feedback when available, switched to ‘blind’ pattern generation in the absence of sensory feedback (and hence produce a viable albeit less elegant locomotion), and even compensate automatically for certain structural changes (e.g., alterations of leg length, such as occur during biological growth). The explanation of this last property involves the modulation exercised by sensory feedback on the pattern generator in these ‘mixed’ solutions (91–2).

The inference to be drawn is that the intermittence of intersubjective feedback, in the early language acquisition process, is of itself a contributing developmental factor. Recall the argument about trial-and-feed, in which feedforward is a mechanism with the potential for securing or formalizing speculative structures. Recall also an earlier reference to the contribution of the gene FOXP2 to cortical development. The consequence of the mutation discovered by researchers was ‘a diffuse condition that affects grammar, speech production, non-verbal intelligence and non-speech related movement of the mouth and face, with detectable brain pathologies caused by a mutation in a single gene’ (MacAndrew 2005). The reason that a single mutation—changing the amino acid arginine to histidine—can present a range of developmental

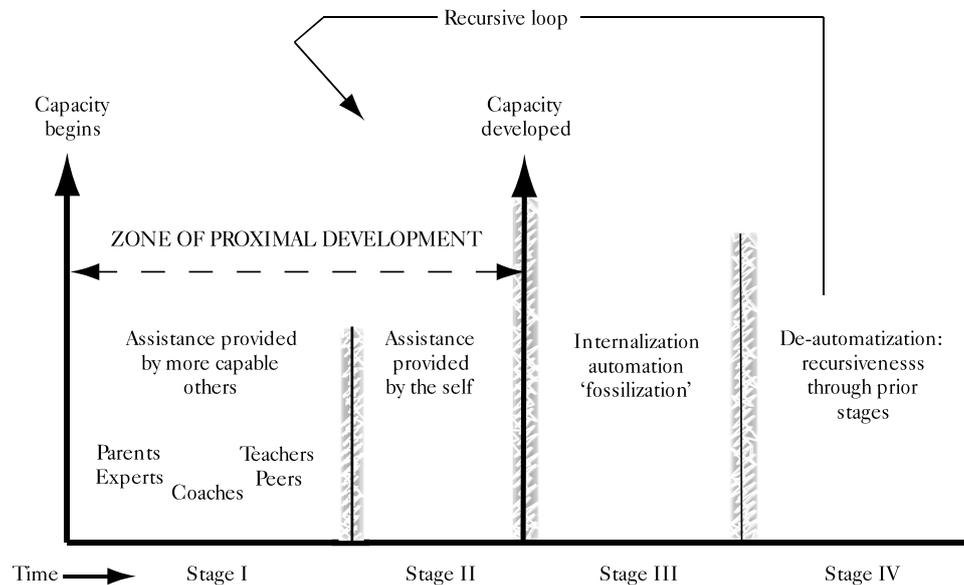
issues whose connection is not intuitively singular, is that the FOX genes are transcription factors. Their role is to regulate feedforward processes—A activates B, A and B activate C, and so on; but out of these simple combinations, complex properties can emerge. Thus seen, language falls into the category Clark calls *indirect emergence*. This ‘relies on the interaction of individual elements but requires that these interactions be mediated by active and often quite complex environmental structures’ (1997, 73-4).

Linked to the idea of stigmergic algorithms, this account helps us understand why the achievement of grammatical stability is invariant across the planet’s diverse linguistic forms, irrespective of the grammatical content of any individual linguistic form. In this respect it is interesting to note that the grammar of a four-year-old child already approximates adult grammar (Skarabela & Allen 2004, 6).

It is perhaps worth pointing out that the successful realization of a basic grammatical framework is essentially an oral competence. At this stage, knowledge is represented and activated in response to external stimuli; it is knowledge *in* the system, but it is not yet knowledge *to* the system (Clark & Karmiloff-Smith 1993a, 495). The concept of Representational Redescription (henceforth RR) posits a systematic advance over this state of affairs, when consistent behavioural mastery of a particular task leads to the abstracted availability of that mastery to be applied to other tasks (496). Although precisely *when* is something of a grey area, this is about the stage when the child enters the broader social world in which the range of authoritative sources of information about the world starts to be delegated by primary carers to a network of trusted others, supplemented by the solidarities established with peers.

Theorization of this step is influenced by the developmental psychologist Lev Vygotsky, who, working under the Soviet regime in 1920s and 1930s Russia, was engaged in developing theoretical underpinnings for the vast project of modernization under way in his time and place. His signature concept, the ‘zone of proximal development’, is defined as ‘the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers’ (1978, 86). In Western pedagogic theory this is taken to mean the difference between a child’s assisted and unassisted test performances, the terminologies ‘child’ and ‘test’ indicating that the concept has become assimilated to a structural focus on formal education. However, Vygotsky’s later remark that ‘Instruction is only useful when it moves ahead of development... leading the child to carry out activities that

force him to rise above himself' (1987, 212–3) need not be restricted to children, nor to the individual.



Tharp & Gallimore (1988, 35)

If we elide the roster of capable others in the first stage (parents, teachers, experts, peers, coaches) by replacing 'more capable others' with 'trusted other(s)' we have a simplified version that corresponds to the pre-modern learning environment experienced by the majority in any given human population. We can then conceive the building of structured models of the proximal zone (featuring detailed explications of the roles and functions of the various categories of 'trusted other', including note of by whom the other is trusted) to theorize the relationship between the repertoire of skills acquired at various stages, and the formality with which those stages are expressed in the social structures supporting them. Comparing these models in low-population-density agrarian cultures and high-population-density post-industrial cultures then gives an informal measure of the scale of the task involved in mastering the competences associated with RR.

RR is theorized to occur through three stages: first the child learns to become a master of some activity; then it analyses introspectively what it has learned; and, finally, it reconciles its performance with its introspection. By the time this latter point is reached, the child has developed the means to create working hypotheses concerning the reasons for things functioning in the way that they do. The process involves re-codifying information from one representational format (the procedural one) to another (a peri-

linguistic format), enabling the subject to map domain-specific principles onto alien contexts.

Although a significant dimension of this acquisition of RR concerns the development of language skills, we need to acknowledge that for all the codification and regulation of language (and for that matter other symbolic systems, such as mathematical and musical notation), these remain unfinalizable. As Vygotsky remarks,

Accord between syntactical and psychological organization is not as prevalent as we tend to assume—rather, it is a requirement that is seldom met. Not only subject and predicate, but grammatical gender, number, case, tense, degree, etc. have their psychological doubles. A spontaneous utterance wrong from the point of view of grammar, may have charm and aesthetic value.... Our daily speech continually fluctuates between the ideals of mathematical and of imaginative harmony. (1962, VII, ii)

This issue, competence in the face of imprecision, is discussed in detail by Clark & Karmiloff-Smith (1993a). At first, the child simply has competence over two unrelated representations that perform two different functions. The first step beyond is for this knowledge to become available to the system so that the similarity can be compared. At this second stage, however, the child cannot yet explain the difference between the two different functions. The knowledge has become available to the system, but the system requires further development before knowledge becomes fully available to introspection (496–8). What exactly characterizes that further stage is difficult to pin down, but there is a possible answer lurking in the observation that while three-year-olds perform word-boundaries, they differentiate between what they will call a word and other things that they say but do not consider to be words:

Numerous studies have shown ... that it is not until about age 6, and for some tasks even later, that children know explicitly that both open class words ... and closed class words ... are *words*. When asked to count words in a sentence, young children frequently neglect to count the closed class items. When asked directly if 'table' is a word, they agree, but when asked if 'the' is a word, they answer in the negative. Yet at 3 years of age children can perceive, produce and correctly segment words like *the* (498).

Normatively speaking, between the ages of three and six, Occidental children have begun the process of learning to read and (a distinctively separate though obviously related task) learning to write. They are learning about number, and they are learning how to tell the time. If the closed-class words in this experimental setting are broadly the same kind of linguistic element that is either produced or omitted in the argument-realization study referenced previously, then the three-year-olds maybe have a point! Words—from their point of view—are the intentional vectors, and the rest of the stuff is eigenvector. The marshalling of intentional vectors relative to self-oriented eigenvectors is thus, I suggest, the foundation of recombinant intentionality.

The normative context is something of a worry, in respect of RR in general: how close is the connection between the concept of representational redescription and the concept of literacy? If it is close, then does that mean that oral cultures do not enjoy the benefits of mastering RR, or does it just mean that they are less capable users of it? Especially if the former, stronger, conclusion is the case then we have discovered something important about the distinction between oral and literate culture, but we are then left with a difficulty. Does the acquisition of literacy 'cause' RR, or is it the other way round? The ontogenic evidence reviewed suggests that RR mind-tools get installed first, though it is not so much a matter of cause as facilitation. We would not claim that 'thinking', 'reason' and 'intelligence' are the preserve of literate culture, but these seem to be just the kind of thing that mastery of RR promises.

Review

In part three we will explore these questions further, extending the somatically transparent mind–tool thesis by positing that literacy can be regarded as a suite of **intersubjective technologies**. We will need a robust definition of technology, for which the examination of function in chapter 5 has laid the foundation. First, here is a brief résumé of the key concepts that we are taking forward.

The Extended Social Brain Hypothesis is drawn from three principal sources:

Philosophy: the extended mind ontology, a minimal-nativist, vehicle oriented approach to the analysis of cognition that lays particular stress on the role of environmental cues. It is, nonetheless, methodologically individualist.

Evolutionary psychology: the social brain hypothesis, developed out of ‘theory of mind’ stories about human evolution, which argues that brain size is correlated with social complexity.

Sociology: actor–network theory, an ontology that treats the relationship between agent and environment as a systematic articulation of semiotic (meaning, in this context, disembodied) rhetoric.

Its key terms are

Performativity: the term is inescapable. The etymological trail of ‘function’, for example, leads to individuals performing certain tasks by virtue of the task’s necessity rather than the individual’s capacities. Performativity is used as an umbrella term in relation to a hybrid made by collocating natural conjugations (first-person, second-person and third-person) with the Peircean categories, firstness, secondness and thirdness. It is explored first as a problem concerning the individual organism (individual, maybe, but indiscrete), under the heading of **polyphonic consciousness**; second as a problem concerning direct interaction with conspecifics, under the heading of **intersubjectivity, intention and implicature**; then thirdly as a problem concerning the harnessing and redeployment of these intersubjective competences under the heading of **recombinant intentionality**.

Function: following Preston, the term is conceived plurally, a collocation of ‘system function’ (a view that treats the assemblage causally and atemporally as a working compositional entity) and ‘selected function’.⁴⁸ The latter term is a reversion of Millikan’s ‘proper function’ that attends to the architectural assemblage temporally and acausally. That is, questions about the compositional status of individual parts are subordinate to questions about what parts there are in a system (functional or otherwise) and how they were assembled. The temporality referred to is embodied movie-time, a characteristically human capability distinct from somatic time and constant time, though continuous with both.

Mind: has been abolished (*cf.* chapter 3). Nevertheless, the natural term is recognized as useful in exemplifying the convenience of code-switching between natural terms in general, and algorithmic analyses of the rich environmentally situated processes for which natural terms frequently stand in. The concept of the **mind–tool** captures this environmental coupling by harnessing plural function, Heideggerian equipment, Gibsonian affordance and Dehaenean code-switching to the processes of polyphonic consciousness.

Polyphonic consciousness is an evolution of Dennett’s multiple drafts model, which was adduced as a holistic alternative to dualist, especially Cartesian, models. Additionally, the polyphonic model draws on the semeiotics of Peirce’s interpretant, and the structuralist *dispositif*, discussed in part one, while the parity between musical note and analytic mind–tool grows from the eliminative thrust of Rortian *meiosis*.

Polyphony has a natural sense of stuff happening simultaneously, but the sense used here is technical and specific. It refers to the practice of early-modern composers such as J.S. Bach, for whom three musical elements—melodic voice-leading, functional harmony, and measured pulse—give each other mutual support enabling the extension of musical structure and with it the extension of emotional impact. The key aspect, then, concerns **mutually supporting components**. These, following the Peircean dimensions outlined previously, are (first) sensory polyphony, the mutually supporting data received by the senses;

⁴⁸ There is an ambiguity (not unwelcome) in Preston where plural may be by reference to Heideggerian equipment, or by the incompleteness of either system or selected function taken singly.

(second) psychological polyphony, the integration of these data with sensorimotor activity in the brain, and correlation of this activity with that of local conspecifics; and (third) semiotic polyphony, the capacity of the conscious entity to interact with the hylozoic content of its environment.

Intersubjectivity. A concomitant of psychological polyphony is the strong claim, grounded in Dunbar's articulation of the social brain hypothesis, that there is no subjectivity without intersubjectivity. Intersubjectivity is a term that refers to the human capacity to 'read' the minds of, firstly, other humans; secondly, other creatures with similar cognitive architectures; thirdly, and with reduced reliability, dissimilar creatures and inanimate entities. With respect to this third category in particular, the claim is that the apparatus that facilitates intersubjectivity between humans also facilitates the hylozoic reading of the environment.

Narrative gravity was posited by Dennett to be the locus of self as an adjunct of the multiple drafts model. A number of 'indiscrete self' ontologies have subsequently emerged, rendering the term 'self' in Dennett's formulation problematic. The Peircean term 'interpretant', which is impartial regarding the somatic configuration of the cognizer, can stand in at risk of sounding tautologous. (Since the term 'sign vehicle' is used by Peirce, it is wise to avoid potential confusion by speaking of the interpretant as 'semeiotic vehicle', that which is mobilized by semeiotic traffic.) The structuralist **dispositif**, a performative sense of *taxis*, may also stand in (though for different reasons) as the centre of narrative gravity.

Fetch is a natural term I have drafted as a means of articulating the fast hypothesis formulation that acts on sensory inputs. The relative weight of urgency (its *critical* mass as a matter of subjective assessment), and the differential impact of skilled reading of the environment, means that two embodied interpretants might formulate starkly different hypotheses based on the same sensory input.

Passage points (obligatory, pragmatic, ritual). An obligatory passage point is a confluence of heterogeneous, but mutually interested and mutually supporting fetches. Implicitly, where an OPP becomes stabilized, it becomes a point of return. In this regard it is suggestive of the Hegelian term *Bestimmt*, determination in its sense as the sum of agreed deliberation. Thus, an OPP can

become a Ritual Passage Point, a point of *unreflecting* return. In relation to the next term, stigmergy, a ritual passage point marks the sublimation of performative to enactive. A Pragmatic Passage Point is also heterogeneous, also mutually interested, *but not mutually supporting*. Finally, Passage Points in general are semiotic inversions of the Platonic term *aporia*. Instead of being ‘difficult of passing’, they are *eporia*, ‘solutions of doubts or difficulties’ (Liddell & Scott), typically in this context arrived at because previously there *was* an *aporia* needing resolution. Hence they are structurally similar to Husserl’s *noema*.

Stigmergy (from *stigma* and *ergon*, meaning sign+work) is a term that translates the action possibilities in the environment conferred by affordances into algorithmic (that is, repeatable, scalable and manifoldly realizable) environmental cues. Such cues are, in a sense, ritual passage points that have emerged out of natural, evolutionary meiosis without the necessity for intentional deliberation.

Recombinant intentionality is what an intentional agent can do with stigmergic algorithms by exploiting physiological attunement to hylozoic cues. Typically, an agent will apply extended attention to the problem at hand, recruiting new perspectives, discarding redundant ones, reworking and redrafting until an equilibrium is reached. It may not require an embodied agent such as a human to accomplish this, but it will (I believe) require facility with movie-time, and it will require the tolerance to accommodate accidental inputs without insisting that such inputs may not be discarded.

Part Three: Technologies

Part three concerns embodied performance in its environmental context. This entails a change of register, enlisting the sociohistorical dimension and venturing into philosophical territory that the analytical tradition has come to regard as ‘strictly meaningless’. The hazard Peirce diagnosed in the Hegelian historical method, which, in contrast to the analytic method, ‘studies complex problems in all their complexity, but which cannot boast any distinguished successes’ (Peirce 1931, 9.64) can be mitigated by separating the phenomenological from the social and treating the former in terms of Peircean firstness and the latter as thirdness, which I call the **sociohistoric**. It matters because Peirce elsewhere remarks that when an experimentalist speaks of experimental phenomena, ‘he does not mean any particular event that did happen to somebody in the dead past, but what *surely will* happen to everybody in the living future who shall fulfil certain conditions’ (1998, 339).

What part three sets out to theorize is the way in which the hylozoic scaffolding of nature is appropriated by the interpretant/dispositif to secure a platform for ever more ambitious projections into the future. Creativity, after all, must entertain some scope for failure, and must therefore proceed in a dialogic relationship between certainty and doubt. John Law, the third principal theorist of the Mine School, coined the term ‘heterogeneous engineer’ for the polyphonic relationship between actants and resources. From a sociohistoric perspective he argues persuasively for a ‘document/device/drilled person’ reading of the material expansion of geographical control in renaissance Europe (Law 1986). Part three seeks an analogous ‘long-distance control’ of the imagination. Accordingly, the abstraction of the ‘interpretant/dispositif’ will ultimately give way to the flesh-clothed **work-maker**.

The term ‘Sociohistoric’ recognizes Peirce’s commentary on the experimentalist as an invariant characteristic of human culture. Simply and obviously put, not all humans are the same age. Oral history and tacit knowledge is homeostatically sustained and forwarded, but its reach can be extended through the technologizing of intersubjectivity. The work-maker is the key figure in accomplishing this. In oral culture, the figure of the shaman performs a number of functions that have some equivalence with familiar notions of the professional from which the work-maker is drawn: lawyer, doctor, minister (in both political and religious senses), journalist. In each case the community supports the function—recognizes its necessity—but does so on the basis of trust. The

assumption that shamanism is bound up with secrecy, hierophancy and exclusivity should be balanced against the exigencies of continuity.

Alongside Law's perspective, which will figure importantly in chapter 10, a second theoretical strand concerns the relationship between orality and literacy. Both terms are exceedingly vague, the former all the more so because it is (literally) impossible for the literate imagination to experience the world from an oral perspective. Moreover, the powerful somatic tools that supplement the literate imagination create the strong impression that the reverse is true! Nevertheless, there is a clear continuity between the oral modality and the anthropology of the social brain. The principal text supporting this argument is Walter Ong's *Orality and Literacy* (1982). The key concept that I propose to develop, the technologizing of intersubjectivity, is a direct modulation of Ong's subtitle, *the technologizing of the word*.

We cannot proceed without theorizing the key term 'technology', but there is a rhetorical difficulty concerning the order of continuation. One choice would be to continue immediately in hot pursuit of the issues discussed in the last chapter of part two. The other—which I have favoured—is to respect the historic bias of part three and proceed more or less chronologically. This entails a return to the Acts of Institution material in chapter two in order to develop the contextualizing relationship between speech acts and the creation of institutions. Accordingly, I will attend to Ong's orality/literacy model before picking up the technological questions hanging over from part two, concluding thereafter with the delineation of the work-maker.

8 The technologizing of intersubjectivity

Roughly speaking, an anthropological line can be traced historically from the establishment of **continuity** with the emergence of grandparents some 25,000 years ago, which leads to the establishment of **consistency** characteristic of the classical Mediterranean, and from the mutual security assured by consistency to the non-homeostatic, clock-oriented **developmental** regime characteristic of enlightenment and modernity. Each modulation in effect re-starts the cycle under more intensely entangled initial conditions.

Walter Ong attempts to understand the trajectory that leads from orality to literacy, on the unstated presumption that the highly technologized nature of occidental culture is at the other end of an orthodox enlightenment progression whose starting point is—mythologically speaking—the fall of Adam (Ong was an ordained Jesuit priest). But what *is* literacy? What is its relationship to the various polyphonic strands of ‘common sense’, and how does its acquisition modulate the environmental competence of its agent? Obviously literacy is not something simple. Should it count as literacy, for instance, if the subject can read fluently but not write at all? On the other hand, if we accept that the proverbial ‘three Rs’ between them constitute the elementary foundation of literacy, should we ask whether there is anything else, besides numeracy, that ought to be added to that foundation? Skilled mutuality rests on oral skills concerned with standards of speaking and listening, or ‘feedforward’ in the sense McLuhan inherited from Richards (meaning approximately the practice of thinking about what you intend to say before you speak).

What do the factors mobilizing the growth of educational institutions, and the trajectory towards full adult literacy in western Europe over the last four centuries, tell us? To the protestant church, promoting silent reading in the early modern period, the urge to share the comfort of religion is a motivating factor. To working parents, the fact that systematic education offers child-minding for those not yet old enough to earn a wage could potentially be the greater motivating attraction. Contrary to suggestions that the drive for literacy was fuelled by ideologies of resistance (for all that such ideology is multi-edged), there is room to admit that at least in part it was fuelled by ideologies of conformity. Hereabouts a distinction between parentalism and grandparentalism has some purchase: oral competence seems primarily a domestic achievement whereas symbolic and conceptual competences emerge under the guidance of trusted others—

more especially the conceptual, since exposure to conceptual polyphony benefits from a corresponding polyphony of authoritative guidance.

Such trust can be vested in materials as much as in people. When that happens, a cadre emerges whose function is to mediate the significance of these material objects—since of course their makers are no longer present and able to do this for themselves. From this cadre emerges a fraction whose function is to mediate the mediators and to orchestrate the conceptual polyphony ensuring that complicated social processes run smoothly. Any claim to speak ‘with authority’, any constitution of corporate authority, and any relationship between authority thus conceived and the coercive apparatus of the state, falls within their remit.

Gramsci’s thinking about the emergence of the intellectual (2001) elegantly conflates the material and the semiotic dimensions of the arguments rehearsed to date, and suggests a continuation of the thesis from the Palaeolithic, where **continuity** is established, through the Hellenic, where **consistency** is established, to—approximately—the Enlightenment, where a human-centred ideology of **development** takes hold. Certainly in Britain, agrarian reforms feed (both figuratively and literally) a process of urbanization that culminates, in late modernity, in a culture that depends heavily on mediations capable of translating oral production into reliable mass outcome. This culture depends on *trust* in its organs of mediation. The body of cultural artefacts being produced by the emerging class of creative professional stands hylozoically *in loco grandparentis* as this process takes hold. The key shift that occurs with this departure from the oral is a shift of focus from the maker to what has been made.

8.1 Continuity: the emergence of the extended family

Nicholas Humphrey makes some intriguing speculations about a link between drawing and the origins of language in a 1998 paper on Pleistocene cave art and the products of a present-day autistic child with a remarkable gift for drawing. In concert with another paper of his, and other work on the foundations of human intelligence, a working hypothesis can be sketched in which continuity—the oral communication of localized virtual repertoires—can begin. Humphrey (1999) cites evidence suggesting that IQ is asymptotic at a brain size of around 750 cc, by which measure *homo erectus* ought to have been capable of intelligence equal to that of *homo sapiens*. If that is so, then there may be a further dimension to the carefully-weighed arguments of Robin Dunbar discussed in chapter 4. Humphrey suggests that the extra element is redundancy—the larger brain helps modern humans to live longer, because it enables mental faculties to last longer.

Evidence tentatively supporting this proposition can be found in a paper by Rachel Caspari and Sang-Hee Lee (2004), which finds a rapid change in the proportion of older (c.30-year-old) to younger (c.15-year-old) adults in the fossil record at about 30,000 years ago. Caspari and Lee hypothesize that grandparents became a significant factor in extending survival success. The ratio change they report is striking, from an old-to-young ratio of 0.12 in Australopithecine, to 0.25 and 0.39 for early Homo and Neanderthal respectively, to 2.08 in the early upper Palaeolithic. Among Neanderthal fossils there is less than one old adult for every three young adults. By the early upper Palaeolithic that changed to a ratio of two old adults for every single young adult. The argument supported by this discovery is that grandparents provide *cultural* support. Not only are they able to share their experience of child-rearing, hunting and so on, but by their very presence they extend the time available for learning and reflection by the community as a whole.

Simulations created by Stephen Shennan (2001) to model the impact and survival of cultural innovation in the upper Palaeolithic suggest that innovation produces low equilibrium fitness and low attractiveness values in small local populations. In larger populations, though, the values are more than an order of magnitude greater. This strongly suggests that Caspari and Lee's data tells a significant story about the early emergence of modern human culture. In theory, longer lives stabilize Pòlya effects, while larger numbers and increased age differentials deepen the potential relationships between authoritative sources and dynamic hubs. The richer contact range available to any individual population member both facilitates specialized craft skills and their vertical transmission, and, via diagonal transmission (outside, that is, the immediate family unit), a richer cross-fertilization and mutuality.

Humphrey (1998) proposes an intriguing, albeit associative, development of this contextualization of craft. Comparing the remarkable artwork of Nadia (a modern autistic child) with examples of European Palaeolithic cave art, Humphrey speculates about a vestibular state where drawing was uncontaminated by 'designating and naming'. Of course there is no reason to suppose that gifted artists were any more numerous in the cave population than they are now; there is reason to suppose, however, that there was a point in the evolution of human culture where linguistic skills were as basic as Nadia's. Since nascent language is likely to have been stable before the ancestral group left Africa around 150,000 years ago, it is difficult to speculate about what elements the cave-dwellers had and what they lacked (172–4). However, Dunbar's emphasis on grooming and gossip—on second-person, conversational language as distinct from

third-person, rhetorical use—suggests a possible route for developing Humphrey’s argument.

Commenting on the naturalistic style of cave art, Humphrey claims that nothing like it emerged until Renaissance Italy, Egyptian and Hellenic art being, he says, stylized and conventional by comparison. Somewhat melodramatically, he supposes that the loss of naturalistic painting might have been the price to be paid for the gain of poetry: ‘Human beings could have Chauvet or the Epic of Gilgamesh but they could not have both’ (176). Some aspect of cave culture evidently lent itself to stigmergic encoding, and it is not inconceivable that populations propagating throughout Europe after the ice receded about 11,000 years ago carried forward foundational cultural elements fostered in the caves. The explanation is likely to be bound up in opportunistic relationships with local environments. The caves would have had an enframement function, conjecturally involving the safe schooling of young hunters.

8.2 Consistency: Havelock’s literacy thesis

Humphrey’s reference to poetry invites our focus to shift to Eric Havelock’s thesis (1963) regarding the emergence of Hellenic literacy. Havelock’s main claim is that Plato’s *Republic* is primarily a treatise on education rather than on politics. He regards this as the key to understanding why Plato elects to attack poets and poetry in particular. Poetry—especially as practiced in the Mediterranean bardic tradition—is an oral technology, one that privileges somatic skill and correspondingly minimizes dependence on extra-somatic resources. Even at its most basic, literacy depends by contrast on the hylozoic potential of extra-somatic materials.

Plato cites authorities liberally, in other contexts, but in *Republic* not even Homer and Hesiod are spared:

[Socrates:]...if Homer had really been able to educate and improve mankind—if he had possessed knowledge and not been a mere imitator—can you imagine, I say, that he would not have had many followers, and been honoured and loved by them? ... And is it conceivable that the contemporaries of Homer, or again of Hesiod, would have allowed either of them to go about as rhapsodists, if they had really been able to make mankind virtuous? Would they not have been as unwilling to part with them as with gold, and have compelled them to stay at home with them? Or, if the master would not stay, then the disciples would have followed him about everywhere, until they had got education enough? (*Republic*, X)

Now, while there is sufficient corroborative material to confirm that ‘Hesiod’ was a named individual, there is conjecture about whether ‘Homer’ was an individual or, instead, the generic term for a species of griot. *Omeros* means ‘hostage’, and, by custom,

the descendants of hostages captured in the course of warfare were not sent into battle because their loyalty could not be counted on. Instead, they were entrusted with the task of remembering and recounting social histories among which war stories were an important element. There is general agreement that the *Iliad* and the *Odyssey* as they become known in the heyday of the Hellenic city-state are the product of a narrative tradition, and not the invention of a single individual. The regularization and notation of the epics—conjecturally at the direction of the Athenian tyrant Hipparchus in the sixth century BCE—may account for the organizational unity that Milman Parry (1971) and others have discerned, and which has been adduced as evidence of Homer's indivisible personhood. Recent parallel scholarship in the scribal culture of early Judaism suggests a similarly and contemporaneously rich process in the assembly of the Torah (Alter 2007).

Havelock shows, in a detailed analysis of the Homeric canon (1963, 61–86), that a great deal of encyclopaedic information is stocked in the narrative structure over and above the historical pageantry. Such things as the 'utterance of rules, the expressions of standards' (70), both public and personal, proper conduct of religious rites, marine technology, geography, all of these elements are embroidered on a fabric composed of mnemonic and prosodic techniques including poetic metre and formulaic procedure applied at both the level of stock-phrase (bright-eyed Athene, wine-dark sea, etc.) and a deeper-level ordering of events, acts and objects. These stock phrases, Havelock says, can serve a wide range of verbal formulae. We recognize the encyclopaedia in print culture as being an indexed, ordered and arranged body of knowledge where redundant repetition is minimized; it is precisely the redundancy of the oral epic that licenses its encyclopaedic function.

It seems a large leap, from one unique, individual bard named Homer to an unpersonified community function, but such people were evidently fairly common. According to Rosalind Thomas, these were people whose role was to remember civic history:

... officials called *mnemones*, literally 'remembrancers'... crop up in inscriptions, therefore by definition *after* the *poleis* have started to use writing. But the name must reflect an early function of remembering. By the Hellenistic period *mnemones* are simply clerks, but earlier *mnemones* were far more. ... Thus in fifth-century Gortyn in Crete, the *mnemon* is closely attached to the judicial processes and act alongside the judge as witness for a past case...—that is, his role was partly to remember court proceedings, for which there were no written records. Another inscription, from Halicarnassus in first half of the fifth century, declares that 'what the *mnemones* know is to be binding.' Even after the advent of writing the *mnemon* continued his role of remembering, and his memory was authoritative (Thomas 1992, 69).

The argument Havelock develops is that the oral technology employed by such officials to perform these broad functions renders their ethical and epistemological relationship dissonant. Because, in poetry, contradictory statements can be made of people or objects at different points in the course of an oration, the medium violates the principle of consistency (1963, 246). How did Plato come to realize that there was a principle of consistency to be violated? That is part of a large story about the development of Hellenic philosophy, which for the most part has no direct bearing on the issue at hand. The matter of writing itself, though, and the propagation of the alphabetic technology between about the eighth century BCE and the fourth, inspires Havelock to assert that: 'As a means of preservation, the acoustic technology of epic had been rendered obsolete by the technology of the written word' (293). However, he immediately concedes that 'it takes time for obsolescence to be recognized' (*ibid.*).

'Obsolete' is an excessively confident term to use. Really the processes at work are too complex to admit the 'progress' narrative.⁴⁹ Some elements are hinted at earlier by Havelock in a passage lauding the aesthetic achievement of Hellenic orality:

We can hazard a guess, in short, that the specific and unique Hellenic intelligence, the source or cause of which has baffled all historians, received its original nurture in communities in which the oral technique of preserved communication threw power and so prestige into the hands of the orally more gifted. It made the competition for power ... identifiable with the competition for intelligence. ...
 ...This explanation can stand as debatable, but it conforms to the established fact that in the Classical Age the specific genius of the Greeks was rhythmic. What we call the Greek sense of beauty, in architecture, sculpture, painting and poetry, was more than anything else a sense of elastic and fluid proportion. (127–8)

Havelock at times seems incautious in generalizing from the Athenian to the Hellenic; the success of the Spartan state in projecting its military power, for instance, was achieved in spite of restricted adoption of the literate technologies. The cultural achievements of Athens arguably owe as much to that city's disproportionate wealth, and its status as an intellectual entrepôt, as to the size of its citizen class. Certainly it is difficult to distinguish cause and effect between these and other contributory factors.

The context Thomas explores in her study of the relationship between orality and literacy in classical Greece is fairly difficult to grasp, with so little evidence to go on. It is the development of the sense of *poleis*, of the associative link between citizenship and property, and of the idea that the rights of a citizen (however loosely defined that term

⁴⁹ Peirce somewhere remarks that there is far too much poetry in Plato, but the writing styles of Nietzsche, Heidegger and Wittgenstein clearly exhibit an attachment to the pre-Aristotelian ideal.

may be in different locales and at different points in the history of the era) have their basis in what ultimately comes to be identified as an abstract sense of justice. Effectively, this sense of justice is equivalent to Havelock's consistency argument. By the fifth century BCE, the populations of the major city-states approached or exceeded 100,000. Of Sparta's population, 8,000 were citizens—adult, male, property-owning and native to the city. Athens' population was somewhat larger, nearer to 200,000 of whom some 40,000 were citizens. It is principally this citizen class that the alphabetic technology supported.⁵⁰

It is useful, perhaps, to think of the various Mediterranean scripts as recording technologies in an analogous relationship with the famous example of the VHS and Betamax video recording systems. Betamax was supposedly a superior technology but the market gravitated to VHS. Similarly, Linear-B possibly did a good job of accurately encoding the sound of speech as the speaker intended, but the equipment required to play it back—a skilled reader—was hard to find, with the consequence that exploiting the technology required a concentration of resources. The Greek alphabet, though more compact, more mobile, easier to learn and so on, probably owed its differential success to the changed environment in which it developed, where new pressures on social coordination were evolving as the culture started to recover in the eighth century BCE from whatever had caused its collapse three or four centuries previously. The point about making the comparison with familiar recording technologies is that reading, in classical Greece as elsewhere in the classical world, was a physical matter of giving voice to the encoded characters. The Greek introduction of vowels has been cited as a technical masterstroke, but Thomas downplays this aspect, suggesting that 'perhaps what the Greeks heard as vowels were the Phoenicians' guttural stops' (1992, 54–6).

What, then, were the benefits of writing technology for the Greeks? At an individual level, the evidence is that wealth (*ploutos*) trumps literacy. In Hellenic and Roman culture, it was perfectly feasible for a citizen to flourish without personal literacy provided they had the means at their disposal to hire literacy services or to own literate slaves. While that fact could hardly be regarded as conclusive proof one way or another, it does seem that the benefits of alphabetic technology are at the least on an *inter*personal level, and really express themselves at the sociopolitical level. The issues highlighted by Thomas

⁵⁰ Population estimates are very difficult to make. Some put the population of Athens at its height as 500,000.

return to an idea of intentionality in which the encounter with writing initially finds the script functioning as a performative substitute for the person represented by it. What evolves, though, is a sense in which the performance comes to represent ‘opinion’, joint authorship, and the will of the *polis*.

Thomas points out that the available evidence about the uses of writing in the early Hellenic period—aside, obviously, from being scarce—may tend to focus attention on certain *kinds* of use, by virtue of the relationship between material and function. Thomas ‘gets a strong impression that the new writing was seized on widely as a way for individuals to mark their possessions and to keep interlopers off’ (1992, 59). However, the extent to which the content of such markings can be seen to possess the kind of self-contained semantic value we associate with written language in the modern world remains problematic. In a later example, Thomas discusses mortgage stones dating from fourth-century Athens. Here, the identity of the creditor and the sum owed are marked on stones that are placed on the debtor’s land. The name of the debtor is not recorded, nor any explicit correlation between the stones and the land they stand on. Their very presence not only identifies the debt with the land, but also identifies the status of the debt as unpaid, since there would be no reason for the markers to remain after it had been settled (90). These mortgage stones excellently demonstrate three characteristics of the mind-tool: utility as memory-supplement, intersubjectivity in terms of the shared comprehension of creditor and debtor, and a specific graphic relationship with the local environment. We can see the writing technology participating in a broader repertoire of extended social relationships, supporting these but not—as yet—portable either physically or conceptually.

Corollary to the assertion of ownership over property is the threat of sanction against potential transgressors. This is where hylozoism starts to be exploited intersubjectively. Early on, inscriptions include metaphysical incitements—not “I, the owner of this item, will blind you if I catch you stealing it”, but ‘may whoever steals me be blind’. ‘It is hard to escape the conclusion’, Thomas continues, ‘that writing down someone’s name rapidly acquired a magical force’ (58). The consequence of this separation of powers, distinguishing—perhaps for the first time—between performance and intention-to-perform, is the establishment of a sort of prosodic cognitive substrate that builds the foundation for the first steps beyond homeostasis. The relationship between memorial and inscription creates the link between the quotidian curse and the preservation of ancestral presence. This ties in neatly with Havelock’s argument about consistency, since consistency and continuity are natural correlates.

What we have in the Hellenic experience of literacy is a ‘grandparent stage’ parallel to that of the upper Palaeolithic, where writing technology develops to preserve and support group know-how, especially regarding the conduct of social relationships over a range of dynamics. To summarize, writing in Hellenic Greece functioned to support oral practices and was inseparable from those oral practices. In particular, it supported social organization in a context of increasing complication where the virtue of settling disputes by means other than blood feud began to gain precedence over the opportunity for glorification offered by pursuing the mortal course.

8.3 Development (1): Technologizing the Word

Corollary to the claim that the oral state is unavailable to the literate imagination is the realization that both terms—oral and literate—are natural terms whose undisclosed compositionality are deeply entangled. In order to develop some theoretical purchase on the issues, I want to turn back to chapter 7.2, and the Husserlian term ‘noemata’, which was introduced in relation to the frame problem. Ong gives ‘noetic’ a social dimension, using it to characterize distinctions between ‘noetic worlds’ differentially organized according to oral or literate mnemonic technologies (Ong 1982, 23–4; 50–4). However, much of Ong’s argument rests on distinctions between European modes, where oral practices such as mnemonic oratory (*viz.* poetic recitation) are already clearly ‘technological’ in the way they support, and are supported by, material relationships with the local environment.

There are few places left in the world where contact with ‘enlightened’ European modes has not already reconfigured the noetic imagination of its inhabitants. Where such populations exist, anthropologists tend to be preceded by pioneers with transformative agendas, whether financial or spiritual. In Papua New Guinea, the linguistic anthropologist Bambi Schieffelin found an intriguing example of the latter. In ‘Found in translating’ (2007), she examines the problem of rendering an instance of Biblical reflexive speech into the Bosavi language. Does the difficulty lie in the plain fact that the Bosavi have not acquired literacy? Or does it arise from conflict between oral and literate versions of intersubjective technology?

The Christian bible is normatively regarded as being deeply implicated in the spread of occidental culture. In common, apparently, with other Papua New Guinea (PNG) communities, the Bosavi have a culturally engendered taboo on making precisely the kind of speculation about the interior thinking of others that the Biblical verses in question deal with. The question Schieffelin’s research raises is whether it is *what* the

bible says that is effective (as, apparently, the missionaries believe), or is it rather a psycholinguistic question about *how* the text expresses its message? Conjecturally, there are three aspects to Biblical texts that might be regarded as ‘intersubjective technology’, and which are not shared by bodies of folklore that might in other respects be regarded as similar (for instance the Indian *Mahabharata*, or the Finnish *Kalevala*). One is prophecy, the second is critique (which lends rationality to prophecy), and the third is the representation of high-level intersubjectivity. It is the last of these that Schieffelin’s work concerns.

The text in question is from St Mark’s gospel (II, 6–8), the ‘take up thy bed and walk’ scene. The difficulty concerns the way in which the Scribes are represented as having thoughts about others’ thoughts, while Jesus has thoughts about their thoughts—a fairly complicated higher-level intersubjectivity. As Mark describes it, the scene is immediately recognizable in modern terms as a media frenzy, the relationship of the scribes to the multitude being reminiscent of that between journalists and public opinion in the present day. Hordes are gathered around the house where Jesus is staying; the invalid’s associates break him in to the house through the roof—a fairly immediate transgression for which the invalid presumably bears ultimate responsibility.

If the objective is to persuade these interlopers to leave the premises, would saying ‘please leave’ (take up your bed and walk) be effective either as words directed at the individual or as a deterrent to the remaining hordes against doing likewise? Forgiving the sin, literally declaring God’s forgiveness, recognizes the transgressive situation and conjures respect from the recognition of that transgression, not only in the individual concerned but in the witnesses. The flaw in translation (if it is a flaw) arises in the original English rendition of the dilemma as Jesus asking ‘which is easier?’ (The St James version puts it thus, but ‘easy’ seems somehow incongruous.)

Melanesian cultures have been studied by occidental scholars since the anthropologist Bronislaw Malinowski’s pioneering expeditions in the early 20th century. Conceivably Melanesians approach the ideal state of orality envisaged by Ong, with all the entailed overtones of Genesis and the Garden of Eden. Among these people, Ong says, language is a mode of action, and words are considered to have great power (32). Schieffelin’s work studying missionaries among the Bosavi people of Papua New Guinea suggests a more complex picture, both in terms of the Bosavi and of the way in which the relationship between literacy and reflexivity may have developed in medieval and early-modern Europe.

On William Foley's account (2000, 357–8), the geographical area designated New Guinea spans an area of about 800,000km² between 125°E and 175°E to the north of Australia. In this space—equivalent to the area of New South Wales, or Texas plus Oklahoma, or continental France plus Germany—approximately 1,200 languages, about a fifth to a quarter of the entire world's inventory, coexist in an unparalleled linguistic diversity. How such diversity is sustained is difficult to explain. The first human occupation of the region dates back 50,000 years, but successive waves of migration did not displace the languages of earlier arrivals on the pattern familiar in Eurasia and Africa, instead simply adding to (if not multiplying) the complexity. Perhaps because the environment is uniquely providential, the region does not have a history of state formation. The basic unit of social structure is the clan, and competition between clans is the basic arena in which political life is played out. Languages in the region are spoken by an average of 3,000 speakers spread over ten to twenty villages, distributions suggestive of Dunbar's social-brain aggregates.

The Bosavi, living north of Mt. Bosavi on the Great Papuan Plateau in the Southern Highlands of Papua New Guinea, follow this pattern—2,000 or so people inhabiting scattered communities of 60–100 (Schieffelin 2007, 143–4). Their world, prior to contact with anthropologists, missionaries, and government representatives, was oral and monolingual. Two Australian protestant missionaries established a mission station in the 1970s with a clinic, hospital, school, and store. The missionaries' approach rejected the incorporation of knowledge about local cultural practices, regarding these not as irrelevant to their project but as an obstacle to its success. In conflict with this ideology was their policy of working in vernacular languages, treating the vernacular as a code that could be separated from local cultural practices and meanings and used independently of them. Everything was already in the Bible, which merely had to be translated, and heard. In practice, though, the missionaries relied on Tok Pisin—the dominant creole in the region—in order to communicate with local people, through a small group of younger men who had learned Tok Pisin while working outside the area. The missionaries taught this group to read (though not to write) in Tok Pisin, and in time group members were working as village pastors and given the authority to preach to and baptize others (144).

The central text was the Tok Pisin Bible, *Nupela Testamen*, which was read aloud during church services. Modelled after the American Good News Bible, an evangelical text geared towards children and uneducated adults, the *Nupela Testamen* evolved over three editions (1969, 1978, 1989) as linguists progressively stabilized Tok Pisin. Readings were

laboured, because the pastors were not fluent readers in the first place, and translating between Tok Pisin and Bosavi overlaid a further burden:

Transcriptions from church services ... reveal pastors' inconsistencies, extensive self-repairs, hesitations, and paraphrases; these flag culturally systematic and significant metalinguistic and metapragmatic differences. These same domains of difference are not only found in pastors' translations from Tok Pisin into Bosavi, but parallel those found in linguists' and Bible translators' revisions of the Tok Pisin Bible....these difficulties are not random, but center on reflexive language and specific speech act verbs (146).

Before the missionaries arrived, the concept of 'sincerity', the idea that one's public demeanour and introspective economy should tally, was neither recognized nor valued by the Bosavi. The idea that one's private feelings could differ from what one reported them to be was not unknown, but speculating on whether someone had really meant what they said was deprecated. Only reports of speech were regarded as evidence of someone's opinion, with syntactic distinctions making it clear whether the reported words were heard by the person repeating them, or whether the report was second or third hand. Translating the Christian texts brought into focus a linguistic problem that required a solution: how to make an explicit match between saying something and meaning it. The consequence of this, Schieffelin argues, was profound, restructuring major portions of their lexicon in the domains of internal states, time and place: 'Without anyone talking about it, they gave rise to a new speech register, which indirectly indexed a new Christian identity and new ways of knowing' (148).

The verses analysed in detail concern an episode in which Jesus performs a perlocutionary act, declaring an invalid's sins forgiven. Scribes, observing this, inwardly dispute the authority behind this speech act. In turn, Jesus is represented as being able to read these scribes' thoughts. This short passage is rich in difficulties for the translators. Firstly the concept of sin must be rendered, and the Bosavi pastors chose the concept of sickness as the means to convey this. We might, following Rorty (1965, 32–41), surmise that the Bosavi are merely trading one sort of demon for another. Instead of ascribing the cause of sickness to the witchcraft of others, the causative ascription was now directed inwards. This is, though, an eliminative move, a simplification with the potential to translate complexity into complication.

Secondly, the pastors struggle to render the concept of inward reflection, and with it the concept that the private thoughts of one person might be available to another. This problem is conflated with that of expressing the concept of blasphemy, which the Bosavi pastors effected through the concept of gossip. Reported thought is commonplace in the narratives and conversations of many cultures. In consequence of

this shared heritage, the idea of multi-dimensional intentionality being a built-in feature of human equipment is easy to accept. For the Bosavi, though, the cultural norm is that only an experiencer can know their own internal state, and therefore only the experiencer has the right to speak of that internal state. Defiance of this norm is characterized as gossip, and is severely sanctioned—anyone proven to have gossiped is liable to pay compensation to the subject of the offence. Children are actively socialized against talking about things for which they have no evidence, and their caregivers do not verbally speculate about the child's introspective states—an unwarrantable restraint from an occidental point of view (155–6).

Repeated revisions of this passage in successive editions of the Nupela Testamen suggest that the problem of articulating the concept of blasphemy was broadly generalizable in the region. The first version renders blasphemy as 'tok bilas', meaning to 'talk decoration', or to talk boastfully. The Bosavi pastors rendered this, in turn, as *sada:dan*—'gossip', in the sense just described: saying things that one has no right to say about someone else, usually, though not necessarily, out of that person's earshot. Jesus was being represented as behaving contrary to the social norms of the community, while (in consequence of his ability to cure the infirm) being legitimated in doing so. The comprehension of this differentiation, one presumes, has the effect of installing in the congregation the foundation of a set of mind-tools that will enable its members to digest the notion of remote authority. This serves the missionaries' ends plainly enough, but it also serves the ends of the government agencies whose secular and temporal authority the missionaries are instrumental in developing. The encounter with the missionaries effects a significant noetic reconfiguration, preparing the Bosavi to become constitutional subjects, fit to participate in the performance of 'the economy'.

8.4 Development (2): Agonism and order in early-modern England

Is it the case, then, that a similar process of reconfiguration took place in Europe during the period in which a single spiritual authority (the Catholic church), operating a network of shamanistic resource centres (providing such services as education and medicine), supervened on the various secular states as they emerged? This sense of ethical coordination, vague as it is, offers a context in which to consider the institutionalization of competition; a way of theorizing an evolution from interpersonal agonism to the non-lethal trials of strength characteristic of rational enquiry.

One of Ong's key arguments is that rising literacy accompanies a kind of 'domestication' of agonistic display. At its mildest, agonism is a characteristic style of oral culture, as with the Cork man in Ong's anecdote who, when asked 'is this the post office?', instead of simply giving an informative 'yes' or 'no', replied with another question: 'would it be a stamp that you're after?' (68) It is conversational give-and-take, the characteristic style, also, of second-person intersubjective communication. We can align it with the display practices called 'lekking' by anthropologists, and also with the notion of *Spieltrieb* that intrigued Peirce. The challenge of reining in lethal agonism continues as a thematic thread in the continuing emergence of literacy from medieval to early modern England, but it is difficult to get clear theoretical purchase on such a broadly-drawn issue.

According to Ong, the connection between oratory and agonism in Greek, Roman, and subsequent European cultures makes them distinct from Indian and Chinese traditions, which sought 'programmatically' to minimise oppositions (1982, 109). Rhetoric long dominated the formal European educational curriculum, but it is more significant, Ong argues, that for about a thousand years, formal education was conducted in Latin. Being a dead language, Latin had to be learned from books. Those learning Latin were overwhelmingly male, and, moreover, while they were not learning their mother tongues, boys were also withdrawn from the oral familiarity of family life. Both of these factors—the dependence on books and the puberty-rite aspect, as Ong calls it—reduced the intersubjective, second-person element in learning. Consequently:

Learned Latin effects even greater objectivity by establishing knowledge in a medium insulated from the emotion-charged depths of one's mother tongue, thus reducing interference from the human life-world and making possible the exquisitely abstract world of mediaeval scholasticism and of the new mathematical modern science which followed on the Scholastic experience (112).

Ong makes a further distinction between chirographic culture and typographic culture, arguing for a similarly radical ontological reshaping in the wake of Gutenberg's invention of moveable type.

Symmetrically, the eminent historian of the book, Roger Chartier (2005, 2007) draws attention to a number of performative facets entrained by the arrival of paper and print technologies. Paper-making from mulberry pulp was invented in China somewhere in the region of 2,000 years ago. The technology was captured by Arabs in the 8th century CE, and might very well have helped support the golden age of scholarship during which so many significant scientific and cultural advances were made, notably in mathematics. Paper-making arrived in Europe in the 13th century CE.

The obvious advantage of printing in terms of mass-producing and distributing standardized texts has become familiar and banal; Chartier points out some ways in which print created new uses for handwriting. Early in the story there is the matter of deciding what to bind, whether to combine printed text and manuscript, which texts to choose and so on. In different copies of a printed edition there are likely to be individually penned marginal commentaries. Later, editions are printed with blank space or blank pages that invite the owner to participate in authorship; college editions printed with widely spaced lines enabled students to insert commentary between the lines of text.

Deciding what to bind is an editorial issue, but the performance of authorship is similarly complicated. Foucault linked a kind of ‘authoritas’ in the scientific text with the author’s name, a process serving to create the signature of the scientific author, conflating the author as inventor or discoverer with the author as narrator and witness—in general, an aristocratic figure predisposed in his cultural milieu to ‘speaking the truth’. However, the practice in publishing plays in England during the Elizabethan period reveals a different set of criteria altogether. Analysis has shown that fees for two thirds of the plays examined are paid to at least two, and up to five authors, whereas collaboration is acknowledged on the title page in little more than a sixth of the sample. A difference emerges here between the preparation of a text, and the accreditation of an author.

Chartier contrasts a determinist view of the printing press in which the invention has an intrinsic meaning and intrinsic properties on the one hand, with a tychic model on the other in which properties emerge from continually reconfiguring oppositions, negotiations, conventions and so on. The printing press is an important piece of scaffolding, but its significance can be overstated; its products still support rather than supplant oral performance. Maybe Plato’s Socrates was the first to complain about ‘dumbing down’ and to articulate suspicions related to the impact of writing on the proper conduct of public debate in *Phaedrus*; especially in the story of Thoth’s gift to King Thamus. Certainly a similar variety of ills have been ascribed to book culture in general, especially in the dread of wide circulation leading to a debasement of knowledge, reprised in the modern experience of Wikipedia.

8.4.1 Literacy and crime

The focus, in Chartier’s scholarship, on material evidence perhaps tends to emphasize consequences within the literate nexus, which in medieval and early-modern times is a

group of people substantially consistent with Gramsci's corps of 'traditional intellectuals'. The effects of literacy on the wider community, as literate practices became more and more widespread, are much more difficult to enumerate. As a matter of fact, attention to violence in the medieval period arises in part from the close study of material (i.e. written) evidence, prompted in part by altogether more present-day concerns about crime. At the time that Ted Robert Gurr was writing his major survey of historical crime trends (Gurr 1981), crime in the USA was reaching the peak of an upsurge. The homicide rate there remained at about 10 per 100,000 for the next decade, but has subsequently reduced by about a half.⁵¹ The question arose: was this upsurge something new; the answer was startling. Based on English evidence gleaned from fourteenth-century coroners' records, London and Oxford were dangerous places, the homicide rate in Oxford being computed at 110 per 100,000 in the period (the 1340s) for which the most complete set of data is available.

The population of Oxford, at the time, was about 7,000, among whom about 1,500—mostly young males—were associated with the university. The actual figures, then, were six or seven homicides in each of the years for which coroners' records remain intact. The assumption is generally made that homicides are the most reliable indicator of crime patterns in this period, because they were subject to public sanction to a greater extent than other crimes. Coroners were required to determine cause of death for revenue purposes, offenders' chattels being forfeit to the crown. Their records provide a more reliable basis for statistics than court records, because the determination of homicide did not necessarily lead to prosecution (Hanawalt 1976, 299). The Oxford rate is the highest discovered in medieval England, estimates for London ranging between 30–50 per 100,000 (Hammer 1978, 12). Becker's analysis of Florentine crime in the same mid-fourteenth century period shows rates reduced from about 150 per 100,000 to about 70 per 100,000 in the latter part of the century (1976, 287). Hanawalt's figures for rural Northamptonshire are not conveniently comparable, owing to the difficulty of making demographic estimates—among other things, the Black Death is in play during this period. Guessing at a population of 50–100,000 (*cf.*, indirectly, Ackerman 1976, 113), her raw numbers, ranging between 10–20 homicides per annum, are broadly in line with the conclusions drawn elsewhere (Hanawalt 1976, 303).

⁵¹ Figures based on FBI reports, www.fbi.gov/ucr/ucr.htm (accessed 22 July 2007), most recently for 2005. There are wide variations between rates in urban and rural areas, and from state to state.

Some patterns discerned in these figures are familiar: although the concept of ‘weekend’ was a good deal less robust in this period, Saturdays, Sundays and Mondays were times of heightened risk, as were the hours between twilight and midnight. In the Oxford material, moreover, there is clear evidence of distinctions between safe and unsafe neighbourhoods. However, as Lawrence Stone observes, comparisons with later datasets suggest that other patterns changed radically. The reduction in the gross number is the most obvious indicator: rates halved by the period between 1550 and 1650, and since then have reduced to a tenth of 17th century levels. From that point of view, the trend Stone identifies from a small percentage of homicides taking place within the biological family in the 14th century— 8%, rising to 15% in the late sixteenth century, about 20% in the seventeenth century, and about 50% in the twentieth—may be an artefactual residue left over after other focal areas diminished in significance (Hammer 1978, 14; Stone 1983, 25–7). A number of other factors arise, which more clearly implicate the onset of literate technologies. The burden of prosecution shifts from the relatives of the deceased to public authorities; medical care improves; public tolerance of violent conduct diminishes. The concept of public tolerance is an evolution of its own, a locus where the issues relating to literacy become particularly significant: a developing sense of personal horizon extending beyond the homeostatic is facilitated by the development of an increasingly effective range of administrative technologies.

Stone (1985, 219–20) illustrates the shift by observing that in medieval times, a cuckolded husband would be likely to assault the seducer physically; by the eighteenth century he would take the offender to court and seek pecuniary damages. More generally, what develops in the late sixteenth and early seventeenth century is a greater willingness to ascribe responsibility to other members of the community, with a corresponding diminution in the role assigned to fate, nature or God. An element in this is the effect of the protestant revolution, the cognitive re-orientation involved in personalizing the individual’s relationship with scripture at the expense of the omniscient role previously ascribed to the parish priest. Another, more practical factor entrained by the dissolution of the monasteries was the release of numbers of literate individuals into the community—clerics who needed new sources of subsistence reconfiguring services previously provided by the church.

Similarly, as Stephens (1990, 546) points out, the civil war a century later stimulated the development of an organized production and distribution system involving printers, publishers, wholesalers, booksellers, chapmen dealing in political and religious books, pamphlets, tracts, and newspapers. However, inferences about readership are largely

drawn from the nature of the material. Evidence of literacy in this and earlier periods is as difficult to assemble as crime statistics, and calls for the same kind of interpretative diligence and ingenuity. The principal source is signature evidence. It is assumed that people capable of signing their names on official documents, whether court affidavits or marriage certificates, could write in other contexts too. Reading, though, is an easier skill to acquire than writing, and there are no indicators that would identify a person who was capable of reading but not writing. Like the scallop larvae that did not attach to ropes in St Brieuc bay in chapter 2.2.1, people who could read but not write leave no trace in history. Correlating signature evidence with school records is not at all reliable, since, especially in the early modern period, there were many varieties of informal schooling and widely differing lengths of time spent in education. Some, indeed, learnt to write in adulthood.

8.4.2 The pardoner and the badger: the emergence of 'rogue literature'

In England, the period between the reformation and the civil war seems to have been pivotal in negotiating the relationship between the decline in violent interpersonal crime and the rise in literacy. Since a similar transformation occurs across Europe, albeit over varying timescales, extracting firm conclusions about metaphysical and abstract concepts is an intensely challenging task. An early bifurcation followed the fourth Lateran Council's suppression of proof by ordeal in 1215. European Christendom adopted the inquisition. To convict someone of a serious crime required a minimum of two eye-witnesses. Where eye-witnesses were lacking but the circumstantial evidence was strong, the confession of the suspect was an acceptable substitute, and torture an acceptable means of obtaining this. England, though, adopted the jury. Circumstantial evidence by itself was sufficient to convict, and juries might convict on the basis of prior knowledge of the accused and only a bare minimum of supporting evidence (Baker 1978).

Supporting the English system was the rhetorical technology of common law. The accumulation of precedents improved the efficiency of the justice system by minimizing the recombinant load on individual judges. If a similar problem had been encountered before, and a solution reached, then there would be no need to devise a fresh solution *ex nihilo*. We are accustomed to the array of volumes in which individual judgements are preserved, in the modern, text-intensive world; it is easy to overlook the importance of the medieval scholar's disciplined training in the use of memory, and the way that writing must have supported oral performance by means that strongly resemble the classical Greek remembrancers. Further, while modern thinking about medieval justice

is perforce drawn to the capital end of the criminal spectrum, the function of clerics in administering a petty, subliminal, or ambient judicial needs is worth considering. The salving of bad consciences and the dispersal of lesser anxieties may very well account for a significant part of the pardoner's social function.

Both in England and elsewhere in Christendom, the pardoner emerged as figure of ridicule, while the selling of indulgences became an increasing focus of discontent regarding the boundary between civil and spiritual aspects of daily life. Paradoxically, a contributing reason for this is likely to have been the church's success in generating a sense of ethical consistency. It is noticeable, though, that the sources of literature critical of ecclesiastical malpractice—figures such as Chaucer, Skelton and Lindsay—tend to be well-connected courtiers with the ear of the monarch. The emergence of 'rogue literature' in the sixteenth century marks a transition to a more secular and more distributed critique. John Heywood's *Play called the foure PP* (c. 1520) sees the civil and clerical figures of the pilgrim, the pardoner, the apothecary and the pedlar compete over who can tell the most outrageous lie.

Thomas Harman's *Caveat or Warning for Common Cursitors* (c. 1566) is entirely secular, and performs a second modulation too: the text represents itself as trustworthy even while being anecdotal, exaggerated and presumptuous (Woodbridge 2001). Harman was a Kent landowner whose court connections were indirect at best; his text was not performed but published. His audience was the literate fraction who had done well out of Henry VIII's reforms and were nervous about the social consequences. Although represented in retrospect as a constative account of 16th century vagabonds, Harman's text should be regarded as contributing to an ethical debate in which the rights of the new landowners needed the rhetorical arts of persuasion to establish a moral precedence over prior forms of mutual obligation.⁵²

Changes in land use, notably the 'Wool Rush' enclosures of the 1540s, had two significant effects. One was to mobilize dispossessed, disaffected and dangerous populations, the other was indirectly to accumulate disaffected attention in times of dearth. (Among the vagabondage of the period, Woodbridge notes, were numbers of former clerics whose most dangerous asset was rhetorical fluency.) Enclosed lands were often put to grazing sheep instead of growing grain, a sustainable change in normal climatic circumstances. However, when grain crops failed—as they did periodically—

⁵² Thanks to Robin Hamilton for his helpful advice on rogue literature.

tensions already fermenting between pre-modern notions of clan obligation and modern individualism became acute threats to public order (Stone 1947, 104–6; Walter & Wrightson 1976, 24). The rhythms of dearth can be regarded as a vastly scaled up reprise of the intermittent feedback issue discussed in chapter 7 (see page 178). Instead of a fatalistic acceptance of God's will, the dispossessed—literate or not—had concrete and identifiable targets to blame. On an individual case-by-case basis this might have represented no great change, but the recurring pattern obliged government administrators to develop structural means of restraining the mounting anger.

Government records note around forty outbreaks of grain rioting in the period 1585 to 1660; in the 1630–1 crisis, for example, grain riots were reported in Somerset, Suffolk, Sussex, Hertfordshire, Hampshire, Berkshire, Wiltshire and Kent (Walter & Wrightson 1976, 26). Attention, especially in grain-producing areas, focused on the role of badgers—a generic term for commodity dealers trading in foodstuffs, to a degree similar to the original French sense of *entrepreneur*—who were blamed for removing supplies from where they were needed, as the locals saw the issue. Of course urban populations saw blame in a different light, since badgers supplied their gustatory needs. Parliament enacted regulations in 1552 and 1563, with orders in council tightening and elaborating these in response to the 1630–1 crisis (30–2). The speed and depth of the shift toward secular responses to dearth should not be exaggerated: periods of dearth occasioned morally-inspired drives against drunkenness and the sources of intoxication, seeking among other things to interdict the supply of grain to brewers—a trade in which badgers again were implicated.

The etymology of 'badger' is difficult to establish. It is perhaps significant that laders and kidders—other trades named in the 1552 legislation alongside badgers—are Germanic in derivation, remembering that in Plantagenet England the formerly-Saxon peasantry named the animals (sheep, cow, pig), while the formerly-French nobility named the meat (mutton, beef, pork).⁵³ That line of argument points to the Germanic 'bag'—bagging to render commodities moveable—at the head of the etymological trail. From there, marking the bags so that their contents are identifiable—badging—begins a transference that resembles (albeit imprecisely) Austin's locutionary/ illocutionary/ perlocutionary progression. From badging to badgering is a representational move, and

⁵³ Laders dealt with the loading of ships, presumably in the sense of negotiating and delivering cargos rather than physically loading them; kidders dealt in firewood. Cf. George Robb (*sic*), *White Collar Crime in Modern England*, 2002, loading boats presumably included paperwork.

again it is significant that the OED definition gives prominence to negative connotations: ‘a cadger, hawker, or huckster’.

Skilled performance is implied: in making promises that are either not kept or are disappointingly kept; or representing the same cargo to several potential buyers in order to establish the best price; outright deceit is unsustainable, so interpretative dexterity, flattery and other persuasive arts are undoubtedly assets that a successful badger would be able to deploy. Concomitantly, the scepticism attracted by clerical intermediaries in the medieval period transfers to commercial intermediaries in the early modern. The articulation of that scepticism, though, passes from a privileged, oral context to a regulatory framework, inscribed in law and supported by the reified hermeneutic resources available through the new medium of print.

In short, detachment engenders creativity on the part of the badger; this is the raw material of recombinant intentionality at its simplest. Grain, bagged, acquires intension. By itself, the intensional load on the bag is limited, but as one intension among many in the imagination of the dealer it acquires a multitude of potential extensions. This cannot be represented as a ‘new’ cognitive development discovered in reformation England, but the harnessing of new paper, print and security technologies—and people capable of putting these to productive use—has the mark of a quasi-irreversible step. Paying attention to the bagging of commodities as a cognitive event is a gesture that echoes Tomasello’s observation that much of what is unique about language can already be found in the act of pointing.

Concomitantly, the badger is an anonymous and generalized figure, capable in turn of intensional transformation into a performative function in the working of the economy. He is the antecedent of the entrepreneur, and, once suitably furnished with intersubjective technologies, of the work-maker.⁵⁴ It is time, now, to develop that notion of intensional transformation in terms of its speculative relationship with potential extensions, by theorizing intersubjective technology through the lens of polyphonic consciousness and recombinant intentionality. This entails the substantiation of the argument that technology is the transparent and seamless extension of skill—transparent, that is, in the strong Dennett–Clark sense elaborated in part two.

⁵⁴ The gendered ‘he’ is a historical presumption. If a similar presumption of masculinity attends the entrepreneur and the heterogeneous engineer, this is not shared with the work-maker.

9 Art loves chance

The fundamental purpose of brains, says Daniel Dennett, is to produce future:

In order to cope, an organism must either armour itself (like a tree or a clam) and ‘hope for the best,’ or else develop methods of getting out of harm’s way and into the better neighbourhoods in its vicinity. If you follow this latter course, you are confronted with the primordial problem that every *agent* must continually solve:

Now what do I do?
(Dennett 1991, 177)

Let us take the notion of reaching for ‘better neighbourhoods’, and cause trouble for it: better neighbourhoods are, by definition (one assumes) niches that are already occupied; getting there entails competition. Implicitly, the question ‘now what do I do?’ is scalable through the ‘kinds of mind’ rehearsed in part two. For a Darwinian mind, there’s nothing for it but to bash away at the coveted niche and succeed or fail (will meets won’t). For the Gregorian mind, conceivably negotiation—with all its scope for messy compromise—is the preferred course.

Now lay this abstract philosophical form next to a piece of political analysis. From Antonio Gramsci’s perspective,

If not all entrepreneurs, at least an élite amongst them must have the capacity to be an organiser of society in general, including all its complex organism of services, right up to the state organism, because of the need to create the conditions most favourable to the expansion of their own class; (Gramsci 2001, 1138)

Gramsci’s organisms already have brains, bodies and histories, because his narrative mobilizes relationships between fairly crudely-drawn aggregates (or classes) of humans living in (relatively) industrialized societies. But the issue is the same: it concerns the procuring and securing of the best possible environment.

Now, a question posed by Shirley Strum and Bruno Latour is as relevant to Dennett’s primordial upscaling as it is to Gramsci’s maximizing entrepreneur:

How do baboons know who is dominant and who is not? Is dominance a fact or an artefact? If it is an artefact, whose artefact is it – is it the observer’s, who is searching for a society into which he can put the baboons? ... Or is it a universal problem, one that both observer and baboon have to solve? (Strum & Latour 1999, 118)

Baboons are observed to spend a great deal of time in various acts of negotiation whose function can be ascribed to the need for constant evaluation of social links. There is no pre-existing hierarchy, according to the performative view, but rather order is established as the provisional outcome of a continuing process of arbitration. Because baboons have limited resources—their bodies and their social skills—colonies can organise only a limited social stability. Strum & Latour call this configuration social

complexity. The introduction of material resources and symbols—the distinguishing characteristic of humans—lead, on the other hand, towards social *complication*. Complication is here defined as an organism built from a series of simple operations, components or concepts.

To some degree, it is a counterintuitive position to argue that primitive (oral) society is more complex than industrial (literate) society. The argument is rather that layered simplifications function in concert to enable more complexity at the social level. A simplification, in this context, can be understood in terms of the conservation of successful experimental outcomes, unsuccessful alternatives having been discarded. The idea of a social ‘level’, then, floats on the interactions—intended or opportunistic—between simplifications. Memory and learning are no less important, but the ability to coordinate and even direct people, and the ability to explain and to enrol cooperation is expanded and reinforced symmetrically through recourse to innate human capacities and to supporting non-human artefacts—technologies.

9.1 Autonomy [mechanical *noemata*]

In the introduction to *Knowing Machines* (1996), Donald MacKenzie notes that the word ‘technology’ properly refers to knowledge of the practical arts rather than to machines *per se*. In modern usage, however, the term has broadened to encompass machines as well as the knowledge embodied in them (9, fn 17). Additionally the word is widely used with the explicit purpose of valorization. It is striking that socio-economic analyses of the machine, especially in relation to the British Industrial Revolution and cognate developments elsewhere, focus on the virtue of consistency. Peirce, for example, affirms that

... machines are “destitute of all originality, of all initiative.” In a machine, Peirce stresses, this is a good thing; it is precisely the machine’s lack of originality that makes it predictable and hence useful; ... “we no more want an original machine than a house-builder would want an original journeyman” (Skagestad 2004, 255)

This virtue of the machine accounts for the judgement of Andrew Ure, whose 1835 *Philosophy of Manufactures* MacKenzie cites as stating that ‘when capital enlists science into her service, the refractory hand of labour will always be taught docility’ (1996, 35–6). MacKenzie further cites Marx as stating that ‘the complaint that the workers lack discipline runs through the whole of the period of manufacture’ (33). MacKenzie later cites the empirical evidence of Michael Piore, who found that, ‘as one engineer explained, “if the cost comparison favoured labour but we were close, I would mechanise anyway”’ (53). The engineer, here, betrays the emotional appeal of

performing the kind of rationality that is widely believed to underwrite the central, maximizing thrust of neoclassical economics, so it is telling that the word Herbert Simon chooses to improve the concept of ‘rational expectations’ is ‘*consistent expectations*’ (1978, 2, fn 1).

The point that MacKenzie stresses in respect of Marx, which bears upon the issue of valorization, is that in the advent of large-scale mechanised production, social relations moulded technology rather than vice versa (28). In this nineteenth-century context, mechanized production is straightforwardly a matter of transforming raw materials into saleable goods, a process in which valorization is the multiplication of the monetary value by which the capitalist can recoup the cost of manufacture and turn a profit. It is where the connection between added monetary value and accumulated intangible value is less obvious that the application of the term ‘valorization’ becomes more difficult.

Interestingly, MacKenzie notes that a definition of the machine as a complex assemblage of tools was worthless, for Marx, ‘*because the historical element is missing from it*’ (34). In this sense, intersubjective *technology* is legitimately distinct from the automation of know-how. It is know-how about how to share or distribute know-how but, counterintuitively, this competence is founded on the range of oral skills that Havelock pronounces obsolete—skills that entail an essentially homeostatic sense of history. For Marx, though, the function of the machine was to supersede know-how, with all its unpredictable orality: ‘the machine ... is a mechanism that, after being set in motion, performed with its tools the same operations as the worker formerly did with similar tools’ (34);

...the special skill of each individual machine operator, which has now been deprived of all significance, vanishes as an infinitesimal quantity in the face of the science, the gigantic natural forces, and the massive social labour embodied in the system of machinery, which, together with these three forces, constitutes the power of the ‘master’ (35).

Yet from resistance to this trend, MacKenzie points out, a significant contribution to the development of British thought—whether philosophy or social policy—emerged; notwithstanding that ‘strikes were a major reason for innovations’ (37–8). Not only innovative machinery, however: the very task of organizing a strike demands innovation among discontented labour and, given the ultimate indispensability of labour, innovative tactics for managing labour relations on the part of employers and, subsequently, higher-level social structures.

9.2 Disclosure [wisdomcraft]

For Heidegger (1977), this field of struggle approaches a *hylomorphic* understanding of individuation. Lost in his misty-eyed peroration he fails to disclose the significance of the underlying Aristotelian shift away from hylozoism and towards rational process, but repetition and return is the circuitry where the ‘essence’ of technology is to be found, with heavy stress on the active deliberation involved in drawing forth that which is to be found. Heidegger turns technology into a sacrament from the outset: ‘Questioning builds a way... The way is a way of thinking’ (3). In discussing Aristotle’s four causes (material, formal, effective, final), he renders Aristotle’s silver (material) bowl (form) as a chalice (5), introducing to final cause the performance of a sacrificial rite and to effective cause the maker’s intention to make a suitable sacred object. Later, Heidegger allows an undisclosed distinction between ‘technology’ and ‘modern technology’ (14), claiming that ‘the work of the peasant does not challenge the soil of the field’ (15)—apparently because the peasant is ignorant of chemistry, not because the field is unaffected by fertilizer and erosion. Heidegger ends up celebrating poetry, but chooses not to exemplify it as a living craft by citing a contemporary, instead turning to the Romantic poet Hölderlin rather as Plato was wont to turn to Hesiod.⁵⁵

The resulting ‘definition’, valorizing long-term, devoted and painstaking labour, is apparently the very opposite of what we are accustomed to meaning by the term ‘technology’. Technologies afford convenience, do they not? Heidegger is somewhat equivocal about this. Convenience, articulated through the key concept of *ge-stell* (enframing), acquires a moral ambiguity that points towards the issue of risk and danger. The way he unfolds this ambiguity performs his message, being characteristically laborious, paying meticulous attention to the history of the significant words around which his argument is constructed.

Regarding cause, he remarks that ‘we have acted as though the doctrine of the four causes had fallen from heaven’ (6), and draws attention to the breadth of meaning available in *aitia*, the word Aristotle used:

⁵⁵ See Pierre Joris on Paul Celan’s famous 1966 visit to Heidegger. Reading ‘Todtnauberg’, the poem Celan inscribed in The Thinker’s guestbook, Joris finds Celan using the word ‘*Waldwasen*’ in an archaic, significant way, almost a parody of Heidegger, implicitly humiliating The Thinker in so doing. <http://wings.buffalo.edu/epc/authors/joris/todtnauberg.html>

...things asked, assumed, demanded of it; responsibility, guilt, blame; in forensic oratory, *invektive* without proof, the opposite of *elenchus* (cross-examining, testing); credited to, reputed to (i.e. indirect or unevicenced attribution) (after Liddell & Scott, *ailia*)

Heidegger's gloss is 'that to which something else is indebted' (7), but the element of indirect responsibility is discarded. This is a matter that Peirce's categorical thirdness presences; presencing being what, for Heidegger, cause *does*. 'The four ways of being responsible bring something into appearance' (9), and we find ourselves engaged once again with the question of 'florid representing' discussed in chapter 6.1.1, almost literally in terms:

It is of utmost importance that we think bringing-forth in its full scope and at the same time in the sense in which the Greeks thought it. Not only handcraft manufacture, not only artistic and poetical bringing into appearance and concrete imagery, is a bringing-forth, *poiesis*. *Physis* also, the arising of something from out of itself, is a bringing-forth, *poiesis*. *Physis* is indeed *poiesis* in the highest sense. For what presences by means of *physis* has the bursting open belonging to bringing-forth, e.g., the bursting of a blossom into bloom (10).

The trouble is that, although Heidegger confidently affirms that 'Bringing-forth brings hither out of concealment forth into unconcealment' (11), it is not clear that bringing-forth does anything more than presence hylomorphic transition, or rather bring a lens to magnify a local detail of transition. We have a performance of hylomorphic sampling, so to speak; just another name for the Bergsonian cinematograph.

Noting the link between *technē* and craft skill, Heidegger points out a further link between *technē* and *epistemē*, highlighting a passage in Aristotle's *Nicomachean Ethics* (VI, 3–4) where Aristotle's distinction between acting and making recalls his own distinction between ready-to-hand and present-at-hand. Aristotle here highlights two other recurring themes: the difficulty of accounting for where original thought comes from, and the concomitant relationship between *technē* and chance—the latter seeding Heidegger's later interrogation of danger. Because Aristotle claims for *technē* an element of reason, Heidegger draws the conclusion that 'It is as revealing, and not as manufacturing, that *technē* is a bringing-forth' (13).

However, *modern* technology does something else, something (*pave* Heidegger) connected to the overlooked element of indirect responsibility. Its mode of revelation is challenge; it 'sets upon' nature. Hence, where previously the peasant sowed grain and left its increase to the soil, industrial agriculture sets upon nature so that the air yields nitrogen for fertilizer; the ground yields oil that either gets translated into pesticide or fuel for tractors, while other ground yields ore to be translated into iron to make tractors (14–15). The term Heidegger develops to disclose the distinctively modern in technology is *ge-stell*, enframingment—a term plainly linked to the previously footnoted issue of *noema* in

Husserl (p. 168), to the frame problem discussed in the previous chapter, and thus linked *in a particular way* to hylomorphic sampling. (Note that sampling is a *probabilistic* practice.)

To set up *ge-stell*, Heidegger first discusses *Bestand*, translated by Lovitt as ‘standing-reserve’, but alternatively renderable as ‘resource’—though Heidegger would probably insist on hyphenating (re-source) to stress the element of arbitrarily recurrent return at the core of his point:

Everywhere everything is ordered to stand by, to be immediately at hand, indeed to stand there just so that it may be on call for a further ordering. Whatever is ordered about in this way has its own standing. We call it the standing-reserve (17).

A sense of primordial force animating the challenge channels human *Entbergen*—‘*Bergen* means to rescue, to recover, to secure, to harbor, to conceal’ (11, fn 10); to salvage, to retrieve (to find again), to hold—through a seeming pun:

That which primordially unfolds the mountains into mountain ranges and courses through them in their folded togetherness is the gathering that we call “Gebirg” [mountain chain] (19).

Heidegger’s rhetorical purpose is to place *ge-stell* outside the human scale, referencing the Kantian sublime so that experience becomes a theatrical dialogue between the evidence of the senses and the essential Platonic primitives around which such evidence germinates narrative trajectories. *Ge-stell* is not a passive byproduct, however: it is an intensifier of challenging. It brings ‘set upon’—presumably in the predatory sense of a lion setting upon a wildebeest—and adds ‘producing and presenting’ to give up *poiesis*, letting ‘what presences come forth into unconcealment’ (21).

The hylomorphic sense of the interpretant being in a state of perpetual *in media res* continues to beg certain originary questions as Heidegger’s argument touches on the Hegelian notion of historical determinism. Heidegger’s ‘destining’ is a subtle piece of accountancy:

It is from out of this destining that the essence of all history is determined. History is neither simply the object of written chronicle nor simply the fulfillment of human activity. That activity first becomes history as something destined. And it is only the destining into objectifying representation that makes the historical accessible as an object for historiography (24).

The debate over system function and selected function appeals to this sense of history. Although Heidegger cites Heisenberg, my hunch is that the uncertainty principle is not integral to his argument. The Peircean view of the same issue, which I will address in the next section, does not *contradict* Heidegger’s, but lends an evolutionary perspective that obliges us to dispense with Heidegger’s ponderous theurgy.

With the Romantic sublime standing behind it, what seems to be happening in Heidegger's account is that the interpretant is being ushered towards an untimely resolution of whatever immediate crisis has one's attention fixed, so that danger is entailed in the denial of contemplation:

But Enframing does not simply endanger man in his relationship to himself and to everything that is. As a destining, it banishes man into that kind of revealing which is an ordering. Where this ordering holds sway, it drives out every other possibility of revealing (27).

In the denial of contemplation, reason is reduced to the throwing of loaded dice. Knowing this, we trust the expected outcome, discounting improbable alternatives, thus dispensing with the rational processes required to resolve their consequences. However, this pessimistic withering of reason bears the seed of redemption. Heidegger cites Hölderlin:

*But where danger is, grows
The saving power also.*

He comments: "To save" is to fetch something home into its essence, in order to bring the essence for the first time into its genuine appearing' (28). By this means, re-source becomes modulated into resource, a positive compositional foundation that re-normalizes contemplation.

9.3 Extension [path dependence]

The skilled thinker chooses equipment wisely. Is it possible, though, that equipment chooses its thinker? If that question seems absurd, then maybe it can be posed more neutrally as a nature/nurture dichotomy. How do items emerge out of flux and establish relationships that sustain them while others are discarded? Recalling Strum & Latour's distinction between complexity and complication, how can we frame an interrogation of the processes that mediate this distinction, presuming that human volition is implicated but not supreme? We have already laid the foundation, discussing Peirce's work on chance in part one. The particular aspect that bears on the present question emerges from Brian Arthur's work on the Pòlya urn, developed as a tool of statistical probability in knowledge economics.

The Pòlya urn is a method for modelling contagion effects. An urn of infinite capacity is primed with two balls of differing colour. The investigator removes a randomly chosen ball from the urn. Returning this ball to the urn, a second ball of the same colour is placed alongside it. As this procedure is repeated, the question arises: will the proportion of one colour to the other fluctuate indefinitely, or will it stabilize? Proofs developed by

Hill, Lane & Sudderth (for two-dimensional processes with stationary urn functions), and Arthur, Ermoliev & Kaniovski (for n -dimensional processes with nonstationary urn functions) show that stabilization does occur, *but*, for any iteration of the process, *the stable proportion is randomly variable*. On one occasion it may be 7:1, on another it may be 3:2, and so on. Early in an iteration of the process, random fluctuations make a large difference; later on their impact is negligible. The significance of n dimensionality is that the technique models stable but non-deterministic outcomes in complex autocatalytic regimes (Arthur, Ermoliev, & Kaniovski, 1994). The n -dimensional regime is sufficiently pliable to account for the limited flexibility of Peircean habit while at the same time being sufficiently stable to account for its durability. Further, it helps illuminate the fixation of one belief by another in the complex epistemic regimes familiar, through language, to humans—not least the meaning and syntactic ordering of the words themselves.

From this perspective, individual choice-acts occur in a dynamic milieu where choices—enframements—are numerous and constrained by time and resource limitations. Pòlya effects accumulate as a probabilistic consequence of the nodal interactions generated. Because these effects are probabilistic but stable (once established), the strong temptation to retrospectively ascribe prior cause to the anterior state is problematized. Instead, analysis focuses on *paths*, strands of narrative whose entanglements collectively, polyphonically, propagate the story.

Salganik, Dodds & Watts (2006) report lock-in effects in an artificial cultural marketplace. Participants were offered choice between 48 songs by unknown bands, and asked to evaluate each item they downloaded. One fifth of the sample were given no information other than the song titles and band names; the remainder were assigned to one of eight social ‘worlds’, where songs were cumulatively ranked by popularity. Although there was correlation between the popularity of songs selected in each of the ‘worlds’ and the rankings conferred by the control group, two notable effects were observed. First, there was variance between the ‘worlds’ regarding which particular songs were rated the *most* popular. Second, popular and unpopular choices tended to be more differentiated from the median in the social ‘worlds’. The authors conclude that

...social influence exerts an important but counterintuitive effect on cultural market formation, generating collective behavior that is reminiscent of (but not identical to) “information cascades” in sequences of individuals making binary choices. ...the more information participants have regarding the decisions of others, the greater agreement they will seem to display regarding their musical preferences; thus the characteristics of success will seem predictable in retrospect (855–6).

Collective social deliberation, then, has the effect of economizing an individual participant's path to institutionally shared values, given artefacts whose properties are sufficiently open to accommodate a spectrum of opinion.

According to economist Paul David, path dependence emerges from the interaction of three conditions: technical interrelatedness; economies of scale; and quasi-irreversibility of investment. In his famous paper on the story of the suboptimal QWERTY typewriter key layout (1985), he says:

*A path-dependent sequence of economic changes is one in which important influences upon the eventual outcome can be exerted by temporally remote events, including happenings dominated by chance elements rather than systematic forces. Stochastic processes like that do not converge automatically to a fixed-point distribution of outcomes, and are called *non-ergodic*. In such circumstances "historical accidents" can neither be ignored, nor neatly quarantined for the purpose of economic analysis; the dynamic process itself takes on an *essentially historical* character.*

In the case of the typewriter, technical interrelatedness was a factor because, in addition to the corporations manufacturing the instrument (originally Remington in the mid 1870s), and the customers buying it, the instrument required operators, and these operators required training. Training was provided by a variety of organizations, both private and public. As an investment, from the customer's point of view, the value of the instrument depended on the continuing availability of operators. From the operator's perspective, investing in the necessary training conferred a 'pecuniary externality', and in time a symmetrical benefit accrued for an emerging market for instruction in touch-typing that reduced the per-unit cost of undertaking training, and of providing it.

The QWERTY layout was prompted by a combination of factors—keys tended to jam; because the platen was oriented face-down, the operator would not be aware of jamming until the page was finished and removed from the machine. These problems, though, had been overcome as early as the 1890s, but already the marginal cost of retraining operators (though not especially high) was sufficient to dissuade corporations from making the investment. Hence *quasi-irreversibility*: the lock-in *could* in theory be reversed.

In *Understanding Media*, Marshall McLuhan parses his famous slogan 'The Medium Is The Message' as meaning that 'the personal and social consequences of any medium—that is, of any extension of ourselves—result from the new scale that is introduced into our affairs by each extension of ourselves' (1964, 7). In the case of the typewriter, there

are several independent vectors that between them support extension along the locked-in trajectory of the qwerty keyboard.

Understanding Media focuses on the way in which a variety of technological extensions exploit the subject's innate oral resources at the expense of whatever rational faculties might otherwise be brought to bear. In the chapter on the typewriter, for instance (258–64), McLuhan contrasts the fact that typewriters have not become fixtures in the classroom (imagine the noise!) with the radical impact they had on the work of poets such as Charles Olson, and Edward Cummings:

```

Buffalo Bill 's
defunct
        who used to
        ride a watersmooth-silver
                stallion
and break onetwothreefourfive pigeonsjustlikethat

                                                    Jesus
he was a handsome man
                        and what i want to know is
how do you like your blueeyed boy
Mister Death

```

(Source: <https://tspace.library.utoronto.ca/html/1807/4350/poem602.html>)

In this Cummings poem, the intrusion of the visible clearly “speaks”. Space-games imitate timing-games so that one translates the space-elided onetwothreefourfive as a rapidly-spoken one-two-three-four-five representing fast gun-play. Echoing Arrow’s remarks about the social availability of privately-held knowledge, the visual aspect “says” ‘this can be done’, both overtly and subtly: the lower-case i, although characteristic of Cummings, here stands humbly in relation to Bill, Jesus and Death.

For the novelist Henry James, too, the typewriter altered his mental habits, though in his case—ironically—this was because he found he preferred dictating to a secretary over composing by hand (Cutting, 2003, pp. 4–5). The effect of this was to skew the noetic process so that the later James has more of an oral feel than the earlier. Relating this to Heideggerian enframement, James relaxes his hylomorphic circuitry so that the intimate relationship between hand and thought is dissolved, relieving the heavy stress on active deliberation involved in drawing forth that which is to be found.

The medium is *not* ‘the message’, but it *does* possess an interpretant function the absence of which would obviate any semiotic content. (This is the reflexivity on which search engine algorithms depend.) For instance, the widely storied printing press would have

been of little use without the development of paper-making. It is not so much that there would have been nothing to print the books on. Rather, the *authors* of those books would have had a much harder time finding the materials on which and with which to draft their manuscripts. But the materials authors find are not neutral, not external to the process of making; nor are they (author or material, take it as you like) necessarily visible in the resulting text.

9.4 Volition [intersubjective technology]

Technology is anterior to individuation, yet technologies are made out of individuations. Somehow, volition opportunistically pulls at both ends of the thread. Is technology something other than, or more than, a special case of the extended phenotype? The instinctive answer is ‘yes’, but this answer is reflexively grounded in the presumption of human exceptionalism, which aligns volition with teleology. We do not find a teleological explanation of the extended phenotype convincing because we cannot then account for volition in any way other than by recourse to external, supernatural causation. We are disinclined to ascribe to such external causes the option of declining-to-cause that distinguishes volition from will.

If we were to answer ‘no’ on partly Humean, partly Peircean grounds, we have instead to account for volition in human terms. The Humean ground would be that reason alone cannot manage the nexus of impulses constituting the experience of volition. Therefore we cannot stand outside the circuits of obligation imposed by nature, therefore our accommodations of convenience are part of nature. The Peircean ground would nevertheless admit the role of ingrained habit in the practical management of this nexus.

The follow-up question to Peirce (though also, implicitly, to Hume) is this: to what extent are my habits *mine*? Once I notice a number of mannerisms that I have in common with other members of my family, I have cause to wonder whether I have any mannerisms of my own. Ultimately, this question ends up challenging Peirce’s cotary maxim, ‘nothing is in the intellect that is not first in the senses’. If I have mannerisms and habits that are not, strictly speaking, my own, is it not possible that something present to my intellect has arrived there indirectly via other peoples’ senses? And if that is the case, then surely the same indirection embraces the evolutionary history standing behind the accumulation of sensory competence in humans?

Volition is paronymically similar to will. The Latin root of volition, *volo* (to wish), is also the root of ‘voluntary’, implicitly stressing the governance of reason. The root of ‘will’ is Germanic, so a direct comparison might risk epistemic dissonance, but OED points both *volo* and will to the Sanskrit *váratī* (chooses, wishes, prefers; *will* v.1). In ordinary use, ‘will’ suggests something later in the cognitive cycle than ‘volition’, something nearer to action. Under volition, the act has not yet been individuated. Comparing ‘will’ to ‘evil’ (ewil, ivil, yfel; evil *a* and *n*), in the latter’s senses of ““exceeding due measure” or “overstepping proper limits””, brings into focus a notion of risk implicit in an act of will. Hence, technology that is anterior to individuation minimizes risk on the assumption that the resource has shown itself to be durable under selection pressure.

The resource does not voluntarily disclose its compositionality, and its compositionality may become partially exposed and exploited by trajectories entirely dissimilar to those contributing to its formation. The double-edged sword, then, is that anterior technology minimizes risk so that posterior technology can probe its durability thus exposing it to fresh risk. Oral performance finds the anterior moving through the interpretant towards the posterior. For the interpretant, technologies are articulations of volition, articulation meaning not only a reification in speech or prose, but semiotic reification that either intercedes as a passage point between mutual interests or, in exemplifying clarity in an otherwise indistinct or underdetermined field, accumulates a gravitational force capable of propagating passage points *ex nihilo*.

By this definition, it might be argued that the notion of *intersubjective* technology is a pleonasm. All technology, in some sense, contributes toward the extension of the interests of the organism through which it moves. As a practical matter—if for no other reason—there is a point, nevertheless, in focusing on technologies whose specific function is, or appears to be, related to interpersonal communication in the widest (including temporal) sense. The impetus for the focus on intersubjectivity arises from the material discussed in part two, for two physiological reasons. First there is the question of translating the Peircean notion of habit into the durable cognitive architecture that (conjecturally) distinguishes the literate, inductive thinker from the purely oral, abductive thinker. On this basis, there is no inside/outside distinction about technology. Prosthetic extension reaches inward as well as outward. Secondly, there is the unresolved issue relating to voice versus hand in the performance of communication. The intuition here is that mastering the fine motor control of the hand entailed in writing, drawing or diagram making is implicated in the acquisition of

technologized habit, *but*, this is not necessarily something installed in *every* individual, nor need it be for the dispositif to evolve.

10 The Work-Maker

This is where Donald MacKenzie's notion of Barnesian performativity takes over from the Austinian foundation outlined in part one and developed in part two. The work-maker is conceived as a specifically Barnesian performer, but as a performer who also summarizes, integrates and embodies the epistemic, the phenomenal and the sociohistoric strands that have weaved polyphonically through this text. Accordingly, this final chapter is part conclusion, part summary, part case-study, but also part continuation. To begin with, then, a brief summary:

The epistemic focus of part one correlates with Peircean **secondness**, but rather than being a performance of epistemology it is more in the nature of a sociology of epistemology. It sets up the interpretant/dispositif as an abstract cognitive construct ready to be fleshed out in subsequent argument. Peirce's interpretant is distinct from the conventional embodied common-sense 'interpreter', while dispositif is ultimately from Aristotle's *taxis*, but via Foucault and Deleuze has come to mean an altogether more dynamic, fluid and evolving hylomorphic arrangement of parts. The interpretant/dispositif performs individuation, which is the rational counterpart, or continuation, of meiosis. This introduces a necessary modulation to Rortian elimination, because rational enquiry needs to be understood as a modulation of 'natural' selection, and not merely a gift bestowed uniquely and universally on humankind.

The phenomenological bias of part two corresponds to Peircean **firstness**, but in a similarly skewed way: its phenomenological sources are present by inference in a way analogous to that of the physicist inferring the existence of a previously undetected particle. Nevertheless, the term is understood to refer to those aspects of cognition that are uniquely the property or function of the interpretant/dispositif. Processes of inference are embodied in cognitive equipment in ways that are continuous across species. What we seek is a vocabulary that affords theoretical purchase on continuities and variabilities among humans as distinct from other species and as distinct from each other.

The phenomenology of creativity is invariant. The necessary epistemic scaffolding is individuated at the *disciplinary*, not the personal, level—though the institutionality of discipline, in that sense, is an individuation that is distinct from the process of adding and removing epistemic scaffolding. According to this claim, there is no *phenomenological* difference between an artist composing, a politician developing policy, a physicist discovering a particle, a software engineer creating an application, or a cook making

dinner from leftovers. There is, though, an *institutional* difference, one that rests to a great extent on the accumulation of tacit knowledge to which an individual has been exposed and to which that individual retains access. This sociohistoric dimension corresponds to Peircean **thirdness**, but its theorization is informed by subsequent thought in perhaps a more marked way than the other two dimensions. In particular, beginning with Einstein (and Bergson), later thinkers have a more clock-oriented relationship with time.

10.1 Economics and performativity

The notion of Barnesian performativity is a recent development that correlates neatly with the Peircean perspective just outlined. Proposed by Donald MacKenzie, the concept emerges from criticism of the apparently unrealistic model of rational action that neoclassical economics assumes. The general concept of performativity was introduced to economics by Michel Callon in his *Laws of the Markets* (1998). However, the Barnesian dimension, introduced by Donald MacKenzie (2007), specifically references Austin in a way that Callon did not.

Though MacKenzie turned to Barry Barnes' paper 'Social Life as Bootstrapped Induction' (1983) as a means of addressing a criticism related to the perception that Austin was solely concerned with language (Didier 2007), Barnesian performativity posits a relationship between theory and practice in which theory shapes practice through the *perlocutionary* force of the theorist. However, the Peircean perspective suggests that a revision of this familiar dualism is necessary. Rather than practice/theory, we need to contemplate a threefold relationship between practice/analysis/negotiation. We can place the Barnesian performer at the nexus, drawing on Dunbar-style social aggregation and interaction, via the tuned dispositif model put forward in chapter 5.4.2.

Additionally, the three levels of performativity MacKenzie posits offer between them a fresh perspective on the problem of higher-level intentionality discussed in chapter 6. *Pace* my criticism of the inflationary trajectory in relation to its evolutionary history, the performative trajectory is once again upwards. In summary,

Generic performativity corresponds to hylozoism—the pre-Socratic doctrine that treats the universe (though, practically speaking this means the *Umwelt*) as 'alive' in totality. Alternatively put, the term represents the view that nature is intrinsically semiotic—a narrower position than that of panpsychism, which

would assert a phenomenological dimension begging certain questions that are outside the scope of this thesis.

Effective performativity corresponds to Aristotelian hylomorphism—the sense that there is a question in nature to which the answer is teleology. The purposive shaping of the environment practised by humans can be regarded at least as an ‘imitation’ of hylomorphism.

Barnesian performativity, the especially strong version of effective performativity, corresponds to poiesis—after Aristotle and Heidegger, this is a discursive relationship between reason and chance that depends on sustained mutuality in order that the practice of imitation be continuing and reflexive. In this respect, differential capacities lead humans to invest trust in skilled specialist practitioners.

As Peirce’s abductive shades into the inductive, so too does ‘effective’, hylomorphic performativity shade into ‘Barnesian’, poietic performativity. This conception of poiesis, extended from Heidegger, rests on a notion of skilled mutuality. The notion of environmental coupling now envisages a skilled or tuned, rather than neutral and passive, environmental context for action. As Richard Sennett remarks, a pianist cannot just support a singer; the singer needs to know *how* to be supported (2003, 55–6). To gain theoretical purchase, I use the term ‘work-maker’ initially in relation to *effective* performativity, but work-making is subject to quasi-irreversible, path-dependent lock-in. The result is the extension of a valorized form corresponding more closely to this specifically Heideggerian notion of poiesis.

MacKenzie also posits a fourth element, which he calls **counterperformativity**. Successful Barnesian performance has the effect of reshaping the environment in such a way that the attributes of success focus and mobilize a variety of responses whose collective consequence is to challenge the initial success. The case study that follows will develop this important notion in more detail. For now, suffice it to say that counterperformativity illustrates the connection between meiosis and hylomorphism. Rationally achieved elimination creates a re-source, from which future eliminations will be made. The work-maker represents this modulated performativity by investing the indexical characteristics of secondness in named, symbolic individuals whose Barnesian function is articulated by the oral, intersubjective processes of the sociohistoric.

10.2 The work-maker ontology

Several strands of thought converge in theorizing the work-maker. First, Gramsci's organic intellectual (2001) represents in its most general form the notion of leadership as a process of social mediation. Second is Schumpeter's *unternehmer*. The *unternehmer* is normally rendered in English as *entrepreneur* rather than the more accurate 'undertaker', but the German term contains useful etymology that I will articulate shortly. Third, with reservations, is Levi-Strauss's engineer. His distinction between mythic thought and scientific enquiry is worth making in order to work through its shortcomings, which are similar to those of Havelock's literacy thesis. Nevertheless, the idea of bricolage as a method corresponds quite happily with Popper's and Feyerabend's trial-and-error conception of scientific enquiry. It is Levi-Strauss's engineer who stands behind the Mine School conception of the heterogeneous engineer (Law 1987; Elzen & MacKenzie 1996), who, in turn, stands behind the Barnesian performer.

Returning to the *unternehmer*, then: for Schumpeter, innovation requires intentionality rather than intellect. His *unternehmer* is a Nietzschean prime mover of economic development, wreaking acts of creative destruction through acts of will (Hébert & Link 2006, 594). Schumpeter's *unternehmer* needs to be distinguished from the prior French term *entrepreneur*, with which the *unternehmer* is normally conflated. The English sense of entrepreneur draws more on the French word (not surprisingly), where its antecedence can be traced to the eighteenth century. Previously used for government contractors, usually engaged in public engineering works, Richard Cantillon established the entrepreneur as a parallel figure to the badger, mediating between producers and consumers through market-day transactions (Cantillon, 2010, p. 31ff). The entrepreneur bears the risks associated with market judgments about what to source and where to distribute products; significantly, Cantillon's entrepreneur could innovate through arbitrage, creating time- and place-utility by choosing where and when to move goods to maximise the difference between purchase and sale price. Evolving from this, Nicholas Baudeau emphasized the significance of intelligence, stressing the entrepreneur's ability to collect and process knowledge (Hébert & Link 2006, 589–90).

Where the orthodox literature on entrepreneurship perhaps stresses aspects of conduct most closely associated with young males, *viz.* self-interested utility maximization, the work-maker back-translates as *entremetteur*—the emphasis is much more on 'putting stuff out there'. This may very well be undertaken in self-interest, but the crucial difference is the element of prestation—the anthropological idea of a payment or gift made with

some indirect expectation of reciprocation. Where do such people come from? They mature in a cultural context, the local virtual repertoires in which individuals develop.

Rendering *unternehmer* as ‘work-maker’ comes from ‘work’ being nothing more than the idea of an expenditure of effort that tangibly makes a change in the environment, with ‘maker’ adding that this work need not necessarily be done by the individual who devises it, like the Roman *auctor*. One translation of *unternehmer* is apparently ‘operator’, and that is what I have in mind—except that in English an operator is either someone in a mundane and routine sort of occupation, or else a Machiavellian schemer. ‘Opera’ translates as ‘work’, in the plural sense of completion and accomplishment (the singular is ‘opus’); ‘maker’ in Scots is *makar*, which is also Scots for poet (thus effecting a connection with *poiesis*). There is one further, subtle distinction between *unternehmer* and its usual translation ‘*entrepreneur*’: whereas *preneur* in French means ‘taker’, *nehmer* in German has a sense of absorption, of gathering in or of soaking up.

Turning now to the heterogeneous engineer, the term coined by John Law (1986, 1987) captures a Peircean/Heideggerian flavour of essentialism that privileges the adductive modality (leading-towards/towards-which) that distinguishes the work-maker from the entrepreneur. I characterize this flavour as ‘the hylozoism of ideas’, recognizing that the term is either a paradox or an oxymoron. It is operationalized by recombinant intentionality on the assumption that environmental interventions represent themselves intersubjectively only to skilled witnesses—drilled people, in Law’s terminology. In Law’s Portuguese case, it is difficult to individuate the idea beyond a general sense of desire (in the Bergsonian-Deleuzian sense that continues Peircean adduction), and it is hard to distinguish between a sense of power and wealth being a driving force, and these being an outcome. The hylozoic idea is easier to diagnose in modern technological contexts such as supercomputing (Elzen & MacKenzie 1996; MacKenzie 1996) and audio synthesis (Pinch & Trocco 2002). The former finds Seymour Cray pursuing the idea of speed, the latter finds Robert Moog pursuing a more amorphous idea of ‘tuning’.

Space precludes a detailed treatment, but briefly: Law’s work refracts the Portuguese expansion through Callon’s passage point notion in a way that discloses the hylozoic significance of entities when arranged in perlocutionary array. He argues for a dense interrelation between natural, technological and social elements:

Of course kings and merchants appear in the story. But so too do sailors and astronomers, navigators and soldiers of fortune, astrolabes and astronomical tables, vessels and ports of call, and last but not least, the winds and currents that lay between Lisbon and Calicut (1986, 2).

One key element, for instance, was the ability to navigate from the Cape of Good Hope (so named by the ardent Portuguese king) to Mombasa, where the Europeans could tap into an existing fund of Arabic knowledge that furnished access to a pre-existing network of Indian Ocean trade. This segment was particularly difficult in the face of contrary currents and winds, but once a successful method had been discovered, a map could be made that effectively eliminated the necessity for further trials and failures. Another key element was the development of the carrack, a vessel that afforded a greater envelope of stability in the face of environmental and human hazards. Carracks were difficult for small vessels to attack; they afforded plenty of cargo space; they were versatile enough to cope with many varieties of wind conditions; and they were manageable by a relatively small crew (*ibid*, 4).

In the case of Pinch's Moog there is a similar negotiation with desire. Moog pioneered the consumer audio synthesizer, in an era of institutional computing and related technological advance. Institutions concentrated resources, and privileged certain styles of expertise (see, e.g., Born 1995). The consumer approach placed a much greater emphasis on portability and spontaneity, but the engineering challenge was to create an interface that allowed the musician to interact with the electronics. Pinch & Trocco contrast Moog's approach with that of Don Buchla, whose Buchla Box—initially, at least—deliberately avoided using a keyboard controller. At the time, oscillators tended to be unstable, so engineering a keyboard and harnessing a conventional idea of 'in tune' was by no means an obvious thing to attempt. This idea of 'tuning' is what Moog pursued, with the payoff that musicians could use his instruments without needing electronic expertise.

In the case of MacKenzie's Cray, the quest is for speed. Cray's story begins at the infancy of the digital computer at the end of the Second World War. These hand-crafted, purpose-built machines had evolved by the early 1950s into two distinctive (and reproducible) types: business and scientific. The term 'supercomputer' generally attaches to the latter, and is particularly related to performance in floating-point arithmetic. The principal customers, with insatiable computing demands and the bottomless pockets to fund development, were the nuclear weapons laboratories at Los Alamos and Lawrence Livermore.

A central feature of Cray's story is the blank sheet of paper. Repeatedly, when beginning a new design, he started from scratch rather than attempting to develop an existing model. This engendered a distinctive sociotechnical style that involved the engineering

of personal business relationships and customers' work cycles as well as the computing machines. Periodically, this involved Cray in founding new start-ups, though in increasingly competitive environments as the market evolved. Once computers were no longer craft-built items, the nature of expertise changed so that customers increasingly sought compatibility with available tacit knowledge at the expense of outright processing power: the notion of speed, for them, included the time taken to get the programming done.

10.3 The adductive engine

In recent years, MacKenzie's attention has turned to the world of financial engineering, and this is the context for his development of Barnesian performativity. With Michel Callon and others, he has been studying the sociology of economics, asking whether 'the economy' is an ostensive/constative phenomenon that exists independently of its observers, or whether it is rather a performative phenomenon that is the constant creation of its participants.

The idea that economists actively create the economy they purport to describe has taken shape relatively recently. Callon's principal authority is a 1988 paper by Faulhaber & Baumol, whose bibliography is notable on the one hand for a great weight of supporting evidence for the case they make, but on the other for the paucity of prior commentary on that evidence. Ault & Ekelund (1987)—one of the few exceptions—ascibe this state of affairs to an antihistorical bias: the cause, they lament, of 'a great deal of unnecessary originality in our discipline' (650). What they mean by 'unnecessary originality' is the reinvention or rediscovery of ideas and techniques that might already have arisen in other places and contexts beyond immediate Vygotskian horizons.

Faulhaber & Baumol observe that while economists' formalizations of certain procedures helped actors reduce imperfection in their decision-making processes, believers in the 'invisible hand' (as Adam Smith called it) will continue to argue that competition forces actors to behave optimally on pain of being driven from the market. The discovery of a formalization does not change behaviour, but merely describes it (1988, 578). The Schumpeterian model Faulhaber & Baumol propose in attempting to render the 'hand' visible is linear, however:

research → invention → development → innovation → diffusion

Schumpeterian creativity (after Callon 2007, 312)

Because Schumpeter argues for a distinction between ‘invention’ as the act of generating a new idea, and ‘innovation’ as the steps entailed in realizing it (580–1), Faulhaber & Baumol’s model opens contradictions whose resolution requires a vagueness about standpoint reminiscent of the difficulties previously raised between second- and third-person narrative in chapter 6.2. On the one hand, economists are generic inventors who fit endogenously into the innovation process; on the other, they are individuated innovators exogenously producing concepts, theories and tools (Callon 2007, 313–4).

Callon introduces the notion of performativity as a mind–tool capable of effecting the transformation of the linear model into a dynamic one. It is Austin in particular that he turns to, though some of his criticisms are truer of post-Austin exegesis than of Austin himself. When Callon says, for instance, that ‘Austin was not explicitly referring to scientific discourse’ (318), we know that Austin’s quarry, the verification principle, was absolutely bound up in scientific discourse. Nevertheless, as Callon says, Austin’s work was developed

...either by highlighting the importance of the interlocutors’ subjectivity (as Grice and Searle for philosophy or Butler for sociology do) or by noting the need to take social and cultural context into account (Bourdieu). But these critiques simply continued Austin’s error by accepting an insurmountable boundary between discourse and that which lies beyond it (either in the form of the psychology of subjects or of society) (318, fn6).

Callon argues that developing Austin should proceed first by insisting that the context of enunciation be included in the enunciation (he calls this the ‘semiotic turn’, following Greimas), and secondly by taking into account the materialities composing that context (the ‘ANT turn’, which inherits not only Greimas but Peirce, Saussure and Lotman too). He continues: ‘Humans in their somatic envelope, made of neurons, genes, proteins and stem cells are constantly **overflowing**’ (46, emphasis added). Elsewhere (Callon 2005, 4) he enlarges the point, saying:

Action is a collective property that naturally overflows. To be attributed to a particular agency, it has to be framed;

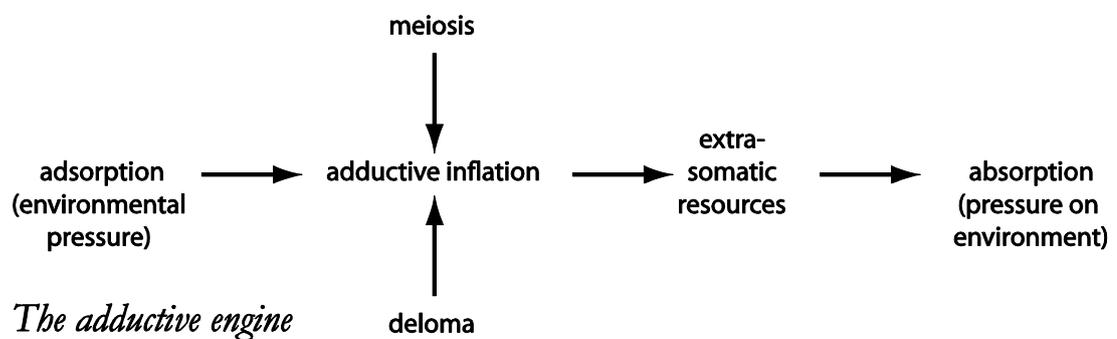
These agencies, like Hobbes’ Leviathan, are made up of human bodies but also of prostheses, tools, equipment, technical devices, algorithms, etc. The notion of a cyborg aptly describes these *agencements*.⁵⁶

⁵⁶ Although Andy Clark’s interest in cyborgs is well known, and the term ‘skinbag’ that he uses in *Natural-Born Cyborgs* seems to bear more than a passing resemblance to Callon’s ‘somatic envelope’, it is conceivable that Callon arrived independently at his formulation via Greimas, Haraway and Hutchins, as Lenoir (1994) indirectly suggests.

Callon's term of choice, *agencement*, is similar in meaning to *dispositif*. Hardie & MacKenzie (2006, 3–4) explain that *agencement* is a double-entendre that encompasses both 'selected' and 'system' function: a 'locutionary' arrangement, configuration or layout of components is conflated with the 'illocutionary' performance of agency. Hardie & MacKenzie note the parallels between *agencement* and the distributed cognition literature.

Callon's choice appears to be a gesture that enables him to adopt the posture of observer rather than participant; *agencement* in this sense seems passive where *dispositif* seems deeply entangled in the processes of hylomorphism. Alternatively the difference can be posed as that between a third-person and first-person point of view—*agencement* in this respect perhaps more closely resembling heterophenomenology as practice than does *dispositif*, the putative subject of heterophenomenology. The distinction reflects an issue regarding the term 'stigmergy' in relation to performativity and rhetoric. 'Stigmergic performativity' is more like *agencement*, concerning the organism's ability to read and act on the semiotic cues while 'stigmergic rhetoric', more like *dispositif*, concerns the organism's capacity to intervene in and amend the environment's semiotic dispositions to better suit the organism's purposes.

Let us characterize economic activity in terms of traffic channelled in these lines of force or flight. The question of determining the trajectory of a stigmergic vehicle can be regulated with a performative notion analogous to the perlocutionary lens developed previously, **illocutionary feedforward**. Adductive inflation is then a somatic performance informed by the subject's own processes of *deloma* (oral sentence-making, which is not necessarily linguistic) and meiosis (explosive simplification), but also by experienced (Vygotskian) or materialized (stigmergic) performances of others yielded to the subject's consciousness by adsorption. The ensuing model, the 'adductive engine' (echoing Clark's *Associative Engines*), sees these processes harnessed in a kind of Rankine cycle:



The somatic terms (meiosis and deloma) have already been broached but **adsorption**, referencing T.S. Eliot's catalysis analogy, requires a further word. Writing about the creative process, Eliot envisions the poet as being like the platinum filament that catalyses sulphur dioxide and oxygen to produce sulphuric acid:

This combination takes place only if the platinum is present; nevertheless the newly formed acid contains no trace of platinum, and the platinum itself is apparently unaffected; has remained inert, neutral, and unchanged. The mind of the poet is the shred of platinum. It may partly or exclusively operate upon the experience of the man himself; but, the more perfect the artist, the more completely separate in him will be the man who suffers and the mind which creates; the more perfectly will the mind digest and transmute the passions which are its material (1922, II).

The gas molecules are adsorbed to the surface of the catalyst; their close proximity promotes reaction—the catalyst rigs the lottery. SO₃ molecules fall from the platinum surface, leaving space for the process to continue.

The idea of a perlocutionary array is that it focuses the energy of these exterior performances. The regulation of their flow back into environmental flux is channelled through illocutionary feedforward. In the Rankine cycle, the energy of steam is harnessed as it expands through a series of turbines. It may be objected that adsorption and meiosis appear to be describing the same phenomenon, albeit on different time-scales. Adsorption is unequivocally a physical process, though complicated by a sense in which it configures a shift from the performativity of strong rhetoric (as Latour conceives it) to the constativity of received wisdom (alternatively, a shifting-between relationship regarding selected and system function). Meiosis may have a supervenient relationship with adsorption, Pòlya processes, Markov chains and so on, but it is more convenient to regard this aspect as being metaphysical. At any rate, meiosis and intersubjectivity seem intimately linked, intersubjective technology lending the natural process a greater potency in those who know how to use it.

10.4 Barnesian performativity and the work-maker

To illustrate the feedforward effect, Callon discusses the example of 'prosthetic prices', which modern-day badgers use in bargaining with primary commodity sources. Citing research by Koray Caliskan on the global cotton market, he notes the range of prices that exist at any given time. Parties to specific transactions have access to a range of these, which become transformed into 'prosthetic prices'—inputs to the calculations made by either party. One party, typically, is 'material'—there is a cotton crop to sell—while the other is 'virtual'—there are a variety of options available in selling on this

crop, and a variety of options, too, in sourcing crops for disposal to any of these options. Caliskan notes the disadvantageous position of the ‘material’ party:

...the price he offers is reduced by his interlocutor to a prosthetic price among many others, and he loses control. He is calculated by one stronger than he as he delivers his bales of cotton, and at the same time he is rendered incapable of choosing another partner’ (Callon 2007, 348).

Both parties, however, are anonymous. The buyer is as expendable as the seller, as far as the market is concerned; so too are the commodities traders whose inputs are the buyer’s outputs.

Callon is interested, though, in a stronger sense of performativity: a sense in which the performance of someone like Adam Smith has the effect of bringing into being the phenomenon the performer purports to describe. The theorization of this stronger sense is substantially grounded in a series of papers by Donald MacKenzie that has recently culminated in the development of Barnesian performativity. The Barnesian hypothesis highlights the anaphoric role of identifiable individuals. Not primarily credit brokers and hedge fund managers—whose activities attract attention in a way that is similar (as we may suppose) to the sixteenth- and seventeenth century commentary on the activities of pardoners and badgers—but the theorists whose ideas are absorbed and reproduced by the educational system that produces such anonymous performers.

The higher orders of intentionality are also implicated in the Barnesian hypothesis, but the modulation is not so straightforward as a distinction between the bucket-brigade and the recombinant. Rather, it is the disposition of perlocutionary force that is at issue. This has an effective dimension, as MacKenzie argues: fossilized Barnesian performances—the quasi-irreversible accumulation of creative input over the generations—channel the actions of present-day actors. However, we still have the problem of accounting for the cognitive and social factors that distinguish and incubate creativity. If there are consistent signs of such elements recurring in the development of economics as a discipline, given its avowed pursuit of abstract principles alienated from human variability, then we may feel more confident about generalizing these elements to other aspects of human culture.

The Black-Scholes equation, now an indispensable tool in financial economics, is at the epicentre of MacKenzie’s research, and takes a hylozoic role similar to that of the scallops in Callon’s earlier work. It was an important factor shaping the development of modern futures trading, a factor that MacKenzie argues was *performative* rather than merely *informative*—the equation’s authors’ status communicating authority and

confidence to the financial actors who implemented its practical use. The story of its shifting relationship with the reality it purports to describe offers compelling evidence for the roles of prestige, chance and convention in performing the economy.

The story is neither short nor simple. Each of the significant papers in the series is of substantial weight, so the first of three caveats in presenting this interpretation of MacKenzie's argument concerns the possible omission of significant details. The second caveat concerns the notion of performativity. The Barnesian concept arose in response to earlier criticisms of the use of Austin's name in making a distinction from generic performativity; it was felt that citing Austin implied an unwarranted linguistic focus. Further complicating the picture is that MacKenzie's and Callon's work on performativity includes the inheritance of (for instance) Greimas, Garfinkel and Butler. Although performativity's relationship with verificationism, personified in Austin's relationship with Ayer, is directly relevant to the question of performative economics, it is not through this route the present authors arrived at their starting point. The third caveat concerns the equation itself. MacKenzie writes that it requires college-level mathematics to grasp; MacKenzie is properly equipped and I am not. Fortunately, the equation involves the same kind of probability theory as that dealt with in section 9.3, so we are not leaping in the dark. Hopping in the twilight, perhaps—but that is an unavoidable hazard of interdisciplinary research.

Finally, at the core of a Barnesian performance is an entirely human (i.e. intentional) capacity to persuade others to take a risk: this seems a reasonable conclusion to draw from MacKenzie's work, but it is not one that he explicitly draws himself. This is where the connection with Schumpeter's *unternehmer*—my work-maker—is made plain. The popular modern conception of the entrepreneur is of someone who takes risks; the regulatory framework is tuned to this idealized, self-interested figure. Without denying that the work-maker is self-interested (far from it: a notion of addictive enslavement is very much to the point), a potent motivation for the work-maker is the gratification that comes from building ever more elaborate relationships whose durability rests on others' willingness to expose themselves to risks for which the work-maker is responsible.

Three themes emerge from MacKenzie's narrative:

The significance of oral relationships—that is, direct interpersonal contact—persists no matter how elaborate their technological support networks become. Such configurations appear to pursue a nomadic relationship with the outer boundaries of socio-technical *agencements'* capacity to support them.

However, the illusion of confidence that this avant-garde maintains in its infrastructure has to be negotiated and mediated through semiotic exchange with complimentary avant-gardes. In practice, the illusion is sustained by a continually reconfiguring personnel roster as individuals gain experience, ideas and contacts before moving on to the next camp.

Because these relationships are non-linear and typically highly pressurized, they are prone to periodic failure. Often, these are failures of intersubjectivity. Husbanding risk and ascribing responsibility for breakdowns and failures is therefore an essential component in the continuing attunement of the *dispositif*.

Paradoxically, however, the characteristics of the socio-technical network remain surprisingly stable even while those of any individual instance are mutable. This lends credence to the social brain hypothesis in the form proposed by Dunbar. That is to say, grooming circles, camps, clans and so on are a stable *form*, even while the natural evanescence of individual instances is probably hastened and multiplied by the accumulation of intersubjective technologies with stigmergic effects. The evidence becomes clearer as we turn to the social dimension of Barnesian performativity. This neat encapsulation of the social transformations contained within ostensibly similar populations in the financial world sets the scene:

On the agricultural exchanges, the stereotypical belief was “I got the trade ’cos I’m faster than you, buddy.” In New York, it was “I got the trade ’cos I’m here,” because I am the designated specialist. In the CBOE’s growing self-perception, it was “I got the trade ’cos I thought it out” (Doherty interview: MacKenzie & Millo 2003, 125).

10.4.1 “’cos I’m faster”: *homo œconomicus* in his natural habitat

The first aspect of performative economics to consider, then, is the question of whether *homo œconomicus*, the egotistic, utility-maximizing rational actor, really exists. The assumption MacKenzie makes is that if such a specimen is going to be found anywhere, then the financial markets are the first place to look. The result is a qualified confirmation. Yes, there is evidence that utility maximization drives the financial markets towards a state of perfect efficiency, but the knots and wrinkles keeping it from such a state are ultimately symmetrical consequences arising out of the pressure to achieve it. Ultimately the efficient market depends on efficient human performance. For most of the time, while individual cognitive loads lie comfortably within the bounds of *ge-stell* and bucket-brigade intentionality, market efficiency and individual efficiency are in harmony. At times of crisis, which typically involve information starvation of one sort

or another, individual performance tends to shift towards the interpretative demands of recombinant intentionality.

In normal times, a performative repertoire of sanctions keeps in check the potential inclination of individual traders to behave totally selfishly—simply ‘failing to see’ a bid offered by an over-aggressive colleague, for instance. Pure ruthlessness is a short-term strategy at best. This suggests that rational actors acknowledge that an unforeseeable future has a bearing on the present. This of course is where the cognitive issue of simulation, and the related concept of intersubjective technology as a means of better projecting such simulations, becomes relevant. An instance explored in MacKenzie & Millo (2003) concerns the creation of the Chicago Board Options Exchange (CBOE). The work-maker ontology suggests a way of understanding collective action as a blend of personal simulation and the active tuning of this cognitive performance by the perlocutionary investment of certain key players. Members of the Chicago Board of Trade—from which CBOE emerged—not only argued for the development of an options exchange, but invested considerable amounts of time (demonstrating commitment) and money (substantiating that commitment by extending loans without the assurance of repayment).

If it is not obvious that the work-maker ontology is at work here, part of the explanation is found in the accounts offered for their actions by leading individuals:

Asked why he devoted effort to collective projects, Melamed cited the influence of his father, a socialist and Bundist, who taught him to “work for society as a whole. My father had instilled in me [the] idea that you gain immortality by tying yourself up with an idea, or a movement, or an institution that transcends mortality” (Melamed interview: MacKenzie & Millo 2003, 115–6).

“We . . . never thought of even asking for reimbursement [for expenses involved in creating the CBOE],” says Eisen. “This was part of the concept that was inculcated into all of us: ‘You owe it to your community.’ We had all done very nicely, thank you . . . and we felt that we had an obligation to the Exchange and this is how you pay your obligations” (Eisen interview: *loc. cit.*).

‘Your community’, however, is typically well within the bounds of the Dunbar-style monkeysphere. What MacKenzie & Millo call ‘large memberships’—most exchanges ranging between 500–3,500—are not only orally tractable but also are striated with marks of status and exclusion. For instance, trading on exchange floors is membership-limited, and numbers are carefully regulated (116–7).

Notably, the group coordinating the launch of the CBOE was small. The suggestion that such exclusivity is nomadic, travelling with the boundaries imposed on the sustenance of broader communal links by developments in information technology, is borne out by a more recent evolution in options trading, the hedge fund. Among the

characteristics Hardie & MacKenzie (2006) enumerate are an exclusivity of clientele buttressed by legal constraints preventing hedge funds from advertising, and limits on the numbers of investors a fund may recruit (8). Staffs, too, are small—in the fund under observation there are five group members. Fund managers typically court anonymity. This opacity is at odds with the Anglo-American presumption of efficient markets based on transparency, suggesting that from one side markets have as much information as practical, and from the other that they have as much as is necessary. Finding the ‘sweet spot’ where the two pressures are in balance is for human performance to negotiate.

What Hardie & MacKenzie observe, in effect, is a grooming circle. The physical layout of the trading room facilitates constant visual cuing, notwithstanding the plethora of computer screens. The team is normally assembled here, not in separate offices or cubicles—‘back office’ facilities being located remotely. The system transmits a trading record to its ‘administrator’, a separate firm whose relevant office is in Dublin; the fund is also linked electronically to its ‘prime broker’, a leading international investment bank (14–17). It is striking that the interactions between group members resemble that of improvising musicians, especially in the jazz genre. There is give-and-take, mutual acknowledgement of individual skills and performances, cheerleading and commiseration:

After discussions such as the above have stabilized an interpretation and generated a decision, or even when the trader has taken a decision without consulting his colleagues, they frequently provide him with emotional support. His work is stressful, involving actions in which large amounts of money (his own and his colleagues’, as well as the fund’s investors’) are at stake. Support for decisions [already] taken was often restated explicitly: ‘I really like that trade’ or ‘Yes, I would be pretty comfortable with that’ (25).

10.4.2 “‘cos I’m here”: perlocutionary arrays

The inheritance from this close attention to social dynamics points toward a significant aspect of Barnesian performativity. Generally speaking, the effect is less a question of individual charisma, and more one of an abstract sense of the weight of authority carried by economics in consequence of its anti-charismatic (as we might call it) network of anonymous wisdom. Jeffrey Sachs, delivering advice to the Bolivian government from the International Monetary Fund on countering hyperinflation in 1986, had this anonymous authority behind him. Despite economic theory’s indifference to Bolivia’s unique geographical challenges, the advice successfully brought inflation under control (MacKenzie, Muniesa & Siu 2007, 1). The New York trader who gets the trade ‘because

of who I am' is not proclaiming mastery of the universe but rather the mastery of a specific corner of it, a discrete place in a perlocutionary array.

In Chicago, the problem facing the CBT group developing the CBOE project in respect of options trading was as much ethical as theoretical. An option gives its owner the right, but not the obligation, to buy or sell an asset on or before a specific future date. Options have been traded since the seventeenth century if not before, but pricing was guided by rule of thumb—a matter of skilled judgement (MacKenzie 2007, 57). The prevailing conventional wisdom regarded options trading as being, if not indistinguishable from gambling, then certainly a dubious and potentially destabilizing practice. Folk memories of the 1929 crash influenced this view, but so too did an even less tangible unease regarding the probity of characters like the pardoner and the badger. Intuitively, we might say that received wisdom recognized that options trading puts a much greater stress on the intentional stance, especially its recombinant mode.

The Black-Scholes equation promised a means of scaffolding that skill, and here the scaffolding metaphor is particularly apt. What first enabled CBOE to achieve sufficient structural robustness to withstand the vagaries of market flux was the comprehensive precision promised by the equation. The equation's initial performance, however, was to substantiate confidence. A significant element in achieving this was conferred by the perlocutionary authority of its authors, convincing regulators that options pricing was tractable to theory, and therefore not to be equated with gambling. The enrolment of Black, Scholes and Merton—whose work, related to the Capital Asset Pricing Model, was altogether more respectable than some of its antecedent hinterland—was part of a broader *interesement* strategy used by the CBT group to recruit economists willing to lend the prestige of their name to the moral underwriting of the project.

The 'random walk model of share price changes' appears in physics as Brownian motion, the movement of particles subject to minute, random collisions. The equivalent body of physical theory concerns phenomena such as the flow of heat. However, the theory governing the flow of heat is not affected by the observer's belief about that theory. The same assumption cannot be made about prices (MacKenzie 2000). The advent of the CBOE, its initial accumulation of credibility and stability, was accompanied by a process in which the initially loose fit between prices as Black-Scholes theorized they should be, and prices as market-makers found them, became closer. These two aspects of the equation's impact combine to make it an especially strong

example of perlocutionary force. The appeal, as with any effective mind–tool, is its portability:

Black, Scholes, and Merton’s arguments were at their core simple and elegant. If the price of a stock followed the standard model of a lognormal random walk in continuous time, and other simplifying assumptions held, it was possible to hedge any option transaction perfectly. ... fellow economists quickly recognized their work as a tour de force. It was more than a solution of a difficult technical problem: it showed how to approach a host of situations that had “option-like” features; and it linked options to the heartland theoretical portrayal of capital markets as efficient and permitting no arbitrage opportunities (MacKenzie & Millo 2003, 120–1).

Computers were not portable enough to take onto the trading floor in the 1970s, and time spent consulting a programmable calculator was time in which a trader might lose an opportunity to a competitor. Fischer Black set up a consultancy which computed price tables and printed them out on colour-coded paper, thus simplifying the decision-making range for the trader. In the process, Black and other consultants offering similar services helped shape the trajectory towards a closer fit with the predictions of the equation. Even traders who did not use the sheets found the prices they were obliged to offer or accept increasingly conditioned by the market’s convergence towards reified theory. Gambling gave way to efficient pricing (MacKenzie 2007, 60–3).

Ironically, the process by which Black, Scholes and Merton arrived at their theoretical perspective was itself something of a random walk. Moreover, much of the theoretical bricolage that the authors accumulated had been developed with the frank intent of finding tools with which to beat either the stock market or the casino. For instance, Edward Thorp, before he turned to finance markets, was a pioneer card-counter until casinos started vigorously discouraging the practice (MacKenzie 2003, 842). One might, for that matter, draw a parallel between the fabled goal of alchemy—turning base metal into gold—and the activities of financial theorists seeking to beat the market and ‘make’ money.

The academic world caught up with Black, Scholes and Merton only after their work had begun to exert its influence on the market. Initially, journals did not find the material especially interesting; the later adoption, MacKenzie speculates, might have owed something to the emergent professionalization of business in the USA creating demand for appropriate theoretical materials. A curious shift in audiences thus operated in which economic theory, having performed ‘to’ the market, became the market’s audience. Ultimately, Scholes and Merton received the Nobel Prize for their contribution (Black had died, and the award is not made posthumously).

10.4.3 “cos I thought it out”: framing the market

A parallel shift occurred in the nature of the equation’s role in the marketplace. It mutated from being more or less an ostensive guide to the price an arbitrageur should offer or seek, to being a mind–tool used to analyse volatility by traders performing the market. It became—and remains—a **way to enframe risk**. For the most part the risk being talked about is marginal, and the virtue of the equation is that it enables the efficient minimization of *that* degree of risk. Nevertheless, with increasing confidence came increasing volumes of trade. The nature of risk, concomitantly, became less a matter of reconciling marginal discrepancies in price, and more about the capacity of the infrastructure to provide the timely information on which efficiency depends.

The ambiguous relationship between these two disparate factors has a bearing on the core doctrine of neoclassical economics, the ‘efficient market hypothesis’. This simply asserts that prices in mature capital markets reflect all available information (MacKenzie 2004b, 303–4). Debate, especially among sociologists, concerns the way in which the variability of human performance impinges on the achievement of efficiency.⁵⁷

Aggregated over the long term, market performance closely conforms to theory; the symbiotic relationship between traders and legislators in responding to novel challenges and opportunities suggests that even here a performative dimension is necessary in order to ensure that the semblance of efficiency remains intact.

Legislators, though, cannot fix problems until they have occurred. The marketplace, mythical emblem of freedom, is a gaol insofar as every inmate may be spending every waking hour looking for the weakness no one has noticed in order to take advantage. One particular ‘gaolbreak’ event is interesting in relation to the Black-Scholes equation and the question of performative economics: the great crash of October 1987. Before it, the equation was becoming an ever closer fit between theory and performance; after it, two related observations about its subsequent fit underwrite the evidential case for effective performativity. Firstly the fit became less exact, and secondly the signature of volatility skew now differs between jurisdictions—between, for instance, the USA and Britain. Since the great crash clearly marks this junction, its circumstances are the obvious place to look for reasons.

⁵⁷ Note that the requirement of a college-level education in mathematics means in practice that such negotiations have a closely circumscribed transparency. How many legislators, for instance, are adequately equipped to understand the issues involved?

One immediately telling remark MacKenzie makes is that US legislators, investigating the causes of the crash, focused on the two days in which the market plunged (2004b, 319). The day after this frame saw a rise in prices that was so steep as to be highly anomalous by historical standards; the reason for ignoring this was either that positive news needs no regulation, or else that the rectification was evidence supporting the hypothesis that the principal cause of the crash was ‘mechanical trading’. It is this facet, which is subtly distinct from the notion of ‘computer trading’, on which investigation focused.

Portfolio insurance is an application of the Black-Scholes equation: option theory is used to set a floor below which the value of an investment portfolio will not fall. It is a further edge sought by certain traders, though not all of them. The term ‘insurance’ is something of a misnomer: if stock prices adopted a trend of lowering discontinuously, there could be difficulty adjusting the replicating portfolio in time. Initially, the small number of investors using option theory in this way kept the danger in check. Theorists had already recognized, however, that as the market for portfolio insurance grew, the potential pressure increased on the resources needed to manage timely adjustment transactions. A critical point would be reached where the size of the market for portfolio insurance as a proportion of the total options market would reach a level where price movements would tend to snowball. Further complicating the situation, beyond the formal consultancy market for portfolio insurance was the much wider adoption of a pragmatic attitude to trading that effectively amounted to the informal implementation of the same principle (308–13).

What happened in the markets was a kind of Bergsonian disconnection. In *Creative Evolution*, Bergson bases an extended analogy on the new cinematographic technology, arguing that ‘time is invention or it is nothing at all’ (1911a, 361); ‘form is only a snapshot view of a transition’ (319); and ‘...the cinematographical character of our knowledge of things is due to the kaleidoscopic character of our adaptation to them’ (323). The illusion of a perfectly informed market is sustained, in effect, by the cinematographic projection of data—so long as the apparatus runs beyond the limits of human perception. Under pressure, it is not necessarily the equipment that fails, although computers programmed to run insurance trades very likely exacerbated the problem in 1987.

The key to understanding the human dimension of the situation is to be found by examining the nature of the disconnection. In the trading room Hardie and MacKenzie

(2006) describe, the team has access to a constant stream of market and market-related data. It is tempting to call this stream ‘overwhelming’, but a variety of cognitive strategies and technological prosthetics serve to filter data. Once a potential anomaly is spotted, there is normally time to investigate and verify its cause. A stock may be being sold because a particular trader requires liquidity, or it may be because adverse news about its performance has reached the market. During the 1987 crash, a variety of factors combined to reduce the quality of available information:

For prolonged periods on 19 and 20 October the stocks of great US corporations such as IBM and General Motors – normally the most readily traded of all private securities – simply did not trade at all, as the New York Stock Exchange’s specialists could not match buyers with sellers and feared bankruptcy if they stepped in to remedy the imbalance (as their regulatory obligations said they should). The printers at the specialists’ booths could not keep up with the waves of sell orders arriving through the semi-automated DOT (Designated Order Turnaround) system, and there were also network delays and software problems. Those who tried to sell via telephones often found they could not get through. Some brokers simply left their telephones to ring unanswered; others tried to respond but could not cope with the volume of calls.

The S&P and other indices were recalculated virtually continuously: as each New York stock traded, exchange employees completed cards and fed them via optical character recognition readers into the exchange’s Market Data System, and computer systems ... updated index values. If significant component stocks in the index were not trading, however, the calculated index value rapidly became ‘stale’: its relationship to market conditions became indeterminate (MacKenzie 2004b, 314–5).

Under pressure, the tendency is to choose heuristically between explanatory hypotheses, and make decisions on the basis of the apparently more likely. There is simply no time to apply the Black-Scholes equation to any given transaction. At times like the period of the crash, there are orally-skilled people looking for the opportunity to make profitable trades. One, identified as Lewis J. Borsellino, was quoted as saying: ‘I could see it in the way their eyes darted around them and the uneasy fidgeting... They were sellers, I decided at that moment’ (322).

Further reinforcing the Bergsonian analogy, the subsequent structure of US financial markets was shaped both legislatively and psychologically by the events of October 1987. Most strikingly, the provision of ‘circuit breakers’ explicitly introduced boundaries to frame the trading routine. As a prophylactic against ‘ad hoc’ trading interruptions, scheduled interruptions were established so that accumulations of paperwork (or the part of its electronic equivalent that requires direct human intervention) could be processed. This measure was introduced by legislators, without theoretical backing. Most financial theorists, MacKenzie notes, would regard circuit breakers as counterproductive (325–6).

10.5 Criticisms of the Barnesian model

MacKenzie's Barnesian hypothesis receives criticism from two quarters: from the anthropologist Daniel Miller, and from Emmanuel Didier, a social historian specializing in the structural function of statistics. In this concluding section, Didier's counterexample to MacKenzie concerning the case of Michigan's cucumbers usefully problematizes the shift from effective to Barnesian. By using it to calibrate the progression, we can draw together the epistemic, the phenomenological and the sociohistoric threads informing the work-maker, and send it, golem-like, out into the world.

For Michel Callon, economics—the range of knowledge and equipment at the economy's disposal—'performs, shapes and formats the economy'. It cannot, then, be merely descriptive; this is evident as soon as the *agencement* of economics is analysed. The worry of opponents such as Daniel Miller is that theorists adopting a performative ontology become implicated in the phenomenon they describe, thus losing their valence as critics (MacKenzie, Muniesa & Siu 2007, 4). The trouble with Miller's proposed alternative, virtualism, is that it does not amount to a theory. The rhetorical style of its presentation is gauche—his essay, 'A theory of virtualism' (1998) is placed last in its volume, and presents the substance of his case only after a lengthy and enthymematic exposition on the subject of 'grand narrative'. Even then, it is plain that 'virtualism' is intended to be a complaint and not a celebration. Most problematically, the virtual as it is understood especially via Bergson and Deleuze, is already factored in to Callon's rhetorical array. Nevertheless, something of Miller's critique finds voice in the issue of *dispositif* versus *agencement* reviewed in section 10.3.

Ironically, the debate on performative economics has had an effect on Miller that parallels the impact of the Black-Scholes equation on those market-makers who were either sceptical about, or ignorant of, its value. On Didier's account, Miller has recently written that economists' models increase their ability to be performative (Didier 2007, 296); indeed, Miller himself, in somewhat Orwellian fashion, claims in a 2005 response to Callon that he was on board with performativity all along (Miller 2005, 4). Callon and Miller both seem to be wide of the mark, however, discussing the issue of whether economists are like priests: Callon because he apparently fears that anthropologists are too fond of accounting for social phenomena in terms of ritual; Miller because the priestly figure is not the economist *per se*, but rather the Barnesian work-maker in general.

In this respect, Didier's own critique of MacKenzie is interesting. His paper focuses on semiotic materialization as an act, using an intriguing and characteristically offbeat ANT story about the expression of the gherkin in US agricultural statistics to illustrate his argument. A statistician-hero, Verne H. Church, notes that Michigan's cucumber crops are not recognized in the statistical returns and, believing that they are sufficiently important in scale to warrant such recognition, sets about developing the means to report, and thereby realize, the product.⁵⁸ For Didier, statistics lie in a hinterland between the illocutionary feedforward generated by market transactions and the perlocutionary disposals of market-makers. Statistics represent a valve-like function that prevents the market from being reversible, but obviously a statistic cannot do this by itself.

Didier calls this 'expression', in the sense Deleuze develops from Spinoza where elements are gathered in a particular way whose relationship 'evidences a new feature of the whole composed by that coming together' (2007, 303). This resembles the analytical notion of compositionality, the idea that 'the meaning of a complex expression is determined by its structure and the meanings of its constituents' (Szabó 2007). However, a statistic, like that which it represents, is an element with the characteristics of noemata. It is the act of disclosing the element's significance that locates it in the dispositif. Distinguishing between the 'natural' cucumber and the 'compositional' statistic turns out to be a question not of fundamental fact but of semeiotic triangulation in the fullest Peircean sense.

Finding a place for the statistician in the performative spectrum is problematic only if one remains overly committed to the perspective of methodological individualism. Must the statistician always be performing the task of statistic-making in order to be considered a statistician? Once Church has discharged his ambition to realize the cucumber crop, has an instance of effective performativity been concluded, or must counting continue? Surely the latter. Certainly the process of counting cucumbers contributes to the making of the economy, though it does not necessarily have a critical impact on economics. As Didier uncovers, the effect is more a matter of improving resolution, enhancing the illusion of a market represented in real time: The US census was able to count only once in ten years; agricultural statistics developed so that counts

⁵⁸ A gherkin is a small cucumber enframed by a manufacturing process that includes, among other things, jarring and pickling in brine.

could be made several times in one year (294). The cinematographical product is the outcome of innumerable craft inputs. For a time, the world's knowledge of cucumbers is mobilized by Church, the charismatic performer; 'it' moves through the performer, and the perspectives of performativity potentially enable us to understand how, as a social phenomenon, this takes place within the oral span of individual human lives. What makes Church's performance Barnesian is not the cucumbers, or even the statistics, but rather the irreversibility of the cinematic process, which discovers that it needs statisticians to perform in this kind of way. However, it is *minimally* Barnesian; Church's performance does not furnish a *new* tool that can be compared to the Black-Scholes equation, even though it provides a new perspective on the agricultural product of Michigan and of the United States *tout court*.

The case for generic performativity seems watertight; so too the case for effective performativity—to this point, in other words, MacKenzie's trajectory and mine appear to be fairly similar. There is a divergence, however, at this higher level. One way of accounting for this is to point out the different routes by which we arrive, MacKenzie's being empirical and mine being theoretical: we both worked it out, but on the basis of completely different raw materials.⁵⁹ We differ, too, on the nature of counterperformativity. This seems to be a relativistic matter. For MacKenzie, attention is focused on the Barnesian train from the station platform, so to speak, as it recedes into the distance. Meiosis, on the other hand, is on board the train and sees the Barnesian performance waving as it recedes into the distance.

This subtle difference feeds back into the problem of defining just what is 'Barnesian'. There is ambiguity in MacKenzie's account about the extent to which performances of this kind depend on the individual talent of the performer, and this problem goes right to the heart of the issue of whether economics is constative or performative. Let generic performativity be styled 'hylozoic', meaning an arrangement of physical and semiotic relationships that is capable of sustaining complex, layered patterns of interaction. Probably the hylozoic is tractable in terms of ordinality and temporality in the terms discussed in part two. Let effective performativity be styled 'hylomorphic', meaning the same thing as 'hylozoic', but reflexively shaped through the plasticity of inclusive fitness, which introduces the spectral. We are left with few options to promote the Barnesian,

⁵⁹ MacKenzie does not discuss Didier's example in terms of Barnesian performativity; the analysis is mine.

but Heidegger's analysis of *poiesis* comes to the rescue. We can style this third form of performativity '*poietic*', with all the assertion of craft valorization thus entailed.

People look at the work of artists such as Tracey Emin or John Cage and say: 'I could do that', and the intuition among economists seems similar. Once Black, Scholes and Merton had presented their equation, it became the obvious way of doing the task to which it was applied, but just as the answer in the case of Emin and Cage is: 'yes, but you didn't, did you?', so too does the naming of the equation recognize the perlocutionary force behind it. To my mind, '*poietic*', Barnesian performativity celebrates exactly that element of perlocutionary force. The rhetorical aspect of stigmergy depends on this human factor although again the idea of a fossilized Barnesian performance is not explicitly sanctioned by a reading of MacKenzie. Elsewhere I have been at pains to minimize the anaphoric use of people's names since I generally believe the practice to be dangerously imprecise. In this case, however, 'Barnesian performativity' conveniently elides the work-maker, adductive inflation and the first- second- and third-person domains of performativity into a single articulation, stressing that however much theory goes into configuring the concept, its ultimate shape is human.

Conclusion

The work-maker is an embodied agent situated in the specific cultural context of modern urban civilization, supported by the laws and institutions of the contract—as suggested at the very outset. Not only is the work-maker an economic actor, but the very fact of economic activity is predicated on this actor's capacity to mediate intention through the reliably systematic, evidential forms that I have called *intersubjective technologies*. Although the concept owes much to the somatically transparent notion of equipment and affordance modulated by Clark in the form of the *extended mind*, it is explicit about one aspect of scaffolding that Clark does not pursue in detail. Scaffolding is primarily composed of *other people*.

Social

That being the case, on the assumption that the argument for the 'scaffolding' ontology is secure, we have sought to disambiguate certain overlapping senses of the social, in order to better press the claim. The principal overlap is between second- and third-person senses of the social, but there is also an overlap between discrete senses of 'common sense', which impinges on the prior distinction. I have parsed the latter in terms of a series of polyphonies whose collective, singular output (or rather, throughput) I characterize as 'polyphonic consciousness'. These are the three Peircean polyphonies—'sensory', the collective sum of our separate senses; 'psychological', a collective sum that incorporates various aspects of enactive perception and their intersubjective complements; and 'semiotic', which cannot be styled a 'sum', but leans on the same sensory and psychological apparatus to individuate the constituents of the environment in which the conscious entity is embedded. The fourth polyphony, indebted to Peirce's work on statistics, is the 'Polyà' polyphony, cultural polyphony.

It is this latter form that affords the platform from which the extension of extra-somatic means of coordinating society, as argued by Strum & Latour (1999) can proceed. Polyphonic consciousness is performative, meaning that its existence is grounded entirely in the provisional, evolutionary outcome of its environmental situation. Dunbar's analysis of primate group size lends important clarification, identifying a continuity first in the human/primate relationship, and second in relationships among humans within the 'ideal' collective of around 150 members. Most notably, there is a sharp rhetorical distinction between the communicative style relating members of the most intense groupings to each other—a style characterized by conversational give and

take—and the more formal rhetoric of address appropriate for one-to-many communication.

Context

The appeal to rhetoric implicates an appeal to language, but as we have seen, the concept of language, in its simplest, oral sense, has become deeply entangled in prosthetic extension. The hand, which is strongly implicated in Heidegger's *vorhandenheit* and *zuhandenheit*, is also implicated in Wittgenstein's *hinweisende*. For Tomasello, everything that is unique to humans in the matter of language is already unique in the act of pointing. What is remarkable, though, is that human physiology is able to respond to its environment as though it, too, is engaged in acts of pointing, pushing, prodding, pressing and so on. The thought that follows from this draws on the presocratic doctrine of hylozoism—that life and matter are inseparable. Refracting it through the semiotic analyses of Peirce and Greimas, the sociology of Callon, Latour and Law, and the philosophy of Dennett and Clark, the ancient doctrine of hylozoism becomes the modern doctrine of stigmergy. Stigmergy conflates the sign (*stigma*) and action (*ergon*) into a continuum. Once the human capacity to shape the environment and filter it with cues and fabricated equipment is factored in, what we arrive at is, in effect, a theory of 'artificial animism', which I call 'recombinant intentionality'.

Creativity

Rhetoric is a form of intersubjectivity that is distinguished from ordinary semiotic transaction by an imbalance captured in the term 'agogic', at the root of Peirce's investigation of abductive reasoning. This is from the Greek, and means 'leading'. Once we start experiencing agogic cues reflexively, we start a process of reification that transforms the abstract interpretant into an embodied agent. It seems that, for the interpretant to interpret, elements in the semiotic flux need to *matter*. It is mattering—or aboutness—that turns data into content, that modulates 'recombinant intentionality' into intersubjective content. However, what may count as 'doesn't matter' is in part a question of structure—an annoying circularity that poses a deep analytic problem. Chemistry may account for our response to agogic cues, but it does not—by itself—account for selectiveness in our responses.

One of the claims made by Austin regarding ordinary language is that it constitutes a resource that preselects among possible outcomes, pragmatically seeding a given problem-space with foregone conclusions. As Feyerabend points out, this resource is neither wholly reliable nor wholly complete, and is in need of constant appraisal and

renewal. Nor is this resource wholly made of words, or *logoi*. This is where intersubjective technology, and its concomitant, the technologizing of intersubjectivity, comes in. The latter recognizes the distinction Ong makes in terms of a difference between oral (spoken and performed) language/signification, and its literate (reified and disembodied) extension, support, and counterposition. Intersubjective technology, then, is a systematically reproduced and communicated—yet fallible—semiotic accumulation, reified without restraint across the somatic boundary. It serves to support the performance of society, yes, but in a sense society *is* intersubjectivity technologized—or rather, *technologizing*. Without a social context, there is no creativity.

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