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Introduction

The end ... is that of delineating, or, as it were, painting what the mind sees and feels: now let us consider what it is to portray duly in form and colour things material, and we shall surely understand the difficulty, or rather the impossibility, of representing the outline and character, the hues and shades, in which any intellectual view really exists in the mind ... Is it not hopeless, then, to expect that the most diligent and anxious investigation can end in more than in giving some very rude description of the living mind, and its feelings, thoughts, and reasonings?

John Henry Newman, *University Sermons*, 13

Taking a chance rather than being parasitic upon modish doubt, having the bravery that comes from a risky faith: these are what Newman uses a sense of limitation none the less to stand for ... [A]rt begins to go wrong ... when it pretends that it is not so much a language of thought to be read and interpreted but a God-like power that can simply reproduce the world ... The gap between the representation and what it stands for itself constitutes part of the communicative power of art; the gap holds within it a silent and implicit call, which the work incorporates within its very means and limitations, a call for a bridging imaginative vision between the work and the life it recalls.

Philip Davis, 'Keeping faith with real reality',
Times Literary Supplement 4806 (12 May 1995): 13f.

1 Words

The title of this book, *Humanities Computing*, names a field of study and practice found both inside and beyond the academy in several parts of the world.¹ This name for it is now quite common among anglophone practitioners, but it and near equivalents in other languages do not exhaust the possibilities, among them combinations of ‘humanities’, ‘arts’, ‘philology’ and the like with variants of ‘computing’, ‘informatics’, ‘technology’, ‘data processing’, ‘digital’, ‘multi-media’ and so forth. In choosing a particular name for the field I have no wish to restrict these possibilities, since they express differences of emphasis that are most welcome in a time of disciplinary experimentation. I have adopted ‘humanities computing’ in particular for certain suggestive qualities in the name: a potential still to be taken as an oxymoron, thus raising the question of what the two activities it identifies have to do with each other; the primacy it gives to the ‘humanities’, preserved as a noun in first position while functioning as an adjective, hence subordinated; and its terse, Anglo-Saxon yoking of Latinate words. I read it first as a challenge to what we think we are doing, then as its name.

I bother to draw out my choice of a title for two reasons: to defamiliarize the juxtaposition and to alert the reader to a philological turn of mind that will dominate throughout. Words can be *very* rich in possibilities of meaning. I take them when the need arises almost as if they were verbal equivalents of the aleph in Jorge Luis Borges’ story. There are times and contexts, such as now with computing, when meaning needs to be excavated and brought to bear on a situation we do not understand. On what they argued was another such occasion, C. K. Ogden and I. A. Richards wrote:

There are some who find difficulty in considering any matter unless they can recognize it as belonging to what is called ‘a subject’ ... These need only be reminded that at one time there were no subjects ... But the discomfort experienced in entering the less familiar fields of inquiry is genuine. In more frequented topics the main roads, whether in the right places or not, are well marked, the mental traveller is fairly well assured of arriving at some well-known spot, whether worth visiting or not, and will usually find himself in respectable and accredited company. But with a new or border-line subject he is required to be more self-dependent; to decide for himself where the greater interest and importance lies and as to the

results to be expected. He is in the position of a prospector. (1949/1923: vii)

So are we, with few or no such assurances.

2 History

Although better historical knowledge may enlighten us otherwise, I like the notion that what once was ‘computers and the humanities’ (when the relationship was desired but largely unrealized), and then ‘computing in the humanities’ (once entry had been gained) is now being resolved into the confident but enigmatic ‘humanities computing’. Although this confidence is strengthening and most welcome, the enigma bears the meaning that animates this book. If at the end of it you have the enigma firmly in mind and are engaged in the questioning which it provokes, then the book has done its essential job.

We are nagged, as I say at the end, by the persistent if largely tacit sense of witnessing an enormously important cultural change. Many claims concerning this change have been made. In the following I attempt to articulate what I think it means for research in the humanities. My argument is the result of many years’ effort to make sense of my own experience with computing both as a scholar and as an adviser to others, from whom I learned more than I can tally.

During most of that time, my thinking was driven by impatience with the discrepancy between the potential of computing for scholarship, emerging clearly in the work of many individuals across the humanities,² and various misconstructions or attempts to turn it aside. The latter I have come to characterize by two related strategies: either *dismissal* of any basis for humanities computing, on the grounds either of the irrelevance, imprecision or triviality of its problems or of its lack of identifiable turf; or *deferral* of promised solutions to these problems, for which the sarcastic phrase ‘Real Soon Now’ has become proverbial.³ Impatience is hardly a virtue, but in my case it had the virtue of stirring me to probe these strategies for what they might teach us, other than never to underestimate human perversity. As a traditionally trained scholar (a Miltonist, with strong research interests in Greco-Roman literature) I already took seriously the grounds for seeking out and holding to the most difficult intellectual problems one can find: how, for example, reliably to identify instances of a literary-critical idea, such as personification. But the trickier rhetoric of deferral led me to the root lesson. The central error of these strategies, I concluded, is

not the demand for relevance, for which some kind of response is reasonable. Nor is it the demand for patience: meaningful results take time. Rather the error lies in the concealed assumption that solving a problem is the end of the matter that generated it. As someone with an earlier background in programming and the arts and crafts, I was prepared to admit that problem-solving skills are required, for example to debug a program or sharpen a chisel. But both the arts and scholarship had taught me that when knowledge is the goal of work, the purpose of solving problems is to get to harder, worthier ones. Hence the fundamental question to which my experience led me. What precisely does computing itself have to do with rendering knowledge problematic? If it is to serve the humanities as they deserve, it must do that.

In the mid to late 1980s, when impatience began driving me to ask this question, I also started teaching the subject. My students, from across the humanities and social sciences, taught me in turn that there was in fact a subject, and that it had to be about *method* – the only scholarly concern all of us shared. So I asked: what is it about computational method that problematizes? The answer had to be what those two strategies of avoidance, with their focus on solutions, were trying to avoid: precisely the systemic failure of computing reliably to solve problems requiring even a minimal degree of intelligence. So what if, I thought, we were to put aside the distracting promise and embrace rather than try to avoid the self-evident crudity of computing, treating the machine exactly as the scholar finds it – ‘a stone adze in the hands of a cabinetmaker’, as Vannevar Bush said about searching, famously in 1945 and again, ‘in spite of great progress’, in 1965.⁴ What if we were to ask what we can do, not just within the limits its propensity to failure imposes, but also *with* these limits? ‘What if the point were not trying to bridge [the] gap but to feed off and develop it?’ (McGann 2001: 103) What do the failures tell us? What epistemological value do they have?

My evolving question had thus succeeded in becoming a very simple one with a very simple answer. It amounted merely to this: first to observe that people learn through an iterative trial-and-error process, then to ask what form this process takes for computing. We know that this process governs the mastery of skills such as riding a bicycle or soldering pipe-joints.⁵ If we look at scholarship as what scholars actually do, we can find trial-and-error in it as well, though without the sense of closure that mastery and performance of a practical skill entail. With intelligence, skill and practice, one gets good at interpreting poetry, but interpreting it is not a job that can be completed in the sense that

soldering a pipe-joint can be (one hopes). My questioning had thus brought me to conclude first that computing fits into scholarship as a rigorously disciplined means of implementing trial-and-error, second that its purpose is to help the scholar refine an inevitable mismatch between a representation and reality (as he or she conceives it) to the point at which the epistemological yield of the representation has been realized.

The nature of this mismatch became clear in my first postdoctoral research project, which applied text-analysis to a long, complex poem. (An example from this project is discussed in Chapter 1.) Such analysis, I discovered, exacts two requirements: first, that all textual entities in question be explicitly, algorithmically identifiable; second, that any two which the scholar regards as identical be rendered identically. Nothing, and so everything, is left to the imagination. Satisfying these requirements in software was forbiddingly difficult, as is normally true for such research, so I turned to metalinguistic encoding. This had the advantage not only of practicality but also of heuristic encounter on a case-by-case basis with the unsayable subtlety and stubborn particularity of poetic language. The conflict between the entities of this language and the twin computational requirements of complete explicitness and absolute consistency then opened up to me the *via negativa* or 'negative way' to knowledge for which I argue here. Because of their particularizing focus on transcendent objects of study, the humanities have always had to deal with what the net does not catch, but the point I make is not confined to them. Sir Arthur Eddington (whom Richard Hamming paraphrases in the second epigraph to this book) describes just such a role for the philosopher in the natural sciences, whose contribution is to examine 'the sensory and intellectual equipment used in observation'.⁶ Humanities computing, being incorrigibly dual, must play both physicist and philosopher.

Another way of approaching the same point opened up for us all as soon as significant quantities of source material became available in digital form, principally with the Web. The importance of accessing this material is no surprise. What can now be done because of the abundance online – despite its sometimes dubious quality and nature – should not be underestimated, though it often is by those committed to doing better. But the torrent rushing out of computers into the various disciplinary heartlands pulled attention away from the difference between cultural artifacts and the data derived from them – away from the analytic concerns of earlier work, as several people have remarked, to a great stocking of the shelves. Revealing much, it

simultaneously obscured the quantum leap from seeing such artifacts to seeing them *as data*. Hence the distinction I make in Chapter 1 between the use of a computing system to deliver results for analysis elsewhere – what I call there a ‘knowledge jukebox’ – and the heuristic use of computing. My argument is essentially that as far as the humanities are concerned, all meaningful uses of computing are heuristic, and therefore that mere ‘delivery’ is dangerously misleading.

Allow me to pick at words for a moment. The problem is not with ‘delivery’ as a synonym for publication (or, more broadly, communication). Rather it is with the metaphorical freight of this particular word, which harkens to the commodification of knowledge as something that can be packaged in units, stored somewhere and delivered to a consumer or dispensed from a machine on demand. This is a different, infrastructurally more sophisticated metaphor than Mr Gradgrind’s empty vessel, but it is an equally inadequate if not pernicious basis on which to found one’s ideas of learning and teaching. Its rapid spread strongly reinforced my conviction that unless practitioners such as myself could show ourselves to be more than mere assistants or delivery-boys to scholarship happening elsewhere, academic credibility would not be forthcoming to our practice. Its lack, inhibiting the creation of dedicated jobs in the field and investment in the research, is a serious matter not only because humanities computing has so much more to offer than convenient vending machines for knowledge. It is also serious because without this research the humanities have difficulty addressing a society (and the students it sends to universities) whose idea of knowledge is defined by such a metaphor. Attending to the problem is not, as I argue in Chapter 4, evidently the concern of mainline computer science. It is the concern of the humanities.

3 Purpose and method

The aim of this book, then, is to open up what has been cast as the new jukebox of knowledge and to demonstrate persuasively not only that *constructing* indefinitely many such machines is the way forward, but also that doing so is a new form of traditional scholarly practice. This dynamic form of practice holds a far greater potential for scholarship than any number of well-crafted products, although crafting them well is essential to that practice.

In this book I anatomize the method of humanities computing into four perspectives: analysis, synthesis, context and profession. The first, second and fourth of these get one chapter each. The third, context,

requires two chapters: one devoted to the disciplinary environment within which humanities computing does its work, and the other to a single discipline, computer science, with which its relationship is rich, poorly understood, problematic and always uneasy. Roughly speaking, the sequence of the book defines a moving focus from the microscopic and private to the macroscopic and social. It also defines a movement of thought-style that has been influenced in turn chiefly by philosophy, history and ethnography. Some sequence or other is inescapable: the linear flow of time and language require it, especially in an expository work of academic prose. The sequence I have chosen reflects a way of prioritizing attention. It begins with the intellectual nub, which remains invariant whatever the job-titles may be, wherever the activity is being practised, whether it is solitary or collaborative and whatever importance it may be given by those who do it.

Other sequences are possible. The most significant alternative would put context first, based on the argument that humanities computing is whatever it is because of the disciplinary and institutional setting in which it arose. The main benefit of this arrangement would be the crucial reminder that its daily work is precisely in that context, that it continues to draw institutional breath because of the good it does for the disciplines it serves. I chose my sequence because I believe that within institutions of higher learning the intellectual case is primary, but I try never to forget the constant work that allows it to be made and heard.

4 Audience

By now I trust that the intended audience of this book will have recognized themselves in my appeal to the traditional focus of the humanities and nearby social sciences, which extends beyond their own specializations to possibilities for a thoughtful, culturally informed and intellectually rich life. Several of these specializations and practitioners are invoked here for the help they offer and for the precedent that connecting with them offers to other possible connections. But in doing so I am not *restricting* the book to these or other specialists, though I hope for their attention. I look to John Dewey's attempt to bring ordinary experience and specialized work into an active relation. I ask his question, drawing it from Thomas Bender's recent essay in *The Transformation of the Humanities in the Twenty-First Century* (1997: 4):

Does the scholar's special knowledge, when 'referred back to ordinary life-experiences ... render them more significant, more

luminous to us, and make our dealings with them more fruitful? Or does it terminate in rendering the things of ordinary experience more opaque?’

I am only too keenly aware that much of the following is likely to seem far more a ‘dark night of the soul’ than the promised luminosity, but at least my intention should be clear. Dewey was not proposing a simplistic reduction of subtle ideas, reverse-engineering a cartoon from the fresco, rather he suggested that we actually communicate the results of our work, not obfuscate the urgent problems with which it is concerned. But in the struggle to do so, now after Babel, the present-day audience is no passive judge. It must participate in the profoundly challenging effort to be clear. Of you I therefore make two non-trivial demands: one for curiosity, the other for magnanimity.

Curiosity is the passion for ‘taking a look’,⁷ following clues, digging into things as our ancestors dug into the innards of the earth for food, treasure, knowledge. Its primary instrument is questioning, which I take to be – in the epigraphic words of Martin Heidegger – *die Frömmigkeit des Denkens*, ‘the piety of thought’. To paraphrase my late, greatly missed friend Don Fowler at his playful best, the primary function of the humanities is to do just this: not to solve problems but to make them worse by the risk-taking exercise of that piety (1999: 442). Both piety and play join hands in the task of keeping the light of knowledge burning brightly. This book is meant to burn in that sense and in T. S. Eliot’s, ‘a lifetime burning in every moment’. No corner of the academy or of society at large goes unaffected by the snuffing, darkening opposite: the promoter’s aggressive pitch, the consumer’s passive hunger and the anxiety that drives them both towards an end of thinking. With its promise of solutions, computing is at the crossroads where they meet. So there we must be. And relentless curiosity is our brightest torch.

The magnanimity or ‘generosity of mind’ that my book requires of you is just the kind called upon by my former teacher Northrop Frye about fifty years ago in his great project, *Anatomy of Criticism*. This book, he wrote, ‘can only be offered to a reader who has enough sympathy with its aims to overlook, in the sense not of ignoring but of seeing past, whatever strikes him as inadequate or simply wrong. I am convinced that if we wait for a fully qualified critic to tackle the subjects of these essays, we shall wait a long time’ (1957: 29). Often sitting on limbs much thinner than the thinnest of his, I too hope for my subject to be more competently addressed. I also am convinced that

mere waiting is unwise, despite the peril of what may seem a premature venture, despite the half-century since humanities computing began. I take the English folk injunction, 'Be bold, but not too bold', as a call to action strong enough to provoke improving conversation but not to derail it. The chief threat of derailment that I see for this book is its potential misconstruction as a 'god-damned jail' where, as Frye said of a hostile reviewer's misunderstanding of the *Anatomy* (1991: 6), practitioners 'would do nothing but clean out its cells'.

Boldness is required because, as the poet confesses in 'East Coker', '... each venture / Is a new beginning, a raid on the inarticulate / With shabby equipment always deteriorating ...' The comparison may seem a bit much, but it is only by bringing together such unlikely bedfellows in just such a love-making struggle that a humanities computing worth the candle may be made – and remade, and made again. Of course, the thought of incompetence is not a happy one. But part of my argument in Chapter 5 is that we need to respond to the dilemma that the demand for competence forces on us – the mandate to know everything about something drives us to an epistemological vanishing point – by enlarging the domain of competence from the individual to the scholarly community. The project that this book describes, implicitly and explicitly, might be possible for an individual with the capacities of a Leibniz, but to be sustainable it requires a rather fundamental change in how work is done and judged. Here lie the roots of a genuine collaborative ideal rather than merely one of a set of 'transcendental virtues' that pepper the nervous discourse of so many twenty-first-century academics (Galison 2004: 380).

5 Weed control

In scholarly writing, acknowledgements, references and bibliographies recognize indebtedness to the past. Indebtedness to the future is expressed in the ancient formula of reciprocity, *do ut des*, 'I give that you may give'. Gathered together in the present, past and future indebtedness form the basis for the ideal to which I refer. But how practitioners work together is something each discipline must evolve for itself. In the specific sense, collaboration is only one expression of the social contract binding practitioners together. When we take the term as denoting a transcendental virtue, to be applied regardless of context, we act as if different styles of work had no organic relation to the intellectual cultures within which we find them. Abundant research as well as common sense tells us, however, that a work-style expresses in its

'epistemic culture' and its modes of communication the fundamental goals of that culture.⁸ This is not to deny that such a community of practice, for example as we find in the humanities, can be reformed from the outside, nor that a change from the inside expresses the need for reformation supplied from without. My point is that the issues involved are too important not to take care in promoting such a reformation. Hence the need for what Clifford Geertz has called 'intellectual weed control' (1993/1973: 27), to extract the ideal from its entanglements so that we may understand when and how collaboration suits the humanities. All too often we speak instead of how the humanities may be reconfigured to suit collaboration.

There are, however, two closely interrelated thought-weeds to be dealt with here, both varieties of a single kind. The other, which I discuss below, is the common notion that *the* computer has a single nature we should regard as its essence and emergent evolutionary form, whether this be modelling machine, interactive environment, appliance or whatever. There are very strong reasons for believing this not to be true; I will draw these out later. For now the important matter is the implication, that having discovered what the single nature of computing is, we must either take it or leave it. There is then no point in asking how the computer might be adapted to suit the humanities. The question is then how to adapt the humanities to suit computing.

Both thought-weeds, in other words, interfere with the attempt to set forth what a computing *of* as well as *in* the humanities might be by misdirecting us to begin the wrong way around, with some ghostly construction of *the* machine and *the* work-habits it defines. As a result, scholarly practice is reconceived as a passive response to extrinsic forces and scholars at best as the welcoming conquered. I urge instead that we begin with as clear a vision of the humanities as we can manage, privileging that vision so that we may then ask what the device can do that we want done. The device, being ours, will of course help us to imagine what we want to do, but the effort begins at home.

5.1 Collaboration

Studies of collaboration (as opposed to invocations of it) converge on the serious question of authorship: in the sciences, 'the intricacies of credit and demonstration', i.e. who gets the credit, how significant contribution is demonstrated;⁹ in the humanities, what it means to be an author.¹⁰ On the one hand, the cultural authority of the sciences has made it easy to form an idealized image of productive teams from

which the complex and problematic realities of the struggle for recognition are missing. On the other hand, 'the romantic myth of the author as solitary genius',¹¹ deconstructed by studies of authorial indebtedness and of actual but poorly recognized collaborations, has made the solitary worker an easy target. The result is confusion.

Out of this confusion arises the caricature popularly known as the 'lone scholar', whose physically solitary work now appears an indulgence that we can no longer afford – and from which the computer offers us the welcome escape-route. Let me be quite clear on this point. I am not denying that collaboration can be good for research, nor that scholarly practice is changing, nor that it should. Quite the contrary: computing brings people together and offers opportunities for practice to change; not only can these effects be very good, but in particular cases they have proven beneficial, as I detail in Chapter 3. But there are questions: What *is* collaboration, exactly?¹² Where in the spectrum from broad, indirect and tacit indebtedness to explicitly joint work do we locate research in the humanities, especially in light of computing? What conclusion do we draw from the attested benefits of collaboration? Evidence of change is not proof of a systemic change.

The myth of the lone scholar is strongly reminiscent of the situation depicted by C. P. Snow in his 1959 Rede Lecture at Cambridge, 'The Two Cultures', in which he compared 'literary intellectuals' with scientists. His portrait of self-indulgent privilege versus upstart vigour would seem to be fulfilled by the popular scenario of the lone scholar, artifact of a bygone age, tiredly shuffling off while sociable collaborators stride confidently onto the academic stage.¹³ Computing allows us to update the picture by supposing that as a result, humanists can behave like scientists and so enjoy renewed vigour as well as social approval. In the decades since Snow's lecture, scientists' behaviour has come to be defined popularly if not always in practice by 'big science' projects, which are massively collaborative. As one prominent scholar in the humanities recently declared, 'specialists should now be able to join together to generate *larger and more meaningful projects*'.¹⁴ (Stop for a moment to weigh the implications of that easy blurring of *large* into *meaningful*.) These projects are not just large, however. They are also extensively managerial. Hence 'large' also implies work that is observed and thus is in current administrative jargon 'transparent', accountable to those who pay for it, who themselves must be accountable for what they do. The outsider's suspicion, driven by enormous, seemingly intractable difficulties between the academy and society, is certainly a problem but not, I think, the root problem. Rather, at root is the

insider's suspicion of his or her own irrelevance – we do not work in a social vacuum – and hence the appeal of the putative salvation-through-collaboration, which the realities of funding seem to confirm. The romantic myth of the solitary genius no longer offers secure protection against self-doubt.

Since computing became a possibility for the humanities, scholars have suffered from a misapprehension that the computer is an alien entity, posing a threat or offering salvation. The threat was once foremost. Now the promise of salvation predominates. Both dissolve away, however, when we realize that, like fictional aliens, the computer is a cultural self-expression to be understood and assimilated – a 'monster' in the etymological sense of an omen or portent of change. Similarly with regard to work-style, the collaborative opportunities brought by computing (which is, many argue, primarily a communications device) need to be understood in the historical context of how humanist scholars have in fact done their work. We need to ask how these opportunities fit into and help us to develop particular disciplinary practices in the ways in which we wish to develop them.

The essence of the traditional humanist's work-style is illuminated by comparing the pace and character of research publication across the disciplines, as Thomas Kuhn suggested years ago from his own experience (1977: 8–10). It varies widely, from the rapid exchange of *results* in the sciences to the slower pace of *argument* in the humanities. To varying degrees within the humanities themselves, this argument is the locus of action: the research itself (e.g. in philosophy) or its synthesis into a disciplinary contribution (e.g. in history) takes place *during* the writing, *in* the essay or monograph, rather than in a non-verbal medium, such as a particle accelerator. Contrast, as Kuhn did, the traditional research publication in experimental physics, which reports on results obtained elsewhere. In the natural sciences, as that 'elsewhere' has shifted from the solitary researcher's laboratory bench to shared, sometimes massive equipment or through a division of labour to the benches of many researchers, collaboration has become a necessity. In the humanities, scholars have tended to be physically alone when at work because their primary epistemic activity *is* the writing, which by nature tends to be a solitary activity.¹⁵ Humanists have thus been intellectually sociable in a different mode from their laboratory-bound colleagues in the sciences.

If we look closely at this solitary work, we have no trouble seeing that the normal environment has always been and is *virtually commu-*

nal, formerly in the traditional sense of ‘virtually’ – ‘in essence or effect’ – and now, increasingly, in the digital sense as well. However far back in time one looks, scholarly correspondence attests to the communal sense of work.¹⁶ So do the conventions of acknowledgement, reference and bibliography; the crucial importance of audience; the centrality of the library; the physical design of the book; the meaning of publication, literally to ‘make public’; the dominant ideal of the so-called ‘plain style’, *non sibi sed omnibus*, ‘not for oneself but for all’;¹⁷ and of course language itself, which, as Wittgenstein argued in *Philosophical Investigations*, cannot be private. Writing only looks like a lonely act. Greg Dening quotes Raymond Williams’ *Writings in Society* (1983):

Whenever I write, I am aware of a society and of a language which I know are vastly larger than myself: not simply ‘out there’, in the world of others, but here, in what I am engaged in doing: composing and relating.

‘I think that this is’, Dening comments, ‘because writing is theatre and the writer a performer. The writer’s goal, in the words of the theatre, is to “produce effects”. Make someone laugh, make someone cry, make someone angry’ (1998: xix–xx). Make someone talk back, provoking further argument.

Recognizing the social qualities of traditional work in the humanities, John Unsworth recommends that we conceptualize the difference computing seems likely to make as a transition ‘from a cooperative to a collaborative model’, in which ‘one works in conjunction with others, jointly producing scholarship that cannot be attributed to a single author’ (2003a). The latter model is, he notes, already attested in computer-related work, especially in face-to-face projects such as those I examine in Chapter 3. The question is, however, whether this work indicates a convergent trend – *the* new way of working, or simply another way. Enthusiasm for it is powered, Unsworth notes, by the possibility of escape from our physically enforced provincialism, ‘a way to overcome geographical dispersion, the difference in time zones, and the limitations of our own knowledge’. Citing a pronounced trend in the biological sciences towards simulation, Timothy Lenoir predicts a similar transcendence of space and time in ‘the fusion of the communication and experimentation functions – the merging of the journal and the lab – in the post-modern academy’ (2002: 115). In the early twentieth century the advent of the telephone stirred similar visions of

radical, compelling change (Pool *et al.* 1977). Visions of this kind omit tacit physical and social factors crucial to many kinds of work. But the larger problem is the tendency to be swept up in a singular, unifying imperative to become as envisioned, irrespective of circumstances, aims and epistemic culture.

Ursula Franklin, in her Massey Lectures, *The Real World of Technology*, distinguishes between ‘holistic’ and ‘prescriptive’ technologies, which she defines as practices of specialization by product and by process, respectively (1990: 18–20). The first comes out of the tradition of the crafts, in which artisans ‘control the process of their own work from beginning to finish’. The second is characteristic of industrialized work, in which manufacture is broken down into steps, each carried out by a separate worker. Franklin points out that although we tend to think of collaboration as belonging to the latter sort of practice, we should really be considering two models for it. ‘Using holistic technologies does not mean that people do not work together,’ she writes, ‘but the way in which they work together leaves the individual worker in control of a particular process of creating and doing something.’ The idea of holistic collaboration, then, dissolves away what is in fact a false distinction, or at least a very fuzzy one, between styles of socially interactive work.

5.2 The nature of computing

Computing appears to us in a myriad of forms, changing and proliferating as it progresses. What is its essential nature, we ask, so that we may understand what we are witnessing and make best use of the possibilities? But the question turns out to be based on a false assumption: as Michael Mahoney has persuasively argued, there is not one but many computings. He reasons, as I do in Chapter 4, that the computer, unlike other machines we have known, does not have such a nature. Rather, the plural object is indefinitely protean or ‘universal’, as computer scientists say. Historically, computing is therefore ‘what people wanted computers to do and how people designed computers to do it’ rather than an essence played out in responses to its impact (2004). The future, this history helps us to see, is up to us.

Hype has hidden this history, as Mahoney says, in predictions of the one future pundits have variously described. By postponing fulfilment of their revolutionary breakthroughs (see my discussion of deferral above), they have fed the illusion that many possibilities of a ragged, diverse, even shapeless present will converge into this future, Real Soon Now. The tendency of chroniclers to write device-histories in which

whatever is thought to be the prevailing form of computing is traced back to a particular evolutionary origin, e.g. in Charles Babbage's Analytical Engine, has exacerbated the problem. Thus we find arguments for particular computings (ubiquitous, interactive or whatever) as the essential expression.¹⁸ But the uncertainly bounded set of device-types we might call 'computers' shows no sign of closure. More significantly, the computer is decentred when we turn to the rich contexts of intention, use and creation surrounding the machine – to 'the communities of computing', as Mahoney says (2004). This leads us to a focus on software more than hardware, and thence to the conflict of monothetic enthusiasm with diversifying reality. The compulsive telling of success stories, he argues, has obscured the diversity of attempts to model the world in the machine, and so to create indefinitely many computings answering to indefinitely many ways of construing it.

Mahoney's turning of attention from working out principles to pursuing practice marks a sea-change of mind that I recommend in this book, from the conception of oneself as an 'end-user' to the idea of an experimenting 'end-maker': not as the consumer, who 'comes at the end' of a chain of manufacture, merely using what others have fashioned, but rather as the creator, who begins with his or her own practice, as I do here. This change, I think, answers to a fundamental criticism of current humanities computing practice articulated by Jerome McGann in *Radiant Textuality*. Citing his own *Rossetti Archive* and similar projects, he argues that the user interface we now have fails to implement their decentred theoretical design: 'All are quite "centered" and even quite nondynamical in their presentational structure ... [A] major part of our future work ... will be the search for ways to implement, at the interface level, the full dynamic – and decentering – capabilities of these new tools.'¹⁹ Their centredness, I am suggesting, answers to the understandable but severely limiting focus on the device as a given. Instead we must begin thinking first of our designs as *desiderata* to be realized.

But enthusiasm does meet reality: the machine we have, Mahoney notes, is 'no more personal than a restaurant'. In the following I will repeatedly quote and allude to William Wulf's eloquently brief aphorism that engineering is 'design under constraint' (2000). This is tellingly what we face with the computer. 'It is not bad,' Mahoney remarks,

but it does have implications for the critical, reflective use of computers, especially in the humanities. It means that the computer as

tool and medium is not neutral, but rather informs (or, as Bolter and Grusin put it, re-mediate) the work that one does with it, if only by setting possibilities and limits on what can be done (or even thought). It calls for critical awareness. (2005)

The universality of computing is thus bounded in principle, however incomplete our knowledge may be of the principles. We can also qualify plurality by discriminating two aspects of the manifold and indefinitely proliferating uses of computing, to which Chapters 1 and 2 are respectively dedicated. In a sense, both Brian Cantwell Smith and Terry Winograd are right: modelling and communicating are both essential, the *yang* and *yin* of the machine, neither meaningful without the other.

6 Style and dependencies

As this book is first of all an act of communication, however, let me end my Introduction by laying the emphasis on conversation, to which this is an invitation in a voice echoing with a multitude of other voices. Here I make every effort to point out the echoes by means of an intensely referential style of writing. Online publication has within the past few years made possible multidisciplinary explorations and massive, digitally searchable collections of writings the like of which would once have been forbiddingly difficult, time-consuming and expensive to locate and very slow to peruse. Online bookshops have simultaneously made conventionally published sources trivial to obtain (though with expensive consequences). This book would have been impossible otherwise. It would have been a different book. I have deliberately kept my stitching together of sources an obvious feature of my style. I have done so not to avoid a charge of plagiarism or to hide uncertainty in a bibliographic flourish, but for two reasons, amplified in Chapter 3: first, to emphasize the historical trajectory of work into collaborative alliances with the disciplines of the humanities; and second, to point emphatically and self-consciously to the origins of a theory of humanities computing in them, and hence to directions for further work.

Many of the stitches will draw attention to my heavy dependence on writings in the history and philosophy of science, especially in Chapter 1. Common sense may no longer hold ‘that the scientist’s answer is the only ultimately true one’ and that in modern civilization science is ‘*quasi lignum vitae in paradiso Dei, et quasi lucerna fulgoris in domo*

Domini' ('as the tree of life in the paradise of God, and as a lamp of splendour in the house of the Lord'), as Thorstein Veblen wrote in 1906, quoting Pope Alexander IV's words to the University of Paris in 1255.²⁰ But strong traces of that attitude remain to power an anxious disciplinary reach for authority and so must be taken into account. The English word 'science', John Searle points out, 'has become something of an honorific term'; he would do without it if he could (1991/1984: 11). But we cannot. Better is to confront it historically, to ask what is meant by the claim to be doing science, what sort of a science is in view – there are many, as we will see – and what effects making the claim has on those who are making it. One of course conjures the miasma of scientism with the word, but dispelling it is simply part of the job of nurturing a beneficial relationship between humanists and their equipment. Two related points are to be made about this here.

First, the history and philosophy of science are disciplinary bridges from the humanities to the sciences and back, so it would seem reasonable to look to them for guidance in the not entirely dissimilar operation of connecting the humanities as a whole to computing. We need their help with the shared question of how machines are involved in making knowledge. An immediate fruit of this turn is the suggestion that experiment is the proper context for work in humanities computing. From that suggestion and the wealth of philosophical, historical and sociological insight into experimental knowledge-making, the coherent way of understanding my subject follows. Another, meta-theoretical fruit is the realization that forming disciplinary kinships is not limited to the intellectual bonds a humanities computing practitioner forms with his or her colleagues outside the field. It is an invaluable (and, in fact, a time-honoured) way of building a field of study and integrating it into the company of others. Hence Chapters 3 and 4.

My second point about 'science' is that however two-cultured we make out the sciences and the humanities to be – and that is changing – neither can be properly understood without the other (Collini 1998). Both together comprise our intellectual landscape and horizon. Even if it were true that these two cultures could have been cleanly separated when C. P. Snow delivered his famous lecture, they certainly cannot be now that they share the same basic equipment for much of their essential work, are found with it in physical and virtual laboratories (the sciences normally, the humanities occasionally) and, as I argue in Chapter 1, converge by virtue of it on a sense of experimental knowledge-making. Clearly the sciences and the humanities remain different

in several important ways. But there appears now to be a basis for convergence, so it would be foolish not to make the right kind of reach.

One reaches out for help, to satisfy a need, a hunger, a desire. Thus the historian of science Lorraine Daston has recently noted that apart from 'some older work on hermeneutics', such as Gadamer's *Truth and Method*, and Anthony Grafton's *The Footnote: a Curious History*, we simply lack 'an epistemology based upon the practices of humanists, on what they do' (2004: 363). To her list one should add, among others, Carlo Ginzburg's remarkable essay 'Clues: Roots of an Evidential Paradigm' (1989/1986), on which I draw heavily in Chapter 3. Still, her point is well taken: the list is quite short. History and philosophy of science, though very helpful in suggesting further directions, will not suffice. But it is worth asking, why *now* do we feel the need, notice the lack? Ginzburg's argument about the differentiation of the particularizing humanities from the nomological sciences gives good reasons for not feeling it earlier. I suspect for reasons given here that the culture responsible for computing has created the very methodological need computing promises to satisfy. If so, then in advancing the cause of humanities computing we are not changing the humanities but responding to a change that has already happened. It's like balancing on a ball, perhaps: movement occasions movement.

The question of culture, Clifford Geertz has taught us, leads to 'thick description', to a hovering barely above the minute particularities of study. In this book I try to speak about a subject, making an abstraction out of experience, mine and others, in an attempt to render this experience communicable, arguable, persuasive. But there are large tracts of this experience from which I cannot generalize because I do not read well enough, or at all, the many languages other than English in which work in and thought about humanities computing are done. So this book must also be a kindly call from anglophone humanities computing to the others. With it comes a problem, and a request to consider it: the problem of translation. I invoke here Umberto Eco's sense of that act, from his *Experiences in Translation* (2001): the interpretation of a text in two different languages, involving the culture of each. More precisely, the problem is this: to assess in a thick description how the field, as it is developing in its various national and linguistic cultures, is responding to particular features of them. In coming to a view of what *the* field is or might be, in arguing across these cultures with one another about what needs doing, who has done what, and so forth, comparative studies are essential. These seem most likely to be done by non-native speakers of the current *lingua franca*.

I deliberately steer clear of political and professional questions, preferring to put the intellectual case first, and leave necessary attention to the social conditions for enacting it to others. Of course each has much more to do with the other than I am admitting here for discussion. I argue from the primacy of desire – or, if you prefer, the imagination. When in the late 1980s I entered the nascent North American scene, dragging experience with computing from the mid 1960s behind me, conditions for humanities computing as a professionally autonomous field of academic work seemed dismal at best. I do not think what has happened since then has happened all by itself. I think people made it happen, despite the obstacles, because of what they were able to imagine, *because of what they desired*. After you have read this book, I ask you to consider what you want to happen and to push for it with all your strength.

Index

'An Index is the *bag* and *baggage* of a book, of more use then honour, even such who seemingly slight it, secretly using it, if not for *need*, for *speed* of what they desire to finde.'

(Thomas Fuller, *A Pisgah Sight of Palestine* (London, 1650): 337)

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