What's going on?[1]

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Abstract

Here I survey activities in the digital humanities as a primary source for our conceptualization of the field. I argue for the fundamental nature of modelling to these humanities and describe three varieties: analytical, synthetic and improvisational. I argue that these three kinds are distributed unevenly over the affected fields according to the degree to which each primarily reports on its objects of study, interprets them or invents new genres of expression. The changes in the disciplines are of course incremental—old things done better, more thoroughly and so forth. But what requires our attention and effort is the refiguration of them, of disciplinarity itself and of the conflicted economies in which academic work is increasingly taking place. I conclude by recommending that the institutional structures we build for the digital humanities should reflect the nature of the practice as it has emerged in the last few decades.

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1 The Question that Won't Go Away

I begin with a question that won't go away: what's going on? This is the question with which Canadian sociologist Erving Goffman would typically begin. Like him, though with different interests, I acknowledge that by asking it I bias matters toward a single explanation and imply a degree of authority no answer to such a question could possibly have (Goffman 1997/1974, pp. 153–5). But one must start somewhere. Where we begin is with the claims, counter-claims, failures, and achievements in computing. Here the work to be done is to make sense of experience and to form an idea of what matters for the humanities in the long haul. My own conclusion is that it is actually quite important that we pay attention. 'For the interesting puzzle in our times', Langdon Winner (1997/1986) has written,'is that we so willingly sleepwalk through the process of reconstituting the conditions of human existence' (p. 61). That is an enormous claim but, I think, no exaggeration: 'in designing tools we are designing ways of being' (Winograd and Flores, 1986, p. xi). Computing is not the only means we have of doing that, but it is certainly a big part of the toolkit present at hand.

There is so much going on now, so much at stake and so many interpreters about, that I think it is best to be cautious and, where possible, to speak plainly, though so much is poorly understood that plain speaking on this subject is difficult. Such, anyhow, is my aim. I will take a relatively conservative reading on the trajectory of computing for the humanities, say what I think our choices are and conclude with the simple recommendation that we design institutional structures for the digital humanities according to the nature of their emergent practice.

2 Modelling

The question of what is happening simply won't go away for a couple of reasons. First, to quote Jerome Bruner's (1986) characterization of the humanities, when asked persistently enough, this question opens up 'the alternativeness of human possibility' (p. 53),

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which is without end. Second, it is being asked of computing—by which I do not mean particular hardware or software in front of you, or in you, or in your car, wrist-watch, refrigerator or ubiquitously wherever, or what we can expect in the next release, or even what we can predict. When I say 'computing' I mean the evolving manifestations of Alan Turing's scheme for the design of indefinitely many devices, limited only by human ingenuity. In the history of inventions, computing is in its infancy, and its products incunabular. The point I am making is that they always will be, however progressively better they get.

But, as with the fairytale pouch that can never be emptied of coins, the consequential matter is *what is done* with computing. To know that, we must know *what it can do* for the humanities, given the kind of coin that it is.

First some basics. For a computer to do anything useful at all, it must have a formalized plan of action (which we call a 'program') that represents in simplified form whatever object or process one is interested in. Devising a model, as we call such a representation, involves a trade-off between what the medium can do and what we can envision doing—or in Bill Wulf's (2000) elegant definition of what an engineer does—'design under constraint'. Aside from money and time, computing brings two interlocking constraints into sharp focus—absolute consistency and complete explicitness. Anything we wish to model in the computer, and so to compute, must be measured against them.

Two closely interrelated problems immediately surface. One is the inevitable and radically severe loss-in-translation which these constraints impose on any real-world object, especially severely on works of art and literature. The other problem, Brian Cantwell Smith (1995) has pointed out, is that we have no theory to tell us in any reliable way whether a given model corresponds with that which it models (p. 462). The crunch comes not so much in determining whether the programmer has done his or her job correctly (though that is a concern), rather with the very idea of 'correctness' in any computationally rigorous description of the world (Smith, 1995). These two problems add up to what is known as the 'software crisis', which was proclaimed at the end of the 1960s and is still very much with us (Mahoney, 1996, p. 779). It frustrates us technically because it stumps us philosophically.

A moment ago I put aside the constraints of money and time. Allow me also to put aside the causes of the software crisis. I promise to return to all of them. But for the moment I want to direct your attention to the divergence of computational models from that which we have always done.

In a loose sense models are not new to scholarship. To render a cultural artefact intellectually tractable, we must ignore some aspects of it and highlight others according to our abilities, interests, and purposes. But calling this and a mechanical construct both 'models' is badly misleading: the mental kind, which Max Weber wisely preferred to call an 'ideal type' (Leff, 1972, p. 148), is without physical form and direct means of access. All that we can witness are its results in language, normally the ahistorical sequences of argument in the very slowly changeable medium of another's prose. In contrast, the digital model of an artefact is more nearly comparable to an argument than to the idea behind it. The digital model likewise begins with a selective, simplified conception of the thing and works this conception out in an external medium of expression, namely software. But again, software is not well understood. What is clear is the difference we experience in the change from writing to modelling: the ability to manipulate something directly without reference to the author or even without thinking-in-the-head. Leaving aside the postponed causes of the software crisis, then, rapid *manipulation* is what separates modelling from writing. Because tinkering with the model is so easy, so tempting, the finality we have known from the written and published word recedes into the future. We do not finish something, we call a halt to it. This inevitably undermines the authority of end-products, though we may choose (unwisely, I am arguing) to pretend that nothing has changed.

The fallout is this, in a nutshell: models of whatever kind are far less important to the digital humanities than *modelling*. Modelling is crucial. If you only remember a single sentence from this brief essay, remember this one: the word '*computing*' *is*

a participle—a verbal adjective that turns things into algorithmic performances.

Considering the implications of modelling, we may be tempted to say that it represents an *unprecedented* change in how we do the humanities. But saying that begs the question at hand. 'Nothing is really unprecedented', the late historian of science Michael Mahoney (1990) has pointed out (p. 326). Finding precedents in past things and experiences is how we make sense of what is new, perhaps even how we perceive the new at all. A new object or idea, once it catches our attention and starts connecting with what we know, tends to bring to the fore-related phenomena previously undervalued or ignored, to suppress other things once prominent and to put still others into a different light. A new past is created. So, rather than hypnotizing ourselves with supposedly unprecedented marvels, we must learn to see computing in its historical and social contexts, and so be able to ground modelling in something larger than itself. For computing to be *of* the humanities as well as *in* them, we must get beyond catalogues, chronologies, and heroic firsts to a genuine history. There are none yet.

But, let me give you a rough idea of how writing a tiny piece of that history might begin. About 30 years ago, Northrop Frye (1976) noted a striking technological change in scholarly resources, from the 'portly ... tomes' of his childhood, communicating in their physical stature 'immense and definitive authority', to the 'paperback revolution' of his adulthood, which better matched the speed of scholarship (p. 49ff) and gave wing to the diversification of publishing. The demotic character and relative impermanence communicated by these paperbacks also implied the undermining of authority I just mentioned, in this case a weakening of the barrier between author and reader. Running in parallel if not cognate with this physically mediated change came the theoretical changes in ideas of textuality, for example Mikhail Bakhtin's (1986/1979) 'dialogic imagination', reader-response theory and, more recently, in anthropological linguistic studies of context. Meanwhile various parts of computer science have developed congruently, from design of black-boxed, batch-orientated systems of former times to toolkits and implementations of 'interaction design' (Winograd, 1997). Computing has become literally and figuratively conversational.

Certain projects in the digital humanities, such as the prosopographical tools built in my department at King's College London, have followed suit by making the individual an active co-maker of that which he or she would previously been merely the user. Projects that create communal spaces for scholarship or involve collaborators in game-playing exchanges are responding in like style.

In view of such changes throughout the humanities and in both computer science and humanities computing, it makes less and less sense to be thinking in terms of 'end-users' and to be creating knowledge-jukeboxes for them. It makes more and more sense to be designing for 'end-makers' and giving them the scholarly equivalent of Tinker Toys. But we must be aware not to be taking away with one hand what we have given with the other. To use Clifford Geertz's (1993/1973) vivid phrase (p. 27), we need rigorous 'intellectual weed-control' against the Taylorian notions that keep users in their place—notions of knowledge 'delivery', scholarly 'impact', learning 'outcomes' and all the rest of the tiresome cant we are submerged in these days. The whole promise of computing for our time—here is my historical thesis—is directly contrary to the obsolete nineteenth century cosmology implicit in such talk. It is especially dangerous because it is congruent with the conveyor-belt mentality Langdon Winner alerts us to. No need, go the murmuring implications, to put serious resources into awakening the technological imaginations and improving the skill-set of academics and their students; no need to alter the design of the curriculum in response; no need to answer Jaroslav Pelikan's (1992) challenging call, in *The Idea of the University* some 16 years ago, to change institutional structures and practices so that suitably qualified technical staff become equal colleagues in the research enterprise (p. 62).

3 Analytic, Synthetic, and Improvisational Modelling

I have not forgotten those hanging problems I put on hold a while back. Let me begin to deal with

some of them now, by distinguishing the three kinds of modelling I just named.

To analyse is to figure out how something works by taking it apart, for example when a literary critic dissects a poem to understand how it does what it does. Constructing and manipulating a digital model *of* a poem—more accurately, *of* an interpretative understanding of the poem—allows the critic to probe his or her particular understanding, perhaps even change it significantly. To synthesize is to make something according to a plan or idea, as when a scholar writes a book or builds a database to represent a structure of interrelationships among disparate but somehow connected historical events and people. In this case, the database allows the designer and others to model *for* possible connections and patterns. To improvise, as London musician and musicologist Derek Bailey (1993) has said, 'means getting from A to C when there is no B' (p. 136). Improvisational modelling, represented partially by Jerome McGann's *IVANHOE*, is an inchoate, highly speculative notion whose discourse is work in progress.

I have written extensively elsewhere about analytic modelling (McCarty, 2005, pp. 20–72), but let me summarize briefly here. It is imitative, therefore severely affected by the problem of loss-in-translation, which I mentioned earlier. In fact, the constraints of complete explicitness and absolute consistency would seem to render analytic modelling useless for our purposes. We have been slow to address this question in recent years if not utterly tongue-tied, but the obvious answer has been staring us full in the face all along: *that the digital model illumines analytically by isolating what would not compute*. In other words, the failures of analytic modelling are where its success is to be found. Its great and revolutionary success for the humanities is to force the epistemological question—how is it that we know what we somehow know—and to give us an instrument for exploring it. I suspect that with the emphasis on standards and best practices, most analytic modelling has gone unnoticed in the manufacture of standard digital resources. Minimizing interpretation in order to ensure wide acceptance and use rules it out. Here, there is considerable work to be done on tools to allow sites for interpretation within an object of study to be identified, annotated, and manipulated rapidly.

Synthetic modelling is the great virtue of the scholarly thematic collections, such as the *Blake Archive*, the historical databases, such as the *Prosopography of the Byzantine World*, and VR reconstructions of lost, damaged, or altered objects, such as the *Pompey Project*. What makes these diverse things exemplary of synthetic modelling, and marks their departure from the knowledge-jukebox, is the specific implementation of tools for comparing, connecting, experimenting with objects of study. Strong factual or factoidal constraints govern what the user (or, more accurately, user-maker) can do, but mechanisms for conjectural play embed standard ways of reasoning from the given to the doorstep of argument. Progress here hinges on tools for bridging, on-the-fly, manipulatory possibilities to software options.

Improvisation differs from creativity by an emphasis on what is given. It is, again, 'getting from A to C when there is no B; it implies a void which has to be filled'.[2] Like synthesis it is constrained, but like creativity it seems mostly to take place below stairs, or where no stairs go. While we do not have to go places to know something about what happens there, nevertheless we should be asking why improvisation has received so little attention. The term I borrow from musicology, where it is used to describe world-wide forms of musical performance, but the idea is closely akin to inventive behaviour in the experimental sciences, in the arts generally, and in ordinary conversation. It is quite clear what people everywhere do all the time, and what some people do brilliantly well in particular media.

Theoretical biologist Robert Rosen (2000) suggests in *Essays on Life Itself* that in the sciences 'a mind-set of reductionism, of looking only downward toward subsystems, and never upward and outward' is to blame (p. 2). He is speaking primarily of physics, which as the dominant science until recently has had an enormous influence on how we think in all areas of life. He and biological anthropologist Terrence Deacon (2006), for example, make a strong case for the self-organizing, non-deterministic, quasi-teleological systems of biology as better, more generous models for us to think with.

UCLA anthropologist Alessandro Duranti (2005) suggests that we look to jazz improvisation for the human capacity to imagine systems with 'a life of their own' (p. 420ff), which like biological systems use constraints to stimulate and leverage further growth rather than, as with analytical modelling, to illumine their incapacities. Literary scholar Lisa Samuels (1997) similarly directs us to the arts: 'Beauty', she declares, 'wedges into the artistic space a structure for continuously imagining what we do not know' (p. 1).

The cusp of change from synthetic to improvisational modelling occurs where strict truth to the artefact or to what is supposed actually to have happened loosens into versimilitude. Here again Bruner's idea of the humanities is useful. The aim of these disciplines, he writes, is that their hypotheses 'fit different human perspectives and that they be recognizable as ''true to conceivable human experience'': that they have verisimilitude' (Bruner, 1986, p. 52). Here is indeed a slippery slope, or more accurately, a skateboarder's half-pipe, namely, again, the problem of imagination. On the one side, with the scholars, is reconstruction faithful to evidence; on the other, with the artists, is vision enabled by media. In between the kinds of modelling blur into each other. As we move from the one to the other, from the known to the unknown, the less the analytic struggle against the constraints of digital representation matters. Interest shifts to what you can project from computing into the world, what possible worlds you can realize and operate within.

Computing, then, puts us into very interesting company. On the analytic side, with our reductive equipment increasingly able to converge on the physical origins of textual, pictorial, and musical experience, we find ourselves with physical scientists. On the improvisational side, equipped to make the absent present, we find ourselves in the equally interesting company of biologists and artists. More about this later, with examples.

4 Disciplines and What is Happening in Them

In the early 1980s, Clifford Geertz and Richard Rorty drew attention to the fact that disciplines are living epistemic cultures of their own, and that to understand what is happening in them, and therefore to learn from them, we must not only respect their integrity but also pay attention to their normal discourse—to their 'tropes and imageries of explanation', as Geertz said (2000/1983, p. 22; cf. Rorty 1980, p. 320). In other words, interdisciplinarity requires ethnography.[3]

Claiming interdisciplinarity is faddish, but computing sets the stage for the real thing because as an applied field its principal focus is *methodological*. Methods migrate irrespective of discipline, according to the kind of data and transformations involved. Likewise, much concerning the application and outcomes of particular methods is shared in common. Here is where humanities computing enters the picture. This interdiscipline (as I like to call it) has developed over the last few decades as the incubator, steward, merchant trader, and critic of digital methods for the humanities. It has also begun to make deep connections into the disciplines for practical wisdom on how to do its job and for theoretical understanding of its practice. All the disciplines are part of its conversation—including, as I have said, the sciences.

What sort of digital work gets done where is not only a function of data type but also of what a given discipline chiefly does: *report and publish* what practitioners find; *interpret* primary sources of knowledge; or *invent* new genres of expression. Current priorities also weigh in heavily. Particularly since the advent of the Web, our attention and energy have been involved with the exponential growth of digitization. The benefits for scholarship here are unarguably great. But as ever larger amounts of searchable and otherwise computable material become available, we do not simply have more evidence for this or that business-as-usual. We have massively greater ecological diversity to take account of, and so can expect inherited ways of construing reality and of working, alone and with each other, to need basic renovation. Here is work to be done. It is not a matter of breaking down disciplinary boundaries—the more we concentrate on breaking these down, the more they are needed for the breaking down. Rather the point is the reconfiguration of disciplinarity. From computing's prospect at least,

the feudal metaphor of turf and the medieval tree of knowledge in its formal garden of learning make no sense. We need other metaphors. Here is work to be done.

So also, at this historical moment the inventing function is or should be prominent, since it is quite clear that imitation of the codex is for us a mug's game, e-paper notwithstanding. This is becoming especially evident in digital scholarly editions and other reporting projects. Codex-dependent genres simply need to be rethought, perhaps dissolved or merged, but certainly re-formed. As Jerome McGann (2001) has pointed out, we have not done very well in this area to date (p. 74). We have exhilarating theoretical visions of decentric scholarly forms—to paraphrase Roland Barthes (1990/1973) from the early 1970s, 'networks with thousands of entrances' (p. 12)—but weak means of attempting their realization. We can see that our tools for the analysis of text strike on both sides of a target we can vaguely describe, but we have no idea of how to build them. We know from careful analysis of traditional scholarly genres, such as the commentary, how powerful and subtle they could be in the hands of a master practitioner in an appreciative community of readers, but we are flummoxed by their challenge to the digital medium (McCarty, 2002). And so on, and so forth. More work to be done.

The interpreting function is dependent on the co-evolution of tools and of theory emergent from experience in the digital medium. On the analytic side, what is important is, as I said, getting to the origins of what we experience before we experience it. What we live for analytically is that residue of anomalies over there in the corner of the problem space, which is where we find (again I quote Jerome McGann) 'the hem of a quantum garment' (2004, p. 201)—the transforming agent of an altogether new way of seeing the world. On the synthetic side, what is important is creative engagement with consensual scholarly discoveries and understandings. For improvisation, what matters is imagining the might-have-been/done/written, taking as given whatever artefact is better to be understood. Again, more about this later.

What, then, about those other constraints I put on hold: the economic constraints of money and time? In a recent book that deserves your attention, *Thing Knowledge: A Philosophy of Scientific Instruments* (2004), Davis Baird, son of a commercial instrument maker, points out that by putting human knowledge and skill into objects, as we are doing, we make strange bedfellows of two very different economies. Even the small-scale manufacture of 'thing knowledge' requires money and expensive people's time, hence the activity tends to reflect organizational models from 'the commodity market where . . . knowledgeable things are sold' or even gets tied to this market (Baird, 2004, p. 213). At the same time, our epistemic goods are not by nature commodities but gifts. New thinking and new institutional structures are needed to reconcile commodity and gift economies more productively.

5 What is to be Done

Computing's trajectory, I said at the outset, calls upon us to rethink the craft of our own research and to connect it up with whatever informs its goals. I noted that in computing's emphasis on modelling rather than models, the already existing movement in scholarship away from the monumental toward the conversational is accelerated. I argued that by virtue of its rigorous constraints, computing gives new form to the ancient realization that transcendence is knowable only by what it is not. Thus the computational 'way of denial' leaves us with ever better questions, and so gives us reason and motive to converse. Modelling improvisationally toward new forms of expression, I said, is performative, moving into and involving the artistic. But (to paraphrase Abby Hoffman), if we are to sustain and develop the theatre in this crowded fire, what sort of a theatre should we be building?

To answer this question in general, with the expectation that it will be applicable to someone else's institution, is foolhardy. Institutional structures are notoriously local and do not translate easily, even within a single academic system. But looking across the highly various institutional

models for humanities computing that have been created in the last couple of decades or so, it seems clear that Pelikan was right on: the support of research simply must become a collegial, collaborative activity, which is to say, not 'support' as it has been known. The major centres built to support—at Toronto, Oxford, Bergen and elsewhere—have vanished, replaced in prominence and influence by those for which collaborative collegiality obtains. The largest and most influential centre to date (which happens to be my own) is an academic entity, with junior and senior appointments in humanities computing, teaching programmes offering BA courses and MA and PhD degrees and a large research staff employed in grant-funded collaborative projects. The details are important, but what matters most in this story is the correlation of institutional success with the intellectual case I have attempted to make. In other words, as I said, *the institutional structures we build for the digital humanities should reflect the nature of the practice as it has emerged in the last few decades*. This is simple to say but quite a challenge to realize.

6 Bridge Building

What, then, *is* going on? In summary, the picture that I see emerging from current work looks like this:

- A world-wide, semi-coordinated effort to create large online scholarly resources, the best of which allow synthetic modelling;
- Out of this activity, the slow development of new genres in something like a digital library, though considerably more complex and various than once was imagined;
- Analytic and synthetic modelling, on the one hand to probe for contributions to the construction of meaning, on the other to reconstruct lost artefacts from fragmentary evidence, blurring gradually into improvisational modelling for what Bruner has called 'possible castles'.

Recall that to model is to create a useful fiction. In analytic modelling, we privilege what we know and use the model to advance the question of *how* we know it. I pointed out earlier that the strongly reductive character of our equipment-orientated analysis gives it a certain kinship with the physical sciences. This is a kinship that computing strengthens further by forcing us to reduce our objects of study to digital proxies. These proxies (data being data) are indistinguishable from anything else in a computer, hence as much candidates for scientific reasoning as any other data. Thus, we acquire access to a bridge (already under construction by historians and philosophers of science) into the scientific heartland. But the point I wish to emphasize is what allows this to happen: not physics-envy but the computational ability to implement the conjectural, that is, *to construct possible worlds and explore them*.

I said earlier that as we move away from reliable knowledge of artefacts, through degrees of uncertainty, to the point at which pre-existing artefacts disappear altogether, analytic is supplanted by synthetic, then synthetic by improvisational modelling. In the case of VR reconstruction, the artefact is enigmatic, fragmentary or missing, so we combine historical evidence and creative inference to produce an illusion of its presence. In such work, the danger of imagining the artefact other than what it was is obvious. But done deliberately, the result becomes more a work of art than of scholarship, or in socio-philosophical terms, a possible world.

Imagine, for example, a model of literary allusion turned to the synthetic purpose of generating all possible connections from, say, the 1611 King James Bible to subsequent English literature, evolving to account for the possibility that each new allusion might affect the range of subsequent possibilities. Imagine an explorable map of these allusions. How would we regard this *simulation* of a literary reality that no one or very, very few, would even claim to be able to reach otherwise? Imagine further. Imagine entirely fictional participatory worlds, of which *Second Life* and its kind give but a dim inkling, turned to artistic purposes. What would the scholarly interpretation of the artistic works thus created, taking place *in* those worlds, be like?

The trajectory toward the fictional holodeck is clear, and some of that only a matter of time. It raises all sorts of interesting questions, for example, about re-enactment of the past and the objectivity of

what we take to be the evidence. Important work has shown objectivity to be recent historical creation and so deconstructed a once seemingly impenetrable barrier between the sciences and the humanities (Daston and Galison, 2007). We are given the opportunity to redraw or to erase old lines of demarcation in academic work. We are given the chance to make new friends on a level playing field. We are given the wherewithal to refurbish the humanities.

But so what? Is any of this totally new? Perhaps not. Perhaps everything can all be done on paper—given a sufficiently long life, inexhaustible resources and no concern for what one's students, and the world, are doing. The important question is not 'is this new?' but in fact 'what's going on?'

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Notes

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2 Bailey, 1993, p. 136. On creativity in the context of computing, see Boden, 2005.

3 For a fuller treatment, see McCarty, 2005: 114–57; 2006.