

Attending from and to the machine

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Abstract. Though a graybeard verging on his institutional retirement, I celebrate the role of computing in inaugurating investigations, my own and those of others, into what we do not know but are curious to find out. I celebrate computing as one of our most potent speculative instruments, for its enabling of competent hands to force us all to rethink what we trusted that we knew. Like generations of our wiser predecessors, I celebrate learning for its own sake, but by other means than they had. I celebrate our responsibilities to those whom we teach, not merely to prepare them for the world as it is but more to open up, with the help of computing, "the alternativeness of human possibility".

1. Learning

Given this point in my career, it might seem more appropriate for me to deliver an exaugural rather than inaugural lecture, to mark impending retirement, reflect on my academic field and tie up loose ends. When I first had that thought and set down the word "exaugural", I thought I might be coining a word. I was wrong. Although the *OED* records but one instance from 1884 and marks it as "rare", it is nowadays very well attested, although chiefly in contexts suggesting a query of its meaning. That it should be thus is not surprising: the gray-beard inaugural does seem both recent and odd. But I am going to offer an inaugural in any case, not as if I were just beginning but because I am, and not as if, quite counterfactually, I were taking up a term of office but because the subject I profess is my vocation, until death do us part. At least that's desire's way of saying it. Fear's way would be to echo the philosophical neurophysiologist Warren McCulloch's confession of his greatest dread:

When we run to catch a baseball [he wrote] we run not toward it but toward the place where it will be when we get there to grab it. This requires prediction.... The earmark of every predictive circuit is that if it has operated long uniformly it will persist in activity, or overshoot; otherwise it could not project regularities from the known past onto the unknown future. That is what, as a scientist, I dread most, for as our memories become stored, we become creatures of our yesterdays – mere has-beens in a changing world. This leaves no room for learning (1951: 54).

As a human being I confess that what matters to me far more than professing what I know is learning what I don't – though rightly pursued these two become but differing ways of talking about one form of life – for me the most wonderful form of life this life could offer.

McCulloch, in an after-dinner speech entitled "The Fun of Failures", tells an apposite story about his colleague Norbert Wiener, the mathematician and cyberneticist, who one day

came splayfoot and triumphant from one of his inspiring lectures, but stopped abruptly in the hall, took his cigar from his mouth, and with a look of astonishment said, 'My God! I've proved too much. There are no prime numbers,' and returned to the blackboard before his students had departed, to try to find his mistake. They did. Such was the teacher [McCulloch comments] who considered the proofs

of theorems in the textbooks ‘a way of hiding how mathematics is made.’ Our proofs are afterthoughts and have little to do with the art of conjecture and discovery. Teaching and learning are not what Donald MacKay called competitive monologue, but dialogue in which each exposes the inadequacies of his map of the world for his partner to complete or correct (1969: 963).

Here, at this inaugural, you are that partner. I look to you, as historian Carl Becker wrote in the dedication to *Everyman his own Historian*, to avoid the error of Hway, a pupil of Confucius: “*Hway, said Confucius, is of no assistance to me; there is nothing that I say in which he does not delight*” (1935).

The hunger for learning is a profoundly human trait – in the old-fashioned sense of “human”, which still echoes in our word “humane”, defining that state to which our biology gives us the opportunity to aspire. Wiener argues in *The Human Use of Human Beings* that “man is a neoteinic form”, physiologically as a child in comparison to the great apes, our nearest relations, in biological terms spending an inordinate percentage of time learning. “Among the animals,” he declares, “man is a Peter Pan who never grows up” (1988/1954: 58). [FIGURE 1] He meant, and I mean, J. M. Barrie’s (not Walt Disney’s) Peter Pan, whom we meet in Kensington Garden.

The hunger for learning is also especially characteristic of a nascent discipline, like mine, which arises ambitiously out of opportunities and intuitions, with no history and very little of its own theoretical equipment, and so in the time-honoured way must turn to its better established kin for the raw material out of which to build a discipline. But quite apart from the state it shares with all upstarts, my field is forever *in statu pupillari* in two ways. For one, it was formed around the idea of collegial service to all the other disciplines of the arts and humanities, and so is uniquely placed in relation to them, both as learner and as teacher. These disciplines constitute its laboratory as well as its surgery. For another, my field is centred on computing, and so orbits a process that is in principle limited only by the human imagination, and so is for the indefinite future capable of surprising us with new means for investigating whatever we fasten on. Being *of* as well as *in* the humanities its orientation is to those disciplines, and as a field of research its purpose is refining and deepening rather than solving problems. Being *of* the humanities it strives for the virtue the great British Latin scholar Don Fowler recognized in the great German Latin scholar Eduard Norden, namely “his championing of the notion that... good [scholarship] does not solve problems but makes them worse...” (1999: 442). Computing can do so in the positive sense by relentlessly turning up contrary evidence, in the negative sense by illuminating the residue of that which will not compute, or what I call, with reference to Pieter Bruegel the Elder, the Icarus Effect [FIGURE 2] – that anomalous detail which once spotted, and taken account of, transforms our understanding of the whole.

My purpose here is to say what I think a computing *of* the humanities is, what demands it makes of us and what opportunities it offers. My purpose is (to quote my colleague and friend David Ganz) to open up “the arsenal of nemesis’ forcing us all to rethink what we trusted that we knew”, to draw out of it the weaponry computing has given us for that

mental fight from which we are sworn never to cease. It is to tell a story the plot of which has nearly been lost to us in our ignorant anxiety to please. It is to exemplify, insofar as I am able, the powerful innocence augured in William Blake's warning that "He who replies to words of doubt / Doth put the light of knowledge out".

2. Inheritance

At the beginning of the second decade of the 21st Century, what is an inaugural that it could aid such purposes?

Although from a very different era, the definition offered in 1906 by Sir Charles Oman, Chichele Professor of Modern History at Oxford – "a sort of profession of faith, a solemn setting forth of the views which the newly appointed professor holds, and the programme which he intends to carry out, so far as in him lies, during his tenure as chair" – more or less survives translation into this moment, though not, I would hope, his identification of the professor's plans with the term of his or her institutional employment. The modesty commonly expressed by inaugural professors who stand in the place where great forebears have stood is not available to someone, like me, who has none but contemporary professors in his field, though I am keenly aware of being small among the intellectual giants to whom I am most deeply indebted. Albert Einstein used his inaugural in 1914 to explain his role as a solitary theoretician among more practically orientated, more highly collaborative experimentalists. The solitude he needed to "eavesdrop on nature" would allow him, he said, to formulate worthy questions for the "united efforts" his science required. (We would do well, I think, to pay attention here to the complementary roles of solitude and collaboration – but more about that later.) Einstein also expressed gratitude for the freedom his professorship bestowed from "the distractions and tribulations of a practical profession" (1997/1914: 16). If, as I suspect, such an expression now seems quite antique, we need reminding how small, cramped, socially problematic, historically provincial and cognitively debilitating a world defined exclusively by immediate practical use actually is. O Oscar, where are you now that we need you most?

Older inaugurals tend to betray a settled self-confidence. Partly, I suspect, this comes from the security bestowed by a kind of superstitious reverence for education recent enough that I can remember being its beneficiary. This reverence is gone now, leaving behind great confusion among our ranks, disaffected tax-payers and so a pressing need for professors like myself to respond convincingly, in plain language, to the great *So what?* question. I will return to that.

Professional self-confidence is also, however, partly the gift of long-established disciplines, with their history, enviably mature resources and institutional stability. Being in an infant discipline, I turn for guidance to the inaugurals of others with equally little to go on. One such was the Torontonian W. J. Ashley, who 122 years ago, in the then new field of political science began by noting the institutional disturbance caused by the introduction of new disciplines. He argued that,

the change has been the result not of mere love of novelty, but of urgent need. It was because men came within sight of new truth, and of new means of discovering truth, in a way which opened up for them whole continents of possible knowledge. [The older disciplines] did not become in themselves less valuable; but other subjects were seen to be valuable of whose existence men had before scarcely dreamed. The *Orbis Veteribus Notus* was not smaller; but it was no longer the whole world. (1888: 3-4)

I praise much in Ashley's declaration, but I am bothered – not by the obvious signs of age in his language, rather by his geographical metaphor. About twenty years later than Ashley, in 1917 in neutral Zürich, while the great empires of Europe were coming to a bloody end [FIGURE 3], the Göttingen mathematician David Hilbert invoked a more contemporary version of this metaphor, apparently without irony, when he spoke of “the great empires of physics and epistemology” with which mathematics had established friendly relations (1996/1917: 1107). Today we may speak somewhat less robustly of our disciplines, but we are still possessed by that old habit of mind which reifies the living intellect of human beings, and so makes *knowing* preliminary and subservient to *knowledge*, then maps the known as turf and territory. Perhaps, as with Ashley's usage, while portions of the earth remained to be colonised, it was not so obvious that thinking in this way cripples thought. More to the point, perhaps reasoning itself has taken on a different style for us, manifested not (with thanks to Gilbert Ryle) in delineating *knowledge that* but in *knowing how* – in processes, practices and the communities defined by them. The problem with turf-warfare is not so much the conflict as what it is over: the fixity, finitude and familiarity of received knowledge in received structures. Thus equally limiting is the possibly even older metaphor of the *arbor scientiae* [FIGURE 4, 5], the tree of knowledge, with its fixed branches of learning, here shown in two 16th-century depictions of *Doctor Illuminatus* Ramon Llull's 13th-century scheme, the one on the right demonstrating its grip on us even to this day.

I suspect that all the talk about interdisciplinarity these days is symptomatic of a basic refiguration of thought of the sort that Clifford Geertz noted for the social sciences thirty years ago (2000/1980). But whatever may be the case for the established disciplines, the orientation of my own to them is not at all well served by a geography of warring states or by the form of a tree. The metaphor that I think best serves is an indefinitely extending archipelago of epistemic island-cultures [FIGURE 6], separate from each other but close enough to allow for cautious intermingling. Among the islands of this archipelago, humanities computing functions as a scholarly merchant-explorer, who facilitates an ongoing interchange of intellectual goods. The great Australian ethnographic historian Greg Denning has written often and powerfully on the explorer's central experience, which he calls “crossing the beaches of the mind”. My experience is much as he has described, with that defining negotiation, difficult enough, out of which emerges the middle ground of participant observation – surely one of the best formulations of the vital paradox at the heart of the intellectual life.

3. Problems at hand

Let me, then, exemplify my subject at the most difficult end of the scale of computing, with the disciplinary artefacts and activities that pose the greatest challenges. I will show a few examples, attempt to indicate the complexity of the problems they raise, describe what we now know to do with them and the benefits which we know even current techniques bring. For practical reasons I will not be able to touch on every interest in the arts and humanities affected by computing. Nor will I visit any of the great collaborative projects of my department. Rather, with things not yet done I will attempt to illustrate the common ground of problems. But I will depend on you to draw analogies from these few examples to your own areas of concern. You will thus need to be quick-witted simultaneous translators in a collaborative effort, taking place here and now, to spread understanding of the digital humanities. This is crucial not just because understanding of my subject is infantile, but also because it is an institutional infant dependent on its colleagues for survival.

I will ask you not to pause at the current state of the art but to awaken your desire and let it reach forward, toward the ever receding horizon of possibilities, to what might be done by someone someday. In other words, my objective is to sketch a mode of imagining rather than to describe anything imagined, built and delivered. I am concerned not with what we demonstrably know how to do, rather with what we don't but want.

3.1 The elusive book

My first example [FIGURE 7] I is from the book *Am Wegesrand* ("by the side of the road"), a little jewel, the work of two German-American graphic artists: Fritz Kredel, who did the woodcuts of flowers, grasses, leaves and roots, most of which he found in Inwood Park, not far from his home in New York City, and Georg Salter, who wrote out the poems in a modern Gothic cursive hand. *Am Wegesrand* was published in Frankfurt in two forms: a limited, hand-coloured edition in 150 signed copies printed at the Bauersche Gießerei, from which this image was taken, and an uncoloured trade edition without the calligraphy printed by Der Goldene Brunnen.

Today we could put together online what is loosely called a "digital edition" of *Am Wegesrand* with superb high-definition images of each page (or, better, openings), transcriptions of the poetry, commentary, links to the scholarship on it, biographies of Kredel and Salter, examples of their work with links to dedicated online sites – and so forth and so on. We could produce it for online or printed distribution in any describable form. Doing this would engage our best technical experts. As with current projects it would raise questions, not only of technique but also of relevance; it would lead us to look quite closely at the original (looking even in a new light), ask *how it does what it does* and so to reconsider exactly *what we thought we were doing*. It would lead us to some very large and difficult questions, e.g. what genre we are groping toward, or as it is more usually asked, what we might mean by a "digital edition" – to which currently we have no good

answer; and – this is without doubt crucial to the future of the digital humanities – *what relationship to computing we might implement from our relationship to the work of art, how the one might simulate the other*. Remember those questions. I will return to them later.

We now have considerable experience doing this sort of thing for a wide variety of manuscripts, archival collections and printed books from all periods. Despite clever bells and whistles, much of the benefit, especially for manuscript editions, comes from straightforward access to images and transcriptions – which as I say is important, but it is not the whole story. To illustrate allow me to move from the 20th-century codex to a medieval glossed manuscript, say Leiden 87, from the 9th Century, written in Carolingian minuscule [FIGURE 8]. There can be no question of substituting digital images for the physical manuscript, however fine the imaging, although good images are of enormous help and worth all our efforts to provide. The physical presence of the codex affords an experience, rich in information and significance to the scholar, for which no simulacrum we know or can imagine how to build serves adequately. Rather the question is, what more than high-definition imaging can computing do to supplement direct physical study? What, in other words, can we imagine the digital manuscript edition to be? To answer that we must ask *inter alia* about the dynamics and semiotics of a 9th-century reading of this 5th-century work, about what devices might be constructed to model and so to probe the strength and implications of our ideas about that reading. What tools might be made available, for example, to analyse the dynamics of letter-formation (the so-called *ductus litterarum*) so as partially at least to automate the identification of hands? How might we study the positioning of the glosses? And so on. As David Ganz says, “How long is a piece of string?” But, in common with the best work in artificial intelligence, the *scholarly* point for the maker of such tools is the residue of questions left over from the making, the ill-behaved Icarus in the works. The scholarly question for the doer is, what can we now *not* do, just as the question for the knower is, what can we now *not* know?

Manuscripts are well protected, sometimes almost too well. Epigraphic objects, which may be simply stones in a field somewhere, are often not protected at all, from the weather, thieves, warfare, opportunistic builders and so on. [FIGURE 9] For example, here thanks to my colleague Charlotte Roueché is a column with a rare instance of a painted inscription (on the right-hand segment, near the discarded water-bottle) which has somehow survived, lying out in the site at Ephesos and gradually deteriorating. One can understand from such examples how in epigraphy, with its prominent reporting function, creating a digital resource taps into motivations that for the scholar go “deeper than plummets sound”. The digital medium answers irresistibly to old dreams and against old fears.

This answering is undoubtedly good, very close to a perfect marriage between what can be done and what we know to want. I do not wish in any way to gainsay it. But for interpreters like me, and for the *future* of the digital humanities, what counts is the questioning. The future dawns when the answers and solutions we have show their inadequacies – by breaking down, proving insufficient or just by being just too

comfortably predictable, and so harbingers of the has-been life McCulloch feared. Those inadequacies, if pressed, defamiliarize both the tool and the object to which it is applied. In Jerome Bruner's paraphrase of the Russian Formalist Viktor Shlovsky, what was obvious and familiar is then made strange, so that we look at it afresh, with a beginner's mind, with Blakean innocence (Bruner 1988: 15; cf. Shlovsky 1965/1917: 18).

3.2 Literature

Now I turn to literature. I summon for an example a single poem, Seamus Heaney's "Field of Vision", which I intend to stand for all literature. I have chosen a very recent poem and something in English to make things as simple for us as possible. I have chosen Heaney because I love his poetry. [FIGURE 10]

I remember this woman who sat for years
In a wheelchair, looking straight ahead
Out the window at sycamore trees unleafing
And leafing at the far end of the lane.

Straight out past the TV in the corner,
The stunted, agitated hawthorn bush,
The same small calves with their backs to wind and rain,
The same acre of ragwort, the same mountain.

She was steadfast as the big window itself.
Her brow was clear as the chrome bits of the chair.
She never lamented once and she never
Carried a spare ounce of emotional weight.

Face to face with her was an education
Of the sort you got across a well-braced gate –
One of those lean, clean, iron, roadside ones
Between two whitewashed pillars, where you could see

Deeper into the country than you expected
And discovered that the field behind the hedge
Grew more distinctly strange as you kept standing
Focused and drawn in by what barred the way.

Let that poem do what it is doing in your mind while I discuss literary computing for a time. I will get back to it. But meanwhile allow the difference between it and the evident activities in literary computing that I am about to review serve as implicit, ironical commentary. That commentary will teach us whatever amounts of humility we are capable of learning.

Once it seemed as if written text were the low-hanging fruit in the digital harvest. From the end of the 1940s, when philologist Fr Roberto Busa began the great *Index Thomisticus* project, to produce a concordance to all St Thomas Aquinas' writings, until the coming of the Web in the early 1990s, much of the work in literary computing was of this kind. But

already by the early to mid 1960s the fruit reachable from the ground was beginning to seem less than adequate for literary-critical purposes. Mainstream criticism had in fact paid no attention to analytical uses of computing, and to this day has continued studiously to neglect these uses (Potter 1989: xvi). Diagnosis of this neglect became a nervous tic of practitioners, spawning numerous articles and asides from the mid 1960s to the present day, including one by Sir Anthony Kenny (1992). Several contributory factors have been fingered, but to my mind by far the most important has been the imaginative failure identified by literary critic Joseph Milic in 1966, in the lead article in the inaugural issue of the first journal in my field. "We are still not thinking of the computer as anything but a myriad of clerks or assistants in one convenient console", he declared, and then called for a "truly imaginative" next step in spite of the odium that had greeted earlier attempts. He went on: "These and other creative uses of the computer are trials of strength, estimates of capability" whose ultimate purpose, he said, was to achieve greater intimacy with "the creative process" (1966: 4-6). For literary scholars, he argued, computing was not about the machine's efficiency as a servant but about its participant enabling of criticism. In a review of books on the social impact of computing, the pioneering systems scientist Sir Charles Geoffrey Vickers used starker language: to succumb to the "dangerously strong" temptation of the amoral "slave labour" on offer, he wrote, would bury computing's intellectual potential (1971).

The historical question of why people should think of computing in terms of the master/servant dialectic is far too complex for me to unpick here. They did (we might say, grossly oversimplifying) because it seemed easily to sort the fundamental challenge computing posed and poses to the idea of the human. Computing is of course not alone in this challenge; as we know in the 201st year since Darwin's birth, refiguring what it means to be human is an ongoing and deeply disturbing project. But when – to get straight to my point – we consider the interpretative practice of literary criticism; when we ask about bringing computing inside, under the skin of scholarship, not as a servant to it but as an intimate, we are perforce asking the question of the human, and the question of text, and the question of what happens when these two vanish in the experience of reading. We are asking, in other words, the very questions our philosophical neurophysiologist Warren McCulloch asked as a lad when he faced his tutor at Haverford College, though he put the matter in terms of numbers rather than words. I paraphrase him: what are we that we may read a text? what is a text that we may read it? McCulloch's tutor, a Quaker, replied to the young lad, "Friend, thee will be busy as long as thee lives" (McCulloch 1988/1961: 2). Who could hope for a finer sentence?

So where are we now? We have artfully crafted online literary resources of great value to our colleagues. We have simple but elegant techniques in interactive concordancing for the day when close reading is again of interest. Best of all, we have come to the point of being able to argue persuasively that stylistic features of a literary work (such as authorial voice, genre, period and nationality) "can all comprise statistically distinguishable groups" (Burrows, forthcoming 2010). This means that we can connect our aesthetic impressions to verbal data in much the same way as we now make sense of populations or of the physical

world, which we have known to behave probabilistically since the early 20th Century. But the regularities we detect by such means are in the text-in-reading. They point to shared mental processes, and so join the study of literature to the cognitive sciences in ways we are just beginning to explore.

In his plenary address to the international digital humanities conference in Toronto in 1989, my mentor Northrop Frye said quietly that when he wrote *Anatomy of Criticism* “such conceptions as ‘software programming’ and ‘computer modelling’ were as yet unknown, and if I were writing such an introduction today I should probably pay a good deal of attention to them” (1991: 6). It took me a long time to understand the implications of that statement – the process toward which he was pointing: not merely to the analytic modelling that demonstrates the inadequacy of any formulation we might make, and so highlights the dark residue of the uncomputable, but an abductive “modelling toward” suspected or merely felt but unknown patterning. I quote Frye because he saw, however uncertainly, exactly where literary computing can take us, when it is liberated from servitude and we from mastery.

For good historical reasons we have inherited the notion that computing happens inside a box sometime after we have done something on a keyboard, with a mouse or other input device, and from which issues, e.g. on screen, the output for us to consider before the next input action. If time did not matter, this would be the relevant account as well as an accurate one. But time does matter because we are beings in time – where being-in-time requires a Heideggerian violence to squeeze from those three words the participial sense of *be-ing*. If our computing machinery is to “augment the human intellect”, as Douglas Engelbart (inventor of the mouse) said it should, then it has to operate at the speed of being, as fast and intimately as corporeal thought, as fast and intimately as a chisel in the hand of a master woodcarver. In the early days of such work, when in World War II the anti-aircraft problem was at the top of the scientific agenda, the bottleneck seemed to be the slow human component, the problematic “machine in the middle”, as the wartime cyberneticists said. But now we know that the problem is to attune the machinery to us humans. Enough of our adult reaching down to accommodate the child-machine; it’s now time to make the child-machine reach up to us. We have developmental, evolutionary arguments from the likes of Merlin Donald about the role of equipment in “the origins of the modern mind” (1991). We have strong analogies from the sciences to suggest that in the immediately responsive situation with computing, emergent capabilities will show themselves. And, more to the literary point, we have Jerome McGann’s thrilling, wild gathering of theoretical raw materials from which a language might be constructed with which to talk about these emergent capabilities soberly enough to design for them (2004).

The dream is this: not only, to use Heidegger’s term, for a computing ready-to-hand, but more, to use Michael Polanyi’s, it is to have a computing from which to attend to the text-in-reading, not merely in the sense of a perfect e-book reader but in a sense now barely conceivable. Take, for example, Heaney’s poem, in particular his summoning of a whole culture in the figure of the woman in the chrome wheelchair, who “never / Carried a spare

ounce of emotional weight”, of the education to powerful strangeness drawing him in. The question now to ask is, what is happening in us, to us as we read these lines? Can we do more with computing to serve that embodied moment than so far we have done? If it is to annotate, then how might annotation be reimagined from centuries of practice to augment critical thought? (My colleague John Bradley is working on this problem now.) Could we go out, as Frye imagined, into the whole of literature better than now, to locate Heaney’s poem in this world of others’ words and others’ experiences? Not push a button and wait for the answer; not follow links; not work within a system of tags established canonically for us by an expert, or a committee, or a consensus of the great and the good; but on the spur of the moment, try things out and see what happens, try things out and model our way experimentally toward a better knowing.

Do I know what I am talking about? No, I don’t. But I know that we must talk in this way, toward that end. I smell food on the wind.

3.3 Aesthetics

Let me rephrase by returning to Kredel’s graphic art, this time for reasons of simplicity to an uncoloured plate from the trade edition [FIGURE 11]. Let me say again, as at the beginning, that here stands the whole problem, which begins for me, an embodied being with slightly more than six and a half decades of kinaesthesia to my credit, in muscle-twitching, vertiginous wonder, and proceeds, through a participation in the thing, to a resonant understanding. “In a work of art”, the Polish Jewish artist and writer Bruno Schulz said in 1935,

the umbilical cord linking it with the totality of our concerns has not yet been severed, the blood of the mystery still circulates; the ends of the blood vessels vanish into the surrounding night and return from it full of dark fluid.... [T]he work operates at a pre-moral depth, at a point where value is still *in statu nascendi*.... If art were merely to confirm what had already been established elsewhere, it would be superfluous. The role of art is to be a probe sunk into the nameless. (1998/1935: 368-70)

Here, in Kredel’s woodcut, Schulz’s nameless is brought into view, inviting sympathetic kinaesthesia, by that large sweeping arc of leaf, those other twisting arcs, the whole balance of the composition, its biological dynamics. We can, as I said, photograph it, but that is only visually to paraphrase. We can tag and catalogue it, but that only helps us find it again, and so restates the problem. How can we learn it, get *into* it, with this marvellous machine, as “naturally”, though differently, as we learn with the codex – also “a machine to think with”, as Ivor Richards said of the book in 1925?

4. Students and the future

It is not at all difficult for professors to find interesting things to do and, after a lifetime of practice, to construct impressive monuments against time, like Ozymandias. But “true greatness of spirit”, Sir Charles Oman said in his inaugural, “is shown not by the man who assumes the pose of infallibility, but by him who joyfully accepts correction, and turns it to

immediate account" (1906: 8). In the best of circumstances that's what students do for the professor. What does the professor do for them?

The service-industry model has been so crudely forced on university lecturers and students alike that you may find that question both too difficult and all too easy to entertain. But I am not asking the customer-service question. Rather I am asking, with specific focus on the digital humanities, how (as Rick Trainor once said) we can remake our students' expectations rather than fulfil them.

You might envision me, as a former North American, in the image of a melancholic frontiersman of an intellectual Old West [FIGURE 12], watching the territories being settled, streets paved, laws passed "and every other damned thing", as Wild Bill Hickock said in the television drama, *Deadwood*. The truth of that metaphor is that my training, like that of others in senior positions of humanities computing, was *sui generis*: largely autodidactic, highly unorthodox, fortuitous, and very much against the grain – so much so that ever since I turned aside from the path of my *Doktorvater* in the mid 1980s, I have been looking over my shoulder, expecting at any moment to see a disciplinary copper running after me, shouting "STOP THAT MAN!" It is true that a dozen years spent in the academic *demi-monde*, on the wrong side of the North American tenure-tracks, bestowed freedom to explore, a survivalist's strength, an artful dodger's agility and the quality of stubbornness. But so much of the good that has happened to me is either accidental or due to others – most especially to my dear friend Harold Short – that even the enviable part of the story is no pattern for replication, no template for the sustainable development of my field. So where from here?

The imperative to attend to what Langdon Winner has called our technological somnambulism simply cannot be denied (1986: 10). Yet even his alert to civilization's engine of change is too superficial a warning to prepare our students for the challenges of the probable future. They already know how to push the right buttons. What they do not know is how to get an effective historical and philosophical handle on the changes of which computing is in part cause, in part cognate product. A whole curriculum could be built around that challenge.

My kind has lived through the ignorant hostility of colleagues to the point where easy, thoughtless familiarity with computing and its equation with problem-solving has become the problem. We have lived through a time when established academics largely dealt with the threat figured in computing by constructing it as a service to be performed by "rude mechanicals" and by punishing any student or colleague who got too close. Now the tendency is to domesticate computing as a handy appliance, a "knowledge jukebox" (I call it), and so to conceal the very thing that should be at the centre of our attention and the curriculum's. As long as we think uncritically of the fruits of our labours as "deliverables" we sustain the servitude that has all along been the sign of our sclerotic resistance to the change going on all around us and to us. It is only, perhaps, because the history of computing is too recent for our best minds to figure out how to write it, and is so clogged

with hype, that we all do not see how fundamental it is to our time, how well connected it is to streams and rivulets of our cultural history, in the sciences, the humanities and the arts, going very wide and way back. The two-cultured gulf institutionalized in our educational systems keeps us from seeing not just that computing belongs to the arts and humanities because it is *of us* but also that it brings us to common ground with the sciences. The disciplinary/departmental blinkers we wear so as not to see the open fields Dame Gillian Beer writes about keeps us from resolving the recurrences of particular methods throughout the disciplines into the methodological commons of which my discipline is the keeper. In Ivor Richards' sense of the philosophical mission, mine "endeavors to keep studies in some touch with one another" with respect to their computable methods. But, thus rooted firmly in the academic enterprise, it also digs critically into the way the so-called Real World (from which our students come and to which they return) orbits the computational, and *vice versa*. It strives to train them to do well with it. Since in principle the forms of computing are indefinitely extendible, this is an indefinitely ongoing job. It is my job.

At the beginning I asked whether computing's involvement in our struggle with the nature of the human did not give us an urgent social purpose. For computing, now ambient and ubiquitous, by nature acts on the world and intervenes in our lives, changing them and itself changing as it goes. Once upon a time computers were slow and separate; now they are fast and close. No more the seduction of slave labour to resist. Now [FIGURE 13] in the future to *Bladerunner's* present – in cinema 28 years ago, in fiction 42 – it might seem that the idea to grasp is the *resonance* of life *in corpore* with the life-like *in silico* [FIGURE 14], here depicted by a brilliant icon of the human-machine-mirroring that possesses our time. But there is so much more than this comfortably disturbing, cozy arrangement with our brain-child. I refer to that which we have marginalised in order to think like this. The philosopher Vernon Pratt pointed out in 1987 that we project our machines toward a concept of mind which more than meets them halfway (245). We construe mentality as if it involved manipulating representations of the world, then we exclaim over the successes of a machine we have built to do just that. "What we must try to imagine", he wrote, "are alternatives to the concept of mentality which sets our agenda today, but which belongs to a framework of ideas that will surely, like its predecessors, pass." We must, he declared, take "a fresh look at the picture, partly in light of those things that the machine becomes able to do for us, and then [change] our ideas about which aspects of thinking or mentality are truly important – that is, *about what thinking is*" – what text is, what music is, what drawing, sculpture and painting are – and so what we are. These are our questions. Exploring them is what the humanities and computing come together to do. It is what they together are for. It is an invitation to which, I hope, you will say YES! [FIGURE 15]

Thank you very much.

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