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Powers of the Facsimile: A Turing Test on Science and Literature

Bruno Latour

Mechanism and writing are from our point of view almost synonymous
Alan Turing¹

*When would an eternally refined estimate become real enough? When would
approximation suffice?*
Plowing the Dark

What is a realist style? Not a realism based on “matters of fact,” but a realism involved in the deployment of what I have called “matters of concern”?² As we have slowly begun to understand over the years, science does not bring what Heidegger called “objects” to the world – that is, something created by the empty mastery of technology – but a much more intriguing kind of entity, which is just as real, but much more entangled and that the same Heidegger has proposed to call “things”. And yet it seems that the model for sturdy realism has remained in philosophy, in science education, and in literature, the style inherited from the type of “objects” as opposed to “things” that has been devised, for complicated aesthetic and political reasons, by the first empiricists, that of

1 1. Alan M. Turing, “Computing Machinery and Intelligence.” *The Philosophy of Artificial Intelligence*. Ed. Margaret A. Boden. Oxford: Oxford UP, 1990. 40-66. Here, 62.

2 “Matters of Concern” is a technical term patterned upon matters of fact. If the latter represents the centerpiece of the early empiricist tradition (the indisputable building block of certainty), then the former represents the centerpiece of a new empiricism (certainty, yes, but mingled with disputability). For more on the distinction between “matters of concern” and “matters of fact,” see Latour, “Why Has Critique Run Out of Steam? From Matters of Fact to Matters of Concern.” *Critical Inquiry* 30.2 (2004): 225-48; and (for a more complete argument), *Politics of Nature: How to Bring the Sciences into Democracy*. Trans. Catherine Porter. Cambridge, MA: Harvard UP, 2004.

matters of fact. Artists and philosophers may rely on imagination, meditation, criticism or other foundations, but when they want to be realists, they have, it seems, no other option but fall back on matters of fact. This division of labor, however, is moot if matters of fact are only a rather unrealistic way to describe the ways in which the various sciences reach objectivity. This is why, in order to be realists, we have to move from first to what I have called second empiricism, the one that is built around matters of concern, not only matters of fact..

For many years now I have found in the great American novelist, Richard Powers, the most rewarding source of philosophical inspiration for this stylistic exploration. I have always taken him to be the novelist of “science studies,” the field to which I belong.³ If the task of science studies is to invent a realist vocabulary that would deal with matters of concern, then I have to understand Powers’s *tricks* in the positive sense of the word. If I fail to learn from him, and fail to adapt my goals to such a rich literary repertoire, no matter my efforts to provide a realistic description of science, it will always appear as another exercise in deconstruction or debunking. Instead of bringing the reader *closer* to the matters at hand, I will always be accused of fleeing further away, by, for instance, directing attention out to the often irrelevant “social” world. It is thus crucial that students of science learn how to achieve greater proximity to their object of study, and circumvent the pitfalls of critical or subjective discourse. Then, we might be able to use Powers’s resources for giving our own descriptions the kind of grasp on reality that we can understand conceptually through the work of William James and Alfred North Whitehead. If philosophy wishes to connect with empirical field work, it has first to learn the skills of literature.

I am not going to read Richard Powers as a literary critic would – I possess none of the credentials to do so – but I will treat his novels as a tool box, to see how we could use even a hundredth of those skills to pursue our own science studies projects, instead of botching our own theories by our tragic inability to write in any realistic way. I am going to first define the types of realism toward which Powers leads us by using the fascinating example provided by *Plowing the Dark* (2000). This will then lead me to a major objection: Powers is a great artist, but why would that be helpful for the study of *science*? To answer this objection, I will then proceed to build a little Turing test of my own by comparing the original *text* of Alan Turing – a paper taken to be the origin of the famous Turing test – with Powers’s writing. The crossover – to use an expression from genetics – of literary resources one explicitly scientific, the other explicitly literary – will allow me to direct our attention to what is so strikingly new in the ways matters of concern enter our world. Let me hasten to add that I miss probably a good third of the bandwidth of Powers’s novels since I am not an English speaker and have only a fraction of his literary and scientific culture, so my use of his work

³ See Latour and Powers, “Two Writers Face One Turing Test: A Dialogue in Honor of Hal.” *Common Knowledge* 7.1 (1998): 177-91.

will be, I am afraid, a horrible simplification. But I have had the privilege of learning first hand that he is a forgiving man ...

How Many Realisms?

To be sure, realism is a multifaceted term and there exist as many realisms as there are definitions of how things stand. But only one distinction interests me here: I want to render more vivid the contrast between the realism achieved by matters-of-fact writing (exemplified, for instance, by a sort of late nineteenth-century Zolaesque style), and the realism achieved by matters-of-concern writing. This is the key difference I wish to lift out of Powers's work and bring into my own account of science in action.

One way to make this contrast visible is to understand the difference between Powers's characters, and those in science-based genres associated with *cyborgs*. Confusing Powers's work with such genres is, in my view, to misunderstand his project. Typically, cyborgs establish a connection between the average definition of a brain, the average definition of a computer, and the average definition of psychology, and fuse the three together in a classic – sometimes strident – character/background/story amalgamation. Whereas Powers, when he connects and fuses domains of reality, takes the *uncertain* deployment of what a computer is, the *controversial* multiplicity of what a brain is, the *wavering* achievements of psychology, and then tries to relate them in a narrative that does *not* imply the existence of a character silhouetted out of a background and inserted into a story. Rather, it is the emergence of plausible fleshy characters, things, and stories, that is the very topic of several of his books, at least the three most relevant for this paper: *Galatea 2.2* (1995), *Gain* (1998), and *Plowing the Dark*.

Reviewers often accuse Powers of being a “brainy” writer whose characterization suffers from an obsession with putting semiotic legs on mere ideas and facts drawn from science and technology. But one of the main problems explored by his novels is exactly the problem of the progressive emergence of individuals: Powers asks what it is for a character to exist at all, when so much of existence depends upon the things one is attached to – the most important connection being to the biological basis of life itself, which is the theme of *The Gold Bug Variations* (1991). By accusing Powers of simply “clothing ideas with flesh,” critics imply that they know what it is to be an idea, what it is to be a character, what it is to possess a “realistic” psychology, what it is to play the role of a “fact” on the stage of the narrative, what it is to be an episode in a narrative, whereas all of those features are explicitly and relentlessly questioned by the novels they are reviewing ... It's as if critics believe that Agatha Christie has provided the definitive realistic view of the world ... or that “water boils at 100° Celsius” is the paramount example of a scientific statement ...

But Powers takes science and technology much more “realistically.” Consider, for instance, the strand of *Plowing the Dark* that takes place in a Bill Gates-like digital factory, and is entirely devoted to exploring what it takes to produce a realistic-looking image out of calculations, and whether this is an intelligent idea or, on the contrary, a dangerous sin ... meanwhile, in the other intertwined plot, a young English teacher has to survive for months after being kidnapped in Lebanon by an Islamic terrorist group. So, as usual, what critics see as a weakness – “M. Powers, why do you give us so many *ideas* when we want *flesh and blood* characters?” – is actually the subject of the novel: “what will happen to you if you dare to produce *flesh and blood* realistic characters out of ideas, signs, symbols, calculations, you reckless makers of facsimiles?” And in parallel: “What will happen to you if you are kidnapped, blindfolded, and left for months without any signs, symbols, pixels, images?” In addition, the very objection that critics raise about Powers’s characters (“are they brains with legs?”) is actually the argument that divides most of the characters in the novel, since the protagonists argue amongst themselves about whether or not the *calculated* image is really just calculation, or something else that escapes calculation. In other words, what Alfred North Whitehead has called the “bifurcation of nature,” is the very literal object of the novel.⁴ Whitehead invented a whole philosophy to see whether or not the difference between primary and secondary qualities – the invisible stuff of the world, on the one hand, and the subjective rendering of phenomena, on the other – could be avoided. Powers’s novel stages just this question: how many distinct layers, routines, and transformations are necessary for a character to have “a life of its own.”

But this is only the superficial *content* of Powers’s argument. The prowess of the novel *as a text* is that the characters are not endowed from beginning to end with the same degree of reality, either. They, too, vary according to chapter, materializing and dematerializing on the page, enacting, so to speak, the very problem that the subject of the novel instantiates in the engineers’ discussions. And this is not done as a formalist exercise, in a sort of Nouveau Roman manner, but rather as a systematic inquiry into what it means to realistically represent the question of what it means to exist. Critics seem to imply that it would be more “realistic” to retain static characters from beginning to end, since this is the way they are supposed to behave in the scale-one world. But of course this is far from the case: continuity of agency is a literary effect produced by what semioticians call “isotopy” and “anaphors” – name tags, colors, clichés, allusions

⁴ The expression is from Whitehead, *The Concept of Nature*. Cambridge: Cambridge UP, 1920. Whitehead summarizes it as follows: “Unless we produce the all-embracing relations, we are faced with a bifurcated nature; namely warmth and redness on one side, and molecules, electrons and ether on the other side. Then the two factors are explained as being respectively the cause and the mind’s reaction to the cause” (32). On this question, see Isabelle Stengers, *Penser Avec Whitehead: Une Libre et Sauvage Création de Concepts*. Paris: Gallimard, 2002.

to other parts – it is thus a highly artificial achievement which can disappear any time.⁵ What, then, is more realistic? To act as if continuity of existence was an unproblematic given? Or to show that it can be a highly variable gradient, which can be intensified or attenuated as the story unfolds? For Powers, *being* is never given, it always has a *temporal* character.

For example, Adie Klarpol, the young heroine of the novel, does not have the same “fleshy” character throughout the book: she actually becomes fleshy, and not just the stereotyped artist-chick-against-the-brainy-nerd-*type* in the middle of the novel. And when she does gain in thickness and realism, that is in individualization, it is because she reads a *poem* by Yeats to a young graduate who falls in love with her at this very instant. In this book, we never encounter a character endowed with an autonomous psychology who uses language to access objects simply sitting in the background (the stock in trade of endless numbers of supposedly “realistic” make-believe narratives that are so disconnected from reality that they take paperback clichés for the only possible way to give flesh to characters). Instead, in all Powers’s novels, for any sort of humanoid character to exist, they must become connected, or have life breathed into them, from some sort of other non-human entity. This is, of course, striking in *Galatea 2.2*, where every single agent – human, humanoid, corporate or non-human – loses its competence at some point, or is endowed with some agency through the addition of some “plug-in” (see, for instance, the main character’s hilarious loss of competence through his thick misuse of the Dutch language). And this is the extraordinary achievement of *Gain*, where through the invention of the corporate body – in this case a soap-making company throughout two centuries of business and chemistry – all the elements that allow collective personae to behave as living characters are painstakingly disentangled in such a way that they are able to meet the sufferings of one individualized character who is dying of cancer. A feat matched by no sociologist of economics.

So, if we just consider the official, explicit, topic of *Plowing*, we already have in place two of the main topics explored by the new empiricist project: what is it for any sort of entity to appear to be real in a narrative? And how can the distribution of agencies between humans and non-humans be made visible instead of being taken for granted? One short passage will be enough to show how this works: this is the moment when Steve Spiegel, a young engineering student at this point, first hears the heroine at a poetry-reading party:

“Once out of nature I shall never take My bodily form from any natural thing.”

The words he supposed, were beautiful. The girl, he decided, was almost. But the way she said them: that was the warrant, the arrest, and the lifetime sentencing. Out of her mouth came a stream of discrete, miraculous gadgets – tiny but mobile

⁵ See Thomas Pavel, *La Pensée du Roman*. Paris: Gallimard, 2003, and his earlier *Fictional Worlds*. Cambridge, MA: Harvard UP, 1986. On isotopy, see Jacques Fontanille, *Sémiotique du Discours*. Limoges: PU de Limoges, 1998. And, as Paul Ricoeur has shown, this is even truer of our own biographies – see *Time and Narrative* Chicago, Chicago University Press, 1990.

creatures so intricately small that generations marveled and would go on marveling at how the inventors got the motors into them.

Once out of nature. The train of syllables struck the boy engineer as the most inconsolably bizarre thing that the universe had ever come up with. And this female mammal uttered the words as if they were so many fearsome, ornate Tinkertoys whose existence depended upon their having no discernible purpose under heaven. The words would not feed the speaker, nor clothe her, nor shelter her from the elements. They couldn't win her a mate, get her with child, defeat her enemies, or in any measurable way advance the cause of her survival here on earth. And yet they were among the most elaborate artifacts ever made. What was the point? How did evolution justify this colossal expenditure of energy? Once upon a time, rhythmic words might have cast some protecting spell. But that spell had broken long ago. And still the words issued from her mouth, mechanical birds mimicking living things. Sounds with meaning, but meaning to no end... [here I cut a part that I will return to below]

"But such a form of Grecian goldsmiths make". The girl's lips were a factory of ethereal phonemes. *"Of hammered gold and gold enameling".* Spiegel had never heard words pronounced that way —alloys of confusion and astonishment. Her mouth became the metal-worked machine its sounds described. Whole sentences of hammered gold tumbled out of it. (199-200)

I guess it would take as much time for me to understand this passage as it would for Steve, the hero, to fathom "how the inventors got the motors into" words. But this is typical of a lot of Powers's work – and I use the word "work" intentionally, since I see him as mining the same seam as science students, albeit with infinitely more sophisticated tools. The episode is in the exact middle of the novel, and the heroine is suddenly taking flesh through her reading of a poem many years ago – it is a flash back – while she is working with her former lover on the creation of a perfect digital facsimile of Van Gogh's *Chambre à Arles* for a sort of Microsoft reality enhancement Cave outfit!

All of those elements are important since, as the novel unfolds, incremental progress is made in the *degree of realism* possessed by the facsimiles.⁶ First Adie tries Douanier Rousseau's *Jungle*, then Van Gogh's *Chambre*, then finally Hagia Sophia and most of the novel is occupied by violent discussions about what features should be added to make the cave more realistic: how much of the world can be described in formal terms? And critics have missed that!

But while this is the *topic* of the scene, the *writing itself* produces the pixelization Powers is talking about. Here Adie becomes real for Steve – and for the reader – but she doesn't do so because she suddenly emerges as a psychological entity. No, much like "Helen" in *Galatea*, she emerges as a poem-reading "female mammal" and this revelation converts Steve at once, from an engineering student into a writer...⁷ This emergence from the background is

⁶ See Adam Lowe and Simon Schaffer N01SE a catalog, Kettle's Yard, Cambridge, 2000.

⁷ This is a semiotic rule that action is rendered in words through the transformation of actants, the degree of reality-effects depends on the way the isotopy is maintained from page to page. For a classic definition, see Julien Algirdas Greimas, *On Meaning: Selected Writings in Semiotic Theory*. Minneapolis: U of Minnesota P, 1976.

important for the novel since, 200 pages later, Adie will sort of disappear as well in the Hagia Sophia facsimile while the doubly-stranded character – Taimur the blindfolded half-black, half-Iranian English professor kidnapped by fundamentalists, who has risked disappearing for good during the whole novel ... – reappears in the light of day and finds himself endowed with a loving wife and child he did not know he had! Existence for a character in Powers’s novel is not a natural birthright but a risky achievement. No one has gone further than Powers in using all the resources of science and technology to explore how many ways there are for entities to move from existence to non-existence and back again. It’s not even true to say that he uses the imagination of science to trigger his own. Rather, he pries open, thanks to his fiction, the different ways in which scientists themselves, unbeknownst to most philosophers, deal with their topics. This allows Powers to deploy the whole gamut of different levels of realism that is so characteristic of matters of concern and which novelists of the past, intimidated by the presentation of objects qua matters of facts, had never been able to tap.

The Matrix of Morphisms

What is constant in RP, and so important for our investigation, is the *morphism* structure that he employs and that the above passage instantiates pretty well. I call (x)-morphism the matrix of transformative metaphors where (x) can be replaced by all sort of particular instances, or layers of discourse: anthropo-, techno-, ideo-, psycho-, logo- morphisms, etc. For instance, in the example of the reading of Yeats’s poem, words are compared to gadgets, to toys, to machines, to factories (a *technomorphism*) which is also crossed with a *biomorphism* (the evolutionary theory implied by “female mammal’s” reproductive success) and a *plusimorphism* (expenditure of energy). Now, bad writers – of novels *as well as* of academic articles – take those morphisms to be stable, so that when they do anthropomorphism they take what they believe we know about humans – a sort of Simenon’s or Agatha Christie’s typical psychology – and bring it to bear on, for instance, a robot (most science fiction never goes further than this sort of “animation,” or projection trick).

But the good writer – of novels *and* of academic articles, as we shall see below – is always complicating the projection by being *uncertain* about the morphisms and by constructing some sort of table of transformations where each morphism is undermined by another one: for instance, here Adie’s speech is not *logomorphic* (words taken as words, since words are taken as toys and machines); but machines are not taken as machines either in a mechanical, ordinary, run-of-the-mill definition of what it is to be a machine.⁸ On the contrary, machines are used

⁸ We will see, below, with Turing’s example that this is also the case with real scientific texts. On indisputable texts, see also Françoise Bastide, *Una Notte Con Saturno. Scritti Semiotici Sol Discorso Scientifico*. Trans. Roberto Pellerey. Roma: Meltemi, 2001.

here to give shape – hence the word “morphism” – to words, though they are themselves compared to magic spells, the history of automata and biomorphisms – “mechanical birds, mimicking living things” – and end up fusing metaphors of industrial fabrication and *psychomorphism* —“alloys of confusion and astonishment.”⁹

This matrix (or metrics) of transformations is essential for carrying out our project because there is of course no way to escape metaphors in order to “just speak” matters-of-factly, as everyone knows nowadays – at least on the Humanities’ side of campus. Such is the essential tropism of discourse that has been studied *ad nauseam* by semioticians, literary critics, science scholars, feminist writers, etc. In various ways, they have all demonstrated that the discourse of demonstration is never straight and literal, but always crooked and metaphorical, that *apodeixis* is always *epideixis*.¹⁰ But there is no reason to take this result as some unfortunate defect of language – “if only we could write literally and not metaphorically” – and use it to hone the trenchant edges of our critical repertoire. The real difference lies elsewhere: either in the using of stabilized morphisms, providing clichés of objectivity and clichés of subjectivity, or in the use of transformed morphisms that thus renew our understanding of what it is to be a thing. The real choice is: can we write bad literature – literal and metaphorical – or good literature – literal and metaphorical?

However, when I formulate things in this way, it sounds as if I have abandoned realism again, since the word “literature,” like the word “rhetoric” always enters a room by chasing strict realists out. So the only way to extricate us out of this quandary is to make more precise and explicit the matrix allowing each entity to give shape to the other. That is, *to be reflexive about the metaphysics of good and bad fabrication*. And of course, this is what is explicit in Powers’s novel as well, since all the different hues and shades of formalists, nerds, mathematicians and logicians, disagree about just what can be expected from those trade-offs between metaphors. Most of their conversations about facsimiles turn on this topic.

So what the novel stages are exchanges between the various morphisms that are mobilized in order to solve the question of what is required to make something realistic. The novel demonstrates this by staging in the text many successive – and rarely successful – “demos.” It thus offers us a pretty clear test to measure up the difference between a good and a bad writer: to test the quality of Powers’s writing, we simply have to do some reverse engineering and transform

9 Here, for instance, like Helen in Galatea, it is the description of the mind that is produced out of engineering metaphors : “Jackdaw struggled mightily to address the barrage. But he could not parse her. Their interface was makeshift, the cable between them noisy, and their throughput limited to the intermittent burst” (26). Similarly, Powers writes: “The question stopped the boy short in mid-ratchet. He seized up, unable to pop all the way back off his internal stack. His conversation hung on that old scheduling puzzle beloved of multitasking programmers” (27).

10 To use the beautiful argument made by Barbara Cassin about the Sophists. See Cassin, *L’effet Sophistique*. Paris: Gallimard, 1995.

his trembling metaphors back, by taking for each of them the clichéd definition of, for instance, factory, toy, language, psychology, and then see whether his effect is ruined or not! I am not simply alluding to the difference between live and dead metaphors.¹¹ No, I am trying to find a reliable test to distinguish the matrix of morphisms that does not transform any of the entities in question – psyches, machines, language, etc. remain the same all along – and those where each element is itself transformed. As we will see later in comparing it with Turing’s text/test, the question is always whether or not inputs are enough to define outputs, or, to use Whitehead’s expression: can we write *about* an event, that is, *extend* its eventfulness?¹²

We could object that Powers succeeds, in the passage above, because he has built his own story around Yeats’s already complex structure. He is in that sense a copyist, a derivative inventor. So are we all. But, interestingly, that is also the topic of the very scene in which this conversion of Stevie-the-engineer into Stevie-the-poet, and of Adie the-abstract-artist-chick into Adie a fleshy living moving character is taking place: this is the part I cut from the scene above, when they were at work deciding what to reproduce of Van Gogh’s room:

*We’ll put the door here, that girl’s latest update*¹³ said. *Start it flush up against the back of the left-hand wall.*

Spiegel and Jackdaw, her vaudeville apprentices, nodded in stereo.

We’ll have to figure out what the floorboards actually look like, under the bed.

We can just reuse the piece we put in over there, Jackdaw said, all innocence.

No, no. That would be cheating. We have to follow the boards that he painted, and extend them. Work outward from the bit he could see.

Jackdaw groaned. *But its’ all going to be invisible in the finished product anyway.*

Not to us, it isn’t.

“But such a form ...” (p. 199-200)

When you create a facsimile, as Steve and Jackdaw – a most extreme example of a young geek – are doing in the novel, and what Powers is doing *as* a novelist (namely to write *in words* about pixel resolution no one sees!), or what Adam Lowe does in real three dimensions,¹⁴ you have to take constant decisions about what is cheating and what is not cheating.

On the face of it, everything is a complete cheat: Van Gogh’s room never asked to become an interactive perfect virtual reality for Bill Gates’s Cave ... and for that matter the hotel room in Arles never requested to be painted in coarse strokes by this mad suicidal painter ... and yet the transformation – the morphism – is exactly what requires an absolute definition of truth and

11 See for instance George Lakoff and Mark Johnson, *Philosophy in the Flesh: The Embodied Mind and Its Challenge to Western Thought*. New York: Basic, 1999.

12 I have made turn it into a principle for writing sociology in *Reassembling the Social*. Oxford: Oxford University Press.

13 Again a striking metaphor for the constant renewal of characters in the novel: Adie is not stable by inertia, but rendered more or less stable by the successive releases of updates. . .

14 On Adam Lowe’s work in *Factum*, see the web site: www.factum-arte.com.

falsehood. It seems absurd to reproduce in pixels the invisible part of a floor plank no one will see, and that do not exist anyway except as an illusion in a painting ... and how absurd to paint the scene when those engineers *qua* artists are trying to recreate in words, the illusion in image, of the illusion in painting of a room. And yet, this “colossal expenditure of energy” is just what allows us to understand the stuff out of which we, as living, breathing, speaking creatures, are made. But are we *made*? That is the question. And there is no way to answer it without probing into the common root of fact, fetish and fiction.

If Powers is so important for our philosophy, it is because he refuses to situate fiction in an easy position *in addition or in contrast* to science. There is no doubt that he is writing novels and not papers for *Science Magazine* and yet, fiction is not what he is after, but rather the common source of fiction and fact – hence the old label I tried to reuse for him of *scientifiction*, but even that does not go far enough. Those who engage with facsimiles cannot use the normal distinction between fiction, as a product of the imagination, and reality as a product of matters of fact. They have to refuse this bifurcation. And they all know that it is dangerous to try to reach, by facsimiles, this source of reproduction – it was a spell in the old days and although the spell has been broken there is still, as we all know, a strong prohibition against images.¹⁵ What sort of Gods are those who indulge in facsimiles imitating? Whose power are they usurping?

The Making of Primary and Secondary Qualities

What makes this novel so extraordinary for me is that the very problem of the bifurcation of nature, and of the distribution of primary and secondary qualities, is made the *explicit* topic of its construction. It’s as if Whitehead’s philosophy were coming to life. Here, for instance, the technical question the geeks try to solve is whether geometry can produce the appearance of life.

The Cavern would settle for nothing less. Every community of polygons needed its catalogue of affordances: pliant, pulpy, wet, burnable, breakable, taut ... And that behavioral catalogue decided how the described object glinted in twilight, how it aged and altered, how it floated on the sea of wider rules all around it. (36-37)

To say that the novel is a constructivist one would be rather an understatement, since it is all about what it means to construct, to build a facsimile (this creation is described as “their object lesson in object”! [63]). As in *Galatea*, it would be utterly boring or simply amusing if the (imagined) soul of the (imagined) human was transported straight into the (imagined) machine: that would simply be a pleasant or an awkward form of anthropomorphism. But the key feature that makes this work such a crucial metaphysical exploration is that this transfiguration – I use the Christian term deliberately – is done bit by bit,

¹⁵ Bruno Latour and Peter Weibel, eds. *Iconoclasm. Beyond the Image Wars in Science, Religion and Art*. Cambridge, MA: MIT, 2002.

layer by layer, byte per byte without deciding in advance what it means for a human, for an automaton, for an image, for a reproduction, indeed for a God to have a shape, a morphism. What most other novels would have done wholesale, especially if it had been about some cyberpunk virtual world, is done here in detail, painstakingly, as if the miracle of transformation was shown in infinitely slow motion. This is what gives so much color to this definition of constructivism: “*If you want a thing to stand, it has to be able to fall*” (342).

For example, when Adie is still drawing a digital mock up of Douanier Rousseau’s *Jungle*, visitors complain that it is not interactive enough, so she tries to *add* to the shape the “pushiness” necessary to create the feel of reality, the same ‘pushiness,’ by the way, that Whitehead lists as an ingredient for the feel of reality:¹⁶

Multiple codes had already implemented a reasonable fraction of collision’s class library. They wrote out methods for a whole host of impacts. Each calculated aftermath got its own mongrel differential equations, trajectories mocking the ones that nature invented. Various variables toted up mass and speed and English, calculating the threshold between bounce and break, between shatter and slide and spin.

Spiegel showed her how, from out of this catalogue of cases, to assign verbs for each set of possible contacts: hand on vine, vine on bird, bird on monkey, monkey on tree limb, limb on hand. In the course of several weeks, Adie watched as software turned her jungle into a gym. The forest became a vast calculator, a gnarled orchard of countless parallel computations. Over the run of the days, any pair of objects learned to calculate what to do when they met one another in space. (60-61)

Of course, this translation of all the verbs of action into calculation, is itself imitated in the general metalangage of English! And yet, as the chapters unfold, the reader has the definitive impression that the description of the *Jungle* becomes more and more realistic thanks to the constructive work of the engineers!

When I first read the book, I could not help but turn it over to see where the circuitry of chips that made it possible were, thus confirming the prediction: “generations marveled and would go on marveling at how the inventors got the motors into them.” No use inventing the e-book, since *Plowing* is already one ... And yet, even at this stage in the novel the bouncing back of leaves and twigs is not enough to give the real feeling of reality and, later in the book, during one of those catastrophic demos given to clients and sponsors, Adie the artist is crushed by the visitor’s complaints that there is no life in her *Jungle*. She is furious, at first, and replies:

Of course it’s interactive. You go down this path or you go down the other. You see something interesting, you go closer. What more invention do you want ?

Well see, I mean: as far as the little artworks are concerned ? They don’t even know the user is there. (165)

¹⁶ Robustness and responsiveness are defined by Whitehead as the lasting properties of resistance. See, *The Concept of Nature*, 66.

How could the critics, this time of Powers's own *demo*, have missed that his novel was about what it means for a few signs on paper to breathe life – and how dangerous an enterprise this can be? How could they be so blind! Interactivity requires inter-action. So at once, in the novel, all the engineers are back to the drawing board, trying to *add* another layer of calculation to find out practically, in the lab, in the text, what an agency should be, what sort of empirical metaphysics would be able to deploy it to the full. The new version of the demo, this time for the Arles room, is much more advanced, each little detail – the drawer, the shirt, the window – being equipped with a vector, and later with some haptic interactive device, that allows agency to spring automatically to life when manipulated:

The visitor's solid hands still passed through everything they tried to feel. But now a thumb and a forefinger, pinched around the phantom drawer knob, could pull it open. Even the designers felt the uncanny effect, moving the wood-grained logic of an object they could not even touch. However incorporeal, the towel ruffled when brushed. The windows cluttered shut at the first mime of force against them. And when the transient user, suckered by a half a billion years of evolution into believing the visible, reached out by reflex to pat the bedcovers, those sheets miraculously turned their corners down as if waiting for the idea of a sleeper to curl up and inhabit them. (224-25)

Anyone who has spent a few nights on a video game, like *Myst*, will share this impression of a more realistic realism, except that, here, the real prowess is that the subjacent layer is still a plain English description of possible new gestures made by ideas of persons no one can touch or see!

Am I wrong in thinking that such a parsing of competences, layers after layers, competence after competence, is unheard of in literature? Instead of giving us a despairing feel for the infinite distance between words and things, Powers gives us – gives me at least – an incredible confidence in the capacity of description: if someone is able to make us see engineers making us feel the turning of the knob in a drawer of a non-existent reproduction of the existing painting by the no longer existing painter of a no longer existing hotel room in Arles (“*at bottom, you know? At bottom, the mind wants to be taken in*” [228]), then every *thing* can be carried in language! All the usual resources of criticism, fiction, and illusion which usually go into chic commentaries of Escher-like ‘abyeme’ effects, are here all telescoped by Powers to provide *more* reality, not less. Constructivism is made to be the exact opposite of deconstruction while, at the same time, using many of the same resources. But the way they are nested in one another is entirely different. “Telescoped” is actually a good metaphor: the more elements nested the better the view, whereas in the logic of critical deconstruction the more elements the more *delayed* the grasp should be. That is the major difference

between deconstruction and what I have called elsewhere the promise of constructivism.¹⁷

And as always with masterpieces, the novel provides its own built-in meta commentary: when the demo has provided clients some satisfaction, Powers writes:

Inside this room, the world re-forms itself. Outside, there is no saying. Against the real, *perhaps* must plead no contest. But from the demonstration room, no one walks out the way he came. (410)

Those who distinguish between world and words, or who use words to flee by the imagination from the much too boring aspects of the “real world,” have never understood what it is to write, to build a model, to equip a laboratory, to build a facsimile, to paint, to paint in pixels a painting, to paint in words the painting of pixels of a painting. The demo in the story demonstrates what language can do in terms of model-building. Then everything is possible and language, far from being this impotent medium or the narrow world we should inhabit at a safe distance from the real one, is the medium which is able to establish subterranean connections between everything on Earth and above – which is, I guess, how to explain the end of the novel and the sort of miraculous communion of saints where Adie, who disappears in the mock up of Hagia Sophia, connects with the finally liberated Taimur.¹⁸

On the Turing Test and Text

The problem is that, if we wish to use Powers’s resources for our own philosophical end, we have to make sure that his overall result is not taken as an apology for the power of literature over that of scientific descriptions. If that were the case then, immediately, the whole project would become one of criticism again: literature for the matters of concern, science for the matters of facts. We would be back to square one. Fortunately, a natural experiment offers itself for our inquiry, provided we keep using the *same resources* to read, not a novel about facsimile makers using powerful computers, but the original text in which Alan Turing described his most famous *test* about a computer becoming indistinguishable from a woman typist. Here we are not dealing with a novel, but with a *bona fide* academic document, albeit a very strange one. And here, again, what is quite amazing is that critics seem to have entirely missed the strange morphisms this “serious” article makes the reader travel through. They take Turing’s description of the computer to be a *formal* depiction of formalism, in

17 Bruno Latour, “The Promises of Constructivism.” Chasing Technoscience: Matrix for Materiality. Eds. D. Ihde and E. Selinger. Bloomington: Indiana UP, 2003. 27-46.

18 This is also how I interpret Jackdaw’s conversion to computing at a very early age, he learns assembler first! (104 and seq.).

spite of the fact that Turing was fighting *against* formalism.¹⁹ This might mean that scientific critics don't read texts any more attentively than literary critics read novels ...

What is so great for my project, however, is that when you compare Powers's novel and Turing's argument, you get another, second degree, Turing *test* of which readers can easily be the judge: *can you tell the difference between the realism of Powers and the realism of Turing, although one is said to be literature and the other science?* If I succeed in fooling the reader, no matter how slightly, then I will have at least indicated that matters of concern might be best accessible through the *joint* inventions of literature and science.²⁰

The problem is that people never read. They take texts as a sort of conveyor-belt, an information transfer of no importance, a taxi driver who doesn't even deserve a tip. The idea that there is such a thing as "information without transformation," what I call "information *double-click*" is thus a consequence of bad reading. Distracted readers have hurriedly managed to extract from Turing's paper an abstract outline of "the" human/machine relation – can a machine think? – but they certainly have never paid attention to its existence *qua* text. If they had, they would have probably been horrified or, at any rate, they would have been unable to provide a formal definition of formalism and to argue that the computer is a "purely" informational machine. And yet, what is so interesting for students of information is that Alan Turing, the *Ur*-programmer, the icon of the computer age, the enigma of Enigma, inaugurates this problem of the thinking machine with the most bizarre, kitschy, baroque text ever submitted to a scholarly journal. If another Alan, this time Sokal, was now trying to publish "Computing and Machinery Intelligence" in a scientific journal, his paper would no doubt be rejected out of hand as a ridiculous hoax ... And yet, it is in the middle of this thick and wild jungle of metaphors, tropes, anecdotes, asides, and self-description that the non-existent computer has been conjured up into existence. Computers, like novels, are born into this cradle of (x)-morphisms.

While Powers raises the question of what it means for a character to be realistic, Turing raises the crucial question of what an *automaton* is. The problem is the same in both cases since it's never completely clear what sort of *autonomy* an automaton possesses. Fundamentalists force us to choose: either it is constructed *or* it is autonomous. The reason why they say this is that, for them, once an array of causality has been defined then everything else, the real, follows. This is the ideal proposed by causal accounts, by matter of fact talk, by what Deleuze has proposed to call the potential/real connection. "Give me the input, I will give you the output." This, for Deleuze, is in opposition to another set of connections

19 "The point of his approach, as he stressed in the paper, was not to talk about it in the abstract, but to try it out and see how much could be achieved. In this he was the Galileo of a new science." Andrew Hodges, *Alan Turing: the Enigma*. New York: Simon, 1983. 418.

20 This test is all the easier since Galatea 2.2 was itself a lengthy exploration of Turing's own text. See Latour and Powers, "Two Writers Face One Turing Test: A Dialogue in Honor of Hal."

that he calls virtual/actual.²¹ In this latter case, no matter how many circumstances – as opposed to causes – no matter how many ingredients you have arrayed, it does *not* allow you to predict what is going to happen to the event, to the “actual occasion.” Which means that any being, even though it is fully constructed, “actualizes virtualities” that exceed, overcome, surprise its makers.

Fine, one could say, but surely this is just the mode of existence that computers *cannot* deliver: here at last, contrary to literature, inputs strictly define outputs. Automata test the limits of constructivism. And yet, where there is the most obvious and complete manufacture of the entity, this is where *nonetheless* the most wonder, surprise, and bewilderment occurs. Automata have fascinated Western philosophy since Greek times precisely because they reinforce, prove, cancel and complicate all our ideas about the obligatory choice between autonomy and construction – and of course about our own existence as well as about our relation to the gods who have fabricated us and that we have fabricated ...²²

This is also why I attach so much importance to the difference introduced by Turing, himself, between abstract reasoning and what he does in this paper.²³ Such a contrast appears twice toward the end of the text.

It begins with a discussion about errors: “In *philosophical* discussions one likes to ignore the possibility of such errors; one is therefore discussing ‘abstract machines.’ These abstract machines *are mathematical fictions* rather than *physical objects*” (emphasis mine).²⁴ This opposition is rather puzzling at first, since it seems that Turing is talking about mathematical fictions, too, not physical objects. But he talks about neither fiction nor practice. Rather, he crisscrosses the many differences between them in order to explore how far we can go (or can err) in attributing agency to the computer (a word which at the time, we should not forget, designated a human!). The whole test he proposes plays on just this uncertainty, as do the engineers assembled by Powers. Turing’s distinction between “philosophical discussion” – this is a derogatory term for him and *not* what he is doing – and his enquiry, is expressed in a magnificent passage, a page later:

The view that machines cannot give rise to surprises is due, I believe, to a *fallacy* to which philosophers and mathematicians are particularly subject. This is the

21 F. Zourabichvili, *Le vocabulaire de Deleuze*. Paris: Ellipses, 2003.

22 Françoise Frontisi-Ducroux, *Dédale: Mythologie de l'Artisan en Grèce Ancienne*. Paris: Maspéro-La Découverte, 1975.

23 It is also interesting to note that he has his own non-positivist philosophy of science, as when he decides to state his belief about what it is to do theoretical work: “The popular view that scientists proceed inexorably from well-established fact to well-established fact, never being influenced by any unproved conjecture, is quite mistaken. Provided it is made clear which are proved facts and which are conjectures, no harm can result. Conjectures are of great importance since they suggest useful lines of research.” Turing, “Computing Machinery.” 49.

24 Turing, “Computing Machinery.” 55.

assumption that as soon as a fact is presented to a mind *all consequences of that fact spring into the mind simultaneously* with it. It is a very useful assumption under many circumstances, but one too easily forgets that it is *false*. A natural consequence of doing so is that one then assumes that there is *no virtue in the mere working out of consequences from data and general principles*. (emphasis mine)²⁵

It is clear from the context that Turing distinguishes here between those who perpetuate the fallacy of mathematicians and philosophers, and those who do as he does, namely “working out the consequences from general principles.” The whole paper, for him, is a thought experiment, to be sure, but one where thought is fully embodied. This is why he meanders through masses of other considerations, including the computer as a physical object and programming as hard labor. Turing is also exploring the contrast between potential/real and virtual/actual. And philosophers are criticized, exactly as in Deleuze, because once they have the facts, the consequences simply “spring to mind”: the real adds nothing that is not already there in the potential. Whereas for real inventors, “there is a virtue in the consequences”: the actual overflows what was virtually there.

Note that above the passage is a commentary offering a self-reflexive description of Turing, as a programmer, being *surprised* by what he has done:

A better variant of the objection says that a machine can never “*take us by surprise*.” This statement is a more direct challenge and can be met directly. *Machines take me by surprise with great frequency*. This is largely because I do not do sufficient calculation to decide what to expect them to do, or rather because, although I do a calculation, I do it in a hurried, slipshod fashion, *taking risks*. Perhaps I say to myself, “I suppose the voltage here ought to be the same as there: anyway let's assume it is.” Naturally I am often wrong, and the result is a *surprise* for me for by the time the experiment is done these assumptions have been forgotten. These admissions lay me open to lectures on the subject of my vicious ways, but do not throw any doubt on my credibility *when I testify to the surprises I experience*. (emphasis mine)²⁶

Who would be so silly as to say that when Turing speaks of programming, he does not know what he is saying ...? He was the best programmer of his time, the first of an immensely long lineage, actually longer than Abraham's progeny, which the Bible says was itself as numerous “as grains of sand” – and is it not out of sand that chips are made? And yet Turing claims: surprise is exactly what our own constructions do to us. Philosophers and mathematicians are content with “abstract description” and “general principles,” but not Turing who finds “virtue” in going further.

This point is crucial because it means that the really important distinction is not between formal and material descriptions, but between formal descriptions of formalism and *non-formal* descriptions of formalism.²⁷ The difference between the

²⁵ Ibid. 57.

²⁶ Ibid. 56-57.

²⁷ Brian Rotman has gone the furthest in this direction, and defined formalism as a strange way of writing the symbols “...” or “etc.” or “and so on” or “and so on ad infinitum,” without paying the price of providing the semiotic delegated character of the calculator with time, energy, support, means, etc.

two types is that a formal description works “as if” it were possible to go on ad infinitum at no special cost, whereas a non-formal description of formalism also describes the work needed to go on, and the many practical surprises one would get along the way.²⁸ We are never attentive to this difference because we are too intelligent (not me fortunately!) and *replace* the *semiotic* characters of Turing’s text – the many, confused, contradictory plots, thick with tropes and metaphors – with an idea, a concept which is simply, though sometimes confusedly, expressed by the text.²⁹ As if the idea is to the text, what the potential is to the real, what facts are to consequences, or, as in Powers’s *Plowing*, what code is to fiction. But this is just *the* type of reading that Turing distinguishes from his own.

When you stage the thought experiment of the imitation game, you realize how many new things will appear in the definition of an automaton, things that no formal description or empty objection would have predicted. One of those surprises, amazingly enough, is that “input” is not a good term to describe what you put “into the machine”:³⁰ “Our most detailed information of Babbage’s Analytical Engine comes from a memoir by Lady Lovelace. In it she states, ‘The Analytical Engine has no pretensions to *originate anything*. It can do *whatever we know how to order it to perform*’ (her italics)” (56). Using the potential/real contrast, this could pass for a restatement of the abstract argument deciding from first principles that since all the robot’s outputs include nothing but our inputs, it can *originate* nothing. Such is the normal, usual, reasonable, logical conception of what a computer is and what an input is. But, according to Turing, this is also a silly approach because it supposes that, from first principles you can “work out the consequences” without surprises, namely that you can control what you do... So what he is saying, in effect, is that all formal descriptions of the computer as an input/output logical entity make a category mistake.

See Rotman, *Ad Infinitum: the Ghost in Turing Machine: Taking God out of Mathematics and Putting the Body Back In*. Stanford: Stanford UP, 1993.

28 A typical example in our text: “Most actual digital computers have only a finite store. There is no theoretical difficulty in the idea of a computer with an unlimited store. Of course only a finite part can have been used at any one time. Likewise only a finite amount can have been constructed, but we can imagine more and more being added as required. Such computers have special theoretical interest and will be called infinitive capacity computers” (45). But what is so interesting about Turing’s textual strategy, is that he also shifts from the costless to the costly thus shifting constantly, like Powers’s characters, from formal to non-formal.

29 This is just what Brian Cantwell Smith tries so beautifully to avoid in his own philosophy of “embodied” computing. See Smith, *On the Origins of Objects*. Cambridge, MA: MIT Press, 1997 and what Reviel Netz has shown even more tellingly by going back all the way to the embodiment of demonstration in Greece *The Shaping of Deduction in Greek Mathematics : A Study in Cognitive History*. Cambridge, Cambridge University Press, 2003.

30 Another problem, as Harry Collins has nicely shown, is that our definition of what thinking is will have been totally altered. See Harry Collins and Martin Kusch. *The Shape of Actions: What Humans and Machines Can Do*. Cambridge, MA: MIT Press, 1998. But Turing himself expresses the same argument: “Nevertheless I believe that at the end of the century the use of words and general educated opinion will have altered so much that one will be able to speak of machines thinking without expecting to be contradicted” (49). I have actually asked Collins to redo the experiment to see what would fail in it: see *Laboratorium*, ed. Hans-Ulrich Obrist and Barbara Vanderlinden. Antwerpen: Dumont, 1999.

This is especially clear when he comes back later in his paper to Lady Lovelace's objection in a stupefying paragraph, which this time considers what it means to "inject" something into the automaton that is supposed to pass as a human mind. This paragraph repays detailed study because it casts light not only on the sheer *number* of morphisms being used up in the course of the text, but also on the fact that Turing, like all great scientists, is also involved in solving reflexively the metaphysical conundrums raised by philosophers: how far can we talk about an agency having autonomy? This is not *my problem* imposed artificially on *his* text, it is *his problem*. Indeed, this is why he goes to the extreme pain of inventing this queerest of tests, the imitation game:

Let us return for a moment to Lady Lovelace's objection, which stated that the machine *can only do what we tell it to do*. One could say that a man can "*inject*" an idea into the machine, and that it will respond to a certain extent and then drop into quiescence, like a piano string struck by a hammer. Another simile would be an atomic pile of less than critical size: an injected idea is to correspond to a neutron entering the pile from without. Each such neutron will cause a certain *disturbance* which eventually dies away. If, however, the size of the pile is sufficiently increased, the disturbance caused by such an incoming neutron will very likely go on and on increasing until the whole pile is destroyed. Is there a *corresponding* phenomenon for minds, and is there one for machines? There does seem to be one for the human mind. The majority of them seem to be "*sub-critical*," i.e. to correspond in this analogy to piles of sub-critical size. An idea presented to such a mind will on average give rise to less than one idea in reply. A smallish proportion are super-critical. An idea presented to such a mind may give rise to a whole "theory" consisting of secondary, tertiary and more remote ideas. Animals minds seem to be very definitely sub-critical. *Adhering to this analogy* we ask, "Can a machine be made to be super-critical?"³¹

One thing is clear when reading this paragraph: positivist philosophers, who argue that referential statements are intrinsically different from metaphorical ones, have certainly not read much Turing. The whole question of what an automaton is, what it means to generate something – a later obsession of Turing in his work on "biomorphs" –, what it means to produce an idea, what it means to probe agency and its limits, are all explored in one single paragraph that goes from the machine in general, to the piano, then to the atomic pile, then to the human mind, then to animals, then to the computer... Lady Lovelace thinks that agencies can be mobilized like the finger-keys of a piano although, even for the piano this is no simple feat as any pianist knows: you inject an input, it does something, and then "drop[s] into quiescence."³² But this is not the sort of agency that Turing's machine have, he argues: it is more like that of an atomic pile. And here we are offered a new philosophical definition of substance: if the machine or the pile is too small, an injected neutron – an input – will die away just as in the piano case. But if it is sufficiently big, then the

³¹ Turing, "Computing Machinery." 60.

³² It is funny that even the ironic motto: "garbage in garbage out" would be wrong with this way of thinking, you actually get more garbage than you have put into it . . .

input/injection/action will create a *disturbance* that will be amplified, and sooner or later the machine will become super-critical.³³ Equipped with this notion of agency, Turing immediately shifts to the mind/brain and raises the general question we all have when reading and discussing our “dear colleagues”: how come their minds are so slow that no matter how many inputs you inject into them, they never seem able to produce any new ideas and drop into the quiescence of most academic life... And then again, Turing returns back to the topic of the machine: can a computer be super-critical? That is, can it trigger, generate, amplify, more ideas than have been put into it – can it actualize virtualities totally unknown, can it surprise us with consequences that were not put into it at the beginning?

Those, like Powers, who write novels about what it means for a character to emerge into life, or like Turing, who devise thought experiments to decide how one could make the distinction between a woman typist and a facsimile, are exploring the same problem: what does it mean to reproduce? The strange allusion to God in answering the Theological objection – the first one to be tackled – is also important in this respect as when Turing, somewhat ironically, states: “In attempting to construct such machines we should not be irreverently usurping His power of creating souls, any more than we are in the procreation of children: rather we are, in either case, *instruments* of His will *providing mansions for the souls that He creates*” (emphasis mine).³⁴

From Turing’s biography there would seem to be many interesting clues to the questions of God, flesh, body, generation, and sexuality, as many commentators have rightly argued. But the most striking clue for the present discussion seems to me different: what could the meaning of “instrument” be for someone who invented so much of what it means for a machine to be a thinking agent?³⁵ In a paper that purports to totally subvert what our definition is of a tool, of an instrument, it is pretty crucial to understand that word. I don’t think I am overinterpreting the text if I point out that “providing mansions for the souls” created by someone else is an infinitely better theory of what an automaton is than the banal constructivism of the *Homo faber* type: “I am in control and you just do what I *input* into you”. And as usual, whenever the hard questions of constructivism are tackled, God appears – no matter how ironic his appearance may be. Whenever someone talks about making something come alive, or exploring what sort of life this is, theology is implied.

33 It is striking to note that among the many bizarre animals inhabiting Turing text and passing Turing test there is also Laplace’s demon and the conception of what would later be called the “butterfly effect”: “The system of the ‘universe as a whole’ is such that quite small errors in the initial conditions can have an overwhelming effect at a later time. The displacement of a single electron by a billionth of a centimetre at one moment might make the difference between a man being killed by an avalanche a year later, or escaping.” Turing, “Computing Machinery.” 47.

34 Turing, “Computing Machinery.” 50.

35 On the prosthetic equipment of formalists, see Hélène Mialet, “Reading Hawking’s Presence: An Interview with a Self-Effacing Man.” *Critical Inquiry* 29.4 (2003): 571-98.

Why is it so important for my purpose to detect such a complex metaphysics of agency in this original text by Turing? Because it demonstrates that when forms, mechanisms, facts, objects are born they are born as *things* not as *objects*. This is where my imitation game between Powers and Turing should begin to work out. If there is one thing that Heidegger would have considered as a typical *Gegenstand* (object), it would have been the computer. Heidegger would have reserved his flourish of enthusiasm for the “thing”, for instance the jug made by hand which mobilizes heaven and earth, divinities and mortals, but about the computer he would have grown cold.³⁶ And yet, if we go on simply counting the number of different agencies making up the cosmology of this text, we will realize that there are many more entities doing many more surprising things than in most of Heidegger’s descriptions of hand-made artistic artifacts ...

In other words, *all objects are born as things*. This is not only what happens when Richard Powers tackles some engineering domain, such as a mock-up of virtual reality. This is also true of the scientific documents he draws upon. Indeed, it’s because of Powers’s close attention to science and technology that we are able to see how much of its realism is already that of matters of concern. This, for my project, is of crucial importance, because it means that when we get closer to the origin of important scientific discoveries – and it is hard to overestimate the role of Turing’s computer in the history of science and technology – we get descriptions of things *not* of objects. It is only late comers, *sub-critical* minds, who take formalism as a formal form and go on debating useless questions like – can computers think? A question Turing, himself, has said to be meaningless...³⁷

Most discussions about scientific culture – for instance that of ‘the’ mind/body problem – have been turning around matters of fact – bifurcated in the Whiteheadian sense – which in no way represents what it is for scientific things to be in the world. Equipped with such a result, we might be able to tell apart a description that is *objective* from one that is ‘*thingly*’ – and this latter term is no synonym for a subjective, reflexive, critical, symbolic interpretation.³⁸ Turing’s description of a computer offers us an unique window into what it means for a nascent machine to be born as a thing – long before it is transmogrified into an object. If a computer is allowed to bifurcate into primary and secondary qualities (for instance a formal machine *plus* a symbolic interpretation) it’s impossible to understand how it came to exist. Objects are badly assembled things.

36 Graham Harman, *Tool-Being: Heidegger and the Metaphysics of Objects*. Peru, IL: Open Court, 2002.

37 See above, “The original question, ‘Can machines think?’ I believe to be too meaningless to deserve discussion.” This is why Dreyfus’s discussion of thinking computers does not come even close to what Turing originally put into the discussion. And also why *Galatea 2.2* goes much further than philosophers because it takes its cues directly from Turing and pursues them to their ultimate consequences – in which again, as we have just read, “there is great virtue” . . .

38 There is a devious etymological relation between ‘thing’ and ‘stretch.’

The new Turing test that I have proposed seems to me unsettling *enough* to indicate that the difference between an important scientific text and an important novel does not lie in one dealing with demonstrations while the other deals with rhetoric, one dealing with proofs while the other deals with stories, one dealing with matters of fact while the other deals with matters of concern. Rather, the difference lies in the efficacy with which both are able to redefine the relation between an input and an output. It's not true that we live in a world of senseless matters of fact to which the human mind alone would be able to add, through imagination, morality, and sensibility, a little bit of superficial meaning.

“Father, Forgive them; for they Know not what they Do”

So, are we now closer to a realist style? One thing at least might now be clearer: great scientists and great writers bring us closer to a common problem of what it means for entities to exchange properties through the artificial construction of language. There is no doubt that Powers's enterprise – and in a large part Turing's – is *cosmic* in the sense that he does not accept the division between language and the world, and thus anyone who does not accept this division has to run the risk of finding oneself holding the burden of the whole world in tiny little words. In that sense, Powers is exactly like Whitehead abandoning the narrow formulation of formalism learned in his youth: if nature does not bifurcate, then everything else has to be changed. Or, again, he is exactly like Adam Lowe: if you begin to make facsimiles, that is, seriously carrying worlds into words – bytes in their case, words about bytes about painting in *Plowing's* case – you can't stop until you go all the way. But instead of running this adventure away from scientists and engineers, the genius of Powers (and of Lowe) is to have decided very early on that those who have always refused in practice (if not in their official sterile philosophy) to make this division *are the scientists and the engineers*. Turing is, here, a paramount example both because of the importance of the computer and of the formalist reading given of his invention.

While the whole of humanities have taken refuge in literature; while the whole of (American) philosophy has emigrated into the refugee camp of language – formal or ordinary –; while most critical minds are camping on the mountain of discourse from which they threaten the rest of us, mere believers, into annihilation, Powers, almost alone in literature, has decided that this divide is an impossible imposture, that the new poetry is in science, not because science is a “nice” source of inspiration, which would be a superficial aesthetization, but because, there, the words carry worlds mysteriously, as it used to be the case in poetry. For Powers, I would be tempted to say, that the sciences are the humanities, that engineering is Latin and Greek, that computer programming is

rhetoric and tragedy (“A good polished program was everything I thought poetry was supposed to do”[215]). The sciences are the classics.

But the problem is that practicing scientists and engineers are the least aware that they hold this treasure of cosmic imbroglions in their vault! This is the great irony: they don’t know what they are doing! Not because they are ignorant of the “subjacent philosophy” guiding their own work, as the rational reconstructors like to see it – Turing is here to prove, again, how reflexive great scientists are about their metaphysical inventions –, but because, they have been forced away from what they do best. Scientists are holding the Scriptures in their hand, but are blinded to its meaning! This is why the sciences are really *so interesting*: you, the scientists, don’t even know what you are doing. Look! You keep speaking to the *hoi polloi* in the old language of matters of fact while in practice all your laboratories’ experiments cry out to speak the new language of matters of concern. Listen, you deaf! Look, you blind, to your images, listen for once to your own prophecies ... Just read what Turing says about his computer, instead of what people say that Turing has said of his formalist computer.

If I allow myself these metaphors, it is because, of course, the whole plot of *Plowing the Dark* struggles with the second commandment: after having revisited, in the beginning, the theme of the Creation story – out of Douanier Rousseau’s *Jungle*. If the various wall covers of Hagia Sophia – iconic, iconoclast, aniconic in turn – are mixed with the story of the Qur’an, this is not for naught. I add nothing which is not in the novel: the nasty mathematician, the solitary architects, the engineers-turned poets, are all asking the same questions: what are we doing when we build facsimiles, and when we do so, are we resorting to the formidable power of calculation or to the formidable power of poetry? And if they are the same, where do these Siamese twins connect? Taimur, the prisoner, captures the story thus:

Here, in these galleries of hypothetical, your Qur’an turns its true face to you. You’ve failed to grasp it until now, the flash point of all faith, the law against depiction. The men who have taken you still adhere to the same ban than the West started out with – its second commandment, for God’s sake. You stroll through the banned images, the forbidden fruit, heaven’s stolen fire. This is the war that steals your life. Its front stretches out before you, farther than you can see. You’ve strayed into a factional flare-up, fluke regional politics. But even yours is just a tiny salient in the global sacred conflict, the millennia-long showdown between those who would fabricate God, forever sculpting and perfecting, and those who would suffer Him unseen. (352)

It’s not by accident that Powers bring the Qur’an into the discussion and, in his usual way of running parallel plots, intertwines the question of reproduction in digital reality with that same question about the emergence of fundamentalism in Islam. Once again he is assembling in his work the most crucial resources for our future. In the 12th century, for instance, in Seville, princes and sultans were holding major *disputatio* between the “three religions.” A monk, a rabbi, and an imam were requested to debate about their creeds and to demonstrate in public the proofs they had of determining the “true religion.” I see great literature as a

way to reassemble and to renew those debates, so crucial for future peace. On condition that a fourth representative be brought in: the scientist and the engineer. Depending on the outcome, we will end up with four fundamentalisms pitted against one another, or four constructivisms added to one another. It all depends on how we understand what it means to *reproduce* something.