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Alien Phenomenology, or What It's Like to Be a Thing

IAN BOGOST

posthuman 20



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Particle man, particle man

Doing the things a particle can
What's he like? It's not important
Particle man

Is he a dot, or is he a speck?
When he's underwater does he get wet?
Or does the water get him instead?
Nobody knows, Particle man

—They Might Be Giants, "Particle Man"

CARPENTRY

Constructing Artifacts That Do Philosophy

As I drove home one sultry July afternoon, I listened to Tony Cox host an episode of National Public Radio's *Talk of the Nation*. The segment was titled "Writers Reveal Why They Write," a subject inspired by a *Publishers Weekly* series in which authors mused about their craft. "Writing," Cox cooed slowly in his introduction, "is a process that can be very hard work. Today, we're going to talk about writing and why we write."¹ Two guests joined the program: the memoir author Ralph Eubanks (*The House at the End of the Road*) and the short-story writer Siobhan Fallon (*You Know When the Men Are Gone*). Not best-selling authors, but successful ones, and in any event writers who had managed to get featured on a national radio program. Wasting little time, Cox got right into it. "Why do you write?" he asked of Eubanks.

"Well," began Eubanks, "I write because it's something that's really very satisfying for me. It's very gratifying." Quickly realizing that he'd never make it through the entire segment with milquetoast answers like this, Eubanks cited advice he'd received from the *Washington Post* journalist and National Book Award finalist Paul Hendrickson.

He said first, never forget that someone asked you to tell your story. My first book, *Ever Is a Long Time* and, to a certain extent, *The House at the End of the Road* are both in the memoir genre—so [I'm] feeling very fortunate to be able to tell my story. Not very many people get an opportunity to do that.

And the other thing that he told me is that when you write, you always want to capture the cruel radiance of what is (that's a quote from Walker Evans). And he said every writer, every artist, wants to capture what is, **not what you think it is but what it really is**, which means you have to dig very deep into yourself and really pull out some things that are very difficult and sometimes very challenging for you.

And there's something both emotionally satisfying about it and something that is very physically satisfying when you finally see your work when it comes out in a finished book or when you see the pages at the end of the day.²

These are genuine if somewhat callow remarks. Gratifying though emotional satisfaction may be, surely something more must drive successful writers to write? Things didn't get much more specific when Fallon entered the conversation.

Well, all writers have that writers' adage in the back of their mind: always about writing what you know. And when I was writing this collection [*You Know When the Men Are Gone*], I was writing about the world that I was living in, which I think is sort of a unique one, and it's living on a military post and the world of or the military community. . . . I just felt like when people think military, they get this visual of an American soldier, and it's easy to sort of forget the families that all are standing behind that soldier and his mother and father and spouse or children or his, you know, if it's a female soldier, her husband. And, I don't know, I thought it was fascinating and wanted to explore that.³

Host and guests covered a range of other trite techniques, from carrying a notebook to record thoughts that would otherwise flit away, to the feeling of terror on seeing the blank page, to the sense of elation that comes from filling it. Overall, platitudes filled the segment: "It's like a journey, then, isn't it?" asked Cox. "I think it's being courageous and not being afraid to put something down on the page," offered Eubanks. Creative advice ought to be practical and concrete,

but the host and guests of *Talk of the Nation* couldn't seem to pierce the veil on their own faces.

Mere bromide was not the problem with "Writers Reveal Why They Write." Clichés also bear truth, after all. No, the problem lies in the fact that *writing* was an arbitrary inscriptive method in the context of the show. Cox may as well have posed the question "Why do you paint?" or even "Why do you bake?" and the conversation wouldn't have changed much:

Like, making myself sit down and forcing myself to bake is difficult, but once I get started, it's just a gorgeous feeling. It's sort of like working out. I know that's a silly analogy, but I feel like they're endorphins.⁴

The real question is subtly different: why do you write *instead of doing something else*, like filmmaking or maeramé or sumi-e or welding or papercraft or gardening? Certainly particular materials afford and constrain different kinds of expression, but why should it be obvious that the choice of writing over another way of inscribing and disseminating ideas is a standard, or even desirable, one?

Natural talent may partly explain why one might choose to become a novelist instead of a musician or a painter, but talent itself—whatever indeed constitutes it—is likely unconcerned with material form. **Happenstance has a greater role to play in an individual's creative fortunes.** And such serendipity isn't limited to one's natural gifts; it also extends to the accident of timing. My own interest in creating and critiquing videogames, for example, is surely more a product of the circumstances in which I happen to live than it is in some inveterate natural ability to manipulate systems that themselves are mere accidents of human discovery and exploitation. Jared Diamond gets it right in his account of material history: the major events and innovations of human progress are the likely outcomes of material conditions, not the product of acute, individual genius.⁵

Still, writing is indeed a creative act recognized among many others. Even if NPR offered no insight on the matter that hot summer afternoon, we can understand intuitively that some people become writers while others become phlebotomists. However, there is one

profession in which writing is not only the assumed method of creativity but practically the only one: the scholar.

For humanists, including philosophers and critics of all stripes, writing is literally the only way to scholarly productivity. One's career is measured in books and articles: publications counted on curricula vitae, citations of those publications in other written matter measured, and on and on. Smart and devoted and self-effacing though we may often be, scholars tend to overlook the unseen assumptions that underlie their professional activities.

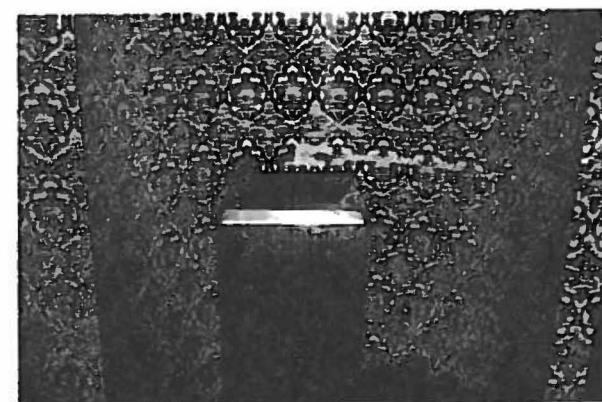
Indeed, when philosophers and critics gather together, whether formally for conferences or by invitation for lectures, they still commit their work to writing, often reading esoteric and inscrutable prose aloud before an audience struggling to follow, heads in hands. In the humanities in particular (unlike the sciences), the academic conference is often understood as an opportunity to test out ideas in front of an audience. Those ideas will, inevitably, become professionally valid only if written down. And when published, they are printed and bound not to be read but merely to have been written. The dodgy marketing of university presses and the massive costs of journals make written scholarship increasingly inaccessible even to scholars, and publication therefore serves as professional endorsement rather than as a process by which works are made public. A few reviews earn merit enough for a positive assessment. Rinse and repeat for tenure, and again for promotion.

Even given trends in digital publishing and online distribution, including blogs and open access presses, questions about the material form of published work go unasked and unanswered. The answer is obvious: writing, always writing. Critics and philosophers will wax grandiose over Jacques Derrida's "definitive" critique of the primacy of speech over writing, writing over speech, only to insist that real scholarship is written scholarship. Is there any other kind?

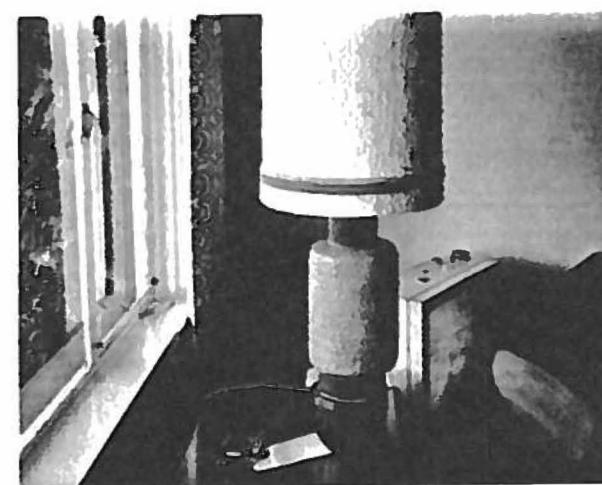
But the privilege of writing isn't limited to the liberal arts. Even in science and engineering, writing casts a pallid shadow over experimentation and construction. Take the chemist who synthesizes a new polymer or the engineer who develops it into a practical and affordable building material. The results of their efforts remain invalid



a



b



c

PLATE 1. (a) Stephen Shore, *New York City*, 1972; (b) Stephen Shore, *Rolla, Missouri*, 1972; (c) Stephen Shore, *Room 28 Holiday Inn, Medicine Hat, Alberta*, 1974. Courtesy of the artist and 303 Gallery, New York.



PLATE 2. Stephen Shore, *Beverly Boulevard and La Brea Avenue, 1975*.
Courtesy of the artist and 303 Gallery, New York.



PLATE 3. Stephen Shore, *Perrine, Florida, November 11, 1977*.
Courtesy of the artist and 303 Gallery, New York.



PLATE 4. Stephen Shore, *Trail's End Restaurant, Kanab, Utah, August 10, 1973*.
Courtesy of the artist and 303 Gallery, New York.

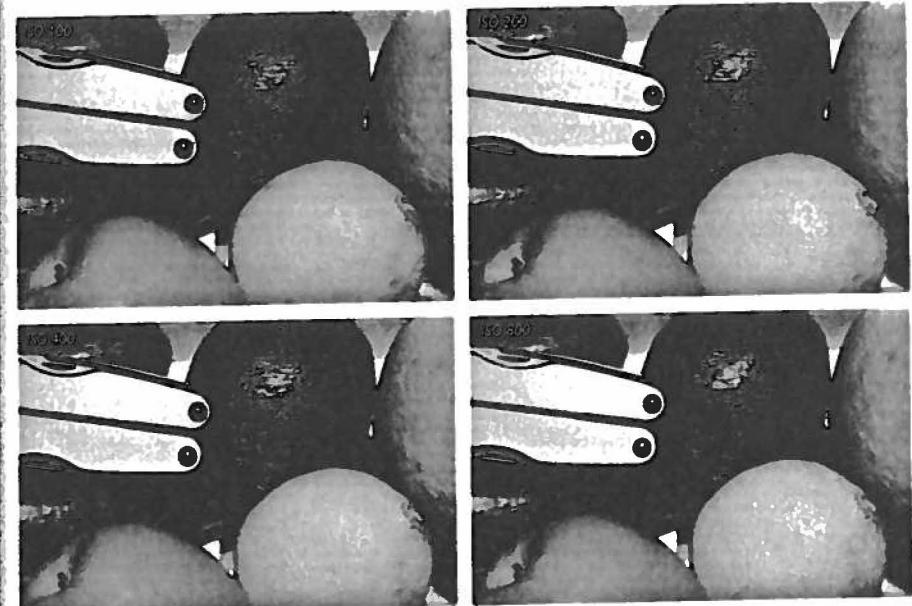


PLATE 5. As the Foveon sensor's light sensitivity is amplified, the images it records exhibit color shifts. Taking the ISO 100 image at top left as a baseline, by ISO 400 red shifts toward yellow, and green both shifts toward cyan and desaturates slightly. At ISO 800, red shifts even farther toward yellow, and green desaturates almost entirely.

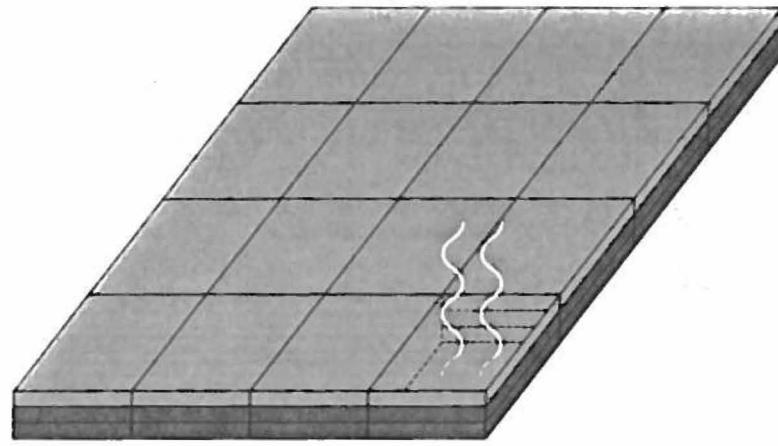
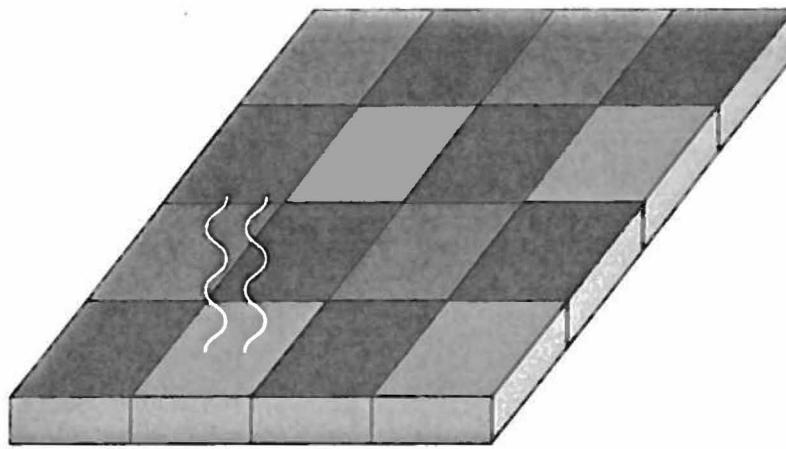


PLATE 6. A Bayer sensor (top) interprets colors by combining results from an array of photocells that are sensitive to a single color (red, green, or blue). In a Foveon sensor (bottom), the silicon is photosensitive to different wavelengths of light at different layers of the individual photocells.

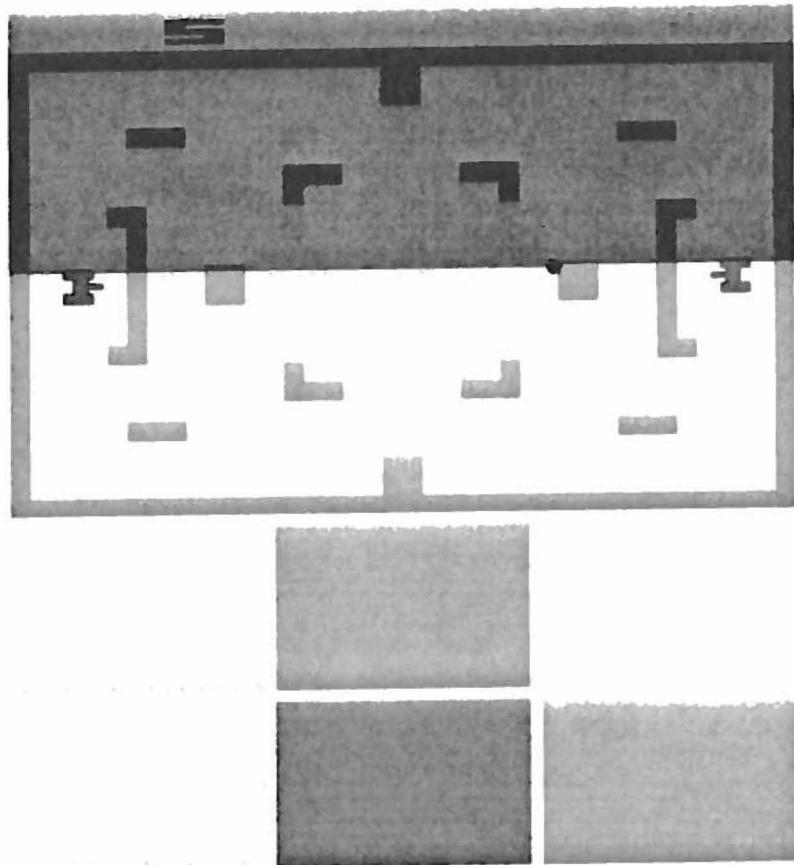


PLATE 7. *I Am TIA* is a work of carpentry that metaphorizes the experience of an Atari television interface adapter (TIA). At top is the reference image, a screen from *Combat* (1977). The black dot shows the current position of the electron gun on the television display, the darkened area above it having already been traversed. At bottom are six screens sampled from the output *I Am TIA* would display just after this moment, its internal circuitry choosing the topmost object's color and adjusting its signal accordingly.

and unaccountable until they are “written up” for publication in the proceedings of an annual field convention or a “top-tier” journal, entry into which confers the chevrons of rank on the researcher.

There’s good scholarly reason to prefer the formality of written matter. The standards of quality, validity, and relevance of academic work are highly valued, and it’s the job of peer review to set and uphold the bar for quality, honesty, and noteworthiness. Transparency is a virtue: findings, methods, data, and other raw materials must be made available during peer review to allow an impartial jury to assess the methods and results independently. When it goes well, this process helps ensure that scholarship maintains its Enlightenment ideal of disinterest and progress, rather than fall prey to nepotism and commercialism. These are worthwhile goals, even if contemporary peer review doesn’t always embody the egalitarian rectitude to which it aspires.

An obvious question, then: must scholarly productivity take written form? Is writing the most efficient and appropriate material for judging academic work? If the answer is yes, it is so only by convention. The merit of writing as the foundation of scholarly productivity is just as arbitrary as the factors that led Eubanks and Fallon to become writers—the truth is, they (and we) did so by happenstance.

The scholar’s obsession with writing creates numerous problems, but two in particular deserve attention and redress. First, academics aren’t even good writers. Our tendency toward obfuscation, disconnection, jargon, and overall incomprehensibility is legendary. As the novelist James Wood puts it in his review of *The Oxford English Literary History*,

The very thing that most matters to writers, the first question they ask of a work—is it any good?—is often largely irrelevant to university teachers. Writers are intensely interested in what might be called aesthetic success: they have to be, because in order to create something successful one must learn about other people’s successful creations. To the academy, much of this value-chat looks like, and can indeed be, mere impressionism.⁶

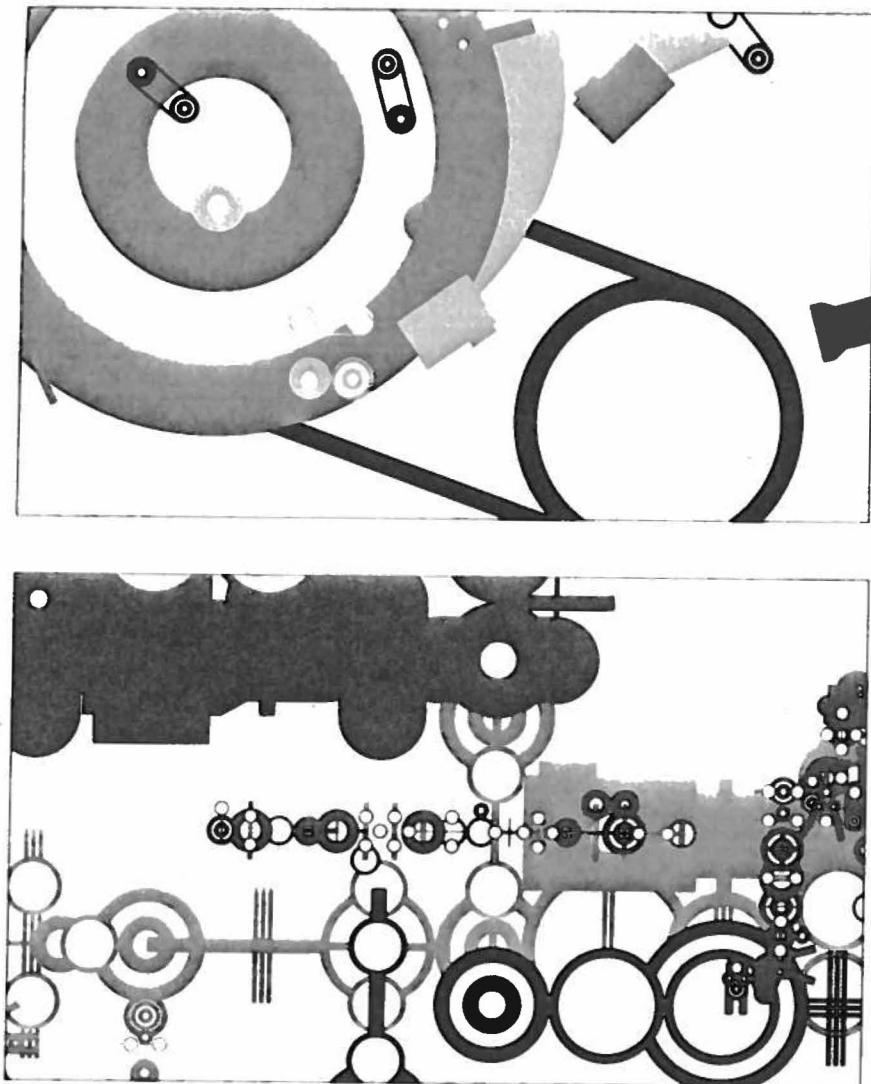


PLATE 8. Two of many possible visual states of *Tableau Machine*, a computational “alien presence” that characterizes a home’s perception through abstract art. Reproduced courtesy of Adam Smith, Mario Romero, Zach Pousman, and Michael Mateas.

The perturbed prose so common to philosophers, critical theorists, and literary critics offers itself up as an easy target, but it's not alone. Many scholars write poorly just to ape their heroes, thinkers whose thought evolved during the tumultuous linguistic turn of the last century.

A more prosaic and less-charged example of bad writing comes in the form of chaff: the myriad instances of “in many ways” and “could we not suggest that” and “is it not the case that” that litter academic prose. David Morris gives it the apt name “academic mumblespeak,” noting how adeptly these bad habits simulate “a sentiment of precision while, at best, delaying the moment when the writer actually has to be precise.” Suffice it to say that academics cannot cite some deeply tended adeptness with the written word in defense of their obsession with it as a sole form of output.

Second, writing is dangerous for philosophy—and for serious scholarly practice in general. It’s not because writing breaks from its origins as Plato would have it, but because writing is *only one form* of being. The long-standing assumption that we relate to the world only through language is a particularly fetid, if still bafflingly popular, opinion. But so long as we pay attention only to language, we underwrite our ignorance of everything else. Levi Bryant puts it this way:

If it is the signifier that falls into the marked space of your distinction, you’ll only ever be able to talk about talk and indicate signs and signifiers. The differences made by light bulbs, fiber optic cables, climate change, and cane toads will be invisible to you and you’ll be awash in texts, believing that these things exhaust the really real.¹⁰

Bryant suggests that our work need not exclude signs, narrative, and discourse, but that we ought also to approach the nonsemiotic world “on its own terms as best we can.”¹¹ Scientists and engineers may enjoy a greater opportunity to pursue extralinguistic pursuits than do humanists, but since all work inevitably pledges fealty to the written word, none are safe. When we spend all of our time reading and writing words—or plotting to do so—we miss opportunities to visit the great outdoors.

Among the consequences of semiotic obsession is an overabundant fixation on argumentation, such that pedantry replaces curiosity. Richard Rorty adeptly explains this phenomenon in his 1996 American Philosophical Association response to Marjorie Greene’s *Philosophical Testament*.

For [many philosophers] “doing philosophy” is primarily a matter of spotting weaknesses in arguments, as opposed to hoping that the next book you read will contain an imaginative, illuminating redescription of how things hang together. Many of our colleagues think that one counts as doing philosophy if one finds a flaw in an argument put forward in a philosophical book or article, and that one is a good philosopher if one is quick to find such flaws and skillful at exhibiting them.¹⁰

There’s a fictional character in *The Simpsons* known as Comic Book Guy. Offering sarcastic quips about his favorite comics and television shows, he epitomizes the nerd-pedant who splits every last hair in his pop cultural fare. Besides serving as a send-up of the quintessential comic book/Dungeons and Dragons geek, Comic Book Guy also lampoons the nitpicky of the Internet, where everyone critiques every detail of everything all the time. But beyond those obvious references, Comic Book Guy also serves as a condemnation-by-proxy of most academics. We are insufferable pettifogs who listen or read first to find fault and only later to seek insight, if ever. “Discourse” is not a term for conversation but the brand-name for a device used to manufacture petty snipes—about the etymology of a word, or the truth value of a proposition, or the unexpected exclusion of a favorite theorist. It is perhaps no accident that among the general public, one finds behavior most similar to academic punctiliousness on the Internet, where all ideas, interchanges, and actions are strained through the sieve of language.

There is another way.

If a physician is someone who *practices* medicine, perhaps a metaphysician ought be someone who *practices* ontology. Just as one would likely not trust a doctor who had only read and written journal

articles about medicine to explain the particular curiosities of one's body, so one ought not trust a metaphysician who had only read and written books about the nature of the universe. As Don Ihde puts it, "Without entering into the doing, the basic thrust and import of phenomenology is likely to be misunderstood at the least or missed at the most."¹¹ Yet ironically, Ihde is forced to explain such a sentiment in a book, just as I am here. What else can be done?

In his book *Shop Class as Soulcraft*, Matthew B. Crawford explains why, after earning a PhD from the University of Chicago in political philosophy, he gave up a white-collar career at a Washington think tank to become a motorcycle mechanic:

Aristotle begins his *Metaphysics* with the observation that "all human beings by nature desire to know." I have argued that real knowledge arises through confrontations with real things. Work, then, offers a broadly available premonition of philosophy. Its value, however, does not lie solely in pointing to some more rarefied experience. Rather, in the best cases, work may itself approach the good sought in philosophy, understood as a way of life.¹²

For Crawford, knowledge and labor are not opposites but two sides of the same coin—alternatives for one another. He invites us to see that philosophy is a *practice* as much as a theory. Like mechanics, philosophers ought to get their hands dirty. Not just dirty with logic or mathematics, in the way Bertrand Russell and Alfred North Whitehead's *Principia Mathematica* investigates the logicist view of mathematics by doing mathematics, but dirty with grease and panko bread crumbs and formaldehyde. I give the name *carpentry* to this practice of constructing artifacts as a philosophical practice.

MAKING THINGS

Making things is hard. Whether it's a cabinet, a software program, or a motorcycle, simply getting something to work at the most basic level is nearly impossible. (Indeed, a great deal of Crawford's book is devoted to accounts of his challenging exploits repairing motorcycles.) Carpentry might offer a more rigorous kind of philosophical creativ-

ity, precisely because it rejects the correlationist agenda by definition, refusing to address only the human reader's ability to pass eyeballs over words and intellect over notions they contain. Sure, written matter is subject to the material constraints of the page, the printing press, the publishing company, and related matters, but those factors exert minimal force on the *content* of a written philosophy. While a few exceptions exist (Jacques Derrida's *Glas*, perhaps, or the Nietzschean aphorism, or the propositional structure of Baruch Spinoza's *Ethics* or Ludwig Wittgenstein's *Tractatus*), philosophical works generally do not perpetrate their philosophical positions through their form as books. The carpenter, by contrast, must contend with the material resistance of his or her chosen form, making the object itself become the philosophy.

Some people become writers, others jewelers, others motorcycle mechanics. Similarly, philosophical creativity can take many forms, and each philosopher's approach to carpentry will differ. In addition to increasing the variety, playfulness, and earnestness of discourse, carpentry has the added benefit of inviting thinkers to exercise and develop their natural talents in a manner akin to Heideggerian dwelling. In doing so, as Iain Thomson suggests, "we come to understand and experience entities as being richer in meaning than we are capable of doing justice to conceptually."¹³

In the context of alien phenomenology, "carpentry" borrows from two sources. First, it extends the ordinary sense of woodcraft to any material whatsoever—to do carpentry is to make anything, but to make it in earnest, with one's own hands, like a cabinetmaker. Second, it folds into this act of construction Graham Harman's philosophical sense of "the carpentry of things," an idea Harman borrowed in turn from Alphonso Lingis. Both Lingis and Harman use that phrase to refer to how things fashion one another and the world at large.¹⁴ Blending these two notions, carpentry entails making things that explain how things make their world. Like scientific experiments and engineering prototypes, the stuffs produced by carpentry are not mere accidents, waypoints on the way to something else. Instead, they are themselves earnest entries into philosophical discourse.

Computer software is one of the things I make, so it stands to

reason that my examples will come from that arena. I offer two cases of philosophical software carpentry that are particularly relevant in the present discussion, for they implement principles discussed in this book: they're ontographical tools meant to characterize the diversity of being.

When Bruno Latour composes his litanies, he does so, of course, by hand. Take a typical example:

Try to make sense of these series: sunspots, thalwegs, antibodies, carbon spectra; fish, trimmed hedges, desert scenery; “le petit pan de mur jaune,” mountain landscapes in India ink, a forest of transepts; lions that the night turns into men, mother goddesses in ivory, totems of ebony.

See? We cannot reduce the number or heterogeneity of alliances in this way. *Natures* mingle with one another and with “us” so thoroughly that we cannot hope to separate them and discover clear, unique origins to their powers.¹⁵

This particular litany is a lovely one, full of surprising and counterintuitive units that deeply resist corroborating one another. But the lesson Latour draws from them is somewhat undermined by the manual, human nature of their selection: in some way, the nonsensical aspect of this litany is compromised by the fact that it had to be assembled by a human being. It's not enough to undermine the claim that no simple reduction can explain the objects together; nevertheless, alternative methods of demonstrating the irreduction might be philosophically desirable.

Enter the *Latour Litanizer*, a machine I constructed to produce ontographs in the form of Latour litanies. It's a simple device, but an effective one. Wikipedia, the online, user-edited encyclopedia, is built atop the wiki software platform MediaWiki. The software was originally created with Wikipedia in mind, but it has since been adapted into a general-purpose authoring and editing platform—a wiki anybody can install and use.¹⁶ Among MediaWiki's features is a “random article” function, which pulls up a page chosen at random from the stock of articles in the wiki's database. Given Wikipedia's large number of entries—English-language articles alone

number well into the millions—accessing the random article function reliably yields a page that one is unlikely to have seen before or even considered.¹⁷

The MediaWiki platform also offers an API, or application programming interface. An API allows a programmer to access parts of a software system's behavior from a program outside it. Some APIs are local (e.g., the APIs in an operating system like Windows or Mac OS that allow an application programmer to render user interfaces or access file management routines). Others, like the MediaWiki API, allow remote procedure calls from afar. Among the functions provided by this API is the ability to access the “random article” feature, which returns a title and a URL (among other metadata) when queried.

The *Latour Litanizer* executes queries against this API and assembles the results into a list with linked object names, one not dissimilar to the sort found in Latour's writings. Each time it's run, the *Latour Litanizer* returns a fresh, new litany. Some examples:

1949 Ostzonenmeisterschaft, Francis Levy, Hairspray (2007 film), Grammy Award for Best New Artist, Loukas Notaras, Citlalatonac, Frasier (season 3), Thallium-203, Psychology of Religion and Coping (book)

RK Jugović, Quirinius, Rozalin, Lublin Voivodeship, Christiana, Delaware

Buddha Tooth Relic Temple and Museum, Lealt Valley Diatomite Railway, Railway Protection Force Academy, Ereğli, Konya

Saint-Vincent-de-Salers, Food Lion, Dragovići, Battle of Cienfuegos, Precipitation, Sitka Pioneer Home, Alma—Marceau (Paris Métro), Thomas Mor Timotheos

Brazilian Antarctica, S. Eugene Poteat, Comiskey Park, Seneca Waterways Council, Winifred Gérin, Euchrysopsisiris, Scott C. Black, Catocala fulminea

Aidan Mitchell, Kiss Me, Baby, List of Statutory Instruments of the United Kingdom, 1951, Edson Cordeiro, Tom Webster

(cartoonist), Hal Winkler, Anglican Diocese of Saldanha Bay, 2006 Wimbledon Championships—Women's Doubles

Ove, Air-Sea War—Battle (Videopac game), Augustinerkirche (Munich), Eaten Alive!, Emilio Kostelitzky, Jetairfly destinations, Stuart Phelps, Adelaide of Holland

Argiope bruennichi, Free rider problem, Pershing LLC, Christian Reif^b

In these lists we find people, places, organizations, ideas, fictions, groups, media, durations, and even other lists. By divorcing the author and reader from the selection process, the litanizer amplifies both the variety of types of units that exist and the variety of alliances between them. The diversity and density of tiny ontology seeps out from these litanies, both individually and (especially) when taken together.

Yet the principal virtue of the *Latour Litanizer* is also impossible to reproduce in print: the rapidness and diversity of its results. The software itself is incredibly simple to operate: a litany is loaded, and a button press calls forth another, which appears in a matter of moments. Not only does the diversity and detachment of being intensify with each fresh litany, but those very qualities also invite further exploration through the link, which leads the reader to a detailed discussion of the object in question at Wikipedia. As anyone who has ever used that website can attest, its value comes less from its ability to achieve Diderotian universal knowledge and more from its willingness to allow anything inside, no matter its apparent validity, relevance, or even truth value.

Consider a second, related example of simple software carpentry. In April 2010 I hosted the first OOO symposium at Georgia Tech. As a part of the preparations, I created a website to promote the event. In addition to the expected features of a conference website, such as location, speakers, abstracts, schedule, and so forth, I also constructed a visual version of the *Latour Litanizer*.¹⁹ I had originally intended it to be little more than an evocative decoration, but it quickly proved its mettle as a philosophical device.

Unlike the litanizer, the “image toy” (I never gave it a proper

name) had a more specific purpose: to illustrate the diversity of objects by demonstrating individual examples one at a time. A large portion of the website was devoted to an image of an object, and each time the page loaded, a new one would be revealed (Figure 5 offers an illustration). As a web viewer browsed through the site reading about the conference details, one small cross-section of the variety of being would unfurl.

Wikipedia is built of words, not images, so a different platform was necessary. I opted for Flickr, another user-contributed, web-based service with millions of individual entries. Furthermore, just any image wouldn’t be satisfactory for the image toy to do its job.

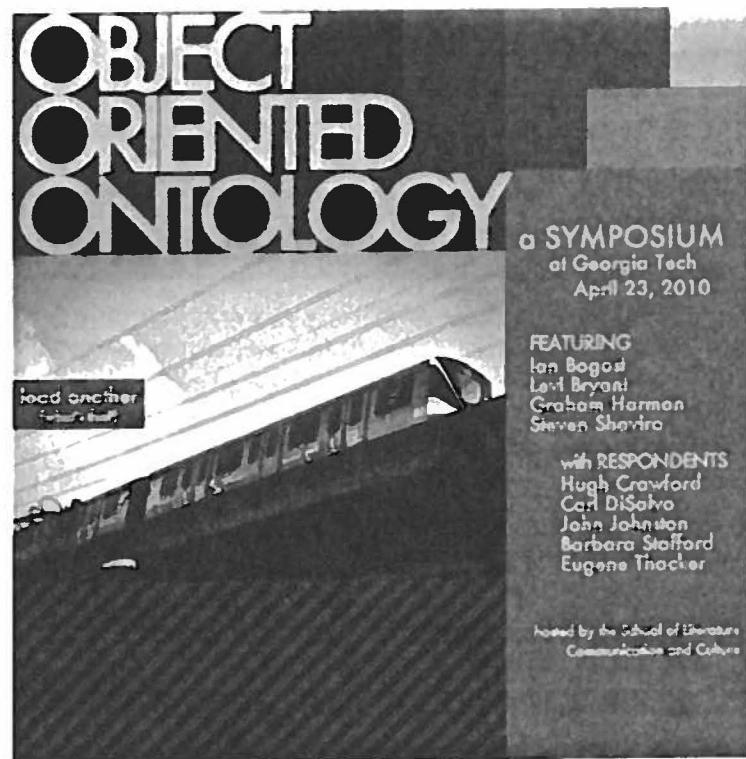


FIGURE 5. A detail from the website for the first Object Oriented Ontology symposium, held at Georgia Tech on April 23, 2010. The heavy rail transit train is one of millions of images that might appear when the page is loaded. Try it yourself at <http://ooo.gatech.edu>.

Many, perhaps most, images on the Flickr service depict people and scenes—the usual portraits and landscapes captured by amateur photographers. I wanted things, but things of myriad types.

When users upload images into the Flickr database, they have the option of tagging them with keywords to describe their contents. The results aren't always complete, but they offer a better account of the subject of an image than otherwise would be possible on such a large scale. Like MediaWiki, Flickr also exposes an API for external programmatic access of its databases, so my system simply needed to query for particular tags. Somewhat arbitrarily, I chose the words "object," "thing," and "stuff," discovering that these terms proved general enough to yield a wide range of different objects: a ferris wheel, a bale of hay, a railroad trellis, a circuit board, a cat, a box of files, a drainage pipe, a thatch umbrella, a lantern.

The results were aesthetically satisfactory for the purpose I had in mind. But an unexpected outcome of the image toy proved that the tool offered philosophical leverage that might have gone otherwise unseen.

The trouble started when Bryant, one of the symposium speakers, related to me that a (female) colleague had showed the site to her (female) dean—at a women's college, no less. The image that apparently popped up was a woman in a bunny suit. I never saw the image, nor did Bryant (given the millions of photos on Flickr, it's unlikely that the same one will be drawn twice), but the dean drew the conclusion that object-oriented ontology was all about objectification (I'm told that she asked why Playboy bunnies would be featured at a philosophy conference). Given the apparently objectified woman *right there on the webpage*, the impression was an understandable one, even if unintended (and certainly unsupported by OOO thought itself). Like the litanizer, the image toy includes a button to load another image, but some website viewers didn't see it, or didn't partake. By convention, website visitors expect a conference webpage to be static and to present its content in full all at once. Seeing the website as a justification of sexist objectification was an unfortunate but understandable interpretation.

Given the charged nature of the subject—a sexist "toy" on a website about an ontology conference organized by and featuring 89

percent white men—it would have been tempting to shut down the feature entirely or to eviscerate its uncertainty and replace it with a dozen carefully suggested stock images, specimens guaranteed not to ruffle feathers. But to do so would destroy the gadget's ontographical power, reducing it to but a visual flourish. Initially I resisted, changing nothing.

But, as anyone who has used the Internet knows all too well, the web is chock-full of just the sort of objectifying images exemplified by the woman in the bunny suit. Something would have to be done lest the spirit of tiny ontology risk misinterpretation. I relented, changing the search query I executed against the Flickr database:

```
options.Tags = "(object OR thing OR stuff) AND NOT (sexy  
OR woman OR girl)"
```

This alteration solved the problem, but as the Boolean criteria above suggest, the change also risks excluding a whole category of units from the realm of being! Are women or girls or sexiness to have no *ontological* place alongside chipmunks, lighthouses, and galoshes?

The promotional and aesthetic accomplishments of the image toy are clear enough. But its philosophical accomplishment comes from the question it poses about the challenge flat ontology and feminism pose to one another. On the one hand, being is unconcerned with issues of gender, performance, and its associated human politics; indeed, tiny ontology invites all beings to partake of the same ontological status, precisely the same fundamental position as many theorists would take on matters of identity politics. But on the other hand, the baggage of worldly stuff still exerts a political challenge on human experience that cannot be satisfactorily dismissed with the simple mantra of tiny ontology. The OOO symposium website's image toy hardly attempts to answer these questions, but it does pose them in a unique way thanks to carpentry.

It might seem silly to talk about making things as if it's a new idea. Designers, engineers, artists, and other folks make things all the time. But philosophers don't; they only make books like this one. Even Wittgenstein didn't seem to think of the famous Viennese

townhouse he helped design as the practice of philosophical architecture, despite his search for a philosophy without statements and claims and arguments.

PHILOSOPHICAL LAB EQUIPMENT

Let's draw a distinction: unlike tools and art, philosophical carpentry *is built with philosophy in mind*: it may serve myriad other productive and aesthetic purposes, breaking with its origins and entering into dissemination like anything else, but it's first constructed as a theory, or an experiment, or a question—one that can be operated. Carpentry is philosophical lab equipment.²⁰

Carpentry can serve a general philosophical purpose, but it presents a particularly fertile opportunity to pursue alien phenomenology. The experiences of things can be characterized only by tracing the exhaust of their effects on the surrounding world and speculating about the coupling between that black noise and the experiences internal to an object. Language is one tool we can use to describe this relationship, but it is *only* one tool, and we ought not feel limited by it.

The phenomenologist who performs carpentry creates a machine that tries to replicate the unit operation of another's experience. Like a space probe sent out to record, process, and report information, the alien phenomenologist's carpentry seeks to capture and characterize an experience it can never fully understand, offering a rendering satisfactory enough to allow the artifact's operator to gain some insight into an alien thing's experience. Again I turn to computation for examples.

Nick Montfort and I have endorsed the coupling between material constraint, creativity, and culture under the name "platform studies," a mode of analysis that explores how understanding a computer platform is vital to a critique of the particular works, genres, or categories of creative production built on top of it.²¹ For example, the nature of the Atari Video Computer System's (VCS) graphics registers constrained Warren Robinett's adaptation of Willie Crowther and Don Woods's text-based *Colossal Cave* into the graphical adventure game *Adventure*, in doing so establishing the conventions of the genre. In platform studies, we shift that focus more intensely toward hardware and software as actors.

Just as the painting infects our material understanding of the photograph, so the influence of photography and cinema on television can cloud our understanding of how computers construct visual images. This confusion is understandable; after all, the television seems to be the same sort of device as that on which most computer images are displayed. It is tempting to imagine that an image like the seemingly simple combination of mazes and abstract tanks in the Atari VCS game *Combat* is drawn like a painting or a photograph. In fact, the computer's perception of its world is even less like the canvas or celluloid, let alone the human eyeball or optic nerve.

The earliest examples of computer graphics were produced on oscilloscopes, not on televisions. Like a television, an oscilloscope constructs an image by firing an electron beam at the phosphor-coated surface of the display. An oscilloscope features an electron gun that can be moved arbitrarily across the display's surface. In 1958 Willy Higginbotham created a simple tennis game he called *Tennis for Two* that uses an oscilloscope as its display. *Spacewar!*, created at MIT in 1962, employs a similar type of monitor, as does the coin-op classic *Asteroids*, although in a larger enclosure, sometimes called an XY display, a vector display, or a random-scan display. To construct an image on an XY display, the electron beam moves to a particular orientation within the tube, turns the beam on, then moves to another location, creating a line between the two with the beam's electron emissions. Each gesture must be created rapidly, before the phosphor burns off. Different phosphor qualities create different appearances on the tube's surface, and the beam's strength can sometimes be adjusted to provide more or less luminescence. From the perspective of human inscription, constructing a frame of *Asteroids* is more like drawing than like photography or cinema—or perhaps more like cuneiform inscription. But from the perspective of the evacuated glass envelope that is the monitor, it is an experience more akin to a laser light show or a rave.

An ordinary television picture of the 1970s and 1980s is displayed by a cathode ray tube (CRT). Like an oscilloscope, the CRT fires patterns of electrons at a phosphorescent screen, which glows to create the visible picture. But unlike an oscilloscope, the screen image on a television is not drawn all at once like quill on parchment but in individual scan lines, each of which is created as the electron gun passes

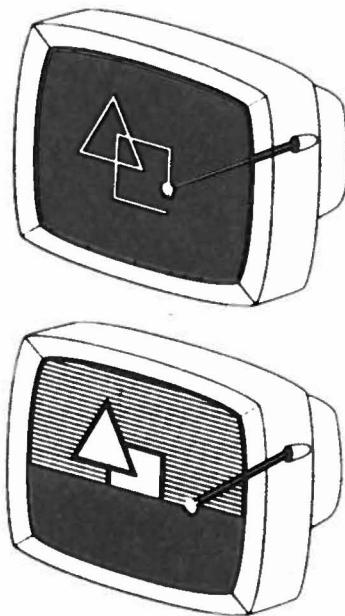


FIGURE 6. In a random-scan display (top, also known as a vector or XY display), the electron gun moves arbitrarily across the phosphorescent surface of the picture tube. In a raster-scan display (bottom), the electron beam moves from one side to another, creating an image through a series of scan lines focused through an aperture grill. A random-scan display draws its picture in a manner akin to a pencil drawing on paper, while a raster-scan display draws more like the writing in a lined notebook.

worth of data, just 128 bytes total. Additionally, the interface between the processor and the television is not automated, as it is in a frame-buffered graphics system. A running Atari VCS program involves an interface between ROM data, processor state, and graphics-sound interface during every moment of every line of the television display.

from side to side across the screen. After each line the beam turns off, and the gun resets its position at the start of the next line. It continues this process for as many scan lines as the TV image requires. Then it turns off again and resets its position at the start of the screen (see Figure 6 for a comparison).

Most modern computer systems offer a *frame buffer*, a space in memory to which the programmer can write graphics information for one entire screen. In a frame buffered graphics system, the computer's video hardware automates the process of translating the information in memory for display on the screen. But in an unusual move driven by numerous design factors, including the high cost of memory, the bare-bones television interface adapter (TIA) graphics chip in the 1977 Atari VCS makes complex seemingly basic tasks like drawing the game's screen.

The Atari does not provide services such as frame buffering for graphics rendering. The machine isn't even equipped with enough memory to store an entire screen's

From a human perspective, we can render metaphorisms of the "notes" of TIA gestures. **Atari VCS players see the same sorts of images that they would have come to expect from television broadcasts—the sense of a moving image like film. But the Atari VCS itself doesn't ever perceive an entire screen's worth of graphical data in one fell swoop.** It apprehends only the syncopations of changes in registers. Its components see things still differently:

The 6502 processor encounters an instruction read sequentially from program flow, performing a lookup to execute a mathematical operation.

The TIA modulates electrical signals when its internal clock prompts it to witness a change on one of its input registers.

The RF conversion box coupled to console and television transmutes an endless stream of data into radio frequency.

Yet what do these descriptions really suggest? However appealing and familiar the usual means of doing philosophy might be, another possible method involves a more hands-on approach, manipulating or vivisecting the objects to be analyzed, mad scientist-like, in the hopes of discovering their secrets.

I created a simple artifact to attempt this feat, another example of carpentry, but this one is a tool for metaphorism. The program, which I call *I am TIA*, approximates the TIA's view of the world through the lens of a standard two-dimensional computer display. Since the TIA is synchronized to the electron gun of the television picture, instead of seeing the entire screen all at once, the TIA determines which of its objects sits atop the current position of the display and modulates its color output accordingly. Once the programmer synchronizes the game's instructions with the television's vertical blank, the TIA takes care of reading the background, playfield, and sprite patterns and colors currently set in its internal registers, converting them into a signal.

***I am TIA* is meant to characterize the experience of the television interface adapter, metaphorizing it for human grasp.** When the pro-

gram runs, it interprets screens of the videogame *Combat*, rendering only the modulated color the TIA calculates and sends to the RF adapter at a given time. Instead of seeing an entire television picture worth of image, the human operator of *I am TIA* sees only the single hue currently processed by the TIA, based on its position on the screen (Plate 7). Since the electron gun burns an entire picture into the phosphor of the television sixty times a second, the program is slowed down considerably. This rendering not only spares its human viewer seizure but also highlights the rate of chromatic experience native to the microchip, which alters its signals in time with the electron beam rather than the human eye, stopping regularly to await its position to reset to the next scan line position. In doing so, *I am TIA* also underscores part of the chip's experience that would never be graspable through human interface with the Atari: the TIA and electron beam must switch off during the television's horizontal and vertical blanks—the period when the beam resets to start a new line or a new screen.

While these moments are purely momentary in real time, when experienced through the decelerated, metaphorical lens of *I am TIA*, strange moments of black silence interrupt the characteristically bright colors of an Atari image. Time moves forward in syncopated bursts of inbound bits and bursts of signal, then of color from joystick to motherboard to television. Despite the fact that the machine must manually synchronize itself to the television display at 60 Hz, it has no concept of a screen's worth of image. It perceives only a miasma of instruction, data, color, darkness.

Other works of alien phenomenal carpentry exist, too, even if they don't explicitly frame themselves in that way. Consider Ben Fry's *Deconstructulator*.²² The program is a modification of a Nintendo Entertainment System (NES) emulator, which runs any NES ROM as if it were being played on the original hardware. On the periphery, the system depicts the current state of the machine's sprite memory in ROM, sprite data in video memory, and current palette registers, which are mapped via keys to the indexed values in the sprites themselves (Figure 7). These update over time as the state of the machine changes while the user plays. While *I am TIA* metaphorizes only one component of the Atari VCS console, *Deconstructula-*

tor offers an operational, exploded view of the entire NES memory architecture, particularly its sprite and palette systems. From a carpenter's perspective, the result opens the hidden file drawers of the NES cartridge, depicting its contents and revealing how the machine manipulates the game's contents within the limitations of its memory constraints.

Even without the fancy packaging of *Deconstructulator*, source code itself often offers inroads in alien phenomenology—particularly when carpentered to reveal the internal experiences of withdrawn units. *Firebug* is a Firefox web browser plug-in that allows the programmer or ordinary user to monitor and display the internal states of the web browser's rendering and behavior system as a page is displayed.²³ Once installed, the tool allows a user to view the HTML that corresponds with a selected visual element on the screen, to reveal and modify the style information (or CSS) that tells the browser which colors, fonts, layout styles, and positions to use for objects on the page, to overlay rectilinear grids to reveal the internal metrics of

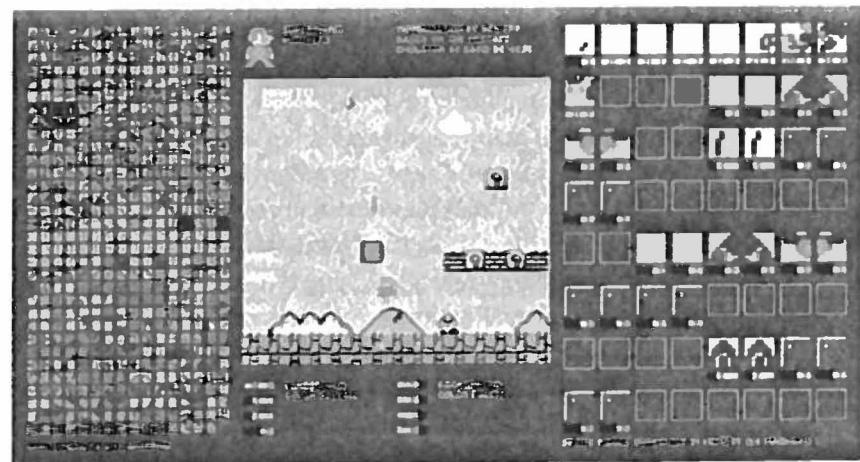


FIGURE 7. Ben Fry's *Deconstructulator* offers an operational exploded view of the Nintendo Entertainment System. In this image, sprite memory appears on the left. Color sets, half a byte in size, colorize the sprites—the active sets appear below the *Super Mario Bros.* screen. At right, the machine's current memory configuration is displayed, including all the sprites and their associated color sets.

a webpage, to review the network activity and duration required to fetch and retrieve every object needed for the page, to debug scripts and show the runtime values of active variables, to reveal the internal object structure of the page within the document object model (DOM) used for both stylesheet rendering and scripted behavior, and so forth.

ALIEN PROBES

But a much more sustained and deliberate example of computational carpentry that performs alien phenomenology can be found in *Tableau Machine*, a nonhuman social actor created by Mario Romero, Zachary Pousman, and Michael Mateas. In 1998 researchers at Georgia Tech began constructing an “Aware Home,” a real residence just north of campus that was outfitted with devices, screens, interfaces, cameras, and sensors. Its initial investigators posed the question, “Is it possible to create a home environment that is aware of its occupants’ whereabouts and activities?” It’s an inquiry with an assumption: that the only thing a home can do is to serve its human occupants.²⁴ As Romero and colleagues put it, research in ubiquitous computing and ambient intelligence “remains rooted in an information access and task-support where the goal is long term active reflection on everyday activity, enjoyment and pleasure.”²⁵ In response to this limitation, Romero, Pousman, and Mateas propose an “alien presence,” a computational agent that senses and interprets the state of an environment (in this case a home) and reports its experience in the form of abstract art. An alien presence, they argue, “does not try to mimic human perception and interpretation, but rather to open a non-human, alien perspective onto everyday activity.”²⁶

Tableau Machine attempts to represent the perceptual apparatus of the entire house by harnessing the Aware Home’s array of cameras, divided into regions, and interpreting the changing images with computer vision algorithms that measure motion in those regions. Instead of predicting or encouraging particular behaviors on the part of individual human actors in the home, as other ubiquitous computing efforts have attempted, *Tableau Machine*’s system interpolates the accumulation and release of motion, which its creators characterize as social energy, social density, and social flow.²⁷ And rather than

depict this information in a one-to-one fashion meant for human legibility, as an information visualization might do, *Tableau Machine* renders the home’s perception as an occasionally changing work of abstract art shown on a plasma display mounted in the home (as if it were a painting or television). The images that appear on that screen follow the general style of fauvism or postimpressionism, but they do not attempt to simulate the style of any particular artist or artistic movement (see Plates 8a and 8b for examples).

Tableau Machine takes for granted that the home itself is a unit, one distinct from but inclusive of its kitchen, living room, dining room, and hallways. Its creators surmise that the home can perceive, but they add an additional presumption: a home’s perception is unfathomable by its human occupants. Instead of understanding it, the best we can do is trace the edges of its dark noise, producing a caricature of its experience in a form we can recognize. In *Tableau Machine*’s case, the rendition is literally caricature, that of abstract art.

Tableau Machine does not try to improve the function of the home or the providence of its occupants. Instead, it hopes only “to encourage engaging conversations and reflections by opening unusual viewpoints into everyday life.”²⁸ That said, Romero, Pousman, and Mateas don’t take *Tableau Machine* as far into the great outdoors as they might, conceding that it “characterizes human activity.”²⁹ The project’s context may help explain that misstep; after all, the three documented the project for publication in the prestigious proceedings of the Association of Computing Machinery Computer-Human Interaction conference (yet another example of the predominance of writing in scholarship, even when the scholarly object is an apparatus). Human-Computer Interaction (HCI) concerns itself with human-computer relations, not computer-computer relations—or house-computer relations, for that matter. Despite its technical tenor, computing is just as correlationist a field as everything else, obsessed with human goals and experiences.

When allowed to break free of this context, it’s clear that *Tableau Machine* is something quite different: it’s an alien probe that turns us into the aliens, gathering data from a strange visual field, analyzing it according to a curious and unfathomable internal logic, and reporting back its distorted impressions of our extraterrestrial world, just as

a robotic space probe might collect radio signals, process radiation signatures, and present an earnest yet inevitably erroneous account of life in the universe.

A field study conducted by *Tableau Machine*'s creators proves the point. They installed the object in three homes in the Atlanta area, effectively transforming the residences of ordinary families into cyborg homes. *Tableau Machine* remained for six to eight weeks in each house, during which time the occupants reported engaging deeply with the curious artifact. Some of these observations were more about engineering than about perception, such as discovering through experimentation that the same domestic states would never generate precisely the same abstract images.³⁰ But others saw the abstract images *Tableau Machine* produced as interpretations of the way their respective homes perceive:

Near the beginning of the deployment, B2 (the mother) began to describe images as being views of the house, either from above or from other perspectives. Other householders followed along in this reasoning, and pointed out clusters that were “the kitchen table” or “the hallway.” As the deployment progressed, B householders began to see individuals in the images, and to draw parallels between activities (such as a boisterous dinner) and the images (a large round shape full of messy shapes on top, including a set of lines that formed something resembling a fork). The family was quite enamored with this image, and others that represented moments around the house. In the last week, Betty found an image that looked like a smiling face, which she took (or pretended to take) as an image of her husband cooking at the stove. At the interview she was very proud of the printout and asked if she could keep it. She hung this picture on the refrigerator.³¹

To be sure, this and other impressions of *Tableau Machine* clearly reveal attempts at anthropomorphism on the part of the family. But as Jane Bennett predicts, such an attitude helps deliver the home's residents out of anthropocentrism.³² While the mother remains concerned about the members of her family, their activities, and their welfare, her experience of domesticity is nevertheless expanded,

such that the perception of the house itself has become a part of her sympathies.

Latour Litanizer, I am TIA, Deconstructulator, Firebug, and Tableau Machine are artifacts of alien phenomenology. Rudimentary perhaps, but concrete, unburdened by theoretical affectation. These examples show how speculation might be used in an applied fashion. They also show that the job of the alien phenomenologist might have as much or more to do with experimentation and construction as it does with writing or speaking. One form of carpentry involves constructing artifacts that illustrate the perspectives of objects.

The relationships between memory addresses and ROM data, or webpages and markup, or households and electronic paintings offer but a few examples of the object perceptions carpentry can reveal. For other things also take place at this very moment, adding themselves and their kindred to the volcanoes, hookahs, muskets, gearshifts, gypsum, and soups that have arisen. Here are some that interest me, but yours will surely vary:

An electron strikes phosphor, lighting a speck on a fluorescent tube that glows and fades.

A metal catch closes a circuit on silicon, whose state a processor bitwise compares to a charge on another wafer.

An I/O bus pushes an OpenGL instruction into the onboard memory of a video card, whose GPU runs matrix operations into the video memory soldered to its board.

Carpentry's implications for weird realism in general might be even more surprising: the philosopher-programmer is joined by the philosopher-geologist, the philosopher-chef, the philosopher-astronomer, the philosopher-mechanic. The “carpentry of things,” one of Harman's synonyms for object-oriented philosophy, might be a job description, not just a metaphor.

A NEW RADICALISM

In a discussion of Whitehead's take on creativity, Steven Meyer reminds us that the former's writing shares a quality with poetry: “In inventing creativity, Whitehead was doing what poets are best known

for doing: naming things that do not already have names, or—what comes to the same thing—giving a new name to something and thereby transforming it.”³³ Meyer also reminds us of one of Whitehead’s famous aphorisms, the kind that makes him the most quoted and the least cited of philosophers: “In the real world it is more important that a proposition be interesting than that it be true.”³⁴

Latour offers his own version of this injunction: “Standing by what is written on a sheet of paper alone is a risky trade. However this trade is no more miraculous than that of the painter, the seaman, the tightrope walker, or the banker.”³⁵ Knowledge, he concludes, “does not exist. . . . Despite all claims to the contrary, crafts hold the key to knowledge.”³⁶

Yet once we are done nodding earnestly at Whitehead and Latour, what do we do? We return to our libraries and our word processors. We refine our diction and insert more endnotes. We apply “rigor,” the scholarly version of Tinker Bell’s fairy dust, in adequate quantities to stave off interest while cheating death. For too long, being “radical” in philosophy has meant writing and talking incessantly, theorizing ideas so big that they can never be concretized but only marked with threatening definite articles (“the political,” “the other,” “the neighbor,” “the animal”). For too long, philosophers have spun waste like a goldfish’s sphincter, rather than spinning yarn like a charka. Whether or not the *real* radical philosophers march or protest or run for office in addition to writing inscrutable tomes—this is a question we can, perhaps, leave aside. Real radicals, we might conclude, *make things*. Examples aren’t hard to find, and some even come from scholars who might be willing to call themselves philosophers.

Meanwhile once more, at the Genoa-based brand consultancy Urustar, designers recast and condense hundreds of pages of my books into playable pixel art.³⁷

Meanwhile, at NYU, Alex Galloway implements a computer version of Guy Debord’s *Le Jeu de la Guerre*, revealing in the process that Debord and his partner Alice Becker Ho misapplied their own rules in their book about the game.³⁸

Meanwhile, at Fergus Henderson’s London restaurant St. John, the chef practices philosophy of “nose to tail eating,” rescuing neglected cuts of meat and offal for innovative preparations.³⁹

Meanwhile, in the courtyard of the Skiles classroom on the Georgia Tech campus, my colleague Hugh Crawford directs his Special Topics in Literature and Culture class in the construction of a full-size wooden hut as a part of their study of Henry David Thoreau’s *Walden*.⁴⁰

These examples do more than put theory into practice; they also represent practice *as* theory. It’s not that writing cannot be interesting. Rather, we might consider that writing *is not the only* method of engendering interest.

If we take vicarious causation seriously, if we believe that things never really interact with one another, but only fuse or connect in a locally conceptual fashion, then the only access any object has to any other is conceptual. When people or toothbrushes or siroccos make sense of encountered objects, they do so through metaphor. As Whitehead and Latour suggest, this process requires creative effort, challenging OOO to become craftsmanship, challenging us to learn a trade. We tend to think of creativity as construction, the assembly of something new out of known parts. A novel is made of words and ink and paper, a painting of pigments and canvas and medium, a philosophy of maxims and arguments and evidence, a house of studs and sheetrock and pipes. Perhaps in the future, following Crawford’s example, radical philosophers will raise not their fists but their hammers.

4. Nagel, "What Is It Like to Be a Bat?" 436.
5. Ibid., 438.
6. Ibid., 442.
7. Ibid., 439.
8. Ibid., 447.
9. Ibid., 449.
10. Ibid.
11. Bennett, *Vibrant Matter*, 120.
12. Ibid., 438.
13. Harman, *Guerrilla Metaphysics*, 3.
14. Ibid., 150.
15. Ibid., 98.
16. Ibid., 94.
17. Epstein, Genis, and Vladiv-Glover, *Russian Postmodernism*, 105.
18. Quoted in Epstein, Genis, and Vladiv-Glover, *Russian Postmodernism*, 138.
19. Epstein, Genis, and Vladiv-Glover, *Russian Postmodernism*, 106.
20. Zhdanov, "Oblast' nerazmenmogo vladeni'a . . .," 63. Quoted in Epstein, Genis, and Vladiv-Glover, *Russian Postmodernism*, 138.
21. Harman, *Guerrilla Metaphysics*, 153. "Real object" is a technical term for Harman, who splits entities into the withdrawn, real objects and the "sensual objects" that enter into relation.
22. Epstein, *After the Future*, 41.
23. Husserl, *Husserliana* (19), 437.
24. From my own tests: at ISO 200, color and saturation shifts are not noticeable; at ISO 400, red shifts toward yellow by about 17 degrees. Green shifts toward cyan slightly and desaturates by around 20 percent; at ISO 800, red shifts toward yellow by about 28 degrees. Green shifts away from cyan slightly, perhaps by 5 degrees, but desaturates almost entirely.
25. Maurer, "Reality and Digital Pictures."
26. From the question and answer session in a presentation of work at MIT in 1974. The University of California, Riverside has archived an audio recording of the session at http://cmplab16.ucr.edu/podcasts/2008.0009.0003/UCR_CMP_Podcasts_CollectionsSeries2.m4a. I am grateful to Ted Papageorge for sharing this recording with me.
27. <http://twitter.com/ibogost/status/5928090585>.
28. Latour, *We Have Never Been Modern*, 89.
29. Latour, *Pasteurization of France*, 197.
30. Ibid., 227.
31. Levinas, *Time and the Other*, 90.

32. Morton, "Unsustaining."
33. Ibid.
34. Pollan, *Botany of Desire*, 5.
35. Husserl (19), 670.
36. Marcus, *Age of Wire and String*, 37.
37. Ibid., 39.
38. Ibid., 41.
39. Ibid., 40.
40. Hawking, *Brief History of Time*, 1.

4. CARPENTRY

1. "What's The Story? Writers Reveal Why They Write." A transcript can be found at <http://www.npr.org/templates/transcript/transcript.php?storyId=128849596>.
2. Ibid. I've taken a few liberties in editing the transcript into this context to make it more legible, but these changes are not material; they serve only to make Eubanks's spoken prose clearer in this written context.
3. Ibid.
4. Ibid., with modification, of course.
5. Cf. Diamond, *Guns, Germs, and Steel*.
6. Wood, "Slightest Sardine."
7. Morris, "Academic Cliche Watch." I am grateful to Morris, Alice Daer, and Robert Jackson for discussing this subject with me in late August 2010 (cf. http://www.bogost.com/blog/academic_mumblespeak.shtml).
8. Bryant, "You Know You're a Correlationist If . . ."
9. Ibid.
10. Rorty, "Comments on Marjorie Green's A Philosophical Testament," 4–5.
11. Ihde, *Experimental Phenomenology*, 14.
12. Crawford, *Shop Class as Soulcraft*, 199.
13. Thomson, *Heidegger on Ontotheology*, 164.
14. Lingis, *Community of Those Who Have Nothing in Common*, 41; Harman, *Guerrilla Metaphysics*, 2, 72, 166.
15. Latour, *Pasteurization of France*, 205–6.
16. See <http://www.mediawiki.org>.
17. As of September 2010, Wikipedia contains approximately 3.4 million articles in English. The random article feature can be accessed by loading <http://en.wikipedia.org/wiki/Special:Random>.
18. The working *Latour Litanizer* can be found at http://www.bogost.com/blog/latour_litanizer.shtml.

19. See <http://ooo.gatech.edu>.
20. I am indebted to Levi Bryant for this particular turn of phrase.
21. Montfort and Bogost, *Racing the Beam*, 14–17, 145–50.
22. Fry, *Deconstructulator*.
23. Hewitt, *Firebug*.
24. See <http://awarehome.iinitc.gatech.edu/about-us>.
25. Romero, Pousman, and Mateas, “Tableau Machine: An Alien Presence in the Home,” 1265–66.
26. Ibid., 1266.
27. Ibid., 1267.
28. Ibid., 1266.
29. Ibid., 1267.
30. Pousman, Romero, Smith, and Mateas, “Living with Tableau Machine,” 375.
31. Ibid.
32. Bennett, *Vibrant Matter*, 120.
33. Meyer, “Introduction,” 8.
34. Whitehead, *Process and Reality*, 259. Quoted in Meyer, 9.
35. Latour, *Pasteurization of France*, 219.
36. Ibid., 218.
37. Urustar, *Urustar*.
38. Galloway, “Guy Debord’s ‘Kriegspiel.’”
39. His cookbook, *The Whole Beast: Nose to Tail Eating*, contains recipes nearly impossible to follow, not because of complexity but because the requisite types and parts of the animals they contain are nearly impossible to find. Ox tongue, pig blood, lamb’s brains, pig spleen. Even the staunchest of vegetarians can appreciate *The Whole Beast*, for it is much more than just an essay on the lost thrift and wanton wastefulness of modern carnivorous life; it is also an experiment in the textures, functions, and sheer existence of things unseen: duck necks, sheep hearts, bone marrow.
40. See <http://smartech.gatech.edu/handle/1853/20514>. For more on the Mad Housers, see <http://www.madhouses.org/>.

5. WONDER

1. Lander, *Stuff White People Like*, 34–35.
2. Ibid., 108.
3. Ibid., 109.
4. <http://www.citypaper.com/special/story.asp?id=11846>.
5. “Tanks, Trucks, and Vikings” (season 5, episode 11), which originally aired on October 2, 2008.

6. Brown, *I’m Just Here for More Food*, 177. See also <http://www.npr.org/templates/story/story.php?storyId=4229760>.
7. Plato, *Theaetetus*, 155c, in *Collected Dialogues*, 860.
8. Plato, *Theaetetus*, 155d.
9. Butler, *Imagination and Politics in Seventeenth-Century England*, 58.
10. Bacon, “On the Advancement of Learning,” in *Works*, 9–10.
11. Maistre, *Examination of the Philosophy of Bacon*, 170.
12. Ibid., 171. A serinette is a device used to teach music to canaries.
13. Bacon, *Works*, 493.
14. Parsons, “Philosophy of Wonder,” 85.
15. Harman, “On Vicarious Causation,” 215.
16. Ibid.
17. See <http://www.edigroupkc.com/TheStemCrisis.htm> for many examples.
18. Ibid.
19. See <http://www.usfirst.org>.
20. See <http://www.crayonstocad.org>.
21. See <http://www.pltw.org>.
22. http://lcc.gatech.edu/compumedia/?page_id=9.
23. Macaulay, *The Way Things Work*.
24. For two example syllabi, see http://www.bogost.com/teaching/the_atari_video_computer_syste.shtml and http://www.bogost.com/teaching/atari_hacks_remakes_and_demake.shtml.
25. For more on Processing, see <http://www.processing.org>.
26. Maeda, “Your Life in 2020.” I am grateful to Mark Guzdial for making me aware of Maeda’s article.
27. This attitude has made for a controversial tenure as president of RISD. See, for example, Macris, “After Criticism.”
28. Gale, “Zombies Ate My Ontology”; Bryant, “Imbroglios of Objects.”
29. Cf. Montfort and Bogost, *Racing the Beam*. See also <http://platformstudies.com>.
30. For our complete response, see Bogost and Montfort, “Platform Studies.”
31. See <http://larvalsubjects.wordpress.com/2009/08/20/imbroglios-of-objects/#comment-19063> and <http://larvalsubjects.wordpress.com/2009/08/20/imbroglios-of-objects/#comment-19088>, respectively.
32. Ennis, “Interview with Nick Srnicek,” <http://anotherheideggerblog.blogspot.com/2009/08/interview-with-nick-srnicek.html>.
33. Latour, *Pasteurization of France*, 188.