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Simulating the Informational Substance of Human Reality in *Queen City Jazz*

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Biography

Susan Castro is an Assistant Professor of Philosophy at Wichita State University. After completing her undergraduate degree in math and computer science and working on the Human Genome project at UCLA, she became interested in philosophy and ethics of science. Her current work is Kant-centered but interdisciplinary, focusing on the value of cognizing as if, ranging from the roles of imagination to the problematic mode of cognition in moral conduct and artistic activity.

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Abstract

Queen City Jazz is a 1994 somewhat post-apocalyptic, somewhat post-human novel in which Kathleen Ann Goonan explores the beautiful and terrifying potential of the combination of unlimited nanotechnology with “an unscrupulous philosophy.” The unscrupulous philosophy within the narrative belongs to the nanoarchitect, Durancy, who imposes his own substantive conception of the good on a society that cannot consent. A second, more basic, unscrupulous philosophy structures the world in which *Queen City Jazz* takes place and underwrites the conditions that enable Durancy to do so. The first half of this paper outlines this philosophical structure and provides a metanarrative highlighting some of the most innovative and distinctive features of the work, for example the idea that the vestigial human pheromone system could be transformed into a powerful means of communication, as powerful an experience machine as any art form has ever been. The second section of this paper addresses the problem of how idea driven science fiction could function as an epistemic tool and what we might learn from *Queen City Jazz* by treating it as a thought experiment. I argue that the extended narrative of idea driven science fiction novels can ground an exploratory simulation in episodic cognition that paradigmatically serves as a rich context for public reflection and discussion concerning how we ought to move forward in science and society. By episodically immersing readers in a dystopic future, thus engaging readers in an affect-rich first person simulation of that possible future, *Queen City Jazz* challenges readers to diagnose what precisely has gone wrong in the Queen City. The final section addresses what we can learn from the experiment, assuming that it is well designed. I argue that it *shows* us the intrinsic value of work, and this has real implications for our technological ends. One of the scruples missing from Durancy’s philosophy is that humans need, thus ought, to work.

Keywords

Episodic Foresight, Constructivism, Thought Experiment, Pheromones

Queen City Jazz is a 1994 somewhat post-apocalyptic, somewhat post-human novel in which Kathleen Ann Goonan explores the beautiful and terrifying potential of the combination of unlimited nanotechnology with “an unscrupulous philosophy.” The unscrupulous philosophy within the narrative belongs to the nanoarchitect, Durancy, who imposes his own substantive conception of the good on a society that cannot consent. A second, more basic, unscrupulous philosophy structures the world in which *Queen City Jazz* takes place and underwrites the conditions that enable Durancy to do so. The first half of this paper outlines the basic philosophical structure of the novel and provides a metanarrative highlighting some of the most innovative and distinctive features of

the work, for example the idea that the vestigial human pheromone system could be transformed into a powerful means of communication, as powerful an experience machine as any art form has ever been. The second section of this paper addresses the problem of how idea driven science fiction could function as an epistemic tool and what we might learn from *Queen City Jazz* by treating it as a thought experiment. I argue that the extended narrative of idea driven science fiction novels can ground an exploratory simulation in episodic cognition that paradigmatically serves as a rich context for public reflection and discussion concerning how we ought to move forward in science and society. By episodically immersing readers in a dystopic future, thus engaging readers in an affect-rich first person simulation of that possible future, *Queen City Jazz* challenges readers to diagnose what precisely has gone wrong in the Queen City. The final section addresses what we can learn from the experiment, assuming that it is well designed. I argue that it *shows* us the intrinsic value of work, and this has real implications for our technological ends. One of the scruples missing from Durancy's philosophy is that humans need, thus ought, to work.

To better frame the problem, consider that freeing us of the burden of work has been one of the central advertised goals of technological development. If work has an intrinsic value for humans, for example because work is essential to freedom, then the elimination of work would be a dystopic ideal. The utopian goal of technology would instead be to free us of the burden without freeing us of work. To put the argument in mundane philosophical terms,

1. Freedom *from* is not an end in itself; its value is derived from enabling our freedom *to*. Idleness, passivity, and rest belong between projects. They cannot constitute a life. Aiming for negation negates us. It is the exercise of our powers that give us life, that make us live. Humans need to work.
2. Our ultimate positive aims are not given to us. We must make them for ourselves.
3. The goal of technology should thus not be to free us from work; it should be to free us to work. More specifically the goal of technology should be to free us from the constant burdens of natural necessity, thereby enabling us to construct for ourselves the plans and pursuits that give our lives meaning and value.
4. The artist, the athlete, and the scholar are archetypes of the lives we might lead if unburdened from natural necessity. Surely there are others we have yet to

discover. No one should be left with nothing to do. We will need to try things out and experiment in thought and deed to realize meaningful ways of life for everyone. This is the work for which technology should free us.

Scholars who find the argument above compelling are likely to have already been softened up by Aristotle, Kant, Marx, or other intellectuals. They already believe, by some description or other, that life is purposive activity and humans are purpose-originators. Artists and athletes, too, are already members of the pro-work choir. The argument is not likely to be so persuasive, or even to get any traction, with those who have an entrenched belief that work is life-sapping exogenous toil, that exercise is an excruciating expenditure of the mind or body, or that effort is a natural evil. The experience of work as an alien torturous constraint is a difficult obstacle to overcome in attempting to convince someone that work is a human need, thus assertoric arguments like the one above cannot get off the ground as long as our fantasies of lives of leisure remain untested. Neither a more elegant assertoric argument nor a plethora of empirical support will help here.

It may be tempting to write off those who deny the first premise by positing that their negative experiences of work have generated an irrational psychological bias that is resistant to counterevidence, but contemporary epistemology offers a broader base of resources for understanding experiential evidence and its role in value judgments. Third person testimony is no match for first person experience, and it should not be, when it comes to making the value judgments by which we live. The kind of evidence that would best support the judgment that humans need to work is first person experience. Given that few if any of us can try out what it's really like to not work, it is fortunate that first person experience can be acquired through simulation. Thought experiments like Gyges' ring and Black and White Mary have been used for thousands of years to *show*, what cannot be said or told (Brown and Fehige 2014; Wittgenstein 1922). Novels like Kathleen Ann Goonan's *Queen City Jazz* can do so as well. As Goonan herself cleverly puts it:

"You're rude and irritating and obfuscating." ... "You could at least tell me what's going on in this place," she said.

"You would think so, wouldn't you?" he asked. "That does sound reasonable, on the face of it" ... "I wish that I could just *tell* you these things. But that way doesn't work – see?" (Goonan 1994, 210-11)

In this paper I both demonstrate and explain how a particular idea driven science fiction novel, *Queen City Jazz*, tests the life of leisure fantasy and brings us to confront the

fundamental question “What (work) would we do?” if technology really freed us. The first half of this paper outlines the philosophical structure of *Queen City Jazz*, i.e. the system of ideas that set its parameters, and provides a metanarrative for how the novel proceeds. This provides a description of method for the experiment and allows readers to *do* enough of the experiment to *see* at least some of what it might show. The second section addresses theoretical problems concerning how science fiction novels could work epistemically, as extended thought experiments or experience machines. The upshot is that by recruiting our affect-rich first person episodic powers of simulation¹ they allow us to have counterfactual experiences that can counter our real experiences, e.g. of work, and consequently to make judgments informed by this extension of experience, as embodied, vulnerable, sentient beings who identify with the characters and critically reflect from the first person. The final section returns to *Queen City Jazz* to explain how this particular thought experiment supports the argument for work by viscerally communicating to readers that we need to *do* work of our own making, to *exercise* freedom, before closing with the suggestion that the aims of mental health research should respect the value of work in human life.

Queen City Jazz

Queen City Jazz is a 1994 somewhat post-apocalyptic, somewhat post-human novel in which Kathleen Ann Goonan explores the beautiful and terrifying potential of the combination of unlimited nanotechnology with “an unscrupulous philosophy.” The unscrupulous philosophy within the narrative belongs to the nanoarchitect, Durancy, who imposes his own substantive conception of the good on a society that cannot consent because the vestigial human pheromone system has been transformed into a powerful means of communication, an experience machine as powerful as any art form has ever been. At this level, the novel is a quasi-aporetic exploration of what we would be like, so changed, both as individuals and as social beings.

1. The episodic simulation theory I advocate in this paper is not necessarily in competition or conflict with others recently offered. For example Thagard’s theory of intuition, which involves encoding representation, neural binding, and interactive competition, is a very low level theory that posits the neurological mechanisms by which *recognition* is possible. Given that recognition is presumably a component or precursor of relevance determination, his theory is an important step towards understanding how a thought experiment could work in the higher level processes (self-interrogation, judgments of relevance, and other skills) that Camilleri argues are necessary to execute a thought experiment *well* (Camilleri 2014). I take the position I advocate in this paper to be sufficiently generic to be compatible with both Thagard and Camilleri.

A second, more basic, unscrupulous philosophy structures the world in which *Queen City Jazz* takes place and underwrites the conditions that enable Durancy to do so. The most basic organizing principle of the novel is the metaphysical premise that *everything is information*, where information is both noun and verb, both the form a thing has at a given time and the processes of taking in or taking on new forms (Goonan 1994, 227). Because “information” is not essentially representative much less factive in *Queen City Jazz*, the principle that everything is information divorces value from actuality. This leaves nanotechnology with a blank evaluative slate and unlimited potential to rebuild the world from its elements up through human cognition and sociality. The most striking implications of this premise arise from an apparently rational choice to enhance the human limbic system, which both abrogates subsequent consent and enables humans to live Durancy’s ideal of the artistic life. The dystopian aspects of the outcome then explicitly result from neglect of a natural law, namely that *any form of information transmission suffers loss*. The novel is thus ultimately structured by the following principles², which serve as parameters for the thought experiment that reveals a fatal flaw in Durancy’s design. Rather than enabling us and freeing us, tampering with the limbic system is likely to generate addiction, dependence, and misery.

1. Everything is information.
2. Learning is the acquisition of information.
3. Nanoeducation is virtually limitless.
4. The human limbic system constitutively informs human experience and higher cognition.
5. The human olfactory/vomeronasal system could learn to become a high intensity, broad bandwidth informational channel.
6. Any form of information transmission suffers loss.

2. I describe this as a set of principles rather than an argument because the logic of *Queen City Jazz* is somewhat inconclusive or aporetic, as any argument from an extended narrative thought experiment can be expected to be. It may be useful to think of the argument as an elenchus, as in a Socratic dialogue. Its purpose is to engage the reader in a cognitive process that one hopes will lead to new insight through the participant’s own cognitive power.

7. Addiction is a result of information loss.

(Aporesis)

To understand the logic of *Queen City Jazz* it is necessary to take the first principle quite literally. At the elemental level, lead is *informed* by its atomic structure as well as by temperature, pressure, and other exogenous sources of information. At the human level, we are informed by our genetics, epigenetics, sensory experience, and memory; by the communication of an idea, by the ingestion of nutrition, and by inoculation against pathogens. Given that the acquisition of information is *learning*, all these mechanisms of information - of becoming informed - are forms of education. Education is thus literally transformative in *Queen City Jazz*.³ In the novel as well as in reality, education is also often involuntary, irreversible, and dangerous. Given that nanotechnology is an artificial mechanism of information, one that need not respect natural kinds, nanoeducation is a nearly limitless learning mechanism in *Queen City Jazz*. Lead can learn to be gold. A train station can learn to repair itself after a bombing. You could wake up one fine morning to find a tiny blinking “n” on the ankle of your work boots. Who knows what they might have learned to do?

Because “information” must be construed so broadly in order to encompass literally everything, it necessarily encompasses what we would pre-theoretically call misinformation, falsehood, delusion, and corruption. Just as growth, development, and healing are processes of information – changes in form – so too are disease, consumption, trauma, and death. The principle that everything is information is entirely indiscriminate. Discrimination between good and bad forms of information would require an independent scruple. By constructing a world with this gap between fact and value, i.e. between the actual forms things take and the forms things ought to take, *Queen City Jazz* forces the reader to recognize both the indispensability of evaluation in and for human life, and how much our actual evaluations rely on unquestioned internalized norms (Stanley 2014; Dodd and Stern-Gillet 1995; Longino 1987).⁴ The lesson for us all,

3. *Queen City Jazz* provides a somewhat ironic perspective on the transformative education model according to which education is a lifelong project of transforming the person, not merely equipping the student with facts and skill sets (Boyd and Meyers 1988; Taylor and Cranton 2012). Personal transformation is a particularly important and elusive goal in ethics education and for building “sustainable societies.”

4. Largely driven by race and gender studies, there has recently been a sea shift in the incoming generation of philosophers towards a consensus that value free science is neither possible nor ideal. The myriad ways in which scientific practice and scientific theory are unavoidably value-laden was an unmistakably prominent

including neuroscientists, is that we cannot afford unscrupulous philosophies. If we are to build our world well, we must consider with extreme care what constitutes good science. If we are to make minds healthy, we must distinguish between good health and poor health, and we must do so without defaulting to the naturalistic fallacy that whatever is natural or normal ought to be our norm. *Queen City Jazz* makes vivid and visceral the tension between our need to divorce *ought* from *is* and our competing need to somehow ground what ought to be in natural norms.

The backstory of *Queen City Jazz* is that when an astronomical event early in the twentieth century makes the end of all energy-based broadcast communications imminent (Goonan 1994, 318), the human imperative to maintain the informational connections that define us drives a movement to preserve what we are by transforming our bodies.

The whole world became dependent on this new system that they thought up, the [Enlivened] Flower Cities. Nan. Changing the human body itself to receive [chemical] messages so that everything else would change... (Goonan 1994, 162)

In the new system, everyone would be free from disease, free from material want, and even free from labor because the pervasive nanotechnic enlivenment of inorganic materials empowered inhabitants to literally realize whatever they could imagine.

If you wanted a piece of 'wood' in a Flower City...You just went to your computer and ordered the substance, which was just like wood, every molecule, except that it wasn't really wood...yet there was no difference except in how it came into being...But it could also look like one thing but be different... (Goonan 1994, 152)

The substance you ordered could be inflammable wood, unbreakable wood. Not even the natural kinds of chemistry and physics are impervious to nan in *Queen City Jazz*. The Flower Cities would be our ultimate tool: self-sustaining, self-healing solar powered complex living beings that do for us whatever we do not wish to do for ourselves.

At first the Conversion to Enlivened Flower Cities surpassed expectations. According to the pamphlet welcoming newcomers to Cincinnati after its Conversion,

theme at the 2014 Philosophy of Science Association meeting, though the indispensability of ethical and social values to the content of science has often not been evident in prominent works in analytic philosophy of science (Bechtel 1988).

...[They enjoyed] a standard of living unparalleled since the beginning of time. Communication has not only been restored, it is conducted at a faster rate and with both a greater accuracy and a wider emotional bandwidth than ever before... (Goonan 1994, 183)

The pamphlet explains how information is stored in DNA and bacteria, how the “pheromone breakthrough” enabled chemical broadcasting, and how its giant Bees and Flowers manage the information of the Enlivened city (Goonan 1994, 183).

...the things nan could do were as dangerous as they were beautiful, and that was what made it so fascinating...the very shape of matter could be shifted and changed and used, almost as easily, once it was all set up, as just *thinking* about it...that was so glorious. (Goonan 1994, 79)

No more tedious trial and error in the laboratory. Our new metaperomonal interface to the nan assemblers would program them to execute our desires without all the fuss and bother.

The infectious idea that got it all started was articulated in 1984 by Eric Drexler in *Engines of Creation*:

In physical terms, it is clear enough why advanced assemblers will be able to do more than existing protein machines. They will be programmable like ribosomes, but they will be able to use a wider range of tools than all the enzymes in a cell put together. (Goonan 1994, 149)

We can easily imagine how it might have happened, given that the nano-infrastructure for radically transforming humans is already being built.⁵ Ribosomes and other natural molecular machines could be customized to denature and refold proteins as a kind of prion dialysis, or to sequester and release neurotransmitters to optimize brain chemistry (Sanbonmatsu 2012; Doyle *et al* 2013; Südhof 2013). Gene therapy packages will someday not merely splice DNA but also synthesize and deliver whatever additional infrastructure is needed to effect a new phenoform, from transcription factors to missing

5. Current work in molecular machines already supports the eventual realization of almost everything mentioned here, *if* targeting problems become sufficiently tractable, though of course it is unlikely that the use of nanotechnology will ever be as easy as just thinking about it. For general overview of molecular machines see Coskun *et al* 2012 and Frank 2011.

elements of signaling cascades. Whole new signaling cascades with functions of our choosing might be engineered de novo by artificial molecular factories. DNA methylation machines and RNA nano-factories could reverse adverse epigenetic effects and implement epigenetic enhancements.⁶ Advances in dynamic field theory⁷ might allow us to cure brain development disorders and lesions through a growth factor orchestration of neurogenesis, differentiation, and selective connectivity to redevelop microstructure and macrostructure.⁸ Brain plasticity could be finely managed to facilitate specialized learning, e.g. how to use a new artificial limb or to learn the languages of terrestrial alien beings like bees. In our scientific dreams we will soon be able to make of ourselves what we will.

Most perspicuously to Goonan's plot, in response to the energy-based broadcasting crisis our vestigial pheromone systems⁹ could be redesigned to link in to the Flower City chemical information networks and link up to our conscious awareness.

Once a human is genetically programmed, their own personally generated pheromones are re-assembled into metapheromonal¹⁰ packages capable of precisely echoing the most complex thought humanity can achieve. Or the most simple. That package passes through the membrane at a touch, to be carried upward to the Flower

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6. The epigenetics of cognition are being researched on several fronts (Zannas and West 2014; VanHook 2015; Lattal and Wood 2013; Masri and Sassone-Corsi 2013; Molfese 2011).
 7. Dynamic Field Theory lends itself well to the sort of informational theory of experience underlying *Queen City Jazz*, particularly in that extension of the classic dynamic fields like vision to include computer networks and social fields would support hints of the extended mind hypothesis in the novel, e.g. dead reckoning scaffolded on semiochemical awareness of solar road location and hints at communal cognition in the Flower Cities (Sandamirskaya *et al* 2013; and Gallagher 2013).
 8. The basic components of very complex orchestrations, e.g. scaffolding, sequencing, and integration, are being developed (De Bo *et al* 2014; Du *et al* 2012; Yan *et al* 2013).
 9. Pheromones, and semiochemicals more generally, have been extensively studied in insects, especially bees and ants, and to a lesser extent in plants and other organisms. Though oxytocin and other putative human pheromones or semiochemicals are currently being studied, it is not yet entirely clear whether there is an operative human pheromone system. Our vomeronasal system is clearly vestigial, but the extant infrastructure is sufficient to pose the question: If we could restore, activate, or enhance this system, how would cognition be affected? (See Dölen and Malenka 2014; Carter 2014; Doty 2014).
 10. The "meta" in "metapheromone" indicates a higher order of informational complexity or content. There is little evidence in the novel that the metapheromonal system she envisioned is metacognitively present to consciousness or that metapheromones have any phenomenal quality, e.g. qualities akin to redness or saltiness.

via bacterial DNA. There, in a form modeled on pollen, it can be collected and taken wherever needed, deposited and carried downward to the exact target room, and either be directly absorbed by the target or translated to any sort of tangible display. (Goonan 1994, 217)

The idea is that instead of conveying our thoughts through words or works of art, we could chemically encode and transmit them through the touch of our palms to the Flower network. Some of these thoughts might be programs for the city to execute. Others might be messages for the Bees to deliver directly to other human beings. As we will see, one of the plot-driving details of this system is that rather than collecting metapheromonal pollen on their legs like ordinary bees, the Bees of a Flower City would embody our thoughts.

Human limbic tissue is integrated into the brain structure of every Bee...This gives them the necessary incentive for the work they must do, and binds them to the city, to humans. In this way they can carry complex emotional information... (Goonan 1994, 274)

To restore broadcasting capacity using this new chemical platform, the Flowers could diffuse semiochemicals through the air from atop their buildings, but of course we would have to be educated to receive them. Our olfactory and vestigial vomeronasal systems would have to be taught to become a high intensity, broad bandwidth informational channel. Nanoeducation would have to create a direct channel to the limbic system¹¹, which constitutively informs human experience and higher cognition. Scent has the power to evoke memory, mood and emotion. Pheromones can evoke desire and aversion. Nan could give us an olfactory capacity any dog might envy, and a vomeronasal capacity beyond peer. Most importantly, if the prefrontal cortex can recruit the visual cortex to envision in imagination¹², a direct channel of communication to an “educated” limbic system could recruit (or hijack) the entire brain, thus the entire body, to *experience*. The pheromone breakthrough thus could not have been a merely somatic breakthrough. It would have unavoidably transformed *us*, and made us receptive to exogenous emotion and volition, vulnerable to a plague of education gone wild (Goonan 1994, 74).

11. For an overview of the limbic system and its relevance, see Catani *et al* 2013.

12. For neural recruitment in imaginative activities see for example Buchanan *et al* 2014, Slotnick *et al* 2012, Gandevia *et al* 1997.

The Flower City utopia was of course short-lived. The assemblers improvised like a jazz band, spreading uncontrollably in wild Surges of material transformation and plagues of informational infection, many of which were literally dead ends.

...people were dropping like flies...The plague takes everybody different. Makes them *learn*, you know? Does something to the brain. Supposed to enhance things. Make everyone superhuman... Only problem is, it got out and spread like wildfire before it was perfected. In fact, a lot of nanoplagues did...Apparently there's a lot more to being human than meets the eye. (Goonan 1994, 64-65)

Those who contracted the plague and survived were made *strange*, pheromonally driven by new imperatives and immersed in a reality constituted by new senses that were cognitively scaffolded on the immense nan-pervaded material world. Victims of the Norleans plague, for example, obsessively build Huck Finn rafts and sing their way downriver to New Orleans, or more often to their deaths in the rapids.

Queen City Jazz opens in the post-Surge world in which nan has become endemic, on the verge of a radical transformation in the life of the young protagonist, Verity. Though she has been raised in an isolated neoShaker community that shuns nan and deeply fears infection, Verity has nubs behind her ears. These are "proof of some sort of tampering; tampering which might infect the Shakers in some unknown way or even kill them" (Goonan 1994, 5). The Shakers are aware of her nubs but she is otherwise able to pass as an uninfected natural human. She hasn't told them that she and her dog Cairo share pictures in their minds. They are also unaware that she is an unnatural dead reckoner. Her cognitive maps are scaffolded on the nan-built solar road system (Goonan 1994, 86). Most importantly they do not know that she is annually Called to the Dayton library to be programmed.

When Verity returns from a programming session at the library, she always has new Dances. Following a preliminary state of seizure, the dance is executed in a cognitive state reminiscent of artistic or divine transport.

Verity felt the Great Blessing echo through her body, unfolding like a flower of light which drew brilliance from the air around her straight into her body, and then it gathered into the center of her bones, concentrated, bright, and rushed upward through her spine until it flowered somewhere above the top of her head.

She began to jerk... about five minutes, and the light within her grew more bold and warm, and if she opened her eyes she knew that all would be bathed in the light, and when she looked at the faces of those around her it would be as if this had all happened a million times before.

The light pulled her from her seat ... as she felt the Dance form and then propel her.

She whirled ... and began a complicated, repetitive step.

She heard Blaze begin to play once more, as if from far away, a melody which hummed like a swarm of bees ... and she heard the shuffling steps of others as, one by one, they joined her. ...[T]hey scattered, reformed, swirled, and finally stopped, all in the same moment, as if they had practiced but they had not

They had found that they were of one mind about her Dances. Sometimes, during Meeting, one of them would rise, and dance a few steps, and the others, remembering exactly, would join in, and for a time they would be part of something larger. (Goonan 1994, 18-19)

By packaging the Dance as at once seizure, enlightenment, and artistic performance, Goonan provokes us to consider the extent to which these phenomena are truly disparate. By positing kinesis as a mechanism for activating nanoprogramming, she further provokes us to consider the extent to which these phenomena are fundamentally somatic. Kinesis is a mechanism of communication in at least two ways. Interpersonally, body language communicates affect, both symbolically (e.g. skipping is a kinetic sign of joy) and sympathetically through mirroring. Kinesis is also an intrapersonal mechanism of communication through sensorimotor feedback loops that aid proprioception and fine motor control as well as cognitive orientation and equilibrium. As Goonan describes it, movement provides chemical information to the brain, which can then feed back to activate precise biochemical pathways that activate latent information (Goonan 1994, 276). Through this process one might learn to play the piano, or program nanoassemblers, perhaps without being metacognitively aware that one is learning or that one has learned. Nanoeducation could artificially produce *know how*, educating everything

from declarative and episodic memory to muscle memory. When an entire community is primed or preprogrammed for reception, a Dance might teach them anything.

The pretense that Verity's community is an uninfected, natural human community is obviously just that – a pretense. They cling tightly to the illusion that they can control what informs them, though it is painfully obvious that they cannot. Other members of the community have their idiosyncrasies. For example, Tai Tai keeps a journal filled with "brackets, dots, numbers, letters, all jumbled together crazy and tight" and Blaze has a special interest in trains, one so distinctive and inexplicable that it seems artificial and exogenous (Goonan 1994, 14). After catching a cold one day Blaze inexplicably *knows how* to play Scott Joplin's "The Chrysanthemum," and he *knows that* a man named Scott Joplin wrote it. Perhaps Tai Tai and Blaze have caught interesting colds before. Perhaps they all have.

The nan contagion is not limited to the individual level, either. The founders built the entire community and wrote its Scriptures in a plague-driven fever.

What do you think?...That Mother Ann [the original founder of the Shakers] appeared on the edge of Bear Creek in a pioneer dress with angel wings and handed that stuff over? Hell, no! Ma put it together in a frenzy, one fine summer just after she was infected...It was ecstasy, all right. (Goonan 1994, 66)

...they raved, they *built*...with winches and saws. Built the barns, this house, the library...They were mad, Absolutely mad. Took them two years... Took a hell of a lot of energy *not* to give in and raft down the river...My mother was crazy. She believed that she was the manifestation of Mother Ann, sent to purify the human race. When people were dropping like flies... (Goonan 1994, 64)

The original founder of the Shakers, Mother Ann had envisioned a society in which men and women would be equal from the start, a celibate society that would effectively return human society to the Garden of Eden. Ma envisioned a society in which men and women could be natural from the start, a technologically celibate society that would return humans to the pre-Surge world. Whereas as Mother Ann had been raised in a sexist society, Ma had been infected by nan. Both sought escape for themselves and their community.

Despite her nubs and her special abilities, Verity has been brought up to fear contamination by outsiders who might carry plague. Yet when she eventually meets a survivor of the Norleans plague, the woman claims to be quite well.

Getting the plague is the most wonderful thing that could ever happen to you. Plague!...That's a terrible word for what happens. It's more like a *cure*. A *change*... (Goonan 1994, 43)

This putative victim does not want to be saved or fixed or cured. Similarly, Blaze remarks after his Scott Joplin infection that “[i]t’s just wonderful, the things that I’m starting to know” (Goonan 1994, 56). What prospectively terrifies is retrospectively wondrous, at least sometimes. When everything is information without evaluative scruples we may be tempted to fall back to consent as the ultimate standard of evaluation, but consent too is compromised in *Queen City Jazz*. The illusion of choice runs deep when our most basic fears and desires are metapheeromally programmable.

Verity’s community does become infected, of course, and this begins to foreground the extent to which our individual identities are determined by the form of community in which we live and through which we experience the world. All her life she had been surrounded by people who in a way defined her, told her who she was, and now it was all gone (Goonan 1994, 136). Trying to retain *herself* in the aftermath of the infection, Verity wraps her dead friends in forbidden Enlivenment Sheets and sets out to deliver them to the Queen City, where she hopes they may be revived. She learns, too late, that the Sheets may do something very different from what she intended. Whether her friends will be healed is an open question. They will certainly be changed. Verity agonizes over whether she has made the right choice for them (Goonan 1994, 146). Is any life better than none at all? What can we want for each other (Goonan 1994, 272)? Is it our prospective or retrospective judgment that matters most in contemplating truly radical change (Goonan 290)?

Inside the Queen City Verity discovers a different form of human reality, or perhaps a form that is no longer human (Goonan 1994, 136, 176). Pheromones control the citizens’ sense of familiarity, recognition, safety, and well-being. Pheromones turn *no* to *yes* (Goonan 1994, 171). As we readers might have foreseen, their nanoeducation goes right to the heart of volition and sense of self (Goonan 1994, 309). Some citizens of the Queen City are from time aware that something is wrong, but pheromonal misdirection prevents them from investigating and addressing it.

[T]here were great ramifications for the memory sponge] in just about every realm of sociological control. They interfaced directly with the brain, and could hold an infinite variety of assemblers and pheromonal analogs...Encyclopedic information flooding into the brain – but *whose* information, and under *whose* control? (Goonan 1994, 312)

They knew in advance that the pheromone breakthrough could turn out to be a cruel disguise for eliciting complete obedience. The alternatives, they thought, were to be controlled by private business concerns or

[c]onsciousness by committee...A dictatorship of direction. A Knowinger Than Thou conglomeration of social scientists, economists, engineers, and a single, somewhat twisted nanoarchitect [named Durancy]. (Goonan 1994, 319)

Any person on the Committee had the ability to step in and subvert the entire plan, though Durancy was the only person to recognize and exploit that fact (Goonan 1994, 320). Like the original Mother Ann and her cohorts, Durancy recognized the need for a new vision of what human society could be in an Enlivened City, an Enlightened Society. Thanks to nanomedicine they would be free from disease. Thanks to material nanoengineering they would be free from hunger and material deprivation. Thanks to the immense labor savings of the system, no one would need to work. Whatever else it would be, the Conversion would be irreversible. Durancy asked himself what people would *do* in an Enlivened City. *How* would they live?

His ultimate vision was of a society in which “[t]here would at last be time for people to develop creative energies. Their *individuality*...” (1994, 360). He could have left his vision open, as an empowering indeterminate idea of personal freedom, but instead he gave it a determinate form by imposing his own substantive conception of the good. Durancy decided that the Enlivened Queen City should be a city of superlative art, a city in which citizens could thoroughly celebrate art. Through metapheomones, he thought, we would be able to experience art, experience lives of art, as we never had before.

[It would be] a symbiosis, if it worked. An organic unity with his mind and brain the interface, the consciousness which sensed and would enjoy and savor and live something other than himself, a piece of another’s life, more delicious than mere reading, or hearing, or seeing, or touching. Art raised to the nth degree.... He could be *anyone*,

and then return to himself, like reading a book only immensely more intense. Yes. He could be...*everyone*. (Goonan 1994, 258-9)

In the post-Surge Queen City, citizens perform. Pheromonally immersed in their parts, *living* their parts right down to their DNA, they execute the City's Program (Goonan 1994, 128-9). They live out Flannery O'Connor's *Wise Blood*. Billie Holiday sings nightly. Citizens immortalize Ernest Hemingway, Charlie Parker...and Mark Twain. One might say that the citizens and Bees of the Queen City execute the episodic memory of the City superorganism. Occasionally the original consciousness of a citizen surfaces between parts to briefly to savor the experience, to rejoice in triumph over embodying a coveted role, or to rage against playing an inferior part in the life of the City (Goonan 1994, chapter 10). At least some citizens are able to exercise a level of discretion as to which roles they play, but opting out is not an option. There is no exit from the City. While the Flowers bloom, everyone plays their part.

The principle which makes the ultimate dystopia inevitable in the novel is the natural law that *any form of information transmission suffers loss* (Goonan 1994, 228). At the technical level, the information nanoscientists acquire is perpetually incomplete, thus its products are inevitably incompletely understood and often flawed. These products, the assemblers, are self-replicating. Each replication is subject to additional information loss. The natural cycle from epidemic to endemic to diffuse parasitic diversity and occasional symbiosis is thus replicated in the artificial nanosphere.

At the psychological level, addiction is a byproduct of information loss. Everything is information, including feeling and the intensity of experiences of art. The parts citizens play don't always "take" (Goonan 1994, 208). Even when they do, the margin of return from each artistic performance diminishes for the citizens, and also for the bees who became addicted to the metapheromonal byproducts of human emotion, specifically those of stories, music, and art (Goonan 1994, 228).¹³ Chasing that initial high, the Bees, who are perhaps themselves agents, cause the same things to be ceaselessly relived and recycled, each time with additional, vital, loss. Incorporating human limbic tissue both gave the Bees needs that bound them to the City and gave them power to bind humans to their needs.

13. See Weinstone 1997 for an exploration of the work addiction does in discourses of virtual reality, including in *Queen City Jazz*. Weinstone takes Verity herself to be a predestined addict to the virtual reality of the city. Though she does not directly apply her insights concerning logocentricism and transcendence to Verity, Weinstone's treatment of the complexities of how we think about addiction raises a host of further issues.

One might surmise as well that at least some of the citizens are addicts to performance highs, including the superficial highs of undeserved accolades with dwindling margins of return. Citizens do not write new material, nor do they aspire to originality or genius in interpretation. They are pheromonally determined to be willing vessels, not agents, not artists. For all his utopian vision, Durancy failed to account for attenuation and corruption of the signal. He failed to guarantee room and time for genuinely new, original art. He failed to distinguish between the value of maintaining and preserving old information and the value of originating information. Humans and Bees can both experience art, but only humans can produce it in the Queen City. Without autonomy, the losses of the system are irrecoverable. Consequently Durancy's nostalgic dream of the artistic life was not in the end an opportunity to explore creative energies and develop individuality. It was for many a living nightmare. Nanotechnology freed citizens of the Queen City only to become victims of his unscrupulous philosophy (Goonan 1994, 134).

What I hope to have communicated thus far through this metanarrative is the logic of *Queen City Jazz*, i.e. the principles on which the world and its plot are structured, with an eye to the implications for how we should proceed in designing our future. Every cognitive phenomenon can presumably be exploited for ill or for good. Perhaps there really are clear cases of each, but we know there are also many cases for which we lack robust standards of adjudication because the standards we normally employ presuppose natural kinds, obvious boundaries between health and illness and between the jazzy improvisation of nature and catastrophic metastasis.¹⁴ When the delimitations of our taxonomy are themselves challenged, we may attempt to fall back on informed consent but this too is compromised along with the limbic system, with communication, with information. The kinds of cognitive change we may initiate (even with quasi-magical nan) are typically irreversible, so we cannot test them out, comparing our judgments prior and post, prior and post. When the change is radical, we cannot extend our judgment or imagination to break new ground with any confidence in our accuracy. In *Queen City Jazz*, the power of information can corrupt as easily as it can heal, and we are seldom able to tell the difference.

But what could this novel possibly tell us about the *real* world where we actually live? How could we possibly learn anything from a fictional narrative about a world and its inhabitants so radically different from our own? Appeal to fear taints the experiment

14. Wolmark identifies *Queen City Jazz* as one of the few science fiction works that challenges us to move beyond the binary (Wolmark 2002, 77).

throughout and it seems there is far too much (irrelevant) detail even in this greatly simplified description for the novel to be a well-defined experiment by any stretch of the imagination. I turn to these issues in the next section before attempting to draw any conclusions from the experiment.

Novels as Thought Experiments

Elgin (2014) and Carroll (2013) have argued that fictional works, including science fiction, can be used as thought experiments. Though there is significant controversy over whether and how anything can be learned from thought experiments, some of their most defensible uses are particularly germane to idea-driven science fiction (Brown and Fehige 2014; Thagard 2014). One use is as a tool for scientific discovery, as opposed to contexts of verification (Schickore 2014; Stuart 2014, 266). In the context of discovery thought experiments can be very effective tools for generating hypotheses and for revealing conceptual shortcomings of theories, e.g. ambiguity of scope, which impact the design of verificational experiments. Another is the use of thought experiments in evaluative contexts, specifically those in which the issue is not how things are but how they ought to be, e.g. in moral philosophy.¹⁵ Thought experiments usefully raise our consciousness of the principles, dispositions and affects we actually employ in moral judgment, e.g. implicit biases, making them available as targets for reflection, critical analysis, and higher order affirmation or rejection (see Cikara *et al* 2010). We sometimes use thought experiments to convey a distinction that we cannot adequately convey by other means. In this section I will focus on how idea-driven science fiction novels like *Queen City Jazz* may legitimately be used as thought experiments for ethics.

Suppose that to argue from a science fiction novel, or from any fictional narrative, is to engage the audience in a thought experiment that effectively “pumps” their intuition:

Thought experiments are among the favorite tools of philosophers, not surprisingly. Who needs a lab when you can figure out the answer to your question by some ingenious deduction?...Some thought experiments are analyzable as rigorous arguments, often of the form *reductio ad absurdum*... Other thought experiments are less rigorous but often just as effective: little stories designed to provide a heartfelt, table-thumping intuition – “Yes, of course, it has to be so!” – about

15. Thomson’s violinist is perhaps the most famous example in general and the most cited in the discourse concerning the epistemic value of thought experiments (Thompson 1971).

whatever thesis is being defended. I have called these *intuition pumps*.
(Dennett 2013, 6. See also Dennett 1995)

If a given thought experiment does no more than pump one's intuition, i.e. if it does no more than trigger a pumped-up conviction of necessity, then intuition pumps are merely persuasive devices that circumvent evidence based reasoning and pose a rhetorical obstacle to critical reflection and epistemic progress. Such appeals to bare intuition have been widely criticized on a variety of grounds, especially ethical intuition pumps in their radically simplified trolley problem form.¹⁶ The simplest and most general purpose of asking people to choose whether to pull the trolley track lever to save five people thereby killing one, or to allow the trolley to continue on its current track to kill five, is to *prove* that certain distinctions are in fact *universally valid* and *decisive* ethical considerations. It turns out that most people do in fact take distinctions between commissions and omissions, between intended effects and unintended side effects, and other trolley-isolable considerations to be morally relevant. Yet whether such considerations are decisive, whether their weight is individually or culturally relative, and whether we ought to treat such considerations as we in fact do are further questions that a bare appeal to intuition cannot answer. Circularity (a.k.a begging the question or preaching to the choir) and the naturalistic fallacy (attempting to infer an *ought* directly from an *is*) are well known logical hazards of appeals to intuition. Trolley problems usefully raise consciousness of our intuitions, but they do not determine our second order evaluation of the intuitions they reveal.

Trolley problems also face less well known but equally important experimental design challenges. They are specifically designed to isolate one consideration from all others by removing as much context as possible. Though a great many participants in trolley problem thought experiments ask or even demand to know the history of the scenario and details about themselves and those whose fates they are to determine,

16. For an extended and somewhat biased but popularly accessible account of trolley problems and what they show, see Edmonds 2013. Like many who employ trolley problems in their work, Edmonds assumes that "[t]he point of *any* thought experiment in ethics is to exclude irrelevant considerations that might cloud our judgment in real cases" (Edmonds 2013, xiii emphasis added). I briefly argue below that extended narratives like science fiction novels that make no attempt to control for allegedly irrelevant considerations offer an alternative form of appeal to intuition that is philosophically useful in important ways. For the purposes of this paper I will lump together all highly controlled ethical thought experiments, those which are designed to isolate one consideration by excluding all context that might surreptitiously offer alternative grounds for judgment, thereby contaminating the experiment. Thompson's violin thus counts as trolley problem, whereas *Brave New World* does not.

these sorts of contextual details are withheld. By controlling for context and requiring participants to choose only on the basis of information that they may explicitly judge to be inadequate, requiring them to do so quickly and without benefit of discourse with others, we putatively learn something about the principles that people in their calm considered judgment think they ought to employ. Controlling for context in this way can be criticized as dehumanizing and, drawing from the Kohlberg/Gilligan debate concerning moral development, sexist or androcentric (Blum 1988; Flanagan and Jackson 1987; Schwartzman 2012). Treating the patients of the experiment as mere generic ahistorical and interchangeable bodies on the track may effectively control for partiality but it arguably does so at the expense of dehumanizing the patients (and perhaps thereby hamstringing the experiment by dispensing with an indispensable moral ground). The agents of the experiment are arguably also dehumanized in that the chooser is treated as an ahistorical, rationally ideal, radically ignorant but morally culpable causal power with unnaturally restricted options. Trolley-style problems are also arguably sexist or androcentric (Benhabib 1986. See also Puka 1990). To characterize the gender dispute very crudely, Kohlberg found that there are stages of moral development and that mature men reach the highest (explicitly but nominally Kantian) level of moral development far more often than women (Kohlberg 1973, 631-2; Kohlberg 1981). Gilligan replied that Kohlberg begged the question by presuming that Kantianism is the highest level of moral development (Gilligan 1982).¹⁷ Given that trolley-problems preclude grounds of care and they force participants to choose on Kantian or Consequentialist grounds alone, such experiments may be deeply gender biased in design, thus they may not actually show what they seem to show about moral psychology.

Although it may be true that in extraordinary circumstances humans must actually solve trolley-like problems, these are far from the human norm. Our lives do not consist of a sequence of emergencies that never come to constitute a personal history or a shared

17. Kohlberg's experiments actually showed that a particular percentage of mature men reason in a particular way and a different percentage of mature women reason in that way. Head counting alone cannot determine whether the minority is defective or ideal or neither. In presuming that the employment of impartial principles is the hallmark of the highest level of moral development Kohlberg presumed that rationalism had won the debate between rationalists like Immanuel Kant and sentimentalists like David Hume. Kohlberg attempts to address this criticism in Kohlberg and Boyd 1973. The movement sparked by Gilligan's insight surprisingly framed the historic debate between rationalists and sentimentalists as posing a false dilemma between agent-centered moral theories. Care ethics is fundamentally a relationship-centered class of moral theories that ultimately challenge the very notions of agents and patients employed by competing moral theories (Held 2005).

history between known participants. Most people do in fact take these mundanities to matter, too. When we generalize from considerations that are really peripheral, we obviously run the risk of seriously distorting or perverting the core of what we wish to investigate. In attempting to generalize from trolley problems and other very simple ethical thought experiments, then, we must rehumanize agents and patients, reinstate their histories and futures, and reconstitute their relationships while avoiding circularity and the naturalistic fallacy. It is not easy to do this well.¹⁸

The more bizarre thought experiments which have been (mis)taken by some to decisively determine necessary truths are arguably among the most misleading.¹⁹ According to Wilkes, it is precisely because the thought experiment to be executed is inadequately described that the resulting intuitions are ungrounded or go awry:

[W]hen we have thought experiments in philosophy, there are as we shall see problems in making the inference – precisely because of the ambiguous uncertainty concerning the relevant background conditions, leaving it unclear whether we have ‘established a phenomenon’. This means that our intuitions run awry, and the inferences are not only problematic, but the ‘jump’ from the phenomenon to the conclusion is made the larger because of the further need to imagine just what these backing conditions, under the imagined circumstances, would be. The ‘possible world’ is inadequately described. (Wilkes 1994, 8)

One possible advantage of appealing to intuition using a science fiction novel is that the extended narrative of a novel deeply contextualizes all the participants in a shared history in a counterfactual world. When a reader becomes episodically immersed in the imagined circumstances to the extent that she is affectively engaged and invested in what happens, perhaps even mirroring the characters, we have some grounds for claiming that the possible world is adequately described.

Instead of controlling for context to isolate a single declaratively expressible consideration, then, the text of a novel engages our episodic faculties. Episodic

18. Gendler attempts to explain how peripheral or exceptional cases can ground generalizations (or universalizations) by distinguishing between norm-driven exceptions and exception-driven norms. She argues that thought experiments (always) operate by appealing to exceptional cases that drive norms by revealing particular regularities to be non-accidental, deeper truths about the world (Gendler 2000, xii, 142-3, 150ff).

19. Thagard for example argues against ever using intuition pump thought experiments, especially in cognitive science (Thagard 2014).

memory, episodic foresight (sometimes called mental time travel), and episodic mindreading (sometimes called theory of mind) are experience-building, world-building, *simulational* activities that can engage us all the way to the visceral level. Immersion in a narrative is an episodic activity that recruits the same brain structures to simulate counterfactual experience. Each of these can be used for entertainment, but they also play an indispensable role in the *systemic* construction of our Ends. At an individual level, episodic memory and foresight help us learn from our successes and failures, develop our characters, and construct life plans, in part by helping us work out how multiple relevant considerations do and should interact in a complex world. At a social level, episodic mindreading or empathy is critical for the development of relationships, the construction and pursuit of shared ends, and the authentic inclusion of real others in one's lived experience.

The obvious disadvantage to the extended narrative thought experiment is the lack of control. The individuals who participate in the experiment may differentially attend to details, so they may effectively be judging on different bases. Given that even the most detailed narratives underdetermine their full simulation in imagination, the details each participant creates to fill the world may differ in experimentally relevant ways. From characters and plots of any significant complexity, many different kinds of conclusions may be drawn. It might well turn out that most narratives are simply inconclusive, supposing that the purpose of the experiment must be to determine universally valid and declaratively communicable results. Perhaps most devastatingly for Western analytic philosophers, this kind of argument is not reducible to a standard argument form that would be logically compelling from the third person perspective. Episodic reasoning is fundamentally first person, only partially expressible in declarative form, and only some of the inferences are logical in nature. Whereas trolley problems must avoid circularity, naturalistic fallacy, dehumanization, and androcentricism, extended narratives must avoid subjectivity, inconclusiveness, incommunicability, and incommensurability.

These pitfalls of extended narrative thought experiments are mitigated by several factors. Unlike stereotypical controlled experiments, simulations are not designed to be conclusive upon initial performance. Simulations are designed to be run repeatedly, so that the effects of chance can be modeled and the parameters can be varied to explore the dynamics of the system. Episodic simulations like rehearsing a gymnastic routine or an important upcoming social interaction are likewise most effective when repeated over time with a field of variations. Their purpose is seldom merely to predict what will happen. Episodic simulations are empowerment mechanisms that serve to increase our influence in events by helping us understand and plan for a range of contingencies in

which we participate. Since many of the contingencies for which we need to plan are determined by the choices of others, episodic simulations are often most effective when performed and critically evaluated in cooperation with others, e.g. mock interviews. Insofar as an idea driven science fiction novel is an episodic simulation for the reader, then, we may expect to learn more from the thought experiment upon repetition, perhaps over a period of years, and in company, e.g. in a class, a book club, or an internet based fan community. When a narrative is so widely shared and repeated that it becomes part of our cultural heritage (e.g. *Star Trek*), the pitfalls of subjectivity, incommunicability, incommensurability, and inclusiveness may become negligible.

Applying these considerations to *Queen City Jazz*, the most obvious hazard of treating this novel as a thought experiment is that our intuitions are clearly being pumped in ways that may compromise the experiment. There are several morally relevant intuitions that the author overtly uses to generate tension and suspense to drive the plot, many of them fears. As a component of a general fear of science run amok, Goonan plays on our fear of unseen (nanoscale) dangers and our fear of the unknown, unanticipable, irreversible consequences that science makes possible. These fears are very common drivers of science fiction drama. Goonan also plays on fears that are typically more specific to first contact and plague-apocalypse science fiction, namely our fear of change, particularly of being changed, as the exogenous becomes endogenous. In this vein she plays on our fear of violations of our personal boundaries from our skin to our will. All these fears shape the evaluative field of judgment both within the novel and to a lesser extent in the real world. By inculcating these fears in the reader, Goonan shapes the ends the reader attributes to the characters as well as the ends the reader wants for the characters. With repetition and reinforcement these fictionally contextualized fears eventually leach into how readers experience the real world, thus how we shape our real ends. Memory, dreams, fantasies, and current experience are less dichotomous and less discrete than many of us assume. Fiction can fundamentally change us by inducing vicarious trauma or inspiration. The affects (feelings, emotions, etc.) may attenuate rapidly but the lessons we learn may be quite lasting (cf. *The Grapes of Wrath*, *Brave New World*, *The Help*, etc.).

If *Queen City Jazz* is to be anything more than an intuition pump, it must adequately describe a coherent cognitive process that *shows* something intersubjectively valid. In particular, the characters must be adequately described *subjects* in whose shoes we can walk an imaginative mile. Tampering with the limbic system is of course an obvious threat to subjectivity but no more so than the cybernetic implants or telepathic control described in other science fiction novels. What makes *Queen City Jazz* distinctive, thus

more worrisome, in its approach to subjectivity is that Goonan explicitly recognizes the power of fiction and other arts to fundamentally change who we are, and extends this idea to its extreme in the *Queen City*. The actors *become the part* as literally as we can imagine. The distance between act and audience is blurred or eliminated, as they *become* the extras of the scene, embedded in the times and places they relive. An inadequate description of the citizens could easily make them incoherent as persons, into non-subjects we can consider only as objects.

The distinction between the lived part and the life is thus crucial to the adequacy of description in Goonan's appeal to intuition. Without it, citizens of the *Queen City* might seem too alien for our empathy to engage. Appeals to intuition regarding the nature and value of subjectivity would then fall flat. Goonan solves this problem by protecting the continuity of the real subject as a substrate for the lived parts, a substrate that surfaces between parts. Some citizens play a variety of short parts with time off between them. These citizens are only one step removed from contemporary method actors. Other citizens might be immersed in a single part for great lengths of time, but Goonan provides an off season to make the lived part discontinuous. During the off season when the Flowers become dormant in the winter, the citizens have an opportunity to recover or reconstruct themselves. Without this time-out from living the artistic life Durancy envisioned, it is not at all clear that there would be any substrate of an individual agent left to recover or any rational will left to do the reconstructing.²⁰ The subjectivity of the characters is thus deeply compromised, but not annihilated by complete immersion in the *Queen City* life. The off-season serves to preserve the reader's intuition that these are people, still humans thus moral patients if not agents, living a largely inhuman (deeply wronged) life. We can simulate what it would be like to be one of them, feel the problem,

20. Wolmark makes a similar point in terms of a normative or natural "unitary" human subject that may be conjoined with or interpenetrated by a technological other (Wolmark 2002, 77). Following Hayles, Wolmark takes the defining environment for the contemporary technologized body to be that of the separability of form and matter and the identification of the human as formal rather than material (Wolmark 2002, 78). Though this separability is prevalent in *Queen City Jazz* and Wolmark is correct that in much of the genre this "entails a loss of social, cultural, and sexual specificity," it is noteworthy that mundane social relations, local culture, and the body are left almost entirely intact in *Queen City Jazz*. Citizens are put to work involuntarily, their bodies and minds are *used* on a regular basis, but they have lives outside the job and their bodies are left almost untouched. A few characters have nubs or a glow. One has paws. One becomes a Bee. Though they presumably could make an art of body modification or more radical self-change, the characters do not even fiddle with their skin color or secondary sexual characteristics, much less make themselves beautiful or monstrous. It is almost exclusively the subjectivity of the characters that is at risk, i.e., vulnerable to exogenous subjectivities.

and reflect upon it. It remains to be seen what we might learn from doing so. To this we turn in the final section.

What Follows from *Queen City Jazz*

Supposing for the sake of argument that its experimental design can be validated despite the problems raised above, what may we learn from *Queen City Jazz*? If Goonan's appeal to intuition works, we readers immersed in the narrative should presumably become at least temporarily very concerned about scientists who attempt to tamper with our limbic system, or even with more moderate attempts to enhance and deepen our virtual reality experiences without biological tampering. More mundanely, we should be very concerned with how our immersion in commercial media may be tampering with who and what we are. The lasting message from fear is that we should be very careful what we wish for. These are, of course, merely intuition pump results. If the experiment really is well designed, it should be possible to diagnose the specific problems in the novel, and by articulating what has gone wrong, really learn something about the values that structure coherent ideals for our future. In this section I describe the protagonist's diagnosis and solution, then interpret the lesson in Marxian terms before arguing that the novel shows something that is very difficult to tell, that humans need, thus ought, to work.

What specifically makes the Queen City or its world dystopic? The real problem cannot be that things change or that people change. Growth and development are *ex hypothesi* good even though they are irreversible, often surprising, and unavoidable. The problem cannot be that some of the efficient causes are too small to see, nor can it be that they are exogenous. The human super-organism, complete with complex microbiome, is a constant flux of microscopic interaction and environmental exchange. We do not live in fear of these.

The general diagnosis Goonan explicitly offers is, not surprisingly, that citizens of the Queen City are not free. There is little volition in the city (Goonan 1994, 352). Verity eventually works out that she is the new Queen and her choices will determine the future for everyone. It is her problem to determine how to free the city from its cycle, and the reader in her protagonist shoes is expected to hypothesize a variety of possible solutions before Verity's solution is revealed. According to Verity's diagnosis, the problem is that the city is a closed system that has been overengineered to serve a unitary purpose with no need for human maintenance or room for growth and development. Her first act is to give citizens a choice to opt out of the city life. She knows that merely opening the doors

will not really enable anyone to escape their addiction – too few will *want* to leave – so she infects the population with a plague virus designed to force them out of the city and then wear off. This both opens the system and gives citizens a new perspective on their options. Her second act is to reseed the city with a “less is more” pluralistic ideal (Goonan 1994, 460). Verity’s vision is of a sane and functional engineer’s city *with* art but not *for* art (Goonan 1994, 450). We are given to believe that her solution is adequate because even India, the monstrous mother²¹ who is putatively the heart of the problem, finds it freeing:

She watched an amazing change come over India’s face. Terror, sorrow, grief, anguish, and then joy suffused her features in quick succession, and then a puzzled wonder as a smile appeared and tears began to flow. Sobbing, she approached Verity, and Verity could not move.

India embraced her.

“Thank you,” she whispered. Her face was growing old, into the face Verity had found so dear. “I thought I never could be free.” (Goonan 1994, 453)

Verity’s plan is to make room for growth and development by *freeing* the citizens both *from* the psychological and physical constraints that imprison them within the city and *from* the commodification of their artistic labor.

The underlying Marxian point here, that a city *for* art, especially one run by Bees addicted to its products, would be a city designed to alienate its citizens from their creative powers, should not be lost on anyone. Like Mother Ann, Ma, and Durancy, Marx and Engels were social architects. Like Goonan and her character Durancy, Engels saw that new technology has the potential to either produce misery and crisis, as big industry did in his day, or “in a different form of society” to free us:

...large-scale industry and the unlimited expansion of production which it makes possible can bring into being a social order in which so much of all the necessities of life will be produced that every member of society will thereby be enabled to develop and exercise all his powers and abilities in complete freedom. (Engels 1847b, 347)

21. See Kornfeld 2004 for more on the monstrous mother in *Queen City Jazz*.

Unlike the nanoarchitects of *Queen City Jazz*, however, Marx had no intention of attempting to free humans from working for their own sustenance. He conceived of labour, human power, and creativity almost exclusively in terms of production for natural sustenance. His aim was to organize society such that the means of securing sustenance are held in common rather than privately held, so that no one would be excluded from or have to compete for a fair share of the benefits of mass production. Unlike Durancy, Marx did not in general deem it a bad thing for a human to live by his own labour. His issue was with labouring for others under threat of material insufficiency, as serfs, slaves, and proletarians must:

We by no means intend to abolish this personal appropriation of the products of labour, an appropriation that is made for the maintenance and reproduction of human life, and that leaves no surplus wherewith to command the labour of others. All that we want to do away with is the miserable character of this appropriation, under which the labourer lives merely to increase capital, and is allowed to live only in so far as the interest of the ruling class requires it. (Marx and Engels, 1848, §II ¶39, 499)

The fundamental problem Marx aimed to solve was the commodification of labour, i.e. the reduction of the value of human activity to an exchange value. Thinking along these lines, one might diagnose the fatal flaw of the *Queen City* as an incomplete de-commodification of labour. Whereas all other commodities became free, i.e. they required no exchange or return for their use, the pheromonal byproducts of our experiences as citizens became a new commodity. Worse, our enslavement to the production of this new commodity was such that our compliance with the social demand for production was involuntary in entirely new way. Our bodies and minds are fundamentally *used* as mere means in the Kantian sense²² to satisfy the needs of the system on which they depend for sustenance and from which they cannot escape. If Verity's plan succeeds in bringing genuine creativity back to the city, the Bees might no longer suffer from information loss. If engineers populate the city, perhaps even the Bees could be freed, but freed to do what?

22. Kant defined prudence as skill in using others as means and argued that prudence is an important step on the path towards moralization, but he most famously argued that using others as "mere" means nevertheless violates the formula of humanity (Kant 1803, 9:450; Kant 1785, 4:429).

Despite their deep occupation with the productive, Marx and Engels occasionally described freedom in terms unconstrained by productive purpose, intimating perhaps that they too were ultimately concerned with freedom *to*. In *A Communist Confession of Faith*, for example, Engels articulated the central aim of the Communist party in terms of the sustainable free exercise of human powers with no reference to production:

[The aim is to] organise society in such a way that every member of it can develop and use all his capabilities and powers in complete freedom and without thereby infringing the basic conditions of this society.
(Engels 1847, 96)

Perhaps Marx offered no positive account of complete freedom because he, like Kant, believed that we can only discover what we may become through the progress of history.²³ Engels did at least envision that the systemic change he advocated, communism, would require us to become “quite different people” (Engels 1847b, 353). Communal control over production would put an end to hyperspecialization, he argued, because the kind of planning it requires “presupposes moreover people of all-round development, capable of surveying the entire system of production...[free] from that one-sidedness which the present division of labour stamps on each one of them” (Engels 1847b, 353). Whether or not Marx and Engels were correct that communism would have the general effect of making us all better-rounded, we should take the point that the reciprocal influence between individual development and social development must figure prominently in our planning for the future. It would be a mistake to take how people are as a given that drives what society may be for humans. We humans rise and fall to the occasion, depending upon what is demanded of us and what resources we may bring to meet those demands.

When the demands are lifted and resources remain, what we would *do* is an open question. What we would *be* as subjects or agents or persons is likewise an open question. In an individualistic capitalist society, it would not be surprising to find that many or most readers of *Queen City Jazz* diagnose the fundamental problem of subjectivity in Goonan’s world in terms of losses and gains of ownership, or in more Marxian terms, estrangement from what should be one’s own.²⁴ On this interpretation the problem is that what ought to be mine is not really my own, or that my ownership of what ought to

23. See Dupré 1998 for a fair interpretation of Kant’s theory.

24. Marx is perhaps as famous for his 1844 essay “Estranged Labour” as for co-authoring the Communist Manifesto (Marx 1844, 270).

be deeply mine is somehow compromised. When an exogenous metaperomone package changes my *no* to *yes*, what matters not that it came from somewhere outside me, but that I act on it without owning it. I am estranged from my own labor, as Marx would say, at the deepest psychological level. I may accept the inevitable as a slave complies under coercion, but the *yes* remains alien. The exogenous cause thus remains a trespasser in my will. My right to reject the exogenous from the domain of what is most essentially mine, by body, my thoughts, my will, is deeply compromised on this view.²⁵ This ownership model of what is *wrong* with limbic tampering is, as I have described it, a rights based understanding of the intuition generated by the narrative: My claim to the use of my mind and body is impotent.

Ownership in this broad sense is clearly a morally significant feature of cognition, and it is one with very deep cognitive roots (Shaw et al 2012; Kalckert and Ehrsson 2012; Limanowski 2014). To give a few cursory examples, Mirrors can allow an amputee to scratch the itch in an absent limb, arguably by creating an illusion of ownership that satisfies the relevant body mapping demands. Schizophrenia is in part characterized by thoughts and desires that are experienced as exogenous and alien, not one's own (Martin and Pacherie 2013). The "first-personness" of episodic memory and episodic foresight can be compromised such that one can remember episodically only as if it happened to someone else, or imagine *someone's* future though not one's own, and this significantly compromises agency (Martin-Ordas et al 2012). Ranging more widely, the endowment effect in behavioral economics (also known as loss aversion or divestiture aversion) reflects how perception of ownership influences judgments and behaviors in neurotypical agents (Shu and Peck 2011).

Even granting that the ownership component of subjectivity is a universally valid morally relevant consideration, I contend that the *Queen city Jazz* experience machine *shows* that *work* is also a fundamental component of subjectivity and a prior one at that. Like ownership and the mineness of my body, thoughts, and choices, *exercise* or *work* has deep biological and cognitive roots. From the adage that "neurons that fire together wire together" to cardiovascular exercise and pedagogy, the indispensability of mental and physical purposive exercise to the healthy development of a human being is widely recognized. We see it in toddlers who begin to reject aid in order to "do it myself," however ineptly. We see it in the charges of infantilization and disrespect laid at

25. Mark Huston's talk "Black Mirror's 'The Entire History of You': Memory as a Recording Device" at *The Work of Cognition and Neuroethics in Science Fiction* conference held by the Center for Cognition and Neuroethics in March 2015 helped sharpen my thoughts on ownership of one's memories.

the doors of helicopter parents, overbearing partners and paternalistic politicians who presume to make things too easy for us. Even when our ends agree, it is often critical to me that *I paint* the painting, *I earn* the income, *I play* with my child, or *I choose* the gift. What is important is not *that* it get done or *that* it be done well. The *doing* is constitutive of the end. A prioritization of work is clearly recognizable in today's Maker movement and in the lives of athletes and musicians who take the exercise of their skills to be non-instrumental ends that structure a way of life.

We have long seen the combined indispensability and priority of work in philosophical arguments valuing activity over passivity or advocating agent-centered moralities over patient-centered ones. From Aristotle to Kant, Marx, and contemporary race theory, philosophers and critical thinkers have long recognized the indispensability of work to human nature, human development, virtue, and happiness. Simplifying their views to an extreme, Aristotle argued that virtue is rational *activity* and the life of rational activity is the life of *eudaimon*. Kant argued that autonomy, the cognitive exercise of freedom, is the good upon which the value of all other goods depends. Marx argued that humans are fundamentally *laborers* who generate value through the exercise of our human capacities. Recently feminists, critical race theorists, and even business ethicists have argued that meaningful work is a fundamental human need that generates moral protections against legal and social exclusion from work, as well as rights to maximal autonomy and freedom of expression in workplaces.²⁶

Some of these indispensability claims can be reframed in terms of ownership – my *agency* is after all *my* agency – but we should take care to avoid recklessly reducing what *I do* or what *I am* to what *I have*. The verbs differ. Advocates of the priority of ownership, including those who grant that exercise is indispensable, may contend that self-ownership is metaphysically prior to exercise. There has to be a me in order for me to be an agent, one might argue, and mineness is constitutive of me. This can be resisted by distinguishing between metaphysics and metacognition. Though most Western analytic philosophers may take it as settled that *being* is metaphysically prior to *doing*, this is not the only coherent metaphysical position. More importantly, even if we grant the priority of being over doing, it does not follow that ownership is prior to exercise. Ownership or mineness in the relevant sense is a psychological or cognitive category that may not be reducible to a metaphysical or epistemic category. What matters in the first person is

26. Iris Young for example has argued forcefully that exclusion from work, i.e. marginalization, is a largely unrecognized and highly dangerous form of oppression (Young 1998).

not necessarily whether the thought *is* mine or even whether I *know* it is mine.²⁷ What matters in the first person may instead be whether I *own* it, whether I *take* it to be mine, or whether I *identify* it as alien or *reject* it. Mineness in the sense relevant to *Queen City Jazz* is thus itself a cognitive activity, a stance one takes towards a body, a thought, or an activity. Insofar as ownership can be a *stance one takes* (or a stance that one is unable to take) towards one's own thoughts and activities, ownership is itself a metacognitive activity²⁸ rather than a metaphysical relation.

Returning to *Queen City Jazz*, the novel clearly supports the view that work is diagnostically critical. Throughout the novel there are hints that development and growth require work. There are constraints on the ways in which certain important kinds of information can be acquired. Maturity, mastery, and creativity cannot simply be given. For example, Verity must be annually programmed to guide her growth. Children in the Queen City learn metaperomonal programming the hard way before they are allowed to let the city do it for them. Human development always requires something endogenous:

...They [parents] try and tell you things, important things that they've learned...But soon they learn that they can't, not really. They can only give you information that is, in a way, oblique. Parents – good parents – realize that there are certain things that you have to learn for yourself. It's the act of incorporation that's important. That's what lays down the synaptic paths, not just *hearing* about something. It's *your* doing, *your* failing, *your* actions, your own enormously individual kinesthesia within the world, within matter's confines and matter's release...that causes growth. (Goonan 1994, 377)

27. I may understand perfectly well that I have schizophrenia and that I experience some of my own thoughts as alien, but this really doesn't solve my problem. Knowing that a seemingly alien thought is really my own does nothing to reduce its alienness or grant me control of it. Knowing that it's mine doesn't make it mine in the relevant sense.

28. The distinction between cognition and metacognition is often characterized by the differences between 1) knowing something in the ordinary case, 2) knowing that you know something without being able to recall it (tip-of-the-tongue phenomenon), and 3) recalling something that you didn't know you knew. Ordinarily cognition and metacognition occur as a package deal, as in 1. Sometimes metacognition occurs without cognition, as in 2 where metamemory is disassociated from memory. In 3 cognition occurs without metacognition, as in cases of blindsight or more commonly as in cases of retrograde amnesia in which one discovers that one plays piano or speaks a second language fluently. The conscious reflective first person perspective is metacognitive.

The novel's exemplar of the fully grown citizen, Sphere, is a true musician. He soaks up all the greatness of the past, masters the information, and creates genuinely new works of art.

...This is a place where you can truly learn things, if you're a part of it...Charlie Parker had this great breakthrough, you know. He was thrown off the stage one time when he was just a kid and then he was absolutely determined to show them. So he went home and played all the records that he could find, over and over, like a maniac. He learned all that and then he tossed it aside. He broke through. He *created*. I think that here you can do that quickly. Learn all the masters that way, then break out into *yourself*, your true self, and still use all that stuff. (Goonan 1994, 386-7)

Passages like this tell us that the exercise of human powers, the kinesis, is indispensable to the development of a human life but they do not clearly disentangle ownership from work. *My doing* it and *my* doing it are merely shifts of emphasis.

The perhaps untellable lesson that the novel shows the reader is that we humans must work to become our selves. The novel as experience machine shows the reader how *we are* and *we become* what we *do*. By effectively stipulating that citizens cannot feel alienated from their activity, cannot reflect upon the activity in out-of-character ways while immersed in it, and cannot even entertain the thought that they are engaged in a performance, Goonan precludes the experienced alienness *in the moment* that is requisite for failures of ownership to be the most fundamental problem. A reader who does the experiment and imaginatively walks in the shoes of a Queen City citizen should consequently find herself demanding the freedom to try it herself, however ineptly, so that she can learn how and make it her own. We first become mature subjects who are capable of owning and disowning through the exercise of our powers.

Science fiction can be useful to the advance of technology not only by helping us envision what is possible but even more importantly by helping us mindfully determine the ends of technology for humans. The daily practice of Western research is not visionary in nature. Scientists and developers are caught up in particular experiments with highly localized ends that primarily concern the incremental extension of knowledge and development of means with little consideration of the ultimate ends to which these may be employed. In order to consider how the advancement of science might best serve our mental health, individually and collectively, we must first determine what we ought to

count as health and what role such considerations as ownership and work ought to play in our construction of mental health as an End. We need scruples to do so. The extent to which science may eventually allow us to realize virtual reality, whether via computers or metaperomones, is still an open question. Whether we ought to do something that we can do is a very different question. Considering how radically an individual might be changed, how radically human civilization might be changed, if we plug along with our noses to the grindstone without looking up to see what we will gain and lose, we have good reason to generate and use idea driven science fiction in the construction of our Ends. What we will *do* must be a central consideration.

To make the implications of the pro-work argument more concrete and immediate, consider that the mere fact that it is difficult for autistic people to determine what others are thinking and feeling does not determine whether we (doctors, parents, etc.) ought to try to make it easy. Even if we someday could make it easy for anyone, there might be greater value in figuring it out oneself, however imperfectly. It might do us all some good, individually and socially, to work harder at communicating clearly, accurately, and selectively. Whether the social aspect of autism ought to be a target for medical intervention, now or ever, depends upon a great many interdependent considerations that we perhaps ought to explore through shared narratives, science fictional and otherwise (e.g. Moon 2004; Gerland 2003).²⁹ We may simply not yet know what is really relevant. Taking the work out of human life might be an enormous mistake. If anyone still has doubts, I suggest you read some science fiction.

29. The idea is that fictional works like *The Speed of the Dark* might reshape and refine the goals of autism research (Moon 2004). The insistence that autism must be cured is driven in large part by the inability of neurotypicals to imagine what it's like to be autistic, which greatly hinders their ability to find value in an autistic way of life. Rather than adopting the simplistic aim to cure autism we might instead aim to counter only its commonly attendant intellectual disabilities that impair self-help, leaving the core autistic self to her own devices. Alternately, we might aim to cure neurotypicals of their burdensome social needs, their honesty disability, or their abusive tendencies. Before we get ahead of ourselves, of course, we should think very hard about the people we aim to make ourselves and the world we aim to create.

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