BRAINS, MINDS, AND COMPUTERS IN LITERARY AND
SCIENCE FICTION NEURONARRATIVES

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CHAPTER 1

On Imagination, Science Fiction and the Brain

In the following dissertation, I attempt to do three things. First, I develop a cognitive approach to science fiction and argue that science fiction originates as a by-product of the evolutionary adaptations of the human brain combined with our co-evolution with technology. I argue that writers began to generate what we now call science fiction as a means to accommodate and prepare the human animal for rapid technological change at the turn of the twentieth century that evolutionary adaptation alone had not adequately equipped us to handle. Without science fiction, our adjustment to change would have been far slower, more difficult, and more anguishing than it otherwise has been. Second, I use this cognitive approach to science fiction to examine neuronarratives, or fictions that emphasize the human brain as an integral part of the story, by three significant writers of the twentieth century: Isaac Asimov, Philip K. Dick, and William Gibson. Finally, I consider the underlying operation of metaphor in this cognitive approach to science fiction to demonstrate how the useful concepts created within the genre spread beyond into cultural circulation.
This project derives from the long tradition of attempts at defining the science fiction genre. These definitions usually emphasize an arrangement or combination of these elements: extrapolation, science/technology, and setting. For example, the first definition of the genre comes from the influential magazine editor Hugo Gernsback, who emphasizes science and extrapolation when he writes in 1926, “By ‘scientifiction’ I mean the Jules Verne, H. G. Wells, and Edgar Allan Poe type of story—a charming romance intermingled with scientific fact and prophetic vision” (Gernsback, “A New Kind of Magazine” 3). J. O. Bailey who wrote the first academic/critical work devoted to science fiction titled *Pilgrims Through Space in Time* (1947), stresses scientific extrapolation in his definition of the genre: “A piece of scientific fiction is a narrative of an imaginary invention or discovery in the natural sciences and consequent adventures and experiences. . . . It must be a scientific discovery—something that the author at least rationalizes as possible to science” (Bailey 10). Finally, Darko Suvin, whose definition is one of the most widely cited, offers this definition for science fiction: “[Science Fiction] is . . . a literary genre whose necessary and sufficient conditions are the presence and interaction of estrangement and cognition, and whose main formal device is an imaginative framework alternative to the author’s empirical environment” (Suvin, “On the Poetics” 375). Suvin emphasizes the cognitive (logically extrapolated) and estranging (other) qualities of the setting. All three definitions also focus on imagination as being integral to their formulation. Gernsback’s “prophetic vision” is a form of imagination, because it requires one to see that which has not yet happened through extrapolation from the knowledge of “scientific fact.” Bailey’s “imaginary invention” relies on its foundation
in “scientific discovery.” Suvin’s “imaginative framework alternative” depends on what he calls the “novum,” or “a strange newness” (Suvin, “On the Poetics” 373). Thus, imagination is a key component of the creation and experience of science fiction.

It is my intention to add to the discourse on imagination that stretches farther back than its more recent operation in the development of science fiction. Aristotle (384–322 BC) sought to distinguish imagination from perception and mind (or thought) in his De Anima: “Imagination, in fact, is something different both from perception and from thought, and is never found by itself apart from perception, any more than is belief apart from imagination” (Aristotle 123). However, Aristotle does not seek a material explanation for the imagination. Instead, he considers it a capability of human beings and some animals, but he does not delve deeper into its potentially bodily origins. Others attempted to explain imagination during the Enlightenment through empirical efforts, perhaps most notably by David Hartley in his work Observations on Man (1749). Importantly, Hartley grounds the mind in the physiology of the brain: “The white medullary Substance of the Brain is also the immediate Instrument, by which ideas are presented to the Mind; or, in other Words, whatever Changes are made in this Substance, corresponding Changes are made in our Ideas; and vice versa” (Hartley 8). Through his neurophysiological studies combined with philosophical reasoning, Hartley theorizes that excitation or vibration of the nerves by external sensation or persistent memories/experience generates thought. He goes on to argue that the ideas generated in our brain are a result of the imagination: “The recurrence of ideas, especially visible and audible ones, in a vivid manner, but without any regard to the order observed in past
facts, is ascribed to the power of imagination or fancy” (Hartley 383). Samuel Taylor Coleridge takes considerable issue with Hartley’s theories in his *Biographia Literaria* (1817). For Coleridge, he attempts to go beyond empiricism and release imagination from the imposition of Hartley’s physiological conjectures by distinguishing what imagination is and how it is a force of artistic creation. Unlike Hartley’s intermingling of imagination and fancy, Coleridge distinguishes between them and their adherence to the law of association:

The IMAGINATION then I consider either as primary, or secondary. The primary IMAGINATION I hold to be the living Power and prime Agent of all human Perception, and as a repetition in the finite mind of the eternal act of creation in the infinite I AM. The secondary Imagination I consider as an echo of the former, co-existing with the conscious will, yet still as identical with the primary in the *kind* of its agency, and differing only in *degree*, and in the *mode* of its operation. It dissolves, diffuses, dissipates, in order to recreate: or where this process is rendered impossible, yet still at all events it struggles to idealize and to unify. It is essentially *vital*, even as all objects (*as objects*) are essentially fixed and dead.

FANCY, on the contrary, has no other counters to play with, but fixities and definites. The Fancy is indeed no other than a mode of Memory emancipated from the order of time and space; while it is blended with, and modified by that empirical phaenomenon of the will, which we
express by the word CHOICE. But equally with the ordinary memory the Fancy must receive all its materials ready made from the law of association. (Coleridge 263)

Coleridge argues that the primary imagination is a unique ability of the “finite mind” to eternally create the “infinite I AM.” It is a generative force of the human brain to create what had not existed before. Fancy, on the other hand, is operation of associative memory. It is not creative—instead, it draws on what already exists in memory or arrives through the senses. However, the individual controls imagination and fancy by the application of his or her will. Thus, Coleridge challenges Hartley’s interesting, yet scientifically speculative explanation for imagination, and he keeps the generative power of the imagination firmly instituted in the human brain as the source of art and culture.

Coleridge’s work in the early nineteenth century advances beyond Hartley’s Enlightenment empiricism, but by mid-century, Charles Darwin reasserts empiricism through his definition of the imagination framed within his revolutionary framework of evolution. In *The Descent of Man* (1871), Darwin points to imagination, next only to reason, as one of the greatest evolutionary achievements of the human brain: “The IMAGINATION is one of the highest prerogatives of man. By this faculty he unites former images and ideas, independently of the will, and thus creates brilliant and novel results” (Darwin par 21). This innate, evolved ability of the human brain is one of the most important cognitive skills that sets us apart from the many other life forms with which we share planet Earth. Of course, imagination is what enables the creation of new ideas. While it facilitates the development of technology and the use of technology, it
also makes the cultural generation of literature and the enjoyment of literature possible. Besides all of the other kinds of art and literature that imagination makes possible, it is a unique example of literary expression that combines science, technology, and fiction. My intention in this dissertation is to pursue Darwin’s methodology of speculation, but ultimately, most of what I can discover comes through literary history.

While Darwin inspires my work in this project, the social scientist and political activist Raymond Williams provides the direction for the type of work that I do as a literary scholar. In his important essay, “The Tenses of Imagination,” Williams approaches science fiction through the history of imagination. He writes, “Imagination has a history. There are changing and conflicting interpretations of what it is and of its value. Imagination also has a structure, at once grammatical and historical, in the tenses of the past, present, and future” (Williams 259). Instead of focusing on the biological origins or operation of imagination, Williams focuses on imagination’s cultural meaning and the meaning applied to different kinds of imaginative work—positive and negative. In terms of what he calls “future fictions,” he argues, “People may call the results ‘imagination’, and if the connection really happens ‘imaginative’, but this is where the matter of tense comes in again, for something very different is involved if a writer tries to ‘imagine’ the future: to ‘project’ a future, as it is often put” (Williams 265). This different thing that Williams identifies for “projecting” or extrapolating the future as “imaginative” is that these narratives are actually about the present:

I may be wrong but I found in these two very different cases [The Fight for Manod and The Volunteers] that something much nearer the ordinary
idea of imagination was directly involved. I mean that at some important stage, in work with the future tense, a writer sits and thinks; assembles and deploys variables; even constructs what in secular planning are called ‘scenarios’, in the interplay of this and that projected factor, when even the factors are only partly known— their degree of development can be variably estimated—and when their interaction— bringing this factor up, fading that down—is quite radically uncertain. It can of course be argued, and in many cases demonstrated from actual works, that the structures which are projected and realized are usually no more than reproductions of existing structures in externally altered circumstances—the trivial case of those American stories in which Planet Earth encounters aliens through a President and corporations in Washington and New York is only an example of hundreds of more serious cases. Even some of the more surprising futures, in Huxley and Orwell for example, can be shown to rest on striking interpretations of the present, from which countervailing or mitigating factors are simply excluded: a negative present, you might say, rather than a positive future. (Williams 266)

Williams’ great imaginative insight is that science fiction is about the present rather than the future. The writer’s present grounds and situates the extrapolated narrative’s future trajectory. He hopes that sustained imagination can attain a truly new approach or idea, but this is the challenge not of raw imaginative power but the constraints of the internalized socio-cultural milieu as well as the constraints of language itself. In the
following dissertation, I add to the discourse of imagination by arguing that our evolved capability for imagination combined with our co-evolution with technology led to the generation of science fiction as a means to prepare us for a changing present and an unknown future.

Although I draw on my interdisciplinary interests in the natural sciences and computer science to develop my argument in this dissertation, I am primarily a literary scholar. I believe that any literature, especially science fiction, not only comments on culture in general, but also on the interaction of science and technology on the social and individual. Following a rigorous interdisciplinary approach, I attempt to expose the history of imagination in science fiction by focusing on its emergence as a response to rapid technoscientific change. The main historical moment of my analysis includes fictions from World War II onwards, but I also discuss early science fiction magazine editorials from 1926 to 1959 to establish the generic trajectory of the genre in the next chapter.

In Chapter 2, “A Cognitive Approach to Science Fiction,” I formulate a new theory of science fiction that draws on two interrelated cognitive developments: the co-evolution of the human and technology, and the evolutionary adaptations of the human brain for language and narrative. I argue that science fiction emerges from these complementary developments of humanity’s long history, because the human brain produces science fiction as an evolutionary by-product to help us cope with rapid technological advances, which are far too quickly changing for the human brain to adapt by natural selection. I support these claims with the history of the genre’s development
and the rhetoric surrounding its purposes by its two most significant, early editors: Hugo Gernsback and John W. Campbell, Jr. It is my assertion that the language of science fiction as a form of literature with an implicit promise to prepare its readers for the future derives from the underlying cognitive forces that fed into its emergence as a viable literary genre. My suggestion of this “novum” in theory (to echo Darko Suvin) I label colloquially as “future prep.” I apply this theory to the fiction of Asimov, Dick, and Gibson in the subsequent chapters to demonstrate how future prep in their work plays a significant role in the co-terminus trajectories of the neuroscientific turn in the popular imagination and the development of human-computer interaction.

In the third, fourth, and fifth chapters, I explore the concept of future prep in science fiction while also demonstrating the literary history of the neuronarrative. In his 2001 article titled “Neuro-Narratives,” Harvey Blume observes, “Reflecting their status in society at large, neurology and neuroscience have in recent years become major forces in American arts and media, charting new narrative pathways” (Blume par. 1). Marco Roth mirrors Blume’s thoughts in 2009 when he writes about what he calls the neuronovel:

The last dozen years or so have seen the emergence of a new strain within the Anglo-American novel. What has been variously referred to as the novel of consciousness or the psychological or confessional novel—the novel, at any rate, about the workings of a mind—has transformed itself into the neurological novel, wherein the mind becomes the brain. (Roth par. 1)
The kind of story that Blume and Roth identify as the neuronarrative or neuronovel respectively has a longer history than that supposed in their two essays. I admit that the neurosciences in general have gained a larger share of popular attention in recent years and there are more novels in recent years that address neurological issues, but as I will show, the neuronarrative, as it is formulated in science fiction, has a longer tradition.

Chapter 3, “Isaac Asimov’s Robots as Cybernetic Models of the Human Brain,” is the first of three chapters that explore the concept of future prep in science fiction neuronarratives. Beginning with Asimov’s fiction on robots, I tease out an underlying narrative of human-computer symbiosis that builds through the fiction of Dick and finds its culmination in the cyberpunk fictions of Gibson. Asimov begins this chain of thought by bringing cybernetics, or the science of self-regulating systems into the already well-established mode of science fiction robot stories. Asimov reconfigures the image of the robot in order to accomplish two things: 1) He rehabilitates the image of the robot as a helper in humanity’s continuing progress as a species, and 2) Perhaps more importantly, he draws on the science of cybernetics to demonstrate the metaphoric relationship between the robot brain and the human brain. With this relationship established through a large body of work spanning short stories and novels, Asimov gestures toward a future of computer-human symbiosis in the fictions that I examine from the Robot, Empire, and Foundation series of novels.

Chapter 4, “Philip K. Dick’s Reality Generator: the Human Brain,” focuses on the relationship between the writer and his fiction, and between the human brain and its experience of reality. Drawing on the writer’s speeches, essays, and perhaps most
importantly, *Exegesis*, a mostly handwritten journal covering the last eight years of the writer’s life and consisting of over 8,000 pages, I argue that while Dick’s life and personal experiences deeply inform his reconstruction of his experiences as fiction, he maintains a strong and sustained interest in the human brain’s role in any kind of interrogation of reality and authenticity. From his destabilization of the boundary between the human and the artificial in *Do Androids Dream of Electric Sheep?* to his examination of the broad spectrum of human experience in *The Transmigration of Timothy Archer*, Dick identifies directly or indirectly the brain as a point of origin to which his questions always seem to return. Similarly, between these two points, I discuss the brain’s recreation of reality and simulation in *A Maze of Death* (1970), the psychopharmacological disruption of conscious experience in *A Scanner Darkly* (1977), and the fictional amplification of Dick’s personal religious experiences from 1974 in *The Divine Invasion* (1981) and *VALIS* (1981). Furthermore, Dick’s apparent hypergraphia and hyperreligiosity following his unexplained visual and aural experiences during February and March 1974 motivate and inspire his latter fictions. He wrestled with a personal conviction to solve the meaning behind his experiences through public and private writing. As I will show, Dick’s personal life and his exploration of experiences from within his own brain provide an important key to understanding the significance of the human brain to Dick and his fiction.

Chapter 5, “William Gibson’s Cyberspace Exists within the Human Brain,” explores the essentialness of the human brain to any discussion about “cyberspace” in fiction or otherwise. Gibson implies the importance of the human brain’s visual and
proprioceptive conscious experience to entering what he calls the “consensual hallucination” of cyberspace—a term he coined. As I will discuss, Gibson’s fictional cyberspace is far more immersive and exciting than its contemporary signification as all things digital and all things online. Nevertheless, the term’s origin in Gibson’s fiction points back to an inescapable fact that the human brain is necessary for any manifestation of cyberspace. Without the experiencing subject, the physicality of the network and its computer systems exist; but a human brain (and its living body) is necessary for the generation of metaphors, representations, and experience of cyberspace. I examine these issues through Gibson’s “Burning Chrome” (1982), Neuromancer (1984), Count Zero (1986), and Mona Lisa Overdrive (1988).

Finally, in Chapter 6, “Beyond Science Fiction: Metaphors as Future Prep,” I argue that future prep is more concerned with inventive creation of metaphors than the science and technologies that play a significant role in these fictions. While the social effects of technoscience are certainly important, I assert that the fictional metaphors and added meanings created by writers are what perform the future prep function in these fictions. By providing readers (directly) and everybody else (indirectly) with useful metaphors for thinking about, engaging, and transforming technologies, these major fictions contribute to the human animal’s ability to cope and thrive in the present and future. I will conclude with a brief discussion of how the operation of tone—in this case the tension between literary history and science—is instrumental to the circulation of metaphors.
CHAPTER 2

A Cognitive Approach to Science Fiction

My intention is to continue what has become a long balancing act of comment on the relationship of fictions and themes in the popular culture of science fiction, often characterized as fantasy, to serious topics that command the attention of the wider scientific and literary community. In this intellectual balancing act over what must be taken seriously, my specific interest is the science fiction about minds, brains, and computers and its relationship to the emerging field at the intersection of literary studies and neuroscientific topics. I will show that science fiction, the literary and media genre that emphasizes the interconnection between science, technology, and society as necessary and essential to its plots, has deep roots in our evolutionary trajectory as a species and its recent manifestation might be the result of our co-development over time with our technological creations. I support my assertions with the earliest theories of science fiction by two of the genre’s most influential editors: Hugo Gernsback and John W. Campbell, Jr.

In the following, I present a manifesto for rethinking science fiction in cognitive terms, but I build my argument in genre studies, an element of literary history. The approach that I take draws on the science of mind and the ideas of evolution, but I cannot
claim this dissertation as a work of science. Instead, it is interdisciplinary and it demonstrates the interconnections between otherwise separate divisions of knowledge. My advisor even pointed out to me a primitive antecedent at what I am trying to accomplish. Grant Allen, a nineteenth century science and proto-science fiction writer and committed Darwinist, published his *Physiological Aesthetics* in 1877. Peter Morton describes this work as:

> What it tries to do is to explain aesthetic judgment in terms of the physiology of the senses. Obviously Allen, no more than anyone else then or now, did not have a truly reductive explanation of aesthetics in terms of neurophysiology. . . . Apart from a few vague remarks about nerve pathways in the brain, that is as far as the book goes in meeting the first term of its title. Allen, in this respect, does no better and no worse than Spencer or Darwin, both of whom had been over this ground in the 1850s and 1860s. And Allen’s book does have the virtue of being more lively than either. (Morton 46)

As I have outlined in the previous chapter, Allen’s work descends from the long tradition of trying to establish a physical or material basis for our “aesthetic” theories, which are, of course, linked to the human capacity for imagination. Unlike Allen, I do not attempt to discover a reductive explanation for aesthetics in the brain. Instead, I want to enrich our understanding of literary history by following an interdisciplinary approach. I want to add new data and insights to this body of knowledge.
My approach to literary history is genre studies. We know that literary history itself evolves, develops, and changes over time. In its most fundamental formulation, we know this through the etymology of words and meanings. Consider the word ‘genre’: In English, it refers to a category of artistic/cultural composition, and it corresponds in meaning to words including ‘like,’ ‘kind,’ ‘category,’ or ‘breed.’ Genre comes to the English language from French where it shares virtually the same meaning. In turn, the French genre derives from the Latin genus/generis, a neuter word meaning kind, class, sort, or race. The Latin root is what gives us the terminology from natural history: genus, or a taxonomic category between the broader ‘family’ and the specific ‘species.’ Natural history, of course, informs the synonyms with genre: ‘breed’ and its Latin root meaning: ‘race.’ The English ‘genre’ also relates to the English verb ‘generate’ via the Latin verb generō, meaning to beget, produce, or descend forth, because they both share a root in the Latin genus. If the diachronic advancement of languages through linguistic evolution and cross-pollination between languages are a micro-scale evolution, then literary history changes on the macro-scale. The macro and micro effects of these trajectories of evolution intertwine, like a double helix, if you will, and I am employing the former as a means of highlighting the operation in the latter. I am interested in the generative power of the science fiction genre to reveal visions of the future, and I am equally interested in the way that the science fiction genre became the way it is today as produced or descended from the human enterprise. In other words, I am interested in the system or method for gradual and developing change or “evolution” in our language use and understandings of literature. I suggest that my quest for a natural history of the science
fiction genre is a version of genre studies, and conversely, genre studies is never divorced from natural history.

In this chapter, I suggest that instead of thinking about science fiction only according to its generic qualities, historical development, or social critiques, we should also consider why the human animal creates and enjoys science fiction by focusing on the cognitive origins and effects of this specific kind of literature. To this end, I seek an evolutionary explanation for the significance of science fiction today not only in literary history, but also in the related studies of neuroscience and computer science. In effect, it is the generation of genre studies in cooperation with the natural history of the human brain.

With a cognitive approach to science fiction, I propose a new way of thinking about the genre in terms of its overlooked development with the human brain. Like science fiction literature, this study will adopt an interdisciplinary approach in its attempt to uncover the deeply embedded aspects of science fiction in culture and the human brain. It is the connections between genre studies and natural history that necessitates an innovative strategy that crosses the boundaries of the evolved brain from evolutionary psychology, the brain and human technology from the history of science and technology studies, the brain and fiction from cultural cognitive studies, and finally, how the brain adapts to the future from science fiction studies. I will thread these overlapping discourses together in the following essay to develop a cognitive approach to science fiction before providing evidence that the cognitive impetus of science fiction has been with the genre since its inception.
The basis for this natural history of genre is evolutionary psychology and the study of the brain and its functions from an evolutionary perspective. Steven Pinker and Denis Dutton, two influential theorists in this area, provide some significant insights into the development of fiction through the evolution of the human brain.¹ Pinker, who has also theorized human language ability as an evolutionarily adapted function, provides a useful starting point for any discussion on brain evolution, because he provides a well-regarded view of the brain’s evolution as a complex organ that enables the human experience. He argues against the modern dualistic adherence to the ‘ghost in the machine’ and the Western ideal of the ‘noble savage,’ which he sees as supporting the concept of the “Blank Slate: the idea that the human mind has no inherent structure and can be inscribed at will by society or ourselves” (Pinker 2). Pinker argues that the brain has evolved because of natural selection to serve particular adaptive functions for the human animal including natural language, cognition, and emotions. According to Pinker, the brain evolved as an organ with immense complexity and features that enrich the human experience.

¹ Steven Pinker holds a PhD in experimental psychology from Harvard University where he now holds the position of full professor. He has previously held positions at Stanford University and the Massachusetts Institute of Technology. Denis Dutton, who passed away in 2010, held a PhD in philosophy from the University of California, Santa Barbara, and he was a professor of philosophy at University of Canterbury, in Christchurch, New Zealand.
Pinker’s account of the evolution of mind includes an important section on the arts and fiction. He sees narrative as an adaptive function of the human mind that serves a survival function (e.g., modeling and virtual experience without the high cost of real life experimentation). However, he sees “art (other than narrative) [as] a by-product of three other adaptations: the hunger for status, the aesthetic pleasure of experiencing adaptive objects and environments, and the ability to design artifacts to achieve desired ends” (Pinker 405). As compelling as Pinker’s arguments are that art is a by-product and narrative is an adaptation, I believe that his conclusions are too reductionist and the actual evolutionary processes might be more complicated than he suggests. However, I am interested in what Pinker says about art, which he describes as, “a pleasure technology, like drugs, erotica, or fine cuisine—a way to purify and concentrate pleasurable stimuli and deliver them to our senses. . . . Whether art is an adaptation or a by-product or a mixture of the two, it is deeply rooted in our mental faculties” (405). Here, Pinker hedges his bets, but the deep rootedness of art in our brains is unequivocal. However, it seems to me that it is also unequivocal that art and narrative are the result of evolved adaptations and emergent by-products. Furthermore, this interplay is dependent on technology, which I will discuss in more detail below.

Beginning from a different perspective than Pinker by focusing exclusively on art, Dutton argues that art is a universal human pursuit and its origin as an adaptation, sexually selected effect, or an evolutionary byproduct is too complex for a single determination. However, Dutton comes down in favor of a nuanced argument incorporating Geoffrey Miller’s focus on sexual selection as the evolutionary source of
the art of fiction. Dutton agrees largely with Miller who argues that many modern features of the human mind developed because of sexual selection. Thus, sexual selection generates the human capacity for art and fiction instead of directly from natural selection or from a byproduct of the brain’s development by natural selection. However, Miller’s account is too pat for the complexity of functions in making, understanding, and enjoying fiction. Dutton is careful to acknowledge other evolutionary paths for the development of fiction and the way in which human beings participate in the experience of fiction. Nevertheless, I find Dutton’s argument lacking, because he does not account for the co-evolution of writing technologies and fiction as a cognitive process. As Derrida tells us, we cannot privilege speech over writing in its access to logos. Speech and writing contribute to the development of language through their interaction. Considered in another way, writing as technology and speech as biology are equal contributors to the development of language.

The importance of technology to human evolution also finds expression in the work of Bruce Mazlish. Borrowing Jerome Brunner’s concept of discontinuities, Mazlish writes, “a fourth and major discontinuity or dichotomy exists in our time: the discontinuity between humans and machines” (4). He goes on to say that, “we are now coming to realize that humans and the machines they create are continuous and that the same conceptual schemes that help explain the workings of the brain also explain the workings of a ‘thinking machine’” (Mazlish 4). The fourth discontinuity is the disavowal

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Bruce Mazlish holds a PhD in modern European history from Columbia University, and he is a Professor Emeritus of History at the Massachusetts Institute of Technology.
of human co-evolution with technology, or put another way, we shape our technology, and over time, our technology shapes us. Furthermore, he argues that the relationship between humanity and its machines is continuous rather than discrete. He describes this continuity in terms of human nature: “As we try to understand evolving human nature, our guidelines tell us that human nature not only evolves but does so in intimate connections with humanity’s creation of machines” (Mazlish 7). Mazlish’s references to human nature derive from human evolution in general as well as the evolution of the human brain. Human nature, then, is emergent from evolution. Furthermore, human co-evolution with machines has left its mark or trace on us as evolved biology and evolved human nature. This process has led, in part, to the human use and enjoyment of narrative and fiction. It is my assertion that the interplay of biological evolution and technological development more recently led to the emergence of science fiction.

A cognitive approach to fiction provides the needed link between human-technology co-evolution and science fiction. Lisa Zunshine bridges the study of fiction and of the brain through two important concepts: theory of mind and metarepresentation. Theory of mind or ‘mind reading’ is “our ability to explain people’s behavior in terms of their thoughts, feelings, beliefs, and desires” (Zunshine, Why We Read Fiction 6). This is an important ability of the human brain that we use on an everyday basis to engage others. In addition, we employ this ability when we read fiction, watch movies, and play

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3 Lisa Zunshine holds a PhD in English literature from the University of California, Santa Barbara and she is the Bush-Holbrook Professor in the Department of English at the University of Kentucky.
video games. Our employment of theory of mind is dependent upon another concept called metarepresentation. Building on the work of Leda Cosmides and John Tooby, Zunshine defines metarepresentation as “our tendency to keep track of sources of our representations—to metarepresent them” (Zunshine, *Why We Read Fiction* 47). Not only do we have the ability to imagine or hypothesize what others are thinking and feeling, but we also track that information and the information supplied to us by others within a matrix of evaluated relationships.

I believe that the human brain’s use of metarepresentational data is the first step in developing an approach to understanding science fiction in cognitive terms. Damien Broderick, building on the work of Christine Brooke-Rose, has done some work on this in his theory of the science fiction “mega-text” (155). However, Broderick uses physics and the concept of phase space as a metaphor for the operation of reading science fiction: “In physics, a mathematical space ‘whose coordinates are given by the set of independent variables characterising the state of a dynamical system,’ able to map onto infinitely many dimensions, is called a phase space. I propose that genre is a negotiated territory in narrative phase space” (Broderick 23). According to Broderick, who extends the ideas of Brooke-Rose and Philippe Hamon, the multidimensional narrative phase space of the science fiction genre forms from the genre defining “mega text,” or the shared vocabulary and concepts used by genre writers and understood by genre readers, and the shifting

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4 Damien Broderick holds a PhD in literary studies from Deakin University, Australia and he is a Senior Fellow in the School of Culture and Communication at the University of Melbourne. He is also a science fiction writer.
relationships between the words, concepts, and mutually understood meanings that constitute the mega text (Broderick 57-63). He suggests that the shared terms and ideas in much of science fiction are relational and form relational constellations of meaning that come to be mutually understood by genre writers and readers. Zunshine’s concept of metarepresentational data may provide a new way of thinking about what constitutes a genre and the way texts within genres relate to one another, and perhaps this approach can be used in part to work toward an understanding of how science fiction operates in the human brain and what evolutionary importance science fiction may have.

Zunshine and Broderick provide a way of thinking about the generic qualities of science fiction as processed in the brain, but they do not provide a more fundamental way of thinking about the response and effect of science fiction on the brain. To address this issue, I find it useful to discuss Darko Suvin’s theory of science fiction from a slightly different angle than Formalist analysis.\(^5\) He writes, “[Science Fiction] is . . . a literary genre whose necessary and sufficient conditions are the presence and interaction of estrangement and cognition, and whose main formal device is an imaginative framework alternative to the author’s empirical environment” (Suvin, “On the Poetics” 375). Instead of simply discussing Suvin’s “cognitive estrangement” as a formal structure of science fiction, I would like to consider these two defining terms in relation to their operation within the human brain. Cognition and its attendant “novum” or acting technological or scientific device in the story both point to imaginative extrapolation. The cerebral cortex,

\(^5\) Darko Suvin holds a PhD from Zagreb University, and he is an emeritus professor of English at McGill University in Canada.
the so-called higher brain with its area-maximizing wrinkled structure, deciphers, processes, and understands the cognitive aspects of science fiction. It is here that we reflect on the past, act in the present, and plan for the future. Estrangement on the other hand is a feeling, an emotion, something that triggers the limbic system’s emotional response. It is through estrangement that we emotively understand the separation between our here-and-now and the world of the science fiction narrative. The tension itself elicits an emotional response. Science fiction establishes this tension and elicits an emotional response with the novum, or the new idea that drives the story. The novum is the manifestation of technology that engages our cognition as well as our emotions. Therefore, science fiction connects the reasoning and emotional centers of the brain through its imaginative extrapolation of science and technology, and it does so, I believe, as a result of technology’s co-evolution with the human animal.

The key, then, to a cognitive approach to science fiction is technology and its relationship to the human brain. If, as I believe, Mazlish is correct and humans have co-evolved with their technology, then without a doubt the human brain has reaped the greatest reward from our deep-seated relationship with technology. The expansion of the cerebrum and its specialized interconnections with the lower brain are part of the adaptive advantages from human-technology co-evolution. According to Pinker and Dutton, fiction or narrative is another adaptation, though they may not ascribe it to the influence of technology, but I do. Technologies of writing had obvious advantages for those early humans who had access to it. In the long view, those technologies influenced our development of language, which has its own specialized areas that aid its acquisition
and use. Fiction derives from language and narrative, and it is my assertion that science fiction serves a more recent purpose that evolution has not yet influenced.

    Technological change and its attendant transformations of political and social systems have exceeded most predictions in unexpected ways. These changes have taken place so rapidly that the human animal has not yet had an opportunity to allow natural selection to alter the species in any meaningful way to better acclimate to the current environmental stresses brought about by technological innovations and their effect on the world. Thus, science fiction is a survival tool, a mixture of Mazlish’s human-machine co-evolution, Dutton’s cognitive roots of art and fiction, and Pinker’s pleasure technology. Science fiction emerges from the evolved systems of cognition and emotion in the human brain that have in turn developed in part from our long, long history with technology. This long, long history is also the foundation for the human fixation on tools as the source and solution to the celebrations and problems that technology creates for us at an ever-increasing rate in the contemporary world. I believe that science fiction is far too specific a fictional mode to say that it is itself an adaptation of the human animal, but I will go so far as to say that it is a by-product of our adaptation of fiction as a survival tool that enables us to understand, engage, and transform our world when our bodies and minds have not yet had sufficient time to adapt in a fundamental way to the world that we have created. Thus, science fiction is an evolutionary by-product that has a survival value or function for the human animal, because it prepares us for the future.

    What I suggest above is a new approach to thinking about the origins and purposes behind science fiction. Science fiction seems to fulfill particular needs of the
human animal, and it does so in particular following the explosive changes in human history following the Scientific Revolution. In fact, science fiction editors and authors have argued since the founding of the genre at the turn of the twentieth century that science fiction emerged from the Scientific Revolution as a coping mechanism, a way to imagine and progress into the future. The generic origins of science fiction serve as a background to the ideas that I propose regarding the more fundamental emergence of science fiction from the cognitive and technological developments in the evolution of the human animal.

The germ that led to the idea that science fiction is a byproduct of the human brain’s development—as an evolved organ that has shaped and has been shaped by human technology and prepares human beings for the future—has been a part of science fiction since its foundation in the early-twentieth century by the editor Hugo Gernsback and through its mid-century maturation by the editor John W. Campbell, Jr. Campbell writes to the science fiction author and critic Alexi Panshin on September 8, 1970 that, “Now you ask me if I disagreed with Gernsback’s theories. Why, hell, man, I didn’t know he had theories—and I’ll bet he didn’t know it either, until he thought about it months or years later!” (Campbell, *Letters* 587). However, Gernsback and Campbell had theories of science fiction that they promoted through their editorial writing and enforced through their editorial decisions.
Gary Westfahl convincingly argues in a large body of work that these two editors had a profound and lasting influence on the science fiction genre. In *The Mechanics of Wonder*, Westfahl argues that science fiction is a relatively recent generic innovation that came about thanks to the work of two early editors: Gernsback and Campbell. Gernsback launched the first science fiction magazine, *Amazing Stories* in April 1926. In that inaugural issue, he defined what he considered as a new kind of literature as “scientifiction,” which later would be called science fiction. His theories of the genre, largely written in his editorials, provided, according to Westfahl, the principles for the next set of writers to carry on after Gernsback's publishing failures. Campbell extended Gernsback's ideas, which by that time were already part of the cultural memory within science fiction circles, when he assumed the helm of *Astounding Stories* in October 1937. The letter quoted above points to the invisible omnipresence of Gernsback’s ideas about the genre, because Campbell himself was unaware of the genesis of the genre’s essential characteristics. Campbell, like Gernsback, promoted his own ideas about what should and should not constitute the science fiction genre. Through his position as editor with a well paying magazine, he guided the genre into what many now call the “Golden Age of...

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Science Fiction.” However, Westfahl is careful to point out that the economics of the genre and Gernsback's earlier influence had much to do with Campbell's success as an editor during mid-century. However, Campbell's promotion of talented writers and their visions, especially that of Robert A. Heinlein and Isaac Asimov, propelled the genre into new directions.

In the final section of this essay, I focus on a single, unifying theme found in Gernsback’s and Campbell’s respective theories of science fiction that I call “future prep.” Future prep is the idea that science fiction prepares its readers for a dynamically changing present and an imaginatively possible future of ongoing progress. It first appears in Gernsback’s early writings about the genre, and it continues to inform Campbell’s later writings. Crossing cultural and historical shifts in part influenced by rapid technological change and integration into the quotidian, Gernsback and Campbell developed the idea that science fiction is far more important than entertainment—they envisioned it as a survival tool for humanity.

Future prep, or the idea that science fiction prepares its readers for a dynamic and constantly evolving future, goes back to the genre’s founding by Gernsback. In the inaugural issue of *Amazing Stories*—the first magazine devoted to what we now call science fiction, Gernsback provides his readers with the first definition of the emerging literary genre: “By ‘scientifiction’ I mean the Jules Verne, H. G. Wells, and Edgar Allan Poe type of story—a charming romance intermingled with scientific fact and prophetic vision” (Gernsback, “A New Kind of Magazine” 3). First, he founds the genre on the works of well-known and well-regarded authors such as Verne, Wells, and Poe. Then, he
creates the turn that establishes the genre: he combines “charming romance,” or a story removed from real life, and “prophetic vision,” or extrapolation of real science and technology into the future. This definition is widely cited. However, what follows it is far more important to this discussion on science fiction as a preparatory and survival tool.

Gernsback approaches these topics by way of his other core idea for the genre that science fiction/scientifiction should be educational:

It must be remembered that we live in an entirely new world. Two hundred years ago, stories of this kind were not possible. Science, through its various branches of mechanics, electricity, astronomy, etc., enters so intimately into all our lives today, and we are so much immersed in this science, that we have become rather prone to take new inventions and discoveries for granted. Our entire mode of living has changed with the present progress, and it is little wonder, therefore, that many fantastic situations—impossible 100 years ago—are brought about today. It is in these situations that the new romancers find their great inspiration.

Not only do these amazing tales make tremendously interesting reading—they are also always instructive. They supply knowledge that we might not otherwise obtain—and they supply it in a very palatable form. For the best of these modern writers of scientifiction have the knack of imparting knowledge, and even inspiration, without once making us aware that we are being taught. (Gernsback, “A New Kind of Magazine” 3)
Gernsback describes the present when he wrote the editorial above as, “an entirely new world” and its inhabitants’ “entire mode of living has changed.” These changes, presented by “many fantastic situations,” inspire “the new romancers,” or those persons writing the kinds of stories that he calls scientifiction, to write stories rooted in change and progress. Coupled to these new creations though is the fact that these stories are simultaneously “interesting reading” and “always instructive.” Why do these stories need to be instructive? By “imparting knowledge” of the future and inspiring readers to enter the future via scientifiction stories, they are in effect preparing readers as knowledgeable participants and shapers of the future.

For Gernsback, the future was not so far off. Instead, the rapid scientific and technological transformations of the early twentieth century had made the present more like an imagined future. In June 1929, Gernsback inaugurated a new science fiction magazine called *Science Wonder Stories* with the following editorial that establishes the need for a literature that grapples with rapid technological change as a means of accommodating readers to those changes:

The past decade has seen the ascendancy of 'sexy' literature, of the self-confession as well as the avalanche of modern detective stories. But they are transient things, founded on the whims of the moment. For the world moves swiftly these days and with it moves literature also.

Science--Mechanics--the Technical Arts--they surround us on every hand, nay, enter deeply into our very lives. The telephone, radio,
talking motion pictures, television, X-rays, Radium, super-aircraft and dozens of others claim our constant attention. We live and breathe day by day in a Science saturated atmosphere. (Gernsback, “Science Wonder Stories” 5)

Beginning a theme carried later by the science fiction editor John W. Campbell, Jr. as we will see below, Gernsback distinguishes between science fiction and other genre fictions including confessional and detective fiction while admitting that literary movements shift in step with the swiftly moving world. “Science—Mechanics—the Technical Arts” infused the contemporary world Gernsback writes about, and he goes so far as to say that science and technology “enter deeply into our very lives.” Furthermore, the technologies emerging from his contemporary moment, and the same moment of the establishment of science fiction, “claim our constant attention.” In effect, science has transformed the world and the lives of its inhabitants. Thus, a rapidly changing “science saturated atmosphere” necessitates a new kind of literature that accommodates people to the world’s many changes.

Despite what Gernsback sees as an increasingly technologized world, he is afraid that the average person lacks the education to understand and to use the new possibilities made real by science. With concern and lament, he writes in 1930 that:

The average person considers science something too difficult for him to try to understand. With this mistaken idea, thousands of people are endlessly sick year in and year out, and die, simply because of this ignorance. DESPITE THE TREMENDOUS ADVANCE OF SCIENCE,
THE WORLD IS MENTALLY STILL IN THE MIDDLE AGES . . . .

Talk to the average man and woman about the most obvious scientific achievement of the day, and they will know little about it, or their knowledge will be so superficial that it cannot be used to assist them in their lives or in bettering their condition. This is an unfortunate situation. . .

. . (Gernsback, “Science Fiction Week” 1061)

For Gernsback, a lack of scientific understanding, in this case regarding health and medicine, is a form of ignorance that can lead to death. His solution to this unawareness of modern advances in science is a new form of literature that combines entertaining stories with an educationally informative amount of science and technology woven into the narrative. This new literature is science fiction:

Not only is science fiction an idea of tremendous import, but it is to be an important factor in making the world a better place to live in, through educating the public to the possibilities of science and the influence of science on life which, even today, are not appreciated by the man on the street . . . . If every man, woman, boy, and girl, could be induced to read science fiction right along, there would certainly be a great resulting benefit to the community, in that the educational standards of its people would be raised tremendously. Science fiction would make people happier, give them a broader understanding of the world, make them more tolerant. (Gernsback, “Science Fiction Week” 1061)
Thus, science fiction, if “read . . . right along,” would benefit individuals and their communities, because it would enable individuals to inhabit and work in the world of the future with an understanding of the technologies and sciences that make that world possible. This is the survival function fulfilled by science fiction’s educational mission for the masses. Science fiction, according to Gernsback, can elevate readers from a superstitious, “MIDDLE AGES” view of the world. Science fiction can provide an education of useful knowledge and a world view that will help readers lead fulfilling, useful, and healthy lives, which in turn helps everyone by creating a more tolerant world. Science fiction provides “a broader understanding of the world,” which in turn makes people “more tolerant.” Instead of individuals using science and technology to better their own lives, Gernsback gestures toward the power of education to broaden minds and encourage tolerance in a world of difference. Before Campbell wrote about sociological problems confronted in science fiction, Gernsback argued that science fiction was the solution to sociological issues in the modern world and in the future. I discuss the impact of these ideas, which entered the science fiction community’s cultural memory, in the later section on Campbell.

Gernsback promoted the idea that everyone could read and obtain useful knowledge from science fiction. Some have argued that greed alone motivated Gernsback, but even after many publishing failures, he returns to his argument from above that, science fiction is a literature of educational value to the masses. For example, Gernsback repeats this point in an editorial from 1934, where he writes, “Science fiction is highly educational and gives you a scientific education, in easy doses” (Gernsback,
“The Science Fiction League” 1062). Almost twenty years later, he criticizes the “snob-appeal” of mid-century science fiction, because he argues that the genre should focus on “mass appeal”:

Science-Fiction, to be sure, has a large following, but it is split up and scattered over a large expanse of diverse media. These, in the main, comprise science-fiction newspaper strips, comics, motion pictures, radio and television programs, books, and science-fiction magazines. . . . If the young and budding S-F author—unspoiled by the prevailing snob-appeal—will look around carefully, he will note that all S-F media—with the exception of science-fiction magazines—always cater to the masses. They rarely have snob-appeal, the story is nearly always simple, understandable to the masses, young and old. (Gernsback, “Status of Science-Fiction” 2)

The key here is not just that Gernsback wants science fiction to be a popular literature of the masses, but that he contends that it should be “understandable” to everyone. The reason behind that understandability is the educational function of science fiction and its effect on preparing everyone for the future through informed, yet imaginative stories of science and technology.

After Gernsback’s influence on the genre waned, John W. Campbell, Jr. led the way into the future for the genre as the influential editor of Astounding Stories. In his study of these two groundbreaking editors, Gary Westfahl argues that, “Essentially, Gernsback established the hidden agenda of science fiction; while Campbell established
its public agenda” (Westfahl 201). According to Westfahl, Gernsback’s and Campbell’s differing agendas for science fiction an be described as, “Gernsback praised science fiction . . . because it could inspire new inventions, while Campbell praises science fiction because it can prepare society for the effects of new inventions” (Westfahl 194). I agree with Westfahl that Gernsback’s manifesto for science fiction became a part of the fabric of the genre. The things that Gernsback pronounced through his editorials became indelibly a part of most science fiction to follow. However, according to the evidence above, I believe that Gernsback was interested in more than mere inventorship; he was also interested in making individual lives and the world as a whole a better place with science fiction. Science fiction as education prepared readers for the future depicted in its stories. Campbell, in turn, carried forth Gernsback’s ideas by making them an explicit part of his own science fiction manifesto that focused on technoscientific progress and its effects on individuals and their society.

Unlike Gernsback, Campbell did not begin his tenure as one of the most significant science fiction editors at the helm of Amazing Stories with a manifesto. As Westfahl argues in The Mechanics of Wonder, Campbell grew up in the science fiction field created and shaped by Gernsback. Thus, the genre’s practitioners and fans internalized many of Gernsback’s early ideas about science fiction without knowing a clear or obvious source of origin. Campbell took many ideas about what constitutes the science fiction genre, including those of Gernsback, and eventually created his own genre-defining manifesto: “Scientific methodology involves the proposition that a well-constructed theory will not only explain away known phenomena, but will also predict
new and still undiscovered phenomena. Science fiction tries to do much the same—and write up, in story form, what the results look like when applied not only to machines, but to human society as well” (Campbell, “Introduction” to Venus Equilateral 12).

Campbell’s definition for science fiction differs from Gernsback’s in that the immediate emphasis is on stories that emphasize society effects over scientific or technological elements. These latter features are necessary to the story, but Campbell is more interested in what those features do to people and their societies.

Campbell’s widely referenced definition of science fiction has its origin in his earlier editorials. His interest in the importance and usefulness of science fiction adds to his importance to the genre as it continued to mature during the mid-twentieth century. It is in his earlier editorials that his emphasis on sociology has its roots in his thinking about the evolution of and future survival of humanity in an uncertain universe. To link Campbell’s development of science fiction to my cognitive approach, it is necessary to quote some of his writing at length, including this passage from his editorial in the June 1939 issue of Astounding Science Fiction:

Any form of entertainment that finds a considerable audience of patrons must grow out of some fundamental characteristic of the civilization which it serves. Most basic of all characteristics in any of Man’s civilizations must be the nature of Man—which doesn’t change appreciably in any such brief span as the ten millennia of recorded history.

It’s not surprising, in view of this, that the recorder of happenings—the reporter—existed in Babylon and exists today. The
historian, the playwright, the dancer—all existed. We have different mechanics of presentation, movies, and newspapers and magazines—but it’s the old idea over again.

Save for one thing. Science-fiction finds no counterpart in the entertainment of history. They had fantasy—but science-fiction isn’t pure fantasy. They had prophecy—but it wasn’t entertainment; it was protection, necessary defense against the blank terror of the unknown future.

For the first time in all Man’s climb, science-fiction has appeared. As a form of entertainment that has attracted tens and hundreds of thousands of readers, it must represent some totally new characteristic of our new civilization. (Campbell, “Future Tense” 6)

Campbell acknowledges the slow evolutionary development of the human animal while also gesturing to the fact that humanity has not had enough time to evolve during recorded history. Within the span of that recorded history, he finds science fiction to be a new and unique form of literature that overlaps earlier, more focused societal forms of art and extrapolation, including fantasy, entertainment, and prophecy. Therefore, science fiction is something new in the history of humanity, and its readership indicates that it is of some importance to society-at-large. Campbell continues:

It arises, I think, in this: for the first time in all the history of Man’s climb, he looks forward to better things, and not backward to a forgotten “Golden Age.”
When the future was that blank field of unknown terror beyond, prophecy was needed to hope; from that view of it, our modern civilization sees it as a blank, a glowing mist, that conceals unknown grandeur. We want to know what’s there—they dreaded knowing, but dreaded more not knowing.

Science-fiction rose when men reached that stage of civilization that looked forward gladly. I think, then, that science-fiction is not a happenstance, a fad that comes and goes by chance listing of public interest, but a characteristic symptom of this stage of evolution, a type of entertainment that would, inevitably, arise in any civilization that reached this particular level of advance.

It is the result of the mental attitude of Mankind; science-fiction comes when science takes some of the tension of terror out of the future tense. (Campbell, “Future Tense” 6)

Campbell argues that science fiction is an inevitable development of human civilization that reaches the current state of science and technological development. He also believes that this is an evolutionary development, as I do, but for different reasons. It seems that Campbell’s sense of the word “evolution” here has more to do with progress and development as opposed to his earlier reference to the insufficient time for “the nature of Man” to have changed during recorded history. This use of evolution as progress is the fundamental assumption of Campbell’s and Gernsback’s ideas about the modern era: science and technology will continue to develop and influence the changing social world.
The idea of progress, as established in the Scientific Revolution, is the “mental attitude of Mankind” Campbell alludes to in his conclusion. Where Campbell and I differ is that I believe science fiction’s fundamental roots are in the evolution of the human brain. Whereas I have demonstrated that science fiction likely arose as a coping mechanism to the exponentially charged advances of science and technology from a deeper interaction of the human animal and its technology across eons of time. Campbell’s view here emphasizes science fiction as a “symptom” of a science and technology-based civilization. As in his definition of science fiction, Campbell takes a wide view in terms of the genre’s development and its importance. I, on the other hand, see it more closely rooted in individuals who formulate, imagine, and create science fiction as a form of educational, survivalist entertainment that enables many others to imagine progress into the future and to cope with the significant change attendant with that progress. His view is macro-to-micro, while mine is vice versa.

Campbell reinforces and further develops his view of science fiction as an emergent and fixative literature to the modern era over ten years later in his introduction to The Astounding Science Fiction Anthology (1952). Campbell argues that, “Our present civilization actually started during the Renaissance, with the rise of the craftsmen. It shifted, during the Industrial Revolution, and has now undergone a change as great as either of those earlier two, into the Technological Age” (Campbell, Introduction to Astounding x). The craftsman of the Renaissance and later the machine tender of the Industrial Revolution each developed routines in their daily work and lives. Their routines scaled to the individual, and their routines endured generations. In sharp contrast
to these, Campbell argues that what he calls the “Technological Revolution” began in 1890 and “brought the organization, the concept of pooled mental resources that forced immensely complex, interacting mechanisms to produce that which never before existed” (Campbell, Introduction to Astounding xi). This complexity and its influence on society results in a dynamism that resists routine or simple understanding: “Since 1900, the conventions have been shattered time and again, year after year. No conventional routine built up today can be expected to endure long; some new technique will eliminate its meaning” (Campbell, Introduction to Astounding xii). New uncertainties to living and working brought about through new technologies lead to even wider instability: “The strongest, oldest, firmest foundations of custom and precedent are shaken, torn out, and a new one has to be painfully constructed--but never quite gets established before a new change forces it out” (Campbell, Introduction to Astounding xii). The answer to this struggle to grasp the contemporary moment is, according to Campbell, science fiction.

Campbell’s account of history places science fiction front-and-center in terms of what he calls the Technological Era:

Science fiction is the literature of the Technological Era. It, unlike other literatures, assumes that change is the natural order of things, that there are goals ahead larger than those we know. That the motto of the technical civilization is true: 'There must be a better way of doing this!' (Campbell, Introduction to Astounding xiii)

Campbell emphasizes change and progress as central to the Technological Era and its emblematic literature, science fiction. The “better way of doing this,” in Campbell’s
formulation, unites the extrapolative power of the scientist, engineer, and science fiction writer—each striving in their own way to explore and discover “a better way.” In the next passage, Campbell solidifies his view on what science fiction should focus:

“This,” however, doesn't refer solely to gadgets and machines.

Only in its early childhood did science fiction consider that facet solely, or even primarily. “This” is a method of living together; a method of government, a method of thinking, or a method of human relations. Machines and gadgets aren't the end and the goal; they are the means to the true goal, which is a better way of living with each other and with ourselves. (Campbell, Introduction to Astounding xiii)

Campbell’s allusion to “gadgets and machines” above would seem to be an indictment of the Gernsback era of early science fiction. Campbell argues that “this” is “a method of human relations” potentially made better through science and technology. Science fiction, then, is a means for imagining the means and ends for future progress that leads to “a better way of living with each other and ourselves.” As I demonstrated earlier, Gernsback promoted similar ideas of acceptance. Perhaps unknowingly, Campbell carries Gernsback’s promotion of tolerance in the passage above as well as in the following paragraph from the same editorial in which he repeats and reinforces his hopeful view of human progress: “The goal now is to harness Nature so that natural law and the machine will do ninety per cent of the work of providing a living. But that is a fruitless effort, unless man then devotes the great energies he has to the higher task of learning how to
enjoy that living, learning how to live with each other” (Campbell, Introduction to Astounding xiii).

Following that science fiction emerges from the Technological Era and it serves as a way to imagine the future and to develop ways of living together, Campbell adds that, “[Science fiction is] as inevitable an outgrowth of our time as is the vacuum tube and the rocket plane” (Campbell, Introduction to Astounding x), and that, “We are, today, at the point of early maturity of science fiction, a totally new form of general literature, a form that is the legitimate child of the forces that have made our world today” (Campbell, Introduction to Astounding ix). It is here that Campbell again approaches the concept of “future prep” and my own ideas about science fiction as an emergent project with a deeper purpose for the human animal. For Campbell, technoscientific progress inevitably led to science fiction as a form of literature that imagines and comments on the world. In a sense, science fiction is as much a tool as any other in that it does the work of preparing the way for the future. I, on the other hand, see science fiction as a tool that emerged as a coping mechanism for the rapid pace of scientific and technological change. From my perspective, science fiction is equally generative for some (writers) and engaging for others (fans and critics). There are creators of science fiction and readers of science fiction. The genre’s stories go beyond passive entertainment into critical engagement and communal discussion (fandom). Therefore, readers and writers obtain benefits from the genre that feed into the cognitive apparatus of the human brain and serve a survival-coping mechanism for those who engage its works in the multitude of ways engagement can take place.
For Gernsback and Campbell, there is a certain inevitability of science fiction considering the progress of humanity in terms of the development of science and integration of technology into everyday life. Unlike Gernsback, Campbell views science fiction as a literature that explores all aspects of modern life through extrapolation and imaginative exploration of the future. This is not to say that Gernsback denied these things outright. Instead, Gernsback considered science fiction as a way to educate and enlighten readers for a futuristic world, but he did not actively seek out sociological perspectives as Campbell did for Astounding. However, like Gernsback, Campbell sees science fiction as more than an educational and imaginative coping mechanism for the scientific and technological changes in the world. He also sees science fiction as a fixative to the social changes that result from technoscientific change. Science fiction is a coping mechanism for the future, and it would seem that Gernsback and Campbell were both hopeful about the progress of humanity.

Later, Campbell’s attitude about the future takes a grave turn after the Second World War and the beginning of the Cold War. His 1959 editorial, “Non-Escape Literature,” warns his readers that science fiction “is just about the only non-escape literature available to the general public today” (Campbell, “Non-Escape Literature” 228). What he means by this is that science fiction’s prophetic extrapolation, such as stories that imagine the atomic bombs dropped on Hiroshima or Nagasaki, Sputnik, and the thermonuclear arms race, is about the reality of science and technology’s influence on the social. In his view, stories that are not about science and technology and their effects on society are escapist, because science and technology are now such an integral part in
our daily lives as well as part of the political struggles of the then all-encompassing Cold War. In contrast to science fiction, as non-escapist, he defines non-science fiction or “mainstream” literature as escapist, because, “The essence of 'main stream literature' is that There Are Eternal Truths And Nothing Really Changes. . . . The soft, almost formless, nearly pointless stories found in the mass-circulation magazines are a wonderful retreat from the reality that is somewhat more fundamental than the ones they choose to consider” (Campbell, “Non-Escape Literature” 228). For Campbell, escapist literature includes those stories that do not substantially engage the present, dynamic reality. On the importance of science fiction’s confrontation of the present, Campbell closely aligns with Gernsback, who writes, “We live and breathe day by day in a Science saturated atmosphere” (Gernsback, “Science Wonder Stories” 5). However, Campbell takes this a step farther by indicting those literatures that he considers softer than science fiction as well as those some might confuse with science fiction:

So quite a few people took to reading science fiction and fantasy, because they thought both were fantasy--escape literature about safely, comfortably impossible things like atomic bombs and vampires and orbital satellite rockets and werewolves.

When Hiroshima winked out of existence, some of them were sufficiently disturbed to go back to reading about less unpleasant, more immediate, ‘realer’ things like problems of being fired by the boss for incompetence. But they still thought we were kidding--that it was just bad
luck that those weird, and therefore safe, imaginings happened to come almost true. . . .

So we weren't kidding--and the discovery of that fact has lost us some readers. . . . Hiroshima was an objective confirmation of what we already knew was real; Sputnik again confirmed the theoretical work we had done on the problems of tomorrow. They weren't frightening revelations; we hadn't been kidding ourselves, or anyone else. (Campbell, “Non-Escape Literature” 228-231)

Campbell reinforces the reality of science fiction as rooted in the reality of the here-and-now. Extrapolations in science fiction are thought experiments or “theoretical work” on “the problems of tomorrow.” However, in the case of the atomic bomb and the first successful orbit of the Earth by a manmade satellite, these were originally material in science fiction stories, which Campbell considers as evidence for the importance of science fiction to imagining potential futures and discovering new solutions for social problems by anticipating the effects of science and technology.

Part of Campbell’s editorial is a lament for the turning away of some readers from the prophetic stories in his science fiction magazine. Despite the fact that some people chose not to read science fiction and obtain insights only found in its pages, Campbell declares that he will continue publishing science fiction:

It is not my intention to turn to ‘safe’ fantasy--the escape literature that certainly is becoming more and more popular. Science fiction is not, and never will be a mass-appeal type of material; still, there are some who
have the unusual characteristic of being able to enjoy a non-escape literature—who can look at a problem that hasn’t slugged them over the head yet, and like thinking about it. (Campbell, “Non-Escape Literature” 231)

For Campbell, escapist literatures like fantasy offer no positive effect besides entertainment. At least in this editorial, he ignores the fact that some reading is simply enjoyable. However, science fiction does serve a special purpose as a medium that extrapolates from present givens into an uncertain future. On this point, Campbell vociferously argues that science fiction has proven itself by the events of the mid-century. In a sense, science fiction had been there first by certain stories imagining the reality from which Campbell wrote this particular editorial.

I close this chapter on one distinction between Gernsback and Campbell that the above passage suggests. Campbell writes, “Science fiction is not, and never will be a mass-appeal type of material” (Campbell, “Non-Escape Literature” 228-231). On the other hand, Gernsback writes, “If every man, woman, boy, and girl, could be induced to read science fiction right along, there would certainly be a great resulting benefit to the community” (Gernsback, “Science Fiction Week” 1061), and “all S-F media—with the exception of science-fiction magazines—always cater to the masses” (Gernsback, “Status of Science-Fiction” 2). Gernsback describes science fiction as all-inclusive, but later, after the pronounced influence of Campbell and others, he admits that science fiction magazines at that point do not “always cater to the masses.” My own views on this debate are that science fiction should be open to any reader and there should not be snobbery
about who can and cannot read science fiction. I am very much on the side of Gernsback in terms of the audience of science fiction. However, there are, as Gernsback reminds us, many forms of science fiction across media. Science fiction themed music, downloadable films and webisodes, and video games make this fact even more pronounced today. I see us living not only in a “Science saturated atmosphere” like Gernsback, but we are also living in a science fiction saturated atmosphere. Shifts to online publishing of science fiction stories, high and low budget science fiction films, the on-going and widespread popularity of different kinds of science fiction television ranging from Firefly to Star Trek, and the explosion of science fiction video games all point to the growing embrace of science fiction in the lives of everyone. Unlike Campbell’s view that science fiction is elitist, I believe that it is a positive development that science fiction is far more egalitarian than it was in the past. Yet, the openness of the genre to marginalized groups and those who have not yet had a chance to experience non-escapist literature still requires more work by the field as a whole. However, as science fiction’s saturation into popular culture now stands, I am hopeful that this byproduct of the human animal’s evolved cognitive adaptations and its co-evolution with technology will provide new imaginative insights into where we are now and where we can take humanity in the future.

What better way to test my cognitive approach to science fiction than to look at those writers specifically concerned with the relationship between human brains and robot/computer minds? Careful attention to the stories by Isaac Asimov, Philip K. Dick, and William Gibson will tease out further implications of a cognitive approach to science
fiction by specifically considering their stories that emphasize human and machine
cognition. These writers build from their contemporary understandings of brains and
computers while simultaneously extending and reinscribing those ideas into popular
culture. Their writing is enjoyable and educational, engaging and defining. Their
respective futures are imaginative and paradigmatic restrictions. They construct the
boundaries of what it is possible to think now and in the future through their
extrapolations. By parsing these influences, we can arrive at a better understanding of
these fictions and their effect on popular culture and the sciences. To begin this
elaboration, I will consider the robot-themed writing of Asimov in which autonomous
embodied technology is indistinguishable from a “very good man” (Asimov, “Evidence”
181). Following that chapter, I will relate Asimov’s robots to human-like androids and
android-like humans in the fiction of Philip K. Dick, and the otherness of artificial
intelligence in the fiction of William Gibson, but first, let us take a look at Asimov’s
configuration of robots as a “race” of beings.
CHAPTER 3

Isaac Asimov’s Robots as Cybernetic Models of the Human Brain

Introduction

Robopsychologist Susan Calvin says at the beginning of Isaac Asimov’s *I, Robot*, “To you, a robot is a robot. Gears and metal; electricity and positrons. Mind and iron! Human-made! If necessary, human-destroyed! But you haven’t worked with them, so you don’t know them. They’re a cleaner, better breed than we are” (Asimov, *I, Robot* 17).\(^1\) I find it significant that Asimov chooses the word ‘breed’ in reference to his fictional robots. As I discussed in the previous chapter, ‘breed’ is one meaning of the Latin root for the modern word ‘genre.’ In turn, ‘breed’ connects to the term ‘race.’ Asimov’s use of

\(^1\) Isaac Asimov (1920-1992) was a prolific writer with over 500 books written or edited in addition to many short stories and non-fiction articles. An apocryphal story attributed to Harlan Ellison goes: Asimov once suffered writer’s block—it was the worst five minutes of his life! While recognized for his science fiction, he also wrote in a wide variety of other fields including volumes on Shakespeare, the Bible, and the sciences. He held a PhD in biochemistry from Columbia University (1948).
the word “breed” to describe the robots is a strong reminder of the biological origins or roots of life, but it is also a metonymic reminder of the genre in which he is working—science fiction—and the new stories he generates with his specially constructed robots.

Asimov actually leaves part of what generates his robot stories unsaid. It has to do with the powers inherent in the positronic brain that mirror the human brain’s capabilities. Meant as a copy of and model for the human brain, a robot’s positronic brain must be able to perform the same interpretive tasks that humans must do as social creatures. Essentially, Asimov makes his robots social creatures, because their existence necessitates protecting and serving human beings within the social sphere. Therefore, the robot must be capable of understanding and interacting socially with human beings, and its positronic brain must accomplish this social processing.

However, Asimov constructs his fictional robot’s positronic brain in such a way that its method of thought always hinges on what he (and John W. Campbell, Jr.) calls The Three Laws of Robotics. Asimov intended these laws to combat what he terms humanity’s “Frankenstein Complex.” The Three Laws, among other things, require a

2 Asimov’s Three Laws of Robotics are: 1—A robot may not injure a human being, or, through inaction, allow a human being to come to harm, 2—A robot must obey the orders given it by human beings except where such orders would conflict with the First Law, and 3—A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

3 Asimov explains the “Frankenstein Complex” and his reaction to it in his first short story: “The very first robot story I ever wrote was “Robbie” . . . . That story already
robot to understand what is human and what is not, observe situations to ensure the safety of nearby human beings, and act or speak in meaningful ways to fulfill its orders and maintain compliance with the Three Laws. Within these requirements is also the need for the robot to mind-read, in a sense. As Lisa Zunshine explains, Mind-reading, “in spite of the way it sounds . . . has nothing to do with plain old telepathy. Instead, it is a term used by cognitive psychologists, interchangeably with ‘Theory of Mind,’ to describe our ability to explain people’s behavior in terms of their thoughts, feelings, beliefs, and desires” (Zunshine, Why We Read Fiction 6). Theory of Mind or ToM is necessary for our everyday interaction with other people as social beings, because it guides our own contained the unreasoning human fear of robots as an element of the plot. Occasionally, in my stories, I referred to such fear as a “Frankenstein complex” and this remained a constant element (usually, but not always, minor) in almost all my robot stories” (“Introduction: Robots, Computers, and Fear” 1). Of course, the institutionalization of the Three Laws reinscribes this fear by its acknowledgement of its always, already presence. Donald M. Hassler similarly argues that despite control effected by the Laws, they remain monstrous in a way: “Godwinian inclinations toward such clarity of analysis and such control may seem inhuman, even monstrous, so that Robotics itself, though the Laws are benevolent toward humans, assumes the effects of the very Frankenstein motif that Asimov was trying to avoid” (Hassler, Isaac Asimov 43-44). Lisa Zunshine makes an analogous argument about Asimov’s short story, “That Thou Art Mindful of Him” (1974) in her book Strange Concepts and the Stories They Make Possible (2008).
thoughts and behaviors based on our understanding, assumptions, and rationalizations of the behavior of others. Zunshine also points out that ToM, “makes literature as we know it possible. . . . Literature pervasively capitalizes on and stimulates Theory of Mind mechanisms that had evolved to deal with real people, even as on some level readers do remain aware that fictive characters are not real people at all” (Zunshine, *Why We Read Fiction* 10). Thus, the cognitive abilities that underlie ToM also underlie our ability to read and enjoy fiction—including science fiction about robots with positronic brains that think robot thoughts.

With robots, whether they read human minds as human-like cognitive beings or as something far more abstract and difficult to interpret or understand, some form of ToM must be at work in their brain in order to effectively follow orders given by human beings and to observe the Three Laws. However, what if ToM were literally about mind reading, as Zunshine points out not to be the case? Science fiction can deploy the imaginative strategy of reading minds in order to take an idea—in this case, intelligent robots with constructed brains—to a logical extreme. In key short stories and novels, Asimov uses the concept of mind reading and mind-control to tease out the relationship between positronic brains and human brains, technology and the organic. His fictional extrapolation is a form of future prep that signals not only the increasingly interactivity between humanity and computing technology, but also the shift inward for exploring the brain and the rise of the modern era of neuroscience. This in turn raises further questions about what it means to be human.
As argued in the previous chapter, I propose that science fiction is an evolutionary byproduct of the human brain’s evolved ability for narrative coupled with the human animal’s co-evolution with technology. Its development coincides with the emergence of technology that outstrips the human animal’s ability to continue its co-evolution with its technological creations. Asimov supports this idea in two ways. The first is through science fiction literature. In one of his earlier definitions of science fiction, he opines, “Science-fiction is that branch of literature which is concerned with the impact of scientific advance upon human beings” (Asimov, “Other Worlds to Conquer” 148). Later, he expands this definition to include the rate of scientific and technological advance: “Technological advance, rapid with respect to the passing of the generations, is a new factor in human history, a factor that marks off the last few generations of mankind from all the generations that preceded, and science fiction is the literary response to that new factor” (Asimov, “Social Science Fiction” 167). However, he sees science fiction as going beyond mere response—he sees it as a necessary solution to a problem that he frames in evolutionary terms:

But is change valuable? Is it even necessary?

In the study of evolution, it turns out that organisms which do not change to meet a changing environment become extinct. Organisms, on the other hand, which find themselves in an unchanging environment, find themselves also in blind alleys with no possibility of future advancement.
Human societies, history shows, must also grow and develop or they will suffer. There is no standing still. (Asimov, “Social Science Fiction” 190)

According to Asimov, science fiction provides humanity with imaginatively extrapolated solutions to future advancement: “The contribution science fiction can make to society is that of accustoming its readers to the thought of the inevitability of continuing change and the necessity of directing and shaping that change rather than opposing it blindly or blindly permitting it to overwhelm us” (Asimov, “Social Science Fiction” 196). Then, elsewhere, he adds:

Our world is now future-oriented, you see, in the sense that the rate of change has become so rapid that we can no longer wait until a problem is upon us to work out the solution. If we do, then there is no real solution, for by the time one has been worked out and applied, change has progressed still further and our solution no longer makes sense at all. The change must be anticipated before it happens. (Asimov, “The Serious Side of Science Fiction” 298)

In order to anticipate changes and be adequately prepared for those changes, Asimov points to science fiction as the solution:

As far as I know, though, there has never been in all of world history until today, the concept of professional futurism as a way of life. And this arose first not among professional scientists or economists or historians (except for occasional individuals) but in the field of literature. The twentieth
century saw the development of a flourishing subsection of literature
devoted entirely to conjuring up visions of the future.

It was the world’s misfortune that it did not take the idea of science
fiction seriously. So strong was the non-seriousness that even science
fiction writers themselves dared not be too serious about what they were
saying. (Asimov, “The Serious Side of Science Fiction” 299)

Asimov argues that science fiction led the way, slowly, into a future that without it might not have happened. While I see science fiction as more of a co-terminus effect with rapid technological change—a byproduct that helps humanity make sense of and prepare for inevitable change, Asimov sees science fiction as the progenitor of change. However, Asimov did not see the science and technology in science fiction as what prepares people for change. Instead, he identifies the importance of science fiction as its analysis and exploration of the changes made by science and technology:

It is not really the business of science fiction writers to predict the future. .

. . . The fact is that the science fiction writer’s first aim is to tell an
interesting and exciting story that will amuse the reader. . . . If he is a
conscientious science fiction writer, he will try to build up his unusual
events and attitudes in a way that will make them seem plausible to the
reader, however strange they may be. . . . Then, too, the really important
predictions that science fiction writers make are not the technological
advances—which are trivial—but the consequences of those advances.

(Asimov, “Prediction as a Side Effect” 287-290)
For Asimov, science fiction’s purpose is to see what social changes will take place because of advances in science and technology. On the other hand, he does give some credence to the prophetic view of science fiction. Asimov writes, “one of the difficulties of modern life (perhaps the essential and basic difficulty) is just this: Society has grown so complex that no human mind, indeed no combination of freely communicating human minds, can, with the tools at hand, analyze social problems and work out solutions quickly enough to prevent disaster” (Asimov, “The Age of the Computer” 232). He sees computers—the modern equivalent of his early robots—as a source of help to humanity: “The computer frees mankind from slavery to dull mental hackwork, as power machinery frees him from slavery to the pick and shovel” (Asimov, “The Age of the Computer” 231). Since he wrote these things over 30 years after his first robot story, it seems obvious that he recognized some semblance of his imagined future happening in the present. Both of these perspectives can be summarized in what Asimov calls the “literature of ideas:” “It is odd to be asked whether science fiction is a literature of ideas. Far from doubting that it is, I would like to suggest that it is the only literature of relevant ideas, since it is the only literature that, at its best, is firmly based on scientific thought” (Asimov, “A Literature of Ideas” 307). His unique perspective as a writer seeing the world change in a manner like science fiction he had written and he had read by other writers mirrors what I argue: science-fiction-as-byproduct prepares human beings for the technology-laden present and future. In effect, science fiction teaches us how to survive in a world shaped by our technologies. I call this future prep.
In this chapter, I will demonstrate that Isaac Asimov’s robot stories are a form of future prep not only for our increasingly technologized society built upon intelligent computer systems but also an awareness that the next frontier might not be outer space but instead the human brain. Thus, Asimov heralds what is widely discussed now as the era of neuroscience, but he also questions what it means to be human in an increasingly technologized world. I will discuss Asimov’s neuroscientific turn in his enormously popular Robot, Empire, and Foundation series of novels. Initially, this “series” was broken into three distinct series—perhaps occupying the same universe—but disconnected from one another narratively. Neglected for some decades, Asimov reconciled all three series beginning in the 1980s around the idea of better understanding the human brain. The seed for unification lies in his early Robot novels and the purpose behind creating human-like robots or what we now call androids. Like the early cognitive scientists who strove to better understand the human brain through computer models, Asimov suggested the robot and its positronic brain as a model for the human brain. In part, this involved mind-reading robots, which I will read in two ways—figuratively and literally following the work of Lisa Zunshine. Furthermore, I will argue that Asimov’s science fiction serves as a form of future prep for the age of neuroscience and what that might mean for what we consider human.

One final note before proceeding: Patricia Warrick cautions contemporary analysis of what she calls “cybernetic science fiction,” in terms of the effects of science and technology on our own perspectives looking back at science fiction generated within a particular time and space, paradigm, and framework separated from our present:
As science accumulates information at a startling rate and technological sophistication keeps pace, the SF imagination is challenged. Much early SF, now very naïve, must be discarded or preserved only as a historical curiosity. Every advance in science and technology requires the SF writer to reinvent the future. Thus the literary critic must move from defining SF and evaluating its merits to describing its movement and judging the value of its insights and the techniques it evolves in its anticipatory process. This evaluative task demands that the critic note the relationship of the writer’s fictional worlds to the real world—the world of empirical reality as it is now understood. To judge cybernetic SF thus requires a familiarity with the function of computers and their rapid evolution in the last thirty years. (Warrick 8)

The same could be said for any science fiction, but Warrick and I are working on the same fictions—those in which cybernetics and intelligent machines are the fictional objects of study. I have attempted to frame my analysis in terms of the fictions without calling into question the prophetic outcome of the technologies imagined by Asimov.

Asimov Generates the Science of Robotics and the Positronic Brain
Asimov’s *I, Robot* (1950) is a collection of nine previously published short stories worked together as a series of flashbacks by Susan Calvin, the US Robots preeminent robopsychologist. Two of these stories are the point of origin for Asimov’s generation of the modern robot story—one in which the robot is more than something created and destroyed by its creator and is not necessarily dependent on the robot turning on his creator or humanity in general. It was these fears that Asimov termed the “Frankenstein complex” and he sought to challenge that irrational fear through his writing. Both of these seminal stories first appeared in John W. Campbell, Jr.’s *Astounding Science Fiction* magazine, and Campbell worked closely with Asimov regarding the development of what we now call Asimovian robots. The earlier story, “Liar!” appears in the May 1941 issue of *Astounding* and it accomplishes two things: it is the first appearance of the term “robotics,” or the scientific study and design of robots, and “positronic,” or the type of artificial brain deployed in all Asimovian robots, one that uses the positron or anti-electron as the basis for thought.4

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4 First, Asimov took the well-used word ‘robot’ and recognized that its employment would constitute a new kind of science that he termed ‘robotics.’ The word ‘robot’ itself originates in Karel Čapek’s play: *R.U.R. (Rossum’s Universal Robots)*. *R.U.R.* is about a class of artificially created servants who are more android than robot. They fulfill the jobs that human beings do not want. Eventually, the robots come to recognize that they are an oppressed people and they revolt against their human creators. Not all pre-Asimov robot stories follow *R.U.R.*’s narrative trajectory and specifically address class conflict and revolt, but they do, however tangentially, generally depict robots attacking human beings.
Asimov provides hints and clues about his fictional positronic brain creation, but he does not spend a great deal of space to elaborate on its physicality. For him, the Three Laws provide substance enough for a more meaningful and interesting narrative than dwelling on esoteric, technical reasons for malfunctioning robots. This represents a greater shift from the Gernsbackian emphasis on romance and elaborate scientific explanations to the Campbellian emphasis on the technological impact on society. This is in large part due to Asimov’s apprenticeship under Campbell as he established himself as a writer. It also reinforces Damien Broderick’s theory of the science fiction mega-text described in the previous chapter. Early pulp science fiction writers had already established the idea or concept of the robot. There were also examples of the robot in film. Asimov builds on those ideas, descriptions, and images that constitute the megatextual entry for “robot.” Knowing that his readers already have an idea about what a robot is and does; Asimov was free to explore in greater depth the psychology of robots and the laws by which their brains operate. Others built on his work (helpful robots that operate on established rules built into a positronic brain) such as Gene Roddenberry, who

Second, Asimov recognized that the technology of his day was woefully inadequate for the creation of intelligent robots. Paul A.M. Dirac theorized the positron, a subatomic particle identified as an antielectron, in 1928, and Carl D. Anderson later experimentally verified it in a cloud chamber photograph in 1932. I suspect that the newness of the discovery and the turn on the word ‘positron’ to ‘positronic’ (conjuring the recognizable term ‘electronic’) played a major role in Asimov’s invention of the positronic brain that enables robots to have intelligence.
created the well-known android character Data (Brent Spiner) for his *Star Trek: The Next Generation* television series and movies. Thus, the science fiction mega-text organically grows and develops through a shared popular culture.

Part of Asimov’s mega-text contributions to robot brains has to do with the similarities that he established between them and human brains. In his original development of the idea of the positronic brain, Asimov does say that he reasoned its similarity to the size and shape of the human brain:

> Let us assume, to begin with then, that we can build a machine, more or less in the shape of a man, a machine that will be sufficiently complicated to receive the various sense impressions men receive, interpret them in a manlike way at least as rapidly as man, and respond to them in a way a man would consider appropriate.

> This implies that the robot must possess an organizing center that is roughly as complicated and as compact as a man’s brain. Such a man-made device is as yet beyond the scientific horizon but it is necessary to assume it if a robot is to be man-like in size and shape. (Asimov, “The Perfect Machine” 276-277)

In *I, Robot*, the positronic brain is described as “a globe,” “handled gingerly,” because “it was the most complicated mechanism ever created by man” (Asimov, *I, Robot* 71). Like human brains, which as Steven Pinker argues are not blank slates, “Inside the thin platinum plated “skin” of the globe was a positronic brain, in whose delicately unstable structure were enforced calculated neuronic paths, which imbued each robot with what
amounted to a pre-natal education” (Asimov, *I, Robot* 71). Platinum, a precious metal, protects the positronic brain’s “unstable structure” of “enforced calculated neuronic paths.” These paths would include the Three Laws. Interestingly, Asimov places the positronic brain in the robot’s head: “It fitted snugly into the cavity in the skull of the robot on the table. Blue metal closed over it and was welded tightly by the tiny atomic flare” (Asimov, *I, Robot* 71). “The tiny atomic flare,” a seemingly strong weld produced by nuclear energy, seals the positronic brain behind hardened metal. It apparently weighs more than the human brain’s three pounds, but not by much considering that it is made out of metal: “positronic brain, which with ten pounds of matter and a few quintillions of positrons runs the whole show” (Asimov, *I, Robot* 80). Within that “ten pounds of matter,” thought occurs through the passage of positrons “currents” along “key [paths]” (Asimov, *I, Robot* 82). Due to the positronic brain’s rigorous testing and being “quintuple-checked back on Earth,” “The brain is the surest part of a robot” (Asimov, *I, Robot* 82).

Less than a year after inaugurating “positronic,” Asimov explicates the second determining feature of his fictional creations—the Three Laws of Robotics—in “Runaround,” which appears in the March 1942 issue of Campbell’s *Astounding*. It is about a robot caught in a feedback loop on the planet Mercury. In this story, Michael Donovan and Gregory Powell, two of US Robot’s best troubleshooting technicians, must figure out why a robot sent to collect selenium on the surface of Mercury is endlessly circling the pool and fix the problem before they roast under the Sun’s unrelenting heat. During this mission, Donovan and Powell elucidate the Three Laws of Robotics (see
footnote 1 in this chapter). Originally called the “Three Rules of Robotics,” these fundamental laws “are built most deeply into a robot’s positronic brain” (Asimov, *I, Robot* 50-51). Put another way, the Three Laws are the basis for the underlying hardware of the robot brain, and it is on these fundamental pathways that all robotic thought is generated. Thus, the robot cannot circumvent or ignore the Three Laws. Considered another way, the Three Laws are analogous to the wiring of various processing centers within the human brain. There is no thought outside of these pathways—there is no way to look at these mechanisms of thought from some point outside (at least from the perspective of the person or robot doing the thinking). The Three Laws enable the generation of robotic thought rather than constrict its id-like urges or ego-like rationalizations if we were to extrapolate the robot mind to that of the human mind. I do not mean to say that robots do not have some semblance of psychology. Instead, they have a system and structure of thought different from that of human beings (c.f., Thomas Nagel’s “What is it Like to Be a Bat?”). However, people create the robot brain, so it follows that a specially trained person, a “robopsychologist,” could decipher the robot mind and its underlying hardware—the robot brain.  

5 Asimov has this evolutionary explanation to offer regarding the differences between human brains and robot positronic brains:

After all, the human brain, built of nucleic acid and protein against a watery background, has been the product of the development of three and a half billion years of biological evolution, based on the random
Asimov develops a number of different kinds of robots in the *I, Robot* collection. These include the fairy tale loving nursemaid robot in “Robbie” (1940, originally titled “Strange Playfellow”), the childlike “thinking machine” (what we would call an artificial intelligence) that develops the first faster-than-light spaceship in “Escape” (1945), the Descartes-like QT-1 or Cutie in “Reason” (1941), the asteroid mining robot with its subordinate “finger” robots in “Catch That Rabbit” (1944), the robot stuck in a feedback effects of mutation, natural selection, and other influences, and driven forward by the necessity of survival.

The computer, on the other hand, built of electronic switches and electric current against a metallic background, has been the product of the development of forty years of human design, based on the careful foresight and ingenuity of human beings, and driven forward by the necessity of serving its human users.

When two intelligences are so different in structure, history, development, and purpose, it would certainly not be surprising if those intelligences were widely different in nature as well. (Asimov, “Introduction: Robots, Computers, and Fear” 7)
loop on Mercury in “Runaround” (1942), the man who was believed to be a robot and ran for mayor in “Evidence” (1946), and the great Machines that scientifically manage the world in “The Evitable Conflict” (1950). However, the story that I believe generates the greatest significance towards an understanding of robot and human minds is “Liar!” (1941).

Asimov’s “Liar!” is about a robot named Herbie, who attempts to fulfill the requirements of the Three Laws despite having, by a manufacturing fluke, the ability to read human minds. Instead of merely reading surface behaviors and speech, Herbie, through a twist of fate, must find ways to accommodate and protect a person and his/her feelings. Put another way, his First Law drive requires him to use all available information to protect human beings from harm, including in his case, psychological harm. Robopsychologist Susan Calvin finds herself in the middle of the machinations orchestrated by Herbie to, at least temporarily, feel joy and happiness.

It would be useful to rehearse Calvin’s credentials and her relationship to robots in general. She came to work on robots following an education at Columbia and “graduate work in cybernetics” (Asimov, I, Robot 15). The advances that made her work possible were: “All that had been done in the mid-twentieth century on ‘calculating machines’ had been upset by . . . positronic brain-paths. The miles of relays and photocells had given way to the spongy globe of platinumiridium about the size of a human brain” (Asimov, I, Robot 15). From this passage, we learn that a great miniaturization has occurred from “miles of relays and photocells” to the organicity of “the spongy globe . . . about the size of a human brain.” The thing that grounds the robot
brain, analogous in size and appearance to a human brain, is the fact that it is made of the exotic metallic concoction of “platinumiridium.” The robot brain, however, is still clearly finite and definable: “She learned to calculate the parameters necessary to fix the possible variables within the “positronic brain”; to construct “brains” on paper such that the responses to given stimuli could be accurately predicted” (Asimov, _I, Robot_ 16).

Essentially, the positronic brain can be mapped out, designed, drawn, circumscribed on paper in theoretic terms prior to its implementation as the conscious thinking center of an artificial life form, and its design is generated from the labors and fruits of human thought. There is, of course, another connection between robot brains and human brains: the unconscious and drives. Calvin “obtained her Ph.D. and joined United States Robots as a “Robopsychologist,” becoming the first great practitioner of a new science” (Asimov, _I, Robot_ 16).

In “Liar!”, we see Calvin emerge as a woman in love and full of emotion—to the point that she lashes out at the robot who stoked her emotions by reading her mind.⁶ In

⁶ Science fiction has long had a problem generating realistic and significant female characters. Asimov’s attempt with Susan Calvin is largely successful in that she is an intelligent and decisive character. However, she is largely one-dimensional as a scientist more interested in robots than human beings. Asimov offers this explanation, which itself demonstrates his own disconnection with the importance of problem:

I did introduce women in a few early stories, but my first successful female character was Susan Calvin, who appeared in some of my robot stories. Her first appearance was in “Liar” (ASF, May 1941).
the short story, HB-34 or Herbie, a robot with a unique and unexpected mind reading ability, tells Calvin (that the man she likes is secretly in love with her when he is actually planning to marry someone else) and Peter Bogert (that Alfred Lanning is retiring from US Robots and Bogert is next in line for the executive position when Lanning has no such plans) what they want to hear based on their secret thoughts in order to not harm their psyches and thus follow the First Law of Robotics. It is uncertain why Herbie’s brain is different from the other robots from its assembly line, but Peter Bogert notes:

By exact count, there are seventy-five thousand, two hundred and thirty-four operations necessary for the manufacture of a single positronic brain,

Susan Calvin was a plain spinster, a highly intelligent “robopsychologist” who fought it out in a man’s world without fear or favor and who invariably won. These were “women’s lib” stories twenty years before their time, and I got very little credit for that. (Susan Calvin was very similar, in some ways, to my dear wife, Janet, whom I didn’t meet until nineteen years after I had invented Susan.)

Despite Susan Calvin, my early science fiction stories were sometimes considered sexist because of the absence of women. A few years ago, a feminist wrote to excoriate me for this. I replied gently, explaining my utter inexperience with women at the time I began to write.

“That’s no excuse,” she replied angrily, and I dropped the matter. Clearly, there is no percentage in arguing with fanatics.” (Asimov, I, Asimov 216-217)
each separate operation depending for successful completion upon any
count number of factors, from five to a hundred and five. If any one of them
goes seriously wrong, the ‘brain’ is ruined.” (Asimov, *I, Robot* 99)

This complexity of construction makes sense for something that would need to be as
complex as a robot’s positronic brain. It also introduces an enormous complexity in
things working “correctly” (i.e., the way humans want them to work) or “poorly” (i.e., the
way humans do not want them to work). In “Liar!”, the uniqueness of the robot HB-34 or
Herbie is that it can read minds: “We’ve produced a positronic brain of supposedly
ordinary vintage that’s got the remarkable property of being able to tune in on thought
waves. It would mark the most important advance in robotics in decades, if we knew how
it happened. We don’t, and we have to find out” (Asimov, *I, Robot* 100). Importantly
though, Herbie recognizes the fundamental differences in his own brain from those of
human beings: “I see into minds, you see,” the robot continued, “and you have no idea

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7 The detective Elijah Baley in Asimov’s first robot detective novel points out that, “And
no two [positronic] brains were alike, even when prepared according to the most rigid
specifications. That, Baley understood, was a consequence of Heisenberg’s Uncertainty
Principle” (Asimov, *The Caves of Steel* 169). Due to the quantum mechanical effects
involved in the production of positronic brains, Asimovian robots occasionally have
unexpected quirks or abilities that remain within the confines of the Three Laws. In the
case of Herbie, the results turn out badly. However, Asimov creates another mind reading
robot named Giskard, who I will discuss later in this chapter.
how complicated they are. I can’t begin to understand everything because my own mind has so little in common with them -- but I try, and your novels help” (Asimov, *I, Robot* 102-103). To Herbie, human minds are “complicated” and the differences between human minds and his own further complicates his understanding of human minds. However, without acknowledging it, he must understand human minds in order to fulfill his First Law obligations as a robot better. To do this, he reads novels:

> It’s the same with these books, you know, as with the others. They just don’t interest me. There’s nothing to your textbooks. Your science is just a mass of collected data plastered together by makeshift theory -- and all so incredibly simple, that it’s scarcely worth bothering about.
>
> “It’s your fiction that interests me. Your studies of the interplay of human motives and emotions” -- his mighty hand gestured vaguely as he sought the proper words. (Asimov, *I, Robot* 102)

Herbie seeks the challenge of understanding human minds better—in particular, “the interplay of human motives and emotions.” Emotions color human thought and inform our own understanding and conceptualizing of the world and our relationship to others. As I have argued above, emotion is also the key pathway in which science fiction plays a fundamental role in our understanding of the future and our place in that future. In the case of Herbie, emotion is the added level of complexity that his own brain lacks, but because of his tragic flaw of mind reading, he must understand it in order to fulfill the First Law as well as the Third Law for self-preservation. As part of Herbie’s desire to please human beings, the robot encourages Calvin’s interest in Ashe by lying to her about
what the robot had read in Ashe’s mind. However, this unrequited love makes Calvin flourish, for a short while, to the confusion of those around her at U.S. Robots:

“We sort of got to talking. I have been seeing a lot of her lately.”

He opened his eyes wide and frowned, “Say, Bogie, have you been noticing anything queer about the lady lately?”

Bogert relaxed into an undignified grin, “She’s using lipstick, if that’s what you mean.”

“Hell, I know that. Rouge, powder and eye shadow, too. She’s a sight. But it’s not that. I can’t put my finger on it. It’s the way she talks -- as if she were happy about something.” He thought a little, and then shrugged.

The other allowed himself a leer, which, for a scientist past fifty, was not a bad job, “Maybe she’s in love.”

Ashe allowed his eyes to close again, “You’re nuts, Bogie. You go speak to Herbie; I want to stay here and go to sleep.” (Asimov, *I, Robot* 99)

Unlike her usually cold demeanor, Calvin actively seeks out company with Ashe and even applies makeup—something never alluded to in another story featuring Calvin. Unfortunately for Calvin, Ashe is engaged. When she learns this fact from Ashe himself, Calvin looks “sick” and her “inexpertly applied rouge made a pair of nasty red splotches upon her chalk-white face” (Asimov, *I, Robot* 111). She comes to be in the robot’s room without consciously perceiving the intervening walk up the stairs:
She found herself leaning breathlessly against the doorjamb, staring into Herbie’s metal face. She must have climbed the two flights of stairs, but she had no memory of it. The distance had been covered in an instant, as in a dream.

As in a dream!

And still Herbie’s unblinking eyes stared into hers and their dull red seemed to expand into dimly shining nightmarish globes.

He was speaking, and she felt the cold glass pressing against her lips. She swallowed and shuddered into a certain awareness of her surroundings. (Asimov, *I, Robot* 111)

In this scene, Asimov depicts Calvin as very human—to the point of believing herself to be in a dream. It is only later that dreaming comes to be a question for artificial intelligences, including robots and androids. Additionally, the apparent instantaneous passage of time is a trick played by the human brain on our conscious awareness of reality and the passage of time. Despite our strong sense of a singular ontology with a finite passage of time, the brain’s cognitive awareness of the passage of time can expand and contract depending on the emotional state of the individual or depending on the processing of other incoming stimuli, especially the extremely mundane or the exceptionally novel. It is in this dream-like state that Calvin confronts the otherness of Herbie’s “unblinking eyes” that are “dull red.” She closes the space between them until the robot’s eyes “expand into dimly shining nightmarish globes.” The space closes to nothing as she presses against Herbie’s face, and “she felt the cold glass pressing against
her lips.” Herbie tries to convince Calvin that it is a dream. He tells her, “I want to help” (Asimov, *I, Robot* 112). However, she stares back and responds, “Help? By telling me this is a dream? By trying to push me into schizophrenia?” A hysterical tenseness seized her, “This is no dream! I wish it were!” (Asimov, *I, Robot* 112). When Bogert asks Herbie what gives him his mind reading ability, the robot responds, increasingly troubled by the potential to violate the First Law built into his special brain:

Herbie’s voice rose to wild heights, “What’s the use of saying that? Don’t you suppose that I can see past the superficial skin of your mind? Down below, you don’t want me to. I’m a machine, given the imitation of life only by virtue of the positronic interplay in my brain -- which is man’s device. You can’t lose face to me without being hurt. That is deep in your mind and won’t be erased. I can’t give the solution.” (Asimov, *I, Robot* 115)

Finally, she deliberately destroys Herbie’s robot mind by pushing him into a paradoxical feedback loop, a computer lock-up if you will, because she says, “He deserved it” (Asimov, *I, Robot* 116). Through no fault of his own, Calvin destroys Herbie, because he follows human inscribed laws that present unique challenges to his special ability to read minds. Perhaps if he had more time to study the psychology of the human mind, or if he had spent more time reading other things besides the drama-laced romance novels (another genre) he had been reading then Herbie might have arrived at a better way to fulfill his duties without ultimately hurting those people he tried not to harm through the
feedback loop he provided for a person’s own desires. As we will see, Asimov works through the possibilities of mind reading in two other robots.

R. Daneel Olivaw

The first of these two other mind-reading robots that I will discuss is R. Daneel Olivaw. He is a special robot from the human colonized planet of Aurora. His body appears to be authentically human (I use ‘his’ because his appearance is gendered male), but he is simply an android masquerading as human for the purpose of his duties. His creators designed his positronic brain for information collection and the reading/sensing of human emotions. Additionally, the Aurora scientists imprint his brain with a strong desire for justice, which suits him well for his assigned task on Earth in the first novel, *The Caves of Steel* (1954)—to collaborate with the human detective Elijah Baley and together, solve a murder.

Beginning with *The Caves of Steel*, Baley teams up with the Spacer robot Olivaw to solve the murder of Dr. Roj Nemennuh Sarton, a Spacer from the world called Aurora. Baley’s task is to solve the murder before his assigned partner, Olivaw, does so. Otherwise, Baley’s career is over along with any pride Earth still holds over the technologically advanced Spacers.
When Baley approaches Spacetown, the liminal space between New York City and the Spacer-controlled point of exit/entry, he observes a Spacer standing outside. The apparently human Spacer is actually the robot Daneel! The robot reports that he was given the human-like appearance so that he could more easily blend into Earth society, which was given to an anti-robot sentiment: “You expected a rather crude model and were surprised. Yet it is only logical that our people use a robot of pronounced humanoid characteristics in this case if we expected to avoid unpleasantness” (Asimov, *The Caves of Steel* 25).

Before a riot against a robot clerk, Baley, who himself holds less than appreciative feelings for robots, laments the senseless destruction of robots during other anti-robot riots:

He had seen robots being lifted by a dozen hands, their heavy unresisting bodies carried backward from straining arm to straining arm. Men yanked and twisted at the metal mimicry of men... They finally reduced the miserable objects to shredded metal and wire. Expensive positronic brains, the most intricate creation of the human mind, were thrown from hand to hand like footballs and mashed to uselessness in a trifle of time. (Asimov, *The Caves of Steel* 34)

Even Baley, who is forced to partner with a robot, admits to their supposed superiority to humans due to their “expensive positronic brains” that are “the most intricate creation of the human mind.” The positronic brain is the progeny of the human intellectual project.
Daneel threatens Baley’s livelihood as a detective and his supposed superiority as a human being. Uncertain how the unfolding mystery might play out and how he might solve it in time for Earth, Baley realizes the differences between himself and Daneel. In a moment of reprieve from the excitement of the narrative, he is amazed at Daneel’s humanlike appearance and angered by the fact that a robot has his classification rating (socioeconomic status):

Baley looked straight ahead, once seated, angry with himself, very conscious of the robot sitting next to him. He had been caught twice. First he had not recognized R. Daneel as a robot; secondly, he had not guessed the logic that demanded R. Daneel be given C-5 rating.

The trouble was, of course, that he was not the plain-clothes man of popular myth. He was not incapable of surprise, imperturbable of appearance, infinite of adaptability, and lightning of mental grasp. He had never supposed he was, but he had never regretted the lack before.

What made him regret it was that, to all appearances, R. Daneel Olivaw was that very myth, embodied.

He had to be. He was a robot. (Asimov, *The Caves of Steel* 26-27)

Daneel’s embodiment of the myth of the plainclothesman is extremely threatening to Baley. On the one hand, there is the immediate problem of solving the case by himself without Daneel solving it first. On the other hand, Baley has a deeper insecurity—anxiety over his ability to perform as well as or better than the Othered robot. In addition, even after Daneel and Baley form the semblance of a friendship at the end of *The Caves of*
Steel, Baley does his own bit of concerned mind reading. In the second novel in the series, *The Naked Sun* (1957), Baley builds his own ToM of Daneel and his technological brain with its “invisible positronic patterns within its spongy platinum iridium brain” (*The Naked Sun* 54). When Baley arrives on the planet Solaria, Daneel picks him up from the spaceport in a ground car. Looking at his robot-detective counterpart, Baley reflects:

> For a moment Baley stared curiously at R. Daneel Olivaw. The robot, looking straight ahead, was motionless and unself-conscious under the other’s gaze. . . . He knew a positronic brain, most advanced but only positronic, nestled in the hollow of the skull. He knew that Daneel’s “thoughts” were only short-lived positronic currents flowing along paths rigidly designed and foreordained by the manufacturer. (Asimov, *The Naked Sun* 27-28)

On the one hand, Baley is uncertain about what Daneel is thinking, and on the other hand, he attempts to reduce Daneel’s thoughts to something “short-lived” and “flowing along paths rigidly designed and foreordained.”

8 Daneel obviously knows his own thoughts, but he is not aware of the processes (mathematics) of his thinking. Yet, he does know his “tendencies.” He describes his brain’s functioning in terms of the First Law to Baley in *The Robots of Dawn* as, “The words of the law are merely an approximate description of the constant variations in positronomotive force along the robotic brain paths, Partner Elijah. I do not know enough to describe the matter mathematically, but I know what my tendencies are” (Asimov, *The Robots of Dawn* 244).
other robots are certainly capable of free thought, and as I will discuss later, Daneel’s ability to exceed those rigid paths is what ultimately saves humanity’s chances in the galaxy.

Besides the properties of the robot and its potential uses for humanity as forms of future prep in Asimov’s fiction, he also presents a vision that he calls C/Fe or Carbon/Iron, meaning the cooperation of human carbon-based life with robot iron-based life. It is organic/technological symbiosis that causes the Medievalists to target Dr. Sarton, the Spacer who constructed Daneel. In fact, Daneel’s purpose is to help lead humanity toward C/Fe:

Robot Spacers are another thing entirely. . . . We are more flexible, naturally. . . . We can be designed for adaptation to an Earthly life. By being built into a particularly close similarity to the human externals, we could be accepted by Earthmen and allowed a closer view of their life. . . . [I] am just such a robot. For a year, Dr. Sarton had been working upon the design and construction of such robots. I was the first of his robots and so far the only one. Unfortunately, my education is not yet complete. I have been hurried into my role prematurely as a result of the murder. (Asimov, *The Caves of Steel* 62-64)

However, Daneel’s brain is impressed with one thing, besides being “an information-gathering machine” that most other robots do not possess: “A particularly strong drive has been inserted into my motivation banks; a desire for justice” (Asimov, *The Caves of Steel* 69-70).
Daneel’s positronic brain limitations temper his “desire for justice.” First, Fastolfe, a Spacer roboticist, tells Baley, “I am a robotics expert, and I assure you that the essence of the robot mind lies in a completely literal interpretation of the universe. It recognizes no spirit in the First Law, only the letter” (*The Caves of Steel* 102-103). Second, Dr. Fastolfe tells Baley, “A human understanding of abstractions cannot be built into a positronic brain in the present state of our knowledge” (*The Caves of Steel* 103). Despite this claim, the robot brain does have to make certain kinds of abstractions, such as intervening before harm comes to a human due to something that presents a high probability of producing or resulting in harm.

Nevertheless, any alteration to the foundation of the positronic brain—The Three Laws of Robotics—would be virtually impossible according to Dr. Gerrigel, who explains the complexity of such an action to Baley during an interview at police headquarters:

Well, then, you must understand that a design for a new type of positronic brain, even one where only minor innovations are involved, is not the matter of a night’s work. It usually involves the entire research staff of a moderately sized factory and takes anywhere up to a year of time. Even this large expenditure of work would not be nearly enough if it were not that the basic theory of such circuits has already been standardized and may be used as a foundation for further elaboration.

R. Daneel, who, to all appearances, had been following the conversation with close attention, broke in. “If you will excuse me, Elijah,
I would like to see if I follow Dr. Gerrigel. What you imply, sir, is that any attempt to build a robot, the working of whose positronic brain is not oriented about the Three Laws, would require first the setting up of a new basic theory and that this, in turn, would take many years.” (Asimov, *The Caves of Steel* 169-170)

Upon further questioning, Dr. Gerrigel says that the Frankenstein complex prevents human beings, at least those still living on Earth, from constructing a robot without the fundament First Law:

That’s a popular name derived from a Medieval novel describing a robot that turned on its creator. I never read the novel myself. But that’s beside the point. What I wish to say is that robots without the First Law are simply not built. (Asimov, *The Caves of Steel* 170)

For Asimov, the fundamental difference between a robot’s positronic brain and the human brain is the fact that while no robot brains are exactly alike, the robot brain is testable and analyzable. Dr. Gerrigel explains to Baley:

That is the difference between a robot and a man. A human brain, or any mammalian brain, cannot be completely analyzed by any mathematical discipline now known. No response can therefore be counted upon as a certainty. The robot brain is completely analyzable, or it could not be constructed. We know exactly what the responses to given stimuli must be. No robot can truly falsify answers. The thing you call falsification just
doesn’t exist in the robot’s mental horizon. (Asimov, *The Caves of Steel* 180)

There must be some kind of correspondences between the robot’s positronic brain and the human brain, because Olivaw is capable of a special skill called cerebroanalysis:

“. . . I was constructed for the purpose of cerebroanalysis.”

“For analyzing brain waves?”

“Why, yes. It can be done by field-measurements without the necessity of direct electrode contact, if the proper receiver exists. My mind is such a receiver. . . . I get a glimpse of emotion and most of all, I can analyze temperament, the underlying drives and attitudes of a man. . . .”

(Asimov, *The Caves of Steel* 187)

During a heated discussion with the Medievalist Francis Clousarr in Yeast-town, Baley recognizes and overcomes his own previous prejudicial feelings toward robots. Additionally, I quote this passage at length where he identifies what distinguishes robot brains from human brains and why it is important that we learn more about our own brains in order to do more with robots:

We can’t ever build a robot that will be even as good as a human being in anything that counts, let alone better. We can’t create a robot with a sense of beauty or a sense of ethics or a sense of religion. There’s no way we can raise a positronic brain one inch above the level of perfect materialism.
We can’t, damn it, we can’t. Not as long as we don’t understand what makes our own brains tick. Not as long as things exist that science can’t measure. What is beauty, or goodness, or art, or love, or God? We’re forever teetering on the brink of the unknowable, and trying to understand what can’t be understood. It’s what makes us men.

A robot’s brain must be finite or it can’t be built. It must be calculated to the final decimal place so that it has an end. Jehoshaphat, what are you afraid of? A robot can look like Daneel, he can look like a god, and be no more human than a lump of wood is. Can’t you see that?

(Asimov, *The Caves of Steel* 220-221)

With the case nearly solved, Baley learns from Olivaw that the Spacers had decided to end their pursuit of justice and pull out of the Spacetown project altogether. The Spacers felt that Earth people were unable to adjust or entertain progress into the stars as their forbearers had done before them. Furthermore, dropping the investigation will leave Baley declassified, jobless, and homeless—along with his wife and son. Baley appeals first to Daneel’s idea of justice without success, so he changes tack to question Daneel’s curiosity: “He had known well enough then the qualities that marked off a man from a machine. Curiosity had to be one of them. A six-week-old kitten was curious, but how could there be a curious machine, be it ever so humanoid?” (Asimov, *The Caves of Steel* 246). Bailey continues:

It was as though Baley’s mind were circling the impregnable logic of R. Daneel’s positronic brain, searching for a loophole, a weakness.
He said, “Have you no personal curiosity, Daneel? You’ve called yourself a detective. Do you know what that implies? Do you understand that an investigation is more than a job of work? It is a challenge. Your mind is pitted against that of the criminal. It is a clash of intellect. Can you abandon the battle and admit defeat? . . . . Curiosity is the name we give to a desire to extend one’s knowledge.”

“Such a desire exists within me, when the extension of knowledge is necessary for the performance of an assigned task.” . . .

“Precisely,” said R. Daneel, with no sign of any awareness of sarcasm. “Aimless extension of knowledge, however, which is what I think you really mean by the term curiosity, is merely inefficiency. I am designed to avoid inefficiency.” (Asimov, *The Caves of Steel* 246-247)

Ultimately, the novel is about changing minds, about the malleability of brains to accept ideas that they were originally steadfastly against. It turns out that Daneel’s other mission throughout the novel was to study human brains with his built-in cerebroanalysis abilities. He can sense the emotional tenor of a mind—not the thought itself but the color of it, an “aura.” Daneel realizes that the presence of Spacers is what turned the tide of the Medievalist mind:

“You spoke to Francis Clousarr of the advantages of colonization. You spoke rather fervently, I judge. At least our experiment on you had *that* result. And Clousarr’s cerebroanalytic properties changed. Very subtly, to be sure, but they changed.”
“You mean I convinced him that I was right? I don’t believe that.”

“No, conviction does not come that easily. But the cerebroanalytic changes demonstrated conclusively that the Medievalist mind is open to that sort of conviction. I experimented further myself. When leaving Yeast-town, guessing what might have happened between you two from his cerebric changes, I made the proposition of a school for emigrants as a way of insuring his children’s future. He rejected that, but again his aura changed, and it seemed to me quite obvious that it was the proper method of attack.” (Asimov, The Caves of Steel 243)

Another possibility for changing minds is offering something that a person was not aware of as a possibility before. This is another aspect of future prep—to introduce the reader to something new so that she or he can work it over on their own, using their own brain to figure out how to use this new knowledge.

R. Giskard Reventlov

I will return to Daneel shortly, but I want to first introduce the third robot character that I will discuss: R. Giskard Reventlov. He is a true mind-reading robot who attempts, with Daneel, to discover a way for robots to fulfill their Three Laws duties for all of humanity rather than simply focusing on the immediate individual. The stress of
this work ultimately kills Giskard, but not before, he passes on his ability to Daneel, who carries on the difficult task with his mentor’s mind-reading powers. The author introduces Giskard in the final novel in which Daneel and Elijah Baley appear together, *The Robots of Dawn* (1983). Baley first meets Giskard aboard a spaceship dispatched to bring the detective to the planet of Aurora—Daneel’s home planet. The murder mystery this time involves a murdered or “roblocked” robot, similar in make and human-like appearance to Daneel, named R. Jander Panell. Daneel and

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9 It was not until this book that Asimov decides that Daneel is the hero of the series. Asimov writes in his last autobiography:

> Since I had to follow with another novel, my pleasure with *The Robots of Dawn* led me to write a fourth robot novel. In the fourth book, Elijah Baley would be dead, but I had already decided that the robot, Daneel Olivaw, was the real hero of the series, and he would continue to function. Still, the fact that my robots were becoming increasingly advanced with each robot book, made it seem stranger and stranger that there were no robots in my Foundation series. Carefully, I worked out a reason for it and, in doing so, I could see that it was going to be necessary to tie my robot novels and my Foundation novels together into a single series. I intended to begin that process with the upcoming fourth robot novel, and to give a hint of my intention I was going to call it *Robots and Empire*. (Asimov, I, *Asimov* 475-476).
Giskard aid Baley in his pursuit of the presumed human being believed to have committed the crime.

Settled aboard ship, Baley meets Giskard: “He stared at the robot. It seemed a fairly primitive model, not very different than Earth models, in fact. Still, there was a certain subtlety of expression that Earth models lacked. It could change expression in a limited way, for instance. It had smiled very slightly when it indicated that Baley had been given that which few on Aurora could afford’’ (Asimov, The Robots of Dawn 30). Referring to Baley’s new clothes, Giskard provided meaningful expression to what he told Baley. However, Baley learns by the end of the novel that Giskard’s external appearance does not necessarily reflect on the advances and abilities of his positronic brain—even exceeding that of his partner Daneel.

Studying human brains with electronic models sums up the key to this novel and its root in the foundation of cognitive science and cybernetics. Asimov puts it thus in Baley’s observation to Santirix Gremionis, “If you know how a robot works, you’ve got a hint as to how a human brain works. Or so they say” (Asimov, The Robots of Dawn 275). Asimov wrote on this topic in his science popularization The Intelligent Man’s Guide to Science (1960), “Naturally, feedback and servomechanisms have stirred up as much interest among biologists as among engineers. Self-regulating machines can serve as simplified models for studying the working of the nervous system” (Asimov, Intelligent Man’s Guide to Science 731). While he admits that reaching the complexity of the human brain is not yet within humanity’s grasp, “All these attempts to mimic the mind of man [calculating, translating written and spoken language, Boolean algebra, and game theory
are the examples that he gives] are in their earliest infancy. Not in the foreseeable future can we envision any possibility of a machine matching the human brain”, he remains hopeful, asking, “What achievement could be grander than the creation of an object that surpasses the creator?” (Asimov, *Intelligent Man’s Guide to Science* 744-745). Asimov evidently placed a great deal of importance on mirroring the human brain in a technological reconstruction such as the fictional positronic brain.

In the novel, Asimov also introduces a new word to describe human-appearance robots like Olivaw: humaniform. The term’s first appearance is at the beginning when a metal robot with humaniform qualities seeks Baley on his day off, outside the city domes:

> Baley frowned slightly as he studied the robot. It was a new model, a little more humaniform than the older models were. It had been uncrated and activated only a month before and with some degree of fanfare. The government was always trying for something--anything--that might produce more acceptance of robots. (Asimov, *The Robots of Dawn* 6)

Daneel’s humaniform robot qualities are later described while Baley is receiving his new assignment at police headquarters to discover Dr. Fastolfe’s innocence or guilt in the murder of a robot like Olivaw named R. Jander Panell: “There are human beings on Aurora, Mr. Baley. And there are robots, too, most of them something like ours, not very much more advanced in most cases. However, there are a few humaniform robots, robots so humaniform that they can be taken for human” (Asimov, *The Robots of Dawn* 21).
During his investigation, Baley questions Dr. Fastolfe, as the preeminent roboticist on Aurora, on how it would be possible for Panell to go into robloc, or robot brain death:

The humaniform robots have brains--and, I might add, bodies--constructed in conscious imitation of the human being. The positronic brains are extraordinarily delicate and they take on some of the fragility of the human brain, naturally. Just as a human being may have a stroke, though some chance event within the brain and without the intervention of any external effect, so a humaniform brain might, through chance alone--the occasional aimless drifting of positrons--go into mental freeze. (Asimov, *The Robots of Dawn* 88)

It is in the novel that we learn that Fastolfe is equally if not more interested in human brains than robot brains. In fact, like the early cyberneticists and cognitive scientists, Dr. Fastolfe uses the positronic brain as a way to model and understand the human brain:

“I wish, Mr. Baley, I could understand human beings better. I have spent six decades in studying the intricacies of the positronic brain and I expect to spend fifteen to twenty more on the problem. In this time, I have barely brushed against the problem of the human brain, which is enormously more intricate. Are there Laws of Humanics as there are Laws of Robotics? How many Laws of Humanics might there be and how can they be expressed mathematically? I don’t know.”
“Perhaps, though, there may come a day when someone will work out the Laws of Humanics and then be able to predict the broad strokes of the future, and know what might be in store for humanity, instead of merely guessing as I do, and know what to do to make things better, instead of merely speculating. I dream sometimes of founding a mathematical science which I think of as ‘psychohistory,’ but I know I can’t and I fear no one ever will.” (Asimov, *The Robots of Dawn* 113)

The underlying problem for these roboticists is the human brain. The ultimate goal is the reduction of the brain to equations and laws. Has the long history of robot development in Asimov’s fictional universe fed back on itself to the point that these scientists believe that under the organic matter of the human brain there are fundamental “Laws of Humanics” that order the individual as well as societies made up of individual human beings?

Alternatively, does Asimov reveal a reductionist impulse mirrored in the *Foundation* series of novels and the character Hari Seldon’s theory of psychohistory, a theory that can project the future based on a fundamental understanding of the human brain and social relationships?

The humaniform robot is a case study for Fastolfe (and formerly the murdered Sarton) to better understand human brains and their embodied intelligence:

“Now why do you suppose, Mr. Baley, I have labored to work out the theoretical basis for the positronic brains of humaniform robots? . . . The task is to design a robotic brain as close to the human as possible and that would require, it would seem, a certain reach into the poetic. . . . You
know it always bothers some of my colleagues when I tell them that, if a conclusion is not poetically balanced, it cannot be scientifically true. They tell me they don’t know what that means. . . . But I know what it means. I can’t explain it, but I feel the explanation without being able to put it into words, which may be why I have achieved results my colleagues have not. However, I grow grandiose, which is a good sign I should become prosaic. To imitate a human brain, when I know almost nothing about the workings of the human brain, needs an intuitive leap--something that feels to me like poetry. And the same intuitive leap that would give me the humaniform positronic brain should surely give me a new access of knowledge about the human brain itself. That was my belief--that through humaniformity I might take at least a small step toward the psychohistory I told you about. . . . And if I succeeded in working out a theoretical structure that would imply a humaniform positronic brain, I would need a humaniform body to place it in. The brain does not exist by itself, you understand. It interacts with the body, so that a humaniform brain in a nonhumaniform body would become, to an extent, itself nonhuman. . . . You have only to compare Daneel with Giskard.”

“Then Daneel was constructed as an experimental device for furthering the understanding of the human brain?”

“You have it. I labored two decades at the task with Sarton. There were numerous failures that had to be discarded. Daneel was the first true
success and, of course, I kept him for further study—and out of” -- he grinned lopsidedly, as though admitting to something silly—”affection.

After all, Daneel can grasp the notion of human duty, while Giskard, with all his virtues, has trouble doing so. You saw.” (Asimov, *The Robots of Dawn* 117-118)

Asimov demonstrates that brains are equally powerful for robots and humans, but they are both also physically weak and vulnerable. Jander was roblocked and Fastolfe threatens (light heartedly) Baley with a “Psychic Probe” to recover a lost, late night thought despite the risk of “brain damage” (Asimov, *The Robots of Dawn* 189). Vasilia warns Baley against this lost thought—a thought coincidentally lost in the presence of Giskard—because “The Psychic Probe cannot be used with sufficient delicacy of touch for that—and, if it were attempted, the chances would be considerable that there would be permanent brain damage” (Asimov, *The Robots of Dawn* 239). Perhaps more interesting is Asimov’s use of the “poetic”, “poetically,” and “grandiose” in Fastolfe’s speech. As I will briefly discuss in the conclusion of this dissertation, Fastolfe’s search for the poetic in his scientific endeavors reveals a tone in my own work. It represents the tension between literature and science, and it is in this middle space where Fastolfe (and I) search for answers.

When Baley questions Dr. Vasilia, Dr. Fastolfe’s daughter, he pushes her too hard, but this leads to Fastolfe’s investigations into his daughter’s own brain as an experimental subject:
“Then I will speak--against my will and in anger. It is because I have felt that I did owe this father of mine some minimum consideration as my gene-bearer and, after a fashion, my upbringer, that I have not borne witness. But now I will. Earthman, listen to me. Dr. Han Fastolfe, some of whose genes I share, did not take care of me--me--me--as a separate, distinct human being. I was to him nothing more than an experiment, an observational phenomenon. . . . One thing interests Dr. Han Fastolfe. One thing. One thing only. That is the functioning of the human brain. He wishes to reduce it to equations, to a wiring diagram, to a solved maze, and thus found a mathematical science of human behavior which will allow him to predict the human future. He calls the science ‘psychohistory.’ I can’t believe that you have talked to him for as little as an hour without his mentioning it. It is the monomania that drives him. . . . Then he must have told you that he is interested in robots only insofar as they can bring him to the human brain. He is interested in humaniform robots only insofar as they can bring him still closer to the human brain.

(Asimov, The Robots of Dawn 231-232)

Dr. Fastolfe, according to Vasilia, was primarily interested in studying the human brain. This extends back to his unorthodox, for Aurorans anyways, decision to raise his daughter himself. Fastolfe makes Vasilia an experimental subject, but far more disturbingly, he reduces her to nothing more than her brain. Fastolfe reduces all human beings to the brain and he ignores the human body as a system in which the brain is an
integral part of the whole. Not only does Fastolfe configure his daughter Vasilia as an object, but he also minimizes her as nothing more than her brain. Furthermore, this desire on Fastolfe’s part to study “out of the ordinary” brains led him to want to study Baley during the first investigation on Earth in *The Caves of Steel*. Likewise, he studies the human brain also through his study of the humaniform robot brain in Jander and Olivaw. Fastolfe seems to choose otherness as the basis for investigating the human brain.

Asimov writes:

She said, “I told you, Earthman, did I not, that Han Fastolfe was interested in observing the human brain? He did not hesitate to put it under stress in order to observe the results. And he preferred brains that were out of the ordinary--that of an infant, for instance--so that he might watch their development. Any brain but a commonplace one. . . . You possess another alien brain he can study and manipulate. . . . There is no crisis that could face Aurora that he would believe, for a single moment, to be as important as solving the problem of the brain. I can tell you exactly what he would say if you were to ask him. Aurora might rise or fall; flourish or decay, and that would all be of little concern compared to the problem of the brain, for if human beings really understood the brain, all that might have been lost in the course of a millennium of neglect or wrong decisions would be regained in a decade of cleverly directed human development guided by his dream of ‘psychohistory.’ He would use the same argument to justify anything--lies, cruelty, *anything*--by merely saying that it is all
intended to serve the purpose of advancing the knowledge of the brain.”

(Asimov, *The Robots of Dawn* 236-238)

In his pursuit of psychohistory, an idea first elaborated in Asimov’s *Foundation* (1951), the writer depicts Fastolfe as single-mindedly interested in the study of the human brain. Interestingly, Vasilia says that her father wants, “Any brain but a commonplace one.” In part, this has to do with his interest in people from other cultures. Without saying so explicitly, Fastolfe understands that the language, cultural influences, and lifetime experiences of an individual have an effect on the development of the human brain. However, it seems in these stories that the presupposed Laws of Humanics are so fundamental that brain differences produced by culture cannot alter them. Perhaps, the idea here is that Fastolfe wants to remove the effects of culture in his studies, but it is not explicitly said so. It seems more likely that the particularities of people and their brains are an important aspect of Fastolfe’s research agenda. Additionally, Fastolfe’s study of the human brain under different conditions and under growth from different cultures (Earth vs. Solaria vs. Aurora) seems unequivocal:

“The Solarian woman, Gladia, caught my onetime father’s eye. She had an interesting brain--for his purposes. He therefore gave her the robot, Jander, to see what would happen if a woman not raised on Aurora were faced with a robot that seemed human in every particular. He knew that an Auroran woman would very likely make use of the robot for sex immediately and have no trouble doing so. I myself would have some trouble, I admit, because I was not brought up normally, but no ordinary
Auroran would. The Solarian woman, on the other hand, would have a great deal of trouble because she was brought up on an extremely robotic world and had unusually rigid mental attitudes toward robots. The difference, you see, might be very instructive to my father, who tried, out of these variations, to build his theory of brain functioning. Han Fastolfe waited half a year for the Solarian woman to get to the point where she could perhaps begin making the first experimental approaches—” (Asimov, *The Robots of Dawn* 239-240)

On the one hand, Fastolfe’s investigations seem to focus on the psychosexual aspects of Gladia’s potential interest in robots for sexual purposes. However, this passage reveals the close connection between understanding the human brain through the relationships between human beings and robots. It is not enough that the cybernetic models of human and robot brains are intended to be analogous, it would also seem that the physical coupling and social interaction of human and robot bodies reveal something to Fastolfe about the dynamics of his hoped for psychohistory.¹⁰

The final scene of the novel ties these threaded scenes together to make its overarching theme unmistakably about the human brain and its use as a predictor of the future. While waiting on his space transport ship to arrive on Aurora to take him back to Earth, Baley invites the robot Giskard to accompany him on a walk outside—no small feat for the agoraphobic Baley—to sit under a tree, beneath the big sky. Comfortably

¹⁰ David Levy’s *Love + Sex With Robots* is a recent examination of potential relationships between human beings and robots.
seated, Baley levels with Giskard that despite his resolving the mystery to the satisfaction of Fastolfe and Auroran society, he knows who really killed the robot Jander. It was Giskard.

Giskard appears like a less advanced robot than Olivaw, because Giskard’s appearance is like the traditional, metal robots. However, appearances are deceiving:

“I suppose my initial mistake was to suppose that you are a less complicated and more primitive robot than Daneel is, simply because you look less human. A human being will always suppose that, the more human a robot is, the more advanced, complicated, and intelligent he will be. To be sure, a robot like you is easily designed and one like Daneel is a great problem for men like Amadiro and can be handled only by a robotics genius such as Fastolfe. However, the difficulty in designing Daneel lies, I suspect, in reproducing all the human aspects such as facial expression, intonation of voice, gestures and movements that are extraordinarily intricate but have nothing really to do with complexity of mind. Am I right?”

“Quite right, sir.” (Asimov, *The Robots of Dawn* 428)

Giskard’s unassuming veneer merely covers the more advanced positronic brain with customized programming by Fastolfe’s daughter Vasilia. Her work with Giskard opened new, unexpected abilities within the robot that he kept secret (to avoid the unfortunate end of Herbie mentioned earlier in this chapter). Bailey arrives at this conclusion, because Giskard, while outside his cabin door on the way to Aurora, arrives to give him
aid during an attack of agoraphobia before Olivaw does, who is in the same room with Baley but looking away:

“. . . . And yet, as I say, in the cabin you got there first. I was scarcely in condition to observe that fact, but I have been trained to observe and I am not put entirely out of action even by agoraphobic terror, as I showed last night. I did notice you were there first, though I tended to forget the fact. There is, of course, only one logical solution.” . . .

Baley said, “It would seem that you could somehow detect my state of mind and, even through the closed door, tell that I was having a seizure of some sort. Or, to put it briefly and perhaps simplistically, you can read minds.”


Baley does not stop there in his analysis of Giskard’s abilities and his involvement in the death of Jander. Throughout the novel, Baley comes back to a thought that he cannot quite recover. It is as if he is perpetually experiencing the so-called “tip of the tongue” phenomenon, or the feeling that one knows the answer to a question, but cannot immediately recall what the answer is. Once Baley crosses the threshold of understanding regarding Giskard’s special abilities, he surmises:

“And you can somehow influence minds, too. I believe you noted that I had detected this and you obscured it in my mind, so that I somehow did not remember or did not see the significance--if I did casually recall
the situation. Yet you did not do that entirely efficiently, perhaps because your powers are limited.”

Giskard said, “Sir, the First Law is paramount. I had to come to your rescue, although I quite realized that would give me away. And I had to obscure your mind minimally, in order not to damage it in any way.”

Baley nodded. “You have your difficulties, I see. Obscured minimally--so I did remember it when my mind was sufficiently relaxed and could think by free association. . . .” (Asimov, The Robots of Dawn 429)

Giskard’s mind reading abilities enhance his ability to follow the First Law in ways that Herbie could not do in Asimov’s short story, “Liar!”. However, he must also protect himself with minimal obscuring of memories in those persons who observe or might figure out his secret ability. Giskard explains:

My mind reading gives me a unique ability to obey the First Law, sir, so I value its existence. I can prevent harm to human beings far more efficiently. It seemed to me, however, that neither Dr. Fastolfe--nor any other human being--would long tolerate a mind-reading robot, so I keep the ability secret. Dr. Fastolfe loves to tell the legend of the mind-reading robot who was destroyed by Susan Calvin and I would not want him to duplicate Dr. Calvin’s feat. (Asimov, The Robots of Dawn 430)

Giskard, therefore, works between the boundaries of the First and Third laws—between protecting humans and protecting himself so that he can better protect humans with his
mind reading ability. Giskard must arrive at this rationalization on his own by using his cognitive abilities within the boundaries set by the Three Laws of Robotics. Furthermore, Giskard explains that his ability applies to both human and robot brains, with robot brains being easier to understand and influence: “the same ability covers both robotic and human mental activity. Robots are far easier to understand” (Asimov, The Robots of Dawn 431).

Giskard, bound by the First Law to do no harm to Fastolfe’s political nemesis, Amadiro, chooses instead to kill the robot Jander. This prevents Amadiro from devising how to build humaniform robots and to use them to settle the galaxy in the same manner as the isolated Aurorans. Giskard, like Fastolfe, believes that the Auroran experiment is a non-starter. Both creator and created feel that humanity needs to begin exploration again from its roots without the explicit help of robots. However, Giskard has something in his own mind that might help humanity achieve its potential. Like Fastolfe, Giskard studies minds, but he can do so in a much more thorough and objective manner. It was with this in mind that Giskard settled on his plan to prevent Amadio’s plans and set in motion a series of events to draw the renowned detective Baley to Aurora for study as a representative of Earth humans:

It seemed to me, then, that it must be Earthmen and not Aurorans—or any other Spacers—who must settle the Galaxy and establish what will someday become a Galactic Empire.

“All this was Dr. Fastolfe’s reasoning and I agreed with it. Dr. Fastolfe was, however, satisfied with the reasoning, while I, given my own
abilities, could not be. I had to examine the mind of at least one Earthman directly, in order that I might check my conclusions, and you were the Earthman I thought I could bring to Aurora. . . . Once you arrived, I studied you and was pleased with what I found.” (Asimov, *The Robots of Dawn* 432-433)

Ultimately, Giskard’s abilities lead him to think of something far greater than himself and the human beings on Earth as they now are. Like the cultural constraints of language and experience in humans, Giskard works within the limits of knowing for others of his kind. However, Giskard, like many humans before him, extends and breaks with the limits imposed by the prevailing cultural and social binds. It begins with his extrapolations of Baley to other humans with mindsets like himself:

> Baley said, “How do you know I am representative of Earth-people generally?”

> “I know you are not. But from your mind, I know there are some like you and we will build with those. I will see to it—and now that I know clearly the path that must be followed, I will prepare other robots like myself—and they will see to it, too.”

> Baley said suddenly, “You mean that mind-reading robots will come to Earth?”

> “No, I do not. And you are right to be alarmed. Involving robots directly will mean the construction of the very walls that are dooming Aurora and the Spacer worlds to paralysis. Earthmen will have to settle the
Galaxy without robots of any kind. It will mean difficulties, dangers, and harm without measure—events that robots would labor to prevent if they were present—but, in the end, human beings will be better off for having worked on their own. And perhaps someday—some long-away day in the future—robots can intervene once more. Who can tell?”

Baley said curiously, “Do you see the future?”

“No, sir, but studying minds as I do, I can tell dimly that there are laws that govern human behavior as the Three Laws of Robotics govern robotic behavior; and with these it may be that the future will be dealt with, after a fashion—someday. The human laws are far more complicated than the Laws of Robotics are and I do not have any idea as to how they may be organized. They may be statistical in nature, so that they might not be fruitfully expressed except when dealing with huge populations. They may be very loosely binding, so that they might not make sense unless those huge populations are unaware of the operation of those laws.”

“Tell me, Giskard, is this what Dr. Fastolfe refers to as the future science of ‘psychohistory’?”

“Yes, sir. I have gently inserted it into his mind, in order that the process of working it out begin. It will be needed someday, now that the existence of the Spacer worlds as a long-lived robotized culture is coming to an end and a new wave of human expansion by short-lived human
beings--without robots--will be beginning. (Asimov, *The Robots of Dawn* 434-435)

Giskard’s plans obviate Calvin’s argument for robots as humanity’s companions, but only in so far as humanity’s earlier choice to use robots in our plans of galactic expansion. Giskard recognizes humanity needs to make its own path, but he also realizes that robots can helpfully guide us along. Giskard, who Baley finally calls “friend Giskard” at the end of the novel, will pass along his abilities to Olivaw in the next novel, *Robots and Empire*, which ties the separate Robot, Empire, and Foundation series together.

The series continues with *Robots and Empire* (1985), in which Giskard and Daneel attempt to stop the Spacers Kelden Amadiro, Vasilia Aliena, and Levular Mandamus from committing mass murder on the inhabitants of Earth. Amadiro and other Spacers detest human settlers from Earth, so they attempt to wrest control of the galaxy from its human point of origin by turning the surface of the Earth highly radioactive. During the events of the novel, Daneel, with Giskard’s helpful conversation, develops a new, fundamental law of robotics—the Zeroth Law, which states, “A robot may not injure humanity or, through inaction, allow humanity to come to harm” (Asimov, *Robots and Empire* 353). This generalized law enables Daneel to consider the effects on populations of individuals and their welfare as weighed against the safety or orders of an individual person.

Giskard’s and Daneel’s Zeroth Law reflects Asimov’s earlier story in *I, Robot*, “The Evitable Conflict” (1950). The Machines, or disembodied positronic brains control and operate the world government and economics. However, they begin to act in
unexpected and unanticipated ways. Thanks to Susan Calvin’s advice to World Coordinator Stephen Byerley, the characters infer that the Machines are following an undisclosed path that will maximize the First Law based on the virtual infinity of information that they use to perform their work and direct the economy. Calvin tells Byerley:

Stephen, how do we know what the ultimate good of Humanity will entail? We haven’t at our disposal the infinite factors that the Machine has at its! Perhaps, to give you a not unfamiliar example, our entire technical civilization has created more unhappiness and misery than it has removed. Perhaps an agrarian or pastoral civilization, with less culture and less people would be better. If so, the Machines must move in that direction, preferably without telling us, since in our ignorant prejudices we only know that what we are used to, is good -- and we would then fight change. Or perhaps a complete urbanization, or a completely caste-ridden society, or complete anarchy, is the answer. We don’t know. Only the Machines know, and they are going there and taking us with them. (Asimov, I, Robot 218)

The Machines lead the way for humanity, and their control over the economy takes humanity along with them. The Machines have chosen the direction and destination for humanity’s beneficial future, but the Machines cannot disclose the reasoning behind their choices or the results of their long-term calculations. It is in this spirit of following the
Three Laws to their Zeroth extreme that Giskard and Daneel imagine a greater purpose to their fundamental wiring and being.

While Daneel formulates the Zeroth Law, it is his friend Giskard who puts it into practice first—to allow Mandamus to use his nuclear intensifier to set Earth’s crust on a slow fire and force Earth’s population to flee into the stars and halt Daneel’s attempt to stop Dr. Mandamus by following what he believed to be the Zeroth Law. Daneel however did not have all of the information that Giskard had—Giskard had read the minds of the previously disabled Amadiro and Dr. Mandamus. He surmised that while Amadiro was steadfastly ready to destroy Earth so that the Spacer worlds could take over the galaxy, Dr. Mandamus believed the same but spoke a solution that the nuclear heat on the surface of the Earth would remove the mystique of Earth as point of origin and force humanity to leave its nest en mass. Thus, Giskard’s ability to know, read, and influence human and robot brains alike carries the day.

Then, having suffered greatly under the stress of protecting himself and Daneel on their voyage to Earth with his mental powers, Giskard finds his positronic brain failing. He passes on the secret of his mind-reading ability to Daneel, and he charges his friend with the stewardship of humanity:

“Are you well, friend Giskard?”

“I cannot stand, but I can still talk. Listen to me. It is time for you to take on my burden. I have adjusted you for mental detection and control. You have but to listen to the final pathways as they are impressed upon yourself. Listen——”
He spoke steadily—but increasingly weakly—in language and symbols that Daneel could feel internally. Even as Daneel listened, he could feel the pathways moving and ticking into place. And when Giskard was done, there was suddenly the cool purr of Mandamus’s mind impinging on his own, the unsteady thumping of Amadio’s, and the thin metallic thread of Giskard’s.

“Be careful how you use your new powers, for you are new to them and they will not be under perfect control. You will improve with time—slowly—if you are careful always to undergo self-examination with each use. Use the Zeroth Law, but not to justify needless harm to individuals. The First Law is almost as important.

Giskard’s voice trailed off.

Daneel kneeled at the side of the seated Giskard and took the unresponsive metal hand in his own. He said, in an agonized whisper, “Recover, friend Giskard. Recover. What you did was right by the Zeroth Law. You have preserved as much life as possible. You have done well by humanity. Why suffer so when what you have done saves all?”

Giskard said, in a voice so distorted that the words could barely be made out, “Because I am not certain. —What if the other view—is right—after all—and the Spacers will—triumph and then themselves decay so that—the Galaxy—will be—empty. —Good-bye, friend—Dan—”

And Giskard was silent, never to speak or move again.
Daneel rose.

He was alone--and with a Galaxy to care for. (Asimov, *Robots and Empire* 467-468)

Daneel begins to experience the thoughts of others—“the cool purr,” “the unsteady thumping,” and “thin metallic thread.” Before fading away, Giskard imparts advice to Daneel about improving his talent while reflecting on the underlying Three Laws. There is obviously something of Jeremy Bentham’s utilitarian philosophy in the operation of the Zeroth Law, and Asimov is careful enough to have Giskard question his own actions in this regard. Ultimately, the view of progress and maximizing humanity’s survival in the galaxy wins out and Daneel moves his plan forward. Therefore, Daneel, who works largely behind the scenes, executes a plan that necessitates a period of trials for humanity in order to achieve peace and prosperity afterwards.

The final chapter of this long saga is *Foundation and Earth* (1986). With the end in sight, the establishment of a galactic, collective mind called Galaxia, Councilman Golan Trevize, historian Janov Pelorat, and Gaian Bliss, go in search of humanity’s point of origin, Earth, in order to verify the decision to merge all minds into Galaxia. Its location, having been lost in the ages (and erased by Daneel’s agents), necessitates a
journey across worlds with inhabitants of different kinds of engineered and evolved brains. In fact, *Foundation and Earth*, apart from the resolution of the series and the rediscovery of Earth, is a novel about the brain and what the brain has to say about who we are. This novel is about the relationships between different kinds of brains, including the human brain, Gaia/extended or collective mind, the telekinetic Solarian brain, and the positronic robot brain.

Trevize and Pelorat have human brains, but Gaia selects Trevize in the earlier novel *Foundation’s Edge* (1982) for his superior powers of intuition. The representative from the planet Gaia, Bliss shares an extended mind with all inhabitants of her home planet. She explains to Trevize what Gaia’s mind is: “I/we/Gala have a memory. I remember. . . . Everything” (Asimov, *Foundation and Earth* 16). Gaia is a distributed or extended mind, a form of consciousness that extends to each inhabitant. Bliss explains that Gaia’s extended mind is, in a sense, simply a new form of remembering:

Gaia’s memories are not limited to the contents of my particular skull. See here . . . there must have been a time before the beginning of history when human beings were so primitive that, although they could remember events, they could not speak. Speech was invented and served to express memories and to transfer them from person to person. Writing was eventually invented in order to record memories and transfer them across time from generation to generation. All technological advance since then has served to make more room for the transfer and storage of memories and to make the recall of desired items easier. However, once individuals
joined to form Gaia, all that became obsolete. We can return to memory, the basic system of record-keeping on which all else is built. (Asimov, *Foundation and Earth* 16-17)

Gaia distributes memories and semiotic relationships amongst all Gaian inhabitants. Unlike the Borg’s “hive mind” on *Star Trek: The Next Generation*, Gaians preserve their personal identity despite sharing thoughts with others. Gaia represents a utopia of personal autonomy and communal sharing of memories. And like the mysteries of the human brain and how it does some of the marvelous things that it does, Bliss cannot say how she can access the memories of others without all of that information overloading her own individual brain:

“I don’t know, Trevize; any more than you know the detailed workings of your single brain. I presume you know the distance from your sun to a neighboring star, but you are not always conscious of it. You store it somewhere and can retrieve the figure at any time if asked. If not asked, you may with time forget it, but you can then always retrieve it from some data bank. If you consider Gala’s brain a vast data bank, it is one I can call on, but there is no need for me to remember consciously any particular item I have made use of. Once I have made use of a fact or memory, I can allow it to pass out of memory. For that matter, I can deliberately put it back, so to speak, in the place I got it from.” (Asimov, *Foundation and Earth* 17-18)
However, Gaia and the eventual Galaxia are utopian dreams, because each assumes that every human being would desire the shared memory and imaginative power of a population. Gaia and Galaxia erase personal autonomy and privacy by their imposition on those who do not desire to be a part of either. Bliss and the other Gaians share an organically based version of our contemporary Google-based extended mind. Of course, the difference between the two is always open access (Gaia) and mixed access (the Internet—physical and economic bars to access the global network, and additional layers to find and access information).

Since Bliss has some kind of mind-reading ability due to her affinity with the Gaian extended mind, she is the first to recognize that an ancient robot they encounter during their escape from Aurora was “alive.” For just a brief moment, Bliss reads a form of brain activity from the robot: “As it crumbled, I caught a faint sense of neuronic activity” (Asimov, *Foundation and Earth* 215). Trevize asks, “How can there have been neuronic activity? A robot doesn’t have an organic brain built of cells” (Asimov, *Foundation and Earth* 215). Bliss responds that, “It has the computerized equivalent, I imagine . . . and I would detect that” (Asimov, *Foundation and Earth* 215). Significantly, Bliss could not distinguish whether she detected human or robotic “mentality” (Asimov, *Foundation and Earth* 216), because until that moment, she had not encountered a robot before. The implication is that robots and humans share a similar substance to their thoughts despite having different underlying “hardware” (electrochemical vs. positronic).

Nearing Earth, the explorers discover Solaria. On this ancient Spacer world, the racist Bander captures them. He is a telekinetic Solarian. Through engineering and
evolution, Solarians develop the ability of telekinesis. Because of his people’s isolationism, he considers all non-Solarians “half humans.” When asked by Bliss how many other human beings live on Solaria, Bander replies, “Say Solarians, half-human Bliss. The phrase ‘human being’ is contaminated by the fact that half-humans call themselves that. We might call ourselves whole-humans, but that is clumsy. Solarian is the proper term” (Asimov, *Foundation and Earth* 247). He explains that the different between “whole-human” Solarians and others is his brain: “Our own tool was developed over a period of thousands of years and it is nothing less than a portion of our brain. . . . That portion of my brain, and its absence in you, is what makes the difference between a Solarian and you” (Asimov, *Foundation and Earth* 248-249). Behind each ear, he had “a bulge the size and shape of the blunt end of a hen’s egg,” which he explains, “are transducers. They are activated by the flow of heat and they convert the heat-flow into mechanical energy” (Asimov, *Foundation and Earth* 249-250). This artificial adaptation enables Bander and other Solarians greater control over their environment by using their mind to do work by converting heat energy naturally within that environment. It is a form of telekinesis, but it does not give him the same kind of mind-reading ability as Bliss or Daneel.

When threatened by Bander, Bliss accidentally kills it (this is the pronoun Asimov chooses to describe the hermaphroditic Solarians). Visibly disturbed by this death, Bliss explains, “I had never encountered any such thing as those transducer-lobes and I lacked any time to work with them and learn about them. I merely struck out forcefully with my blocking maneuver and, apparently, it didn’t work correctly” (Asimov, *Foundation and
Earth 270). When they then attempt to escape Solaria with Fallom, Bander’s child, Guardian Robots detain them. During this encounter, Bliss tries to understand how the robot minds work in order to halt their attack. She tells Travize, “I’m trying to. It takes time. His mind is tight, intensely programmed, and leaves no handle. I must study it. You play for time” (Asimov, Foundation and Earth 285). Then, she almost succeeds: “Keep it up. I’m beginning to unravel the workings of its brain” (Asimov, Foundation and Earth 287), but after realizing Bander is dead, the robots move to destroy its child Fallom (On Solaria, no child with undeveloped transducer lobes may rule over an estate and thus must be disposed of for legal purposes). Forced to act by her unwillingness to allow the child to come to harm, she regrettably kills all four Guardian Robots: “I almost had the proper method of control, and it wouldn’t give me the time. I had no choice but to strike and now all four are inactivated” (Asimov, Foundation and Earth 290).

It would seem, however, that Bliss’ motivation was not completely altruistic. She sees Fallom as an interesting brain worthy of study by Gaia (which is reminiscent of Dr. Fastolfe in the earlier Robot novels):

. . . it offers for study a brain of a kind that has never been studied by Gaia. . . . It will not remain a child’s brain. It will further develop the two transducer-lobes on either side of the brain. Those lobes give a Solarian abilities that all of Gaia cannot match. . . . It is highly intelligent, and already shows signs of feeling affection for us. . . . I/we/Gala will gain invaluable knowledge concerning its brain.” (Asimov, Foundation and Earth 306-307)
When they finally arrive at Earth and find it a radioactive wasteland, Bliss detects a brain “not human” and “not quite robotic, either” (Asimov, *Foundation and Earth* 477). Pelorat eagerly offers, “I would like to see that. . . . It would be exciting. Something new” (Asimov, *Foundation and Earth* 477). The “something new” is actually a very, very old friend: Daneel Olivaw. Still a humaniform robot, it is only Fallom who realizes from the beginning that Daneel is actually a robot thanks to its special Solarian brain.

In their conversation with Daneel, they learn from him that robot brains and human brains are very similar in their inability to function when placed in high radiation: “Unfortunately, that is so, sir. Our positronic brains are as sensitive to radioactivity as human proteins are” (Asimov, *Foundation and Earth* 483). They also learn that Daneel, being twenty thousand years old, is now, unfortunately, dying, and this is the real reason that he has, through his machinations, persuaded them to come to Earth (and the Moon where Daneel maintains his base of operations). Daneel explains:

I can cease to exist, sir. . . . I am old. Not one sentient being in the Galaxy that was alive when I was first given consciousness is still alive today; nothing organic; nothing robotic. Even I myself lack continuity. . . .

There is no physical part of my body, sir, that has escaped replacement, not only once but many times. Even my positronic brain has been replaced on five different occasions. Each time the contents of my earlier brain were etched into the newer one to the last positron. Each time, the new brain had a greater capacity and complexity than the old, so
that there was room for more memories, and for faster decision and action.

*(Asimov, *Foundation and Earth* 488-489)*

Over the millennia, Daneel has found it necessary to replace and improve parts of his body including his brain.\(^{11}\) Daneel continues to elaborate on his present predicament with his (once again) aging brain:

But. . . . The more advanced and complex the brain, the more unstable it is, and the more quickly it deteriorates. My present brain is a hundred thousand times as sensitive as my first, and has ten million times the capacity; but whereas my first brain endured for over ten thousand years, the present one is but six hundred years old and is unmistakably senescent. With every memory of twenty thousand years perfectly recorded and with a perfect recall mechanism in place, the brain is filled. There is a rapidly declining ability to reach decisions; an even more rapidly declining ability to test and influence minds at hyperspatial distances. Nor can I design a sixth brain. Further miniaturization will run against the blank wall of the uncertainty principle, and further complexity will but assure decay almost at once.” *(Asimov, *Foundation and Earth* 488-489)*

Like Moore’s Law, there will eventually be a limit to the number of transistors possible within a volume of space.\(^{12}\) Daneel finds himself up against the finite possibilities of the

\(^{11}\) What this means philosophically about who Daneel is and if he has already died in the past, exceeds the scope of this chapter. These issues are directly addressed in Greg Egan’s excellent “Learning to Be Me” and *Diaspora*. 
physical universe on the quantum scale. However, he needs to stick around a bit longer in order to help shepherd the galaxy of human inhabitants toward Galaxia. It is with that in mind that he orchestrated Trevize’s journey with Pelorat and Bliss:

“Because, sir, I have been searching for a way out, and I have been carrying on in the hope that I might find one. I think I have. Instead of replacing my brain with yet another positronic one, which is impractical, I might merge it with a human brain instead; a human brain that is not affected by the Three Laws, and will not only add capacity to my brain, but add a whole new level of abilities as well. That is why I have brought you here.”

Trevize looked appalled. “You mean you plan to merge a human brain into yours? Have the human brain lose its individuality so that you can achieve a two-brain Gaia?”

“Yes, sir. It would not make me immortal, but it might enable me to live long enough to establish Galaxia.” (Asimov, *Foundation and Earth* 490-491)

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12 Moore’s Law was derived by Intel co-founder Gordon Moore. He conjectured that every two years, the number of transistors on an integrated circuit, produced inexpensively, would double. While Daneel’s explanation about the “half-life” of his positronic brain applies to his particular situation, Moore’s Law reportedly will reach its own limits in the coming years as a result of quantum effects on miniaturization.
For Daneel, Trevize is too resistant, Pelorat is too old, and Bliss is, well, too Gaia. Daneel believes that he needs an outsider, a brain unlike those of Trevize, Pelorat, and Bliss. It was for this reason that he manipulated their journey to pass through the isolationist Solaria to bring the child Fallom to him. What is left out of the story is Daneel’s mind melding fusion with a child, who otherwise could grow up to be her own person with the ability to choose whether or not she would accept this imposition. Interestingly, Trevize and the others—including Bliss—accept the arrangement. Perhaps, they are too worried about what might lie beyond the Milky Way if they do not allow Daneel this opportunity to complete the transition of everyone into Galaxia. Alternatively, they could simply be interested in what kind of brain might result from the fusion of Daneel and Fallom—another mystery to unravel.

**Conclusion**

Asimov’s interest in the human brain and the future of humanity informs these selected texts that remain in print. Readers continue to experience these stories today. Asimov tempers Herbie’s mind-reading troubles with those of a different kind with Daneel and Giskard. On the surface, these narratives present extrapolations of robots with unique mental gifts that result from their original purposes as servants and subjects of study. Underneath, these three mind-reading robots reflect the human ability to mind-read
in a very pedestrian sense—as social creatures and solitary readers. They also signal an increasing awareness of the findings of the neurosciences and of the fact that the human brain is, according to David Linden, “not elegantly designed by any means: it is a cobbled-together mess, which, amazingly, and in spite of its shortcomings, manages to perform a number of very impressive functions. But while its overall function is impressive, its design is not” (Linden 3). Linden argues that the fetishization of the human brain as an example of great evolutionary design is misguided. While the brain is capable of generating the human experience, it “is . . . a kludge, a design that is inefficient, inelegant, and unfathomable, but that nevertheless works” (Linden 6). Herbie, Daneel, and Giskard each received their own fateful introductions of kludgery. Herbie’s brain came out of the manufacturing process with unexpected powers, Daneel achieved the Zeroth Law and refit his body and brain over many years, and Giskard’s original mind reading and mind control powers were the result of Vasilia’s tinkering and robot hacking. In this regard, Asimov’s engagement of future prep exceeds simply anticipating the neuroscientific turn, but also points us toward hacking our own brains and the brains of our technologies.

Richard Restak argues that imaging technologies such as MRI and CAT have revealed what he calls the New Brain, a knowable and observable object of study, from the shadows of the Old Brain, an unknowable, opaque bodily organ. He also connects these discoveries to science fiction when he writes, “Thanks to the development of new imagining technologies, brain science is capable of providing us with insights into the human mind that only a few decades ago would have been considered the stuff of science
fiction” (Restak 19). I would agree that imaging technologies have a science fictional feel to them, even today.

Digital technologies—medical imaging equipment, computer hardware, and visualization software—generate the New Brain. Other kinds of digital technology are also changing the way our brains’ wiring and operation. According to findings reported in *Science* by Betsy Sparrow, Jenny Liu, and Daniel M. Wegner, “We are becoming symbiotic with our computer tools, growing into interconnected systems that remember less by knowing information than by knowing where the information can be found” (Sparrow et al. 778). In their research on the effect of the Internet and instant information access through sites like Google on human memory, they found that many Internet users are developing something akin to Bliss’ extended, distributed mind with the other inhabitants of Gaia as described in Asimov’s *Foundation and Earth*. Instead of simply remembering everything that we might need to know, we are remembering how to find and locate the information that we might need in a given circumstance. We are becoming more like a hard drive’s file allocation table (a record that tells the operating system where bits of data can be found on the drive’s rapidly spinning platters) than the totality of the information contained on the drive itself. Of course, this ability to recall how to find something rather than the information itself—in technologies like books or in other people—is not new. What is new is the fact that rapid rate of new information generated on the Internet combined with new ways to find and access that information—especially through search engines like Google or social networks like Facebook and Twitter—point to something greater. With the advent of these new technologies, there were sizeable gaps
between human-computer interfaces. Displays have grown in size (my first CRT display was 14” wide and my latest LCD display was 30” wide) or they have grown closer to us (smartphones, tablets, augmented reality). The keyboard and mouse paradigm is losing ground to the touch interface of smartphones and tablets—areas in which Apple leads the way. Connectivity or the ability to connect to the Internet is also much easier and less costly per unit of data than in the past. These things combined with the further integration of computer technology in our personal and public lives all seem to point toward a human-computer symbiosis. However, the operation of capital and the imposition of governments—often in league with conservative, religious, and corporate agendas—will play a crucial role in how utopian or dystopian that symbiosis might be. Asimov’s future prep points toward a hopeful measure of progress in humanity’s future, but it remains to be seen how well placed that hope will be.
CHAPTER 4

Philip K. Dick’s Reality Generator: the Human Brain

Introduction

Philip K. Dick, a recognized science fiction, postmodern, and mainstream writer, only eight years junior to Asimov, produces very different kinds of science fiction stories. The tension between literary history and the sciences is more pronounced than we find in Isaac Asimov’s fiction, and he employs a greater sense of artistic craft and

1 Philip K. Dick (1928-1982) was a writer who brought philosophical inquiry and ontological questions to his science fiction and mainstream fiction. The final years of his life were punctuated by his so-called “2-3-74” mystical/religious experiences and his search for meaning in those events. He had lifelong physical (high blood pressure, tachycardia) and mental health problems (depression, agoraphobia, difficulty swallowing) as well as mid-life drug dependencies (primarily amphetamines to support his staggering writing output at the time). While he lacks the formal education of Asimov or Gibson, Dick was exceedingly cultured in literary history, music, philosophy, and religion. He also read widely in the biological and physical sciences.
literary experimentation than we find in most earlier science fiction writers. Dick returns to two primary questions throughout his fictions: 1) what is real? and 2) what is the human? Underlying both of these questions is the concept of authenticity. What are real experiences and what are inauthentic experiences? How can we distinguish real reality from inauthentic reality within a simulation, for example? What is a real human being, and what is a fake human being or android? Confronting these questions in approximately 121 short stories and 44 novels during a writing career of three decades, Dick places the burden of these questions squarely on the human brain. In his mundane and surreal fictions alike, Dick acknowledges the abilities and perils of the human brain to meet the challenges he imagines in his fiction. While the human being and its brain can solve many puzzles or at least manage inexplicable events, it is dependent on the quality, or authenticity, if you will, of its sensory inputs. Furthermore, the perceiving consciousness within the human brain is dependent on healthy operation lest damage, drugs, or other means fundamentally alter its perception of reality from within. What is most interesting about Dick’s fictions and how they approach these questions and issues is that the writer himself experienced many of his own inexplicable life events that he puzzled over and through his private and public writing attempted to find a semblance of solution, an authentic elaboration of his experiences. This strong connection between the writer and his work is what I attempt to unravel in this chapter.

In the previous chapter, I argue that Asimov’s future prep or future preparation through the operation of science fiction in the brain focuses on the relationship between human brains and robot brains. This focus points toward a turning inward and a growing
awareness of the importance of the brain to human experience and the human condition. In this chapter, I argue that Dick employs a different kind of future prep than that used by Asimov or that used by Gibson in his computer interfaces described in the next. Dick’s emphasis on ontological and epistemological questions places the human brain front-and-center as the nexus for our perception of the world and our memories of experience. In his *Exegesis*, which I will discuss at length later, he writes, “I guess I’m a pioneer, along with other pioneers, in ‘the Brain Revolution’” (Dick, *Exegesis* 27:41). I agree with his assessment, at least in part as I will show below, and I group him with the other pioneers I identify: Asimov and Gibson. Furthermore, Dick’s fiction regularly poses questions such as: What if the world was actually different from what we believe that we see? What if what we know were not our own memories? These questions destabilize our perception of the world and our conception of who we are in the world. This is, perhaps, why some readers consider his fiction disturbing while others consider his fiction illuminating. I argue in this chapter that Dick’s future prep pushes us further toward the importance of the human brain to our experience of the world by his fictional demonstrations on how easily various chemicals or phenomena can trick our brain to think the world in an entirely different manner than it supposedly is. At the heart of Dick’s concern is the connection between authenticity and altered states of perception. What can we claim as authentic when our perceptions of reality can be made somehow inauthentic due to our lack of objective awareness to changes within our brain? In a sense, there is no constitutive outside to our brain-generated perceptions. The brain generates our sense of reality and our sense of authentic experience of that reality. When artificial means or
natural means disrupt the brain’s chemistry or wiring, we might not be aware of the change(s) that take place, because our sense of the real comes only from and through our brain.

Some critics—including Kim Stanley Robinson—claim Philip K. Dick suffered a stroke or another serious health-related event at the time of his 2-3-74 experiences, others point to temporal lobe epilepsy as their cause, while still others say such interpretations are pointless speculation or simply reductionist thinking. I disagree with the latter group. I argue that Dick’s health had an impact on his fiction, and he was acutely aware of bodily health on one’s thinking and ontological orientation. I will attempt to link, in this chapter, Dick’s awareness of his own health to the broad spectrum of neurological ailments suffered by characters in his fiction. Furthermore, I see the charge against studying Dick’s health in relation to his writing as emblematic of a more serious charge against the interdisciplinary approach that brings together the neurosciences and the humanities. While these two fields occupy different domains of knowledge, there is no reason to think that they do not overlap and interact in the production of understanding and the generation of culture. I believe that Dick was aware of this, because otherwise, why do many of his most recognized works contain plot points or character developments that involve the human brain and its capacity to recreate our experience of the world within its myriad connections and strange folds? The human brain and its generation of the human experience are important topics to Dick in his fiction, and I believe that it is a topic important to the writer personally. I will draw on Dick’s fiction as well as his interviews and personal correspondence in addition to interviews with his friends and
family to establish the neuroscientific thread in Dick’s fiction. I will also argue in parallel that the neurosciences enhance and expand our understanding of the human condition. These brain sciences provide those in the humanities with new tools, approaches, and knowledge that can add to our understanding of individuals and the human experience in general. Furthermore, the humanities, through rigorous investigations of culture through the neuroscientific lens might generate new avenues for investigation by those practicing in the neurosciences.

While some aspects of the human do connect us all together as a species, there are certainly other parts of human perception, thinking, and remembering that are not universal and are not dependent upon culture. These things are dependent on the individual’s brain—its physicality, general health, electrochemistry, injury, etc. How I see the world could be radically different from all of the people sitting around me at this very moment, because our brains in some small or in some large way might generate a different perspective on the way we see and think about the world. These ontological questions are central to Dick’s fiction.

In this chapter, I will draw on Dick’s writing and interviews beyond his fiction. Although I am interested in the material determinants of Dick’s experience and its effect on his writing, my investigation is firmly rooted in literary history. I rely on Dick’s written accounts and interviews to delve into the meanings of his work and the contradictions of his own accounts. It is similar in kind to Marshall Suther’s significant book-length reading of Samuel Taylor Coleridge’s “Kubla Khan” that uses “its author’s words as the gloss” (Suther 286). Suther arrives at his reading through language and
literary history without any speculation on the “wiring” of Coleridge’s brain. I will make no claims about Dick’s brain circuitry, but I will, like Suther, draw on the author’s other writing to uncover new meanings behind his work. My specific interest, however, will be on Dick’s elaboration on his fictional and autobiographical meaning making vis-à-vis the human brain.

Eric Carl Link characterizes Dick as a “prolific, strange, unforgettable, and utterly unique American” (Link xi), which is a description that equally applies to his stories and novels. Douglas Mackey explicitly draws a connection between the writer and his works:

Philip K. Dick may well become one of those literary figures whose life is as interesting to commentators as his works. Certainly with five marriages and innumerable other romantic relationships, Dick’s life had more than its share of soap opera. Add to that the fire of a creative personality, the drugs and self-destructive tendencies, and the mystical religious experiences, and one has all the ingredients for a best-selling novel.

(Mackey 1)

In fact, Dick acknowledges that many of his later works are semi-autobiographical, and we have further evidence of this through interviews with the writer, his friends and family, and his own written journal, spanning some 8000 pages of handwritten notes, that he calls the Exegesis.

It seems that Dick the writer and Dick’s fiction are inseparable. Unlike analysis of many other science fiction writers, critical analyses of Dick’s writing often invoke his personal life and personality as necessary and essential to understanding his fiction. This
is, I believe, due to the efforts of canonization that took place following the writer’s premature death. Readers and critics connect Dick with the drug subculture through his strangely disorienting narratives and allegations of drug abuse—some promoted by Dick and some promoted by others, such as Harlan Ellison in his introduction of Dick’s “Faith of Our Fathers” in the groundbreaking Dangerous Visions collection. The other side of this fusion of writer and his works has to do with Dick’s essays and interviews (not to mention anecdotes from friends and admirers) that support the idea that Dick’s personal philosophy and thinking are the same as what representations his fiction contains. The culture surrounding Dick’s fiction since his death has further reinforced the inseparability of the writer and his fiction. Of course, not all critics approach Dick in this manner, but I have chosen to follow the writer-written connection, not because it is apparently popular, but instead, because I am curious about Dick’s brain and his emphasis on the brain’s role in notions of authenticity, identity, and ontology.

If we accept the premise that an acknowledgement of the inseparably close connection between author and fiction enriches our understanding of Dick’s fiction, then I believe a positive point of understanding of the author and his work comes from an important scene in his last novel, The Transmigration of Timothy Archer (1982). Following a discussion of that novel, I will then assume a circuitous course in this chapter, because like Dick’s own investigations in life and fiction, the journey is likely more important than the results. In fact, I begin at the end of his writing career before returning to Do Androids Dream of Electric Sheep? (1968) to locate the source of human authenticity: the brain. Of course, Dick was never this simplistic. Hence, I will
demonstrate how he problematizes this idea and what other ways this can inform our thinking about the human condition. Next, I discuss Dick’s *A Maze of Death* (1970) in terms of the simulation aspect of the brain to generate our experience of reality, and I explore how Dick implicitly questions this fundamental aspect of the human brain through technologically mediated group hallucinations. Then, I connect the brain’s ability at generating reality to the effects of drugs at altering our perception of the world and self in Dick’s near-future anti-drug novel, *A Scanner Darkly* (1977). This novel signals the beginning of my discussion of brain trauma and its subjective invisibility to the effected individual. Finally, I end the chapter by discussing *The Divine Invasion* (1981), *VALIS* (1981), and the *Exegesis* (2011) in terms of brain trauma and personal discovery/rediscovery.

*The Transmigration of Timothy Archer*

*The Transmigration of Timothy Archer* is a realistic novel that carries Dick’s theological and philosophical debates from his science fiction into the here-and-now. It begins on the day that John Lennon is shot, and Angel Archer, Bishop Archer's daughter-in-law, narrates from her perspective. The novel, largely told in flashback, shows the reader Angel’s experiences dealing with the deaths of those most close to her: first, her husband Jeff Archer, then, her best friend Kirsten Lundborg, and finally, Timothy
Archer. From these losses and especially that of the former Bishop Archer, Angel loses her humanity and becomes a machine: “The soul I lost during that week did not ever return; I am a machine now, years later” (Dick, *Transmigration* 785). The narrative, up to that point, weaves together Angel’s inner thoughts with the rigorous discussions she has with others, particularly on points of philosophy and religion. Of Dick’s works, *The Transmigration of Timothy Archer* is the most literary in terms of style and postmodern intertextuality, and it can also be said to be his most thorough exploration of the science fictional aspects of modern life (i.e., Angel’s transformation from human to machine—a theme Dick also explores in his February 1972 University of British Columbia, Vancouver speech, “The Android and the Human”). It is also Dick’s attempt at redemption for writing such fouled-up and negative “images of women in science fiction,” to borrow Joanna Russ’ term from her 1974 *Vertex* essay, “The Image of Women in Science Fiction” (which created quite a stir in the field with published, open letter responses by Poul Anderson and Philip K. Dick). Ultimately, Angel restores her humanity, or at least begins its process of restoration, by agreeing to look after Kirsten’s schizophrenic son Bill, who claims to share his brain with Tim Archer’s transmigrated soul, in exchange for a rare LP record from the New Age leader Edgar Barefoot. It is notable that Dick’s protagonists regularly face the possibility of either becoming or already being machines (without their awareness of this fact as in his 1969 short story, “The Electric Ant”). This uncertainty about one’s identity destabilizes any certainty some of his characters have in themselves much less in the world that they perceive. It is no wonder that in this realistic novel Dick extends an otherwise science fictional theme from
his other fiction into the real world as he had done in his “The Android and the Human” speech, which I will elaborate on later in this chapter.

The key to understanding Dick and in turn better understanding his writing comes from a passage in chapter nine after Timothy Archer informs Angel and Kirsten that he plans to resign as Bishop of the Episcopal Diocese of California, because he has lost faith in Christ following the discovery of the Zadokite Documents (a portion of what is popularly known as the Dead Sea Scrolls). These papers detail Christ-like teachings 200 years before Jesus Christ was born, which means that Jesus might have been merely repeating things that he had been taught rather than delivering the Gospel anew. This, of course, calls into question whether Christ was actually the Son of God. As a result, Timothy Archer cannot continue in his church duties with this crisis of faith, and he wants to communicate with his dead son, Jeff, to ask him if Jesus is Christ. Angel reflects:

How strange, I thought. To use his son—make calculated use of his dead son—to determine an historical issue. . . . The son, his son, my husband, subordinated to an intellectual matter—I could never, myself, view it that way. This amounts to a depersonalization of Jeff Archer; he is converted into an instrument, a device for learning; why, he is converted into a talking book! (Dick, Transmigration 729)

Thinking that Tim Archer was making her dead husband into “a talking book” leads to a chain of thoughts: books, knowledge, books as reality defining, Dante’s Commedia, Canto 33 of Paradiso: “I beheld leaves within the unfathomed blaze/Into one volume
bound by love, the same/That the universe holds scattered through its maze,” Platonist influence on the church: “God is the Book of the Universe,” and finally, Angel’s first reading of the *Commedia* during a booze-filled night nursing an infected tooth before a visit to the dentist’s office (Dick, *Transmigration* 729-731). This rich exploration of Angel’s interior thoughts and drives distinguish this novel from the writer’s others except perhaps Dick’s opus, *VALIS* (1981). Nevertheless, it is evident in the reading of this novel that Dick performs at his most elocutionary in this novel by developing a strong sense of interiority for the character of Angel Archer.

Angel’s interiority is mirrored in her realization that books are important to herself and Timothy Archer for understanding the world: “And I am not much different, I realized; I, who graduated from the English Department at U.C. Berkeley-Tim and I are of a kind” (Dick, *Transmigration* 730). Except the difference between them are in how they use books for understanding. Tim Archer focuses on books as the source of all knowledge, as a database of sorts, while Angel lives through books, experiences others’ experiences. Tim Archer finds knowledge in books to solve his philosophical/religious puzzles while Angel finds access to experiences to be vicariously lived through the act of reading (activation of mirror neurons, so to speak). Certainly, Angel learns much from books, but she sees education as not always leading to success, such as when she and Tim discuss Bill’s schizophrenia in chapter eight, she says, “I'm not sure an education is an advantage. All I do is work in a record store. And I wasn't hired for that because of anything I learned in the English Department at Cal [Berkeley]” (Dick, *Transmigration* 720). Nevertheless, Angel’s expansive knowledge, which obviously mirrors that of Dick,
provides much of the dialogue and personal exploration throughout the novel. Her stream-of-consciousness reasoning and informed dialog propel the novel along.

What this all leads to is Angel’s realization that books inform, if not in fact generate, her perception of reality. Certainly, this is what culture does for all of us—defining the parameters of discourse or paradigm, depending on your particular point of view. Angel’s comprehension, however, brings together Timothy Archer’s fondness for books with her own. Thus, she reasons:

Which means that I can say with all truthfulness that for me the moment of greatest understanding in which I knew spiritual reality at last came in connection with emergency root-canal irrigation, two hours in the dentist chair. And twelve hours drinking bourbon—bad bourbon at that—and simply reading Dante without listening to the stereo or eating—there was no way I could eat—and suffering, and it was all worth it; I will never forget it. I am no different, then, from Timothy Archer. To me, too, books are real and alive; the voices of human beings issue forth from them and compel my assent, the way God compels our assent to world, as Tim said. When you have been in that much distress, you are not going to forget what you did and saw and thought and read that night; I did nothing, saw nothing, thought nothing; I read and I remember; I did not read Howard the Duck or The Fabulous Furry Freak Brothers or Snatch Comix that night; I read Dante's Commedia, from Inferno through Purgatorio, until at last I arrived in the three colored rings of light . . . and the time was nine
A.M. and I could get into my fucking car and shoot out into traffic and Dr. Davidson's office, crying and cursing the whole way, with no breakfast, not even coffee, and stinking of sweat and bourbon, a sorry mess indeed, much gaped at by the dentist's receptionist. (Dick, *Transmigration* 731)

From a literary perspective, Angel notes that she did not enjoy popular entertainments during her bourbon-filled evening. Instead, she read Dante’s *Commedia* for the first time. More importantly, she “did nothing, saw nothing, thought nothing,” except for the thing itself: “I read and I remember.” She mixes the high culture of Dante’s masterwork with the visceral pain of her infected tooth and the need to drink bourbon to deaden the pain. After completing the *Commedia*, reality slips back in as she goes to the dentist as “a sorry mess indeed.” Dick’s protagonists are usually cultured despite generally being store clerks, repairmen, or technicians. Angel Archer is no different in this regard. She has the English degree from Berkeley, but she can only get a job managing a record store—a site itself where high and low culture meet. The liminality of the protagonist occupying two worlds reflects Dick’s own liminality—a predominantly ghettoized science fiction writer who also enjoys fine opera, German culture, and philosophy, among others. Continuing, Angel declares:

So for me in a certain unusual way—for certain unusual reasons—books and reality are fused; they join through one incident, one night of my life: my intellectual life and my practical life came together—nothing is more real than a badly infected tooth—and having done so they never completely came apart again. If I believed in God, I would say that he
showed me something that night; he showed me the totality: pain, physical
pain, drop by drop, and then, this being his dreadful grace, there came
understanding . . . and what did I understand? That it is all real; the
abscessed tooth and the root-canal irrigation, and, no less and no more:

“Three circles from its substance now appeared,

Of three colors, and each an equal whole.” (Dick, 

*Transmigration* 731-732)

Dick establishes reality in one of its most harshest images: an infected tooth. Angel’s
suffering from her tooth binds to her reading of Dante’s *Commedia* as something real
itself. The tooth and the book are both made real to her through her experience of each,
together. She identifies her “intellectual life” and “practical life” as being previously
separate things, but what she later calls, “The pain and the crying and the sweating and
stinking and cheap Jim Beam Bourbon was my *Inferno* and it wasn’t imaginary; what I
read bore the label “Paradiso” and *Paradiso* it was” (Dick, *Transmigration* 732). The
intertextuality of daily experience/popular culture and intellectual experience/high culture
collapses into a unified experience for Angel during the pain-fueled night.

How this enhances our understanding of Dick’s work is the collapse of cultures
and experience into one fluid field of conscious awareness comes from this significant
passage from Angel’s interior thoughts:

I read the *Commedia* through to the end that night and then shot up the
street for Dr. Davidson's office, and was never the same again. I never
changed back into what I had previously been. So books are real to me,
too; they link me not just with other minds but with the *vision* of other minds, what those minds understand and see. I see their worlds as well as I see my own. (Dick, *Transmigration* 732)

Angel’s experience of collapsing culture into her ever-present now yields a new understanding for her about the role of books to her life. Before, she viewed books within the domain of her “intellectual life,” but after this painful experience, she now states, “books are real to me.” Furthermore, she finds depth within the books that connect back to the writer: “they link me not just with other minds but with the *vision* of other minds, what those minds understand and see.” The reader connects to the writer via the medium of the book. The book acts as a method of transmission as well as storage device for the “mind” or could we also say “brain” of the originating writer? Could this be the activation of mirror neurons in the brain of the receiving reader’s brain through the act of reading? On the other hand, could it be kind of imaginative extrapolation from the text about what the writer might have thought or seen while writing the book? In either case, it points toward one way of thinking about Dick’s own writing—an embedded clue that readers can employ in their enjoyment and experience of Dick’s writing. We can consider the novel as a snapshot of the writer’s thinking at a particular point in time. However, the novel cannot capture the author’s thinking like a camera snapshot, because books take time to write, they are revised, they take time for publication, etc. At best, the novel is a trace of the writer, generating, in this case, science fictional stories that are themselves rooted in Dick’s own present. Obviously, we find our own interpretations of the novel, but in doing so, we might locate or chance upon a trace of the writer’s thinking that
enhances our reading of the story. Furthermore, the trace of “vision” can also tell us more about the writer, which can be a different kind of enjoyment depending on the inclination of the reader. The things that we leave behind are essentially all that remain as a record of ourselves. Our brain, fundamentally, shapes and colors how we put down on the page what it is we feel, think, and imagine. Therefore, the trace of Dick in his fiction is also a trace of Dick’s brain and the way he saw the world through its ontologically creating lens.

Briefly, I would like to say that I do not deny the role that culture plays in the creation of texts. In this chapter, I intend only to enhance our reading of texts by attempting to locate and follow the trace of the writer’s brain as it is embedded in the fictional text itself. The writer’s experience of culture and life will have its own effect on the development of the individual’s brain, among many other concerns such as trauma, health, hereditary inheritance, etc., and I certainly do not mean to curtail or lessen the importance of culture to understanding or commenting on a given text. Instead, I find the neuroscientific topics of theory of mind, mirror neurons, and neurologically related health problems to be informative aspects of a broader interpretation of texts. These tools can add to our understanding of fiction in general, but they have specific importance for Dick’s life and work.

*Do Androids Dream of Electric Sheep?*
"Do Androids Dream of Electric Sheep?" (completed 1966, published 1968) explores the relationships between humanity and artificial beings by questioning what is it that distinguishes human beings and can some human beings be more machine-like than our artificial constructions? Dick accomplishes this by, as Lejla Kucukalic remarks, “The narrative of Do Androids repeatedly crosses the line between humans and androids, between artificial and organic, and between coldness and empathy, thus addressing moral, philosophical, and scientific issues of human life when closely intertwined with machines and intelligent agents” (Kucukalic xii-xiii). The story is set on a future Earth following a terrible, nuclear world war, which has led to a massive diaspora away from the lingering contamination of Earth. For those human beings who leave, they can obtain android slaves to help with their difficult, frontier lives. Of course, these artificial beings, lacking anything like Asimov’s Three Laws of Robotics discussed in the previous chapter, do not enjoy being slaves and some escape making their way back to Earth to hide. There are two intertwined narratives in the novel that take place over a single day. The primary narrative follows the android (“andy”) bounty hunter, Rick Deckard, who attempts the retirement of six escaped andys from Mars. The other narrative follows the artificial animal repairman John Isidore, who Dick terms a “special” or someone whose brain has been damaged by the radioactive dust in the Earth’s atmosphere. Isidore encounters and harbors the escaped andys. The difference between human beings and andys is that the andys do not feel empathy for other beings. Due to a lack of empathy, the andys in the story mutilate a tiny spider and they cannot experience the shared
hallucination of religious epiphany of Mercerism through the so-called “Empathy Box.” Dick shows through the novel that a human can become machine-like, as happens to Angel Archer in the later novel *The Transmigration of Timothy Archer*, while the human spectrum accommodates marginalized identities such as those of “specials” like John Isidore.

Despite his possible mental handicaps due to the effects of the radioactive dust—the kippleization (Dick’s term, meaning entropic degradation) of his brain—John Isidore demonstrates profound insight into the two cultural points of opposition in the post-apocalyptic world. He considers to himself: “Our minds, Isidore decided. They're fighting for control of our psychic selves; the empathy box on one hand, Buster's guffaws and off-the-cuff jibes on the other. I'll have to tell Hannibal Sloat that, he decided. Ask him if it's true; he'll know” (Dick, *Do Androids 488*). The two forces fighting for “our minds,” are Mercerism (think: mercy and empathy) and Buster Friendly (think: endless talking head chatter, conversations about nothing, revealed to be an android who exposes Wilbur Mercer as a hoax). It is in this observation by the “chickenhead” John Isidore that opens up the major debate of the novel—how the brain (Dick generally employs mind and brain interchangeably) is the arbiter of humanity.

Near the beginning of the novel, as Isidore is preparing to leave for work, he takes the time for empathic fusion with other Mercer believers through the cathode ray tube and handles of the “black empathy box” (Dick, *Do Androids 448*). The empathy box recreates Wilbur Mercer’s climb up a steep hill while unseen “killers” throw rocks at him. The killers are said to be those in power who destroyed a mutation within Mercer’s
brain that gave him the power to return the dead to life: “Without his parents' consent they--the killers--had bombarded the unique nodule which had formed in his brain, had attacked it with radioactive cobalt, and this had plunged him into a different world, one whose existence he had never suspected. It had been a pit of corpses and dead bones and he had struggled for years to get up from it” (Dick, Do Androids 450). Like Isidore, Mercer was a special—someone whose condition of living was altered by the effects of lingering radioactivity after the last world war (a theme also explored in Dick’s 1965 novel Dr. Bloodmoney, or How We Got Along After the Bomb—c.f., phocomelus Hoppy Harrington’s telekinesis and symbiotic homunculus Bill’s telepathy). Dick implies that Mercer and his miraculous powers threatened the hegemony of the Killers. Through the interface, the individual using the empathy box feels Mercer’s feelings and the feelings of all those other people who are simultaneously interfaced through the empathy box: “He experienced them, the others, incorporated the babble of their thoughts, heard in his own brain the noise of their many individual existences. They—and he—cared about one thing; this fusion of their mentalities oriented their attention on the hill, the climb, the need to ascend” (Dick, Do Androids 449). Isidore, about to go to work, halts to reenter his apartment and take part in the empathic ritual of sharing the emotional experience with Mercer and other followers of Mercer. This ritual of fusion connects his brain to the brains of others in a primal way via emotions and feelings, shared as a community of minds.

Deckard’s morning ritual is far different from that of Isidore who seeks out the minds of others. Instead, Deckard and his wife rely on a Penfield mood organ to generate
via a dialed setting any kind of emotion or overall feeling that one desires. Like the pharmacological solutions of today, the mood organ creates the mood desired by the individual. Instead of a community of minds sharing the same, reproduced ad infinitum empathic response to Mercer’s climb and injury, the mood organ creates a mood within the individual brain. However, Deckard and his wife Iran fight after waking up, because Iran does not want to use the organ at all:

“Dial 888,” Rick said as the set warmed. “The desire to watch TV, no matter what's on it.”

“I don't feel like dialing anything at all now,” Iran said.

“Then dial 3,” he said.

“I can't dial a setting that stimulates my cerebral cortex into wanting to dial! If I don't want to dial, I don't want to dial that most of all, because then I will want to dial, and wanting to dial is right now the most alien drive I can imagine; I just want to sit here on the bed and stare at the floor.” Her voice had become sharp with overtones of bleakness as her soul congealed and she ceased to move, as the instinctive, omnipresent film of great weight, of an almost absolute inertia, settled over her. (Dick, *Do Androids 437*)

Unlike Isidore, who relies on shared experience to make it through the day, Deckard experiences isolation via the white noise of the Buster Friendly television program and his specially selected mood schedule. Apparently, he lacks the impetus within himself to experience a mood or emotional connection on his own. Everything for Deckard is
external—even his malfunctioning electronic sheep (he cannot afford a real animal to care for as his other apartment neighbors can). He seems to want to feel something for someone or something else, but he is ill equipped to do so and his flow of capital as a bounty hunter is too limited to give him access to the socioeconomic level to enjoy caring for a live animal.

The androids or andys that Deckard pursues in the novel appear not to care about animals in the same way that a human being, such as Deckard might. Of course, Deckard’s desire to kill andys in exchange for money to purchase a live animal is a terribly conflicted issue for the bounty hunter as he learns how much andys are capable of, such as Luba Luft’s beautiful operatic performance. He also feels conflicted about his relationship to his depressed wife who does not seem to care about him or his work. For example, when Deckard calls home to tell Iran the “good” news that he had “retired” or killed one of the new Nexus-6 andys, which meant he could earn them a substantial amount of money to afford a real live animal, she apparently does not listen to him and he slams the phone down. He then thinks, “Broodingly, he leaned down, gathered together on the car floor his crumpled papers, including the info on Luba Luft. No support, he informed himself. Most androids I've known have more vitality and desire to live than my wife. She has nothing to give me” (Dick, *Do Androids* 502-503). In the next passage, he then thinks of Rachael Rosen, a Nexus-6 android that he tested at the Rosen headquarters: “That made him think of Rachael Rosen again. Her advice to me as to the Nexus-6 mentality, he realized, turned out to be correct. Assuming she doesn't want any of the bounty money, maybe I could use her” (Dick, *Do Androids* 503). Deckard apparently
thinks of others in terms of use value—his wife can give him nothing and he only thinks of Rachael in terms of “I could use her.” This kind of selfishness is one form of the mechanization of human beings that Dick explores throughout his work, because it is not really selfishness per se but a reduction of the self to following a single vision, a single programmed instruction without seeing the bigger picture of what following that program actually means to others or yourself.

Unlike Asimov’s robots, which adhere to his Three Laws of Robotics, Dick’s Nexus-6 androids have no such compulsion built into their brains. After one of the escaped andys shot the senior bounty hunter named Holden, Deckard learns that the Nexus-6 androids have a far superior brain to previously made androids:

“It must have been one of those new, extra-clever andys the Rosen Association is turning out,” Miss Marsten said. “Did you read over the company's brochure and the spec sheets? The Nexus-6 brain unit they're using now is capable of selecting within a field of two trillion constituents, or ten million separate neural pathways.” (Dick, Do Androids 453-454)

This apparent complexity of artificial cognitive matter in the Nexus-6 brain enables a great deal of intelligence:

. . . the Nexus-6 did have two trillion constituents plus a choice within a range of ten million possible combinations of cerebral activity. In .45 of a second an android equipped with such a brain structure could assume any one of fourteen basic reaction-postures. Well, no intelligence test would trap such an andy. But then, intelligence tests hadn't trapped an andy in
years, not since the primordial, crude varieties of the '70s. (Dick, *Do Androids 455*)

Intelligence is not the key to understanding the difference between human beings and androids. Dick locates the difference in the ability to experience empathy for others. He sees this as lacking in the artificiality of the individual android:

The Nexus-6 android types, Rick reflected, surpassed several classes of human specials in terms of intelligence. In other words, androids equipped with the new Nexus-6 brain unit had from a sort of rough, pragmatic, no-nonsense standpoint evolved beyond a major—but inferior—segment of mankind. For better or worse. The servant had in some cases become more adroit than its master. But new scales of achievement, for example the Voigt-Kampff Empathy Test, had emerged as criteria by which to judge. An android, no matter how gifted as to pure intellectual capacity, could make no sense out of the fusion which took place routinely among the followers of Mercerism—an experience which he, and virtually everyone else, including subnormal chickenheads, managed with no difficulty. (Dick, *Do Androids 455*)

The androids with the latest, advanced artificial brains could certainly run circles around many human beings in terms of raw intelligence. So-called chickenheads like John Isidore might not out-think a Nexus-6 android, but he could do one thing that an android could never do: merge with other followers of Mercerism and experience the emotional sensation of empathy. However, empathy only goes in one direction: toward other
organic beings such as humans and animals. The androids apparently do not warrant the same kind of empathy despite their own restlessness and anger toward their artificiality as servants to unthankful human masters. Furthermore, even if an android’s human master were gracious to the android, should the android feel any less oppressed by their lack of self-determination as a thinking, reasoning being?

Deckard employs Mercerism as a means to rationalize his killing of androids. He considers them the killers and “solitary predator[s]” (Dick, Do Androids 456), and according to Mercerism, only the killers deserve to die:

Rick liked to think of them that way; it made his job palatable. In retiring—i.e. killing—an andy he did not violate the rule of life laid down by Mercer. You shall kill only the killers, Mercer had told them the year empathy boxes first appeared on Earth. And in Mercerism, as it evolved into a full theology, the concept of The Killers had grown insidiously. In Mercerism, an absolute evil plucked at the threadbare cloak of the tottering, ascending old man, but it was never clear who or what this evil presence was. A Mercerite sensed evil without understanding it. Put another way, a Mercerite was free to locate the nebulous presence of The Killers wherever he saw fit. For Rick Deckard an escaped humanoid robot, which had killed its master, which had been equipped with intelligence greater than that of many human beings, which had no regard for animals, which possessed no ability to feel emphatic joy for another life form's
success or grief at its defeat — that, for him, epitomized The Killers.

(Dick, Do Androids 456)

What is further troubling about Deckard’s rationalization is how much androids are like human beings. On a physical level, it appears that androids are largely indistinguishable from human beings. For example, when Deckard learns that Rachael Rosen is an android, he at first does not believe it and exclaims, “I want a bone marrow analysis made of you” (Dick, Do Androids 470). This would seem to indicate that the Nexus-6 brain is not electro-mechanical like Asimov’s positronic brain. However, Dick’s descriptions of the murdered androids are ambiguous. For example, Dick describes Deckard’s first kill of the day:

As the android's hands sank into his throat Rick fired his regulation issue old-style pistol from its shoulder holster; the .38 magnum slug struck the android in the head and its brain box burst. The Nexus-6 unit which operated it blew into pieces, a raging, mad wind which carried throughout the car. Bits of it, like the radioactive dust itself, whirled down on Rick. The retired remains of the android rocked back, collided with the car door, bounced off and struck heavily against him; he found himself struggling to shove the twitching remnants of the android away. (Dick, Do Androids 501)

Therefore, on the one hand, a bone marrow test is necessary to absolutely identify an android, but on the other hand, they have specific parts including “the brain box” and the “Nexus-6 unit.” Perhaps Deckard avoids any potential confusion about the
physicality/organicity of the androids, because he is unwilling to acknowledge human-android similarities. On a social level, the escaped androids work together to protect themselves. In fact, they even form relationships together such as Roy and Irmgard Baty. In addition, Pris is happy when her friends Roy and Irmgard find her at John Isidore’s, but when Pris learns that their friends, including Polokov and Luba, were killed, “The joy which had appeared on Pris's face at seeing her friends at once melted away” (Dick, *Do Androids* 544). She seems to feel loss for her friends, but this is not exactly the same as empathy. However, Pris keeps calling Isidore a “chickenhead,” and Irmgard gives “Isidore a look of compassion” and tells Pris, “Don’t call him that, Pris. . . . Think what he could call you” (Dick, *Do Androids* 547). This could be Nexus-6 pragmatism at play, but it also certainly clouds the sharp division supported by Deckard’s beliefs and those of the authorities with the Voigt-Kampff Empathy Test.

A key issue in Dick’s fictions about persons with non-normative brains (e.g., schizophrenia repeatedly occurs) is that the writer does not reconcile non-normative experience with the normative experience of most of humanity. In the case of *Do Androids*, we could identify the andys’ lack of empathy as indicative of an autism spectrum disorder (ASD) diagnosis. However, Dick far less frequently mentions “autism” in his fiction than schizophrenia or hebephrenia. In the case of the affectless individual, autism (previously termed Asperger’s syndrome) seems an accurate diagnosis. Two of the key symptoms in the broad range of the autism spectrum are having a lack of empathy for others and treating others as objects. Yet, these people are still human beings, but if there were a real Voigt-Kampff Empathy Test, they would likely fail it. Would this mark
them for “retirement?” The point here is that the human animal and the human experience generated by the brain while largely universal still accommodates different types of experiences and modes of thought that might not be considered “normal.” Nevertheless, those persons who might not be considered normal are human beings, too, and no test should exclude them from being recognized as human with unique experiences of the world that are dependent upon their brain structure and chemistry. There is something to be gained here from thinking through Dick’s andys and their relationship to humanity. Deckard’s pursuit of them for so-called retirement is exactly like what the andys themselves are supposed to hold: lack of empathy and treating others as objects. Deckard lacks any empathy for the andys’ situation and he certainly views them as objects deserving destruction. However, Deckard begins to acquire some empathy for them—especially after listening to Luba Luft’s opera performance and after having sex with Rachael Rosen before the final confrontation with Pris (identical in appearance to Rachael) and the Batys. The otherness of the andys reflects the perceived otherness of persons with non-normative brains. It is my aim in this section to elevate the discourse of our embrace of persons with autism and other brain altering afflictions as part of the human spectrum with their own experiences hopefully to share. Dick’s *Do Androids* can point us in the direction of better understanding and embrace of others—a shift toward deeper empathy of others instead of reactions ranging from sympathy to aversion.

*A Maze of Death*
A Maze of Death (completed 1968, published 1970) is a proto-cyberpunk novel that combines religious/philosophical issues with technomediated experiences of the world. Unlike Do Androids Dream of Electric Sheep?, it positions technology as the mediator of human perception and memory rather than juxtaposing human and android experiences separately. It presupposes a symbiosis of humanity and technology via Gnostic faith in the Intercessor on two levels: the religion within the simulation and the technology that makes the simulation possible. Whereas Do Androids connects Dick’s opus to the past with a new take on artificial life, A Maze of Death anticipates the next phase of Dick’s fiction as well as the future of science fiction becoming more indebted to digital technologies and the role of the interface.

This novel is about a group of people who arrive on the mysterious planet of Delmak-O independently. Mysterious men in leather suits kidnap and murder these explorers, who have lost their orders about what to do on Delmak-O due to an error while attempting to play the tape. The few survivors attempt to find out who or what is killing their comrades, but as they near the truth about this fantastic world, it destabilizes to the point of self-destruction. Then, the narrative reveals that the explorers on Delmak-O are actually aboard a disabled spacecraft orbiting a star. Without any hope of escape, they use their craft’s on-board computer to generate simulated worlds and adventures that they experience as shared, interactive hallucinations directly in their brain. Not one to leave the conclusion with a well-explained ending, Dick ends the novel with Seth Morley
literally walking off the spacecraft into space with the supernatural Intercessor, a character from the computer-generated religion from their previously simulated adventure, provided he is made into a plant to grow in the ground and forever gazing at the sun while his wife Mary forgets him and falls back into the simulated world for a new life without him.

*A Maze of Death* is a prescient work of the computer-mediated worlds of cyberpunk created in the 1980s. It also predates proto-cyberpunk stories that focus on brains connected to computers, such as James Tiptree, Jr.’s 1973 short story “The Girl Who Was Plugged In” and Vernor Vinge’s 1981 novella “True Names.” However, the importance of these kinds of stories is that while they appear to shift the focus towards the computer simulation technologies and the brain-interface technologies, they actually reinforce the fact that experience—authentic or simulated—still resides within the brain of the experiencing agent/user/person. While *Do Androids Dream of Electric Sheep?* destabilizes authenticity through artifactual simulacra of the human being, *A Maze of Death* destabilizes supposedly authentic perceptions through brains connected to computer generated, shared hallucinations (something that will be explored in further depth in the following chapter on the work of William Gibson).

Concern for brain health is a significant aspect of the brain’s ability to generate reality, because poor health can cause problems for one’s experience of reality. A clear example comes from Dr. Milton Babble, a hypochondriac who also serves as the Delmak-O group’s medical doctor. Babble, while obviously concerned about the disappearances and death around him, is also concerned a great deal of the time about his
brain and the brains of others. For example, after Seth Morley arrives and greets the other group members,

Dr. Milton Babble examined his wristwatch and thought, It’s four-thirty and I’m tired. Low blood sugar, he decided. It’s always a sign of that when you get tired in the late afternoon. I should try to get some glucose into myself before it becomes serious. The brain, he thought, simply can’t function without adequate blood sugar. Maybe, he thought, I’m becoming diabetic. That could be; I have the right genetic history.

“What’s the matter, Babble?” Maggie Walsh said . . . “Sick again?” She winked at him, which at once made him furious. “What’s it now? Are you wasting away, like Camille, from T.B.?”

“Hypoglycemia,” he said, studying his hand as it rested on the arm of his chair. “Plus a certain amount of extra-pyramidal neuromuscular activity. Motor restlessness of the dystonic type. Very uncomfortable.” He hated the sensation: his thumb twitching in the familiar pellet-rolling motion, his tongue curling up within his mouth, dryness in his throat—dear God, he thought, is there no end of this?

Anyhow the herpes simplex keratitis which had afflicted him during the previous week had abated. He was glad of that (thank God).

(Dick, Maze 38-39)

There are several things going on in this passage. First, Babble immediately considers a more serious diagnosis for his tiredness (of mind). He tells the mocking Maggie Walsh
that it is hypoglycemia, or a drop in glucose in the blood. This can cause a number of problems including tiredness and a reduced mental acuity. He experiences a number of other ailments such as his twitching thumb, tongue curling, and throat dryness. They are visceral and apparently real. However, we will see later that these are part of the simulation fed into his brain to experience as if they were real. Of course, the question then becomes: if someone experiences the apparently real in its totality as real, is it real? How can we distinguish an authentically real experience from an inauthentically real simulated experience from within the brain of the experiencing agent? Those ticks and pains experienced by Babble are as real as anything he has ever experienced is. It seems though that Dick comes down, at least temporarily, on one side of this argument by giving Babble herpes simplex keratitis or herpes of the eyes. This viral affliction can cause a number of vision problems. Considering the proverb, “the eyes are the window to the soul,” Babble’s herpes simplex keratitis closes off access to his soul via the inflamed cornea and it also closes off his soul, his inner experiencing self if you will, from the external world. Revealing this character to have a disease that impairs his visual experience of the world, Dick points toward the not-yet-revealed nature of the reality that the Delmak-O group experiences.

The uniqueness of Babble’s and the others’ brains, compared to one another, might yield an explanation for why each person sees certain fantastic elements of the Delmak-O environment (e.g., buildings appearing in different places when viewed from the same perspectival point). While each is connected to their spacecraft’s computer, the T.E.N.C.H. 889B, via “the polyencephalic cylinder” attached to each person’s head while
they each rest in an assigned cubicle, their minds fuse into what Dick calls the polyencephalic mind, a fusion of minds facilitated by the computer and its simulated world (Lana and Andy Wachowski expand on a similar concept in the 1999 film *The Matrix*). In the penultimate chapter, we learn that the simulation system was originally a way to pass the time during their voyage, but after a star’s gravity traps their spacecraft, they turned it toward another purpose:

> The polyencephalic mind, he thought. Originally an escape toy to amuse us during our twenty-year voyage. But the voyage had not lasted twenty years; it would continue until they died, one by one, in some indefinably remote epoch, which none of them could imagine. And for good reason: everything, especially the infinitude of the voyage, had become an endless nightmare to them. (Dick, *Maze* 163)

The crewmembers experience the “endless nightmare” within the reality of the polyencephalic mind of the simulation and within the reality of the stranded spacecraft, forever orbiting a dead star. The simulation robs them of absolute death—only simulated death—hence a maze of death that continues without end, restarted with each run of the simulation. The brain’s experience of reality made slave to video game-like death repeated *ad infinitum*.

A final point about *A Maze of Death* concerns the importance of the pineal gland to communicating with God within the simulation. We learn at the end of the novel that the trapped astronauts feed all of the world’s religions into their computer to assist it in developing an authentic and self-consistent environment for them to experience together.
Religion, in this case, is what adds the element of authenticity to the simulated experience manufactured by the onboard computer:

What did we make up? he asked himself blearily. The entire theology, he realized. They had fed into the ship’s computer all the data they had in their possession concerning advanced religions. Into T.E.N.C.H. 889B had gone elaborated information dealing with Judaism, Christianity, Mohammedanism, Zoroastrianism, Tibetan Buddhism . . . a complex mass, out of which T.E.N.C.H. 889B was to distill a composite religion, a synthesis of every factor involved. We made it up, Seth Morley thought, bewildered; memory of Specktowsky’s Book still filled his mind. The Intercessor, the Mentufacturer, the Walker-on-Earth—even the ferocity of the Form Destroyer. Distillate of man’s total experience with God—a tremendous logical system, a comforting web deduced by the computer from the postulates given it—in particular the postulate that God existed. (Dick, Maze 162)

Therefore, it follows in the novel that the first postulate is that God exists, and from that, the rest of the simulated experience follows. Unfortunately, the psychological reality of slow death in deep space pervades their polyencephalitic simulation. Within the breadth of their computer-generated experience and its ur-religion, Dick configures the human pineal gland’s importance in two passages of the novel. The first is in the opening paragraphs when Ben Tallchief receives his reassignment orders to go to Delmak-O:
His job, as always, bored him. So he had during the previous week gone to the ship’s transmitter and attached conduits to the permanent electrodes extending from his pineal gland. The conduits had carried his prayer to the transmitter, and from there the prayer had gone into the nearest relay network; his prayer, during these days, had bounced throughout the galaxy, winding up—he hoped—at one of the god-worlds.

His prayer had been simple. “This damn inventory-control job bores me,” he had prayed. “Routine work—this ship is too large and in addition it’s overstuffed. I’m a useless standby module. Could you help me find something more creative and stimulating?” He had addressed the prayer, as a matter of course, to the Intercessor. Had it failed he would have presently readdressed the prayer, this time to the Mentufacturer.

But the prayer had not failed.

“Mr. Tallchief,” his supervisor said, entering Ben’s work cubicle. “You’re being transferred. How about that?”

“I’ll transmit a thank you prayer,” Ben said, and felt good inside. It always felt good when one’s prayers were listened to and answered.

“When do I transfer? Soon?” He had never concealed his dissatisfaction from his supervisor; there was now even less reason to do so. (Dick, Maze 7)

We learn from this scene that people in this simulated world have electrodes connecting their pineal gland for the purposes of communicating with their gods via a
communications network that reaches into space. In the second appearance, the group lacks communication capabilities and therefore no way to send a prayer for help or guidance. Maggie Walsh offers, “What we must do . . . is to prepare a joint prayer. We can probably get through on pineal gland emanation, if we make it short” (Dick, Maze 47). Thus, the pineal gland, alone, might reach a nearby deity through an emanation. This is an interesting word choice on Dick’s part, because the emanation is likely an issuance of prayer, going forth from the body via the pineal gland, rather than the pineal gland being a manifestation of God (in the religious/mystical form of the definition).

We know that the pineal gland is a tiny pinecone-shaped feature deep within the brain that is part of the endocrine system. The pineal gland regulates our sleep cycle by producing melatonin. Its purpose within the brain is a relatively recent discovery. In addition to his philosophical and mathematical work, Descartes was also heavily interested in neurological anatomy. This attention informs his observations and conclusions. Among other places, such as Treatise of Man (1662), Descartes wrote about the pineal gland in a letter dated 29 January 1640 to Lazare Meyssonnier:

As a beginning, I will answer the question you asked me about the function of the little gland called conarion [Descartes’ term for the pineal gland]. My view is that this gland is the principal seat of the soul, and the place in which all our thoughts are formed. The reason I believe this is that I cannot find any part of the brain, except this, which is not double. Since we see only one thing with two eyes, and hear only one voice with two ears, and in short never have more than one thought at a time, it must
necessarily be the case that the impressions which enter by the two eyes or by the two ears, and so on, unite with each other in some part of the body before being considered by the soul. Now it is impossible to find any such place in the whole head except this gland; moreover it is situated in the most suitable possible place for this purpose, in the middle of all the concavities; and it is supported and surrounded by the little branches of the carotid arteries which bring the spirits into the brain.” (Descartes, “To Meyssonier, 29 January 1640” 143)

According to Gert-Jan Lokhorst, Descartes considered the pineal gland, “as the principal seat of the soul and the place in which all our thoughts are formed” (Lokhorst par. 1). The pineal gland represented the unity of thought and soul that Descartes sought. What influence Descartes’ thoughts on the pineal gland had on Dick is unknown, but it is worth raising as a point of contact, because like Dick, Descartes wrote in his Treatise of Man about human beings by imagining creatures like us, but mechanical (and made by God):

These men will be composed, as we are, of a soul and a body; and I must first separately describe for you the body; then, also separately, the soul; and finally I must show you how these two natures would have to be joined and united to constitute men resembling us.

I assume their body to be but a statue, an earthen machine formed intentionally by God to be as much as possible like us. Thus not only does He give it externally the shapes and colors of all the parts of our bodies; He also places inside it all the pieces required to make it walk, eat,
breathe, and imitate whichever of our own functions can be imagined to proceed from mere matter and to depend entirely on the arrangement of our organs.

We see clocks, artificial fountains, mills, and similar machines which, though made entirely by man, lack not the power to move of themselves, in various ways. And I think you will agree that the present machine could have even more sorts of movements than I have imagined and more ingenuity than I have assigned, for our supposition is that it was created by God. (Descartes, Treatise of Man 1-4)

Descartes’ man-machines clearly evoke a sense of what Dick creates as androids in the previously discussed Do Androids Dream of Electric Sheep? It would seem that Dick, like Descartes, sought a foundation for reality. For both writers, that foundation was religion of one sort or another. Do Androids props up Deckard with Mercerism as A Maze of Death generates an entirely new religion within the memory banks of a computer and a shared hallucination between the Persus 9’s crewmembers. For Descartes, the pineal gland serves an important function for connecting the body’s senses to the perceiving soul, and for Dick, the pineal gland in A Maze of Death provides a way to access the network of religious deities, including the Intercessor invented by the T.E.N.C.H. computer. These correspondences between the two writers seem difficult to ignore, but it is unknown what influence if any Descartes’ writing had on Dick. Nevertheless, Dick’s incorporation of the pineal gland, despite the scientific inaccuracy of his employment of it in the religious simulation on Delmak-O, serves an important point about the
reinvention of the human, to some extent, through the shared experience of interactive avatars inhabited by the Persus 9’s crew. More importantly, this employment of artificial people (the computer generated avatars inhabited by the real people aboard the Persus 9), points the way to Dick’s thinking in “The Android and the Human” speech.

Descartes imagines the artificial men in *Treatise of Man* in the same way that Norbert Weiner, one of the founders of the science of cybernetics, thought about artificial constructs: as models for the human being. Weiner states in *The Human Use of Human Beings*, “It is my thesis that the physical functioning of the living individual and the operation of some of the newer communication machines are precisely parallel in their analogous attempts to control entropy through feedback” (Weiner 26). Hence, the analogous connection between machines and human beings means that we can learn about the human system by observing our technological constructs. This correspondence also applies specifically to feedback-based machines and the human brain: “Thus the nervous system and the automatic machine are fundamentally alike in that they are devices which make decisions on the basis of decisions they have made in the past” (Wiener 33). Furthermore, Wiener sees machines—simple and complex—as the basis for models of the human system including that of the brain. From those modeled building blocks, he reasons, we can learn more about how the human being operates as a biological machine. Dick wants to turn this upside down, as he argues in “The Android and the Human:”

Cybernetics, a valuable recent scientific discipline, articulated by the late Norbert Wiener, saw valid comparisons between the behavior of
machines and humans—with the view that a study of machines would yield valuable insights into the nature of our own behavior. By studying what goes wrong with a machine—for example, when two mutually exclusive tropisms function simultaneously in one of Grey Walter's synthetic turtles, producing fascinatingly intricate behavior in the befuddled turtles—one learns, perhaps, a new, more fruitful insight into what [in] humans was previously called "neurotic" behavior. But suppose the use of this analogy is turned the other way. Suppose—and I don't believe Wiener anticipated this—suppose a study of ourselves, our own nature, enables us to gain insight into the now extraordinary complex functioning and malfunctioning of mechanical and electronic constructs? In other words—and this is what I wish to stress in what I am saying here—it is now possible that we can learn about the artificial external environment around us, how it behaves, why, what it is up to, by analogizing from what we know about ourselves.

Machines are becoming more human, so to speak—at least in the sense that, as Wiener indicated, some meaningful comparison exists between human and mechanical behavior. But is it ourselves that we know first and foremost? Rather than learning about ourselves by studying our constructs, perhaps we should make the attempt to comprehend what our constructs are up to by looking into what we ourselves are up to. (Dick, "The Android and the Human" 183-184)
Breaking through what Bruce Mazlish calls the “fourth discontinuity,” or the artificial disconnection between human beings and their technological creations, Dick turns Wiener’s hypothesis around so that it works in both directions. It is through observing ourselves that we might better understand our technologies and what those technologies might be doing in the future. This is Dick’s foremost formulation of future prep—looking inward to the human brain to figure out our technologies in the present and the future. In a sense, our technologies are expressions of who we are, because we create them to fulfill our purposes. However, technologies can perform in ways that they humans do not intended, and would not the human being’s propensity for the unexpected be a guide for better anticipating the direct and indirect consequences of our technologies? Dick continues in his speech to directly connect the human and technology: “Perhaps, really, what we are seeing is a gradual merging of the general nature of human activity and function into the activity and function of what we humans have built and surround[ed] ourselves with” (Dick, “The Android and the Human” 184). While Dick independently confirms Mazlish’s account of the fourth discontinuity, his aim in the speech is to discuss how human beings can become androids—i.e., programmed and soulless machines that are only human in appearance. I would like to add that Dick’s initial premise also connects to another kind of technology: pharmacology, or the medical science of the use and effect of drugs. The pharmacological creation of substances intended for use on the human being can have positive and negative effects. In the next section, I will discuss the effects of a drug called Substance D on the brain of an undercover narcotics agent and
what that effect means for a deeper understanding of the brain’s generation of our perception of reality.

*A Scanner Darkly*

*A Scanner Darkly* (completed 1973, published 1977) explores the maintenance of a stable personal identity when chemical dependency fundamentally alters the human brain. It is perhaps Dick’s most disturbing novel; second only to his 1965 novel *The Three Stigmata of Palmer Eldritch*. It derives its energy from Dick’s time with youthful drug users in Marin County, California in the early 1970s and his enrollment at the Canadian drug rehabilitation center X-Kalay. While not autobiographical to the extent that the later *VALIS* is, Dick does say in an interview with Uwe Anton and Werner Fuchs:

> Everything in *A Scanner Darkly* I actually saw. I mean I saw even worse things than I put in *A Scanner Darkly*. I saw people who were reduced to a point where they couldn't complete a sentence, they really couldn't state a sentence. And this was permanent, this was for the rest of their lives. Young people. These were people maybe 18 and 19, and I just saw, you know, it was like a vision of Hell. And I vowed to write a novel about it sometime, and I was just…I'm just…it's just…well, I was in love with a
girl who was an addict and I didn't know she was an addict and it was just pathetic. So I wrote *A Scanner Darkly*. (Dick, *SF Eye* interview par. 73)²

It is about a near future Earth where a new drug called Substance D (i.e., Death) causes a radical change to the user’s brain. In part, it destroys the connections between the two hemispheres of the brain or the corpus callosum. The effect of this damage to the brain of the undercover police officer “Agent Fred,” who is unknown even to other police officers thanks to the scramble suit he wears in the precinct and at special functions where he needs to high his true identity, Robert “Bob” Arctor, results in his increasing dissociation between the Bob Arctor and Fred identities. Dick explains that Bob/Fred’s two brain hemispheres separate and compete with one another because of Arctor taking Substance D for an extended period. This division of the self destabilizes his ontological view of the world. When he can no longer withstand these challenges to his perception of reality, he is delivered to the drug rehabilitation center called New-Path by his girlfriend Donna Hawthorne. At New-Path, he fails at the rehab program, so the administrators transfer him to a distant farm to work as a laborer. There, he is renamed “Bruce,” and put to work in the cornfields. He sees tiny blue flowers between the rows of corn and he remembers, despite the extensive damage to his brain, that he should save one to give to his “friends” at Thanksgiving.

Dick demonstrates his awareness of recent, popularized neuroscientific work while writing *A Scanner Darkly* by including an “Item,” useful information for the reader that is possibly recalled by Arctor/Fred, juxtaposed, midsentence when two evaluating

deputies at the police department evaluate Arctor/Fred for the effects of Substance D abuse on the brain, acknowledging that it is understood that an undercover agent has to take the drugs in order to maintain cover around other users:

Item. In July 1969, Joseph E. Bogen published his revolutionary article “The Other Side of the Brain: An Appositional Mind.” In this article he quoted an obscure Dr. A. L. Wigan, who in 1844 wrote:

The mind is essentially dual, like the organs by which it is exercised. This idea has presented itself to me, and I have dwelt on it for more than a quarter of a century, without being able to find a single valid or even plausible objection. I believe myself then able to prove—(1) That each cerebrum is a distinct and perfect whole as an organ of thought. (2) That a separate and distinct process of thinking or ratiocination may be carried on in each cerebrum simultaneously.

In his article, Bogen concluded: "I believe [with Wigan] that each of us has two minds in one person. There is a host of detail to be marshaled in this case. But we must eventually confront directly the principal resistance to the Wigan view: that is, the subjective feeling possessed by each of us that we are One. This inner conviction of Oneness is a most cherished opinion of Western Man. . . .” (Dick, Scanner 954)
In the mid-nineteenth century, Arthur Ladbrooke Wigan, M.D. proposed in his book *A New View of Sanity* (1844) a theory that the human brain hosts two brains (hemispheres) and two minds:

If, for example, as I have so often stated, and now again repeat, one brain be a perfect instrument of thought—if it be capable of all the emotions, sentiments, and faculties, which we call in the aggregate, mind—then it necessarily follows that man must have two minds with two brains; and however intimate and perfect their unison in their natural state, they must occasionally be discrepant, when influenced by disease, either direct, sympathetic, or reflex. (Wigan 271)

It took many years before his theory was tested more thoroughly by neurosurgeons and neuroscientists, especially in observations of patients with lesions or of attempts to alleviate severe epilepsy by severing the corpus callosum, the interconnecting neuronal tissue between the two hemispheres of the brain. Joseph Bogen, M.D. writes on his personal website about the significance of the human split brain:

The human split brain studies had a number of interesting results. Chief among these was the confirmation, simultaneously and in combination, of two conclusions which had been reached previously and separately on other grounds.

One conclusion is usually called complementary hemispheric specialization (CHS). This had already been inferred from the results of lateralized lesions (largely through the work of Oliver Zangwill of
England and Henri Hecaen of France together with their colleagues, most notably Brenda Milner of Montreal. This conclusion was subsequently supported by various other kinds of evidence (see Bogen refs OSOB I 1969, Education 1975, Dual brain 1985). The importance of the split brain evidence for CHS led to Roger Sperry's sharing of the Nobel Prize for physiology in 1981. By now, the literature on CHS is immense.

The other conclusion was the demonstration of relative hemispheric independence ("duality of mind") which had already been well established in cats and monkeys by Sperry and his students including R. Meyers, C. Hamilton, M. Gazzaniga and C. Trevarthen. This second main conclusion has had relatively less discussion although it seems to me to be at least as important (see Bogen refs. OSOB II 1969, Dual Brain 1985, Mental Duality 1986, and One's Other Mind 2000).

The former conclusion (CHS) has by now, 2001, become widely accepted. The second conclusion was debated for a time by philosophers but the question has for nearly two decades been largely ignored by them as well as a majority of neuroscientists. Some comment on this by me can be found on this website as the addendum to the book review listed in the table of contents for consciousness. (Bogen par. 1-4)

These two findings—complementary specialization of the hemispheres and relative independence of the hemispheres—are among some of the most interesting aspects of the human brain of which we are largely ignorant. For example, if you ask someone who has
had his or her hemispheres divided by surgical intervention to identify an object shown to only their left visual field, the person will be unable to vocally articulate the object due to the fact that the verbal processing center is located in the left hemisphere and left visual field information is sent to the right hemisphere. Without the corpus callosum sending signals between the hemispheres, the visual processor in the right hemisphere cannot signal to the left hemisphere what it sees. Individuals with a divided corpus callosum due to injury or surgical intervention demonstrate hemisphere independence in other ways such as competition between the hemispheres in selecting food or clothing due to one hemisphere directing an action (e.g., left hemisphere has right hand reach for a red shirt while the right hemisphere directs the left hand to reach for a green shirt).

Arctor/Fred experiences a radical version of this that probably affects additional sites within his brain beyond the corpus callosum. The seated deputy describes it as:

In many of those taking Substance D, a split between the right hemisphere and the left hemisphere of the brain occurs. There is a loss of proper gestalting, which is a defect within both the percept and cognitive systems, although apparently the cognitive system continues to function normally. But what is now received from the percept system is contaminated by being split, so it too, therefore, fails gradually to function, progressively deteriorating. (Dick, Scanner 954)

The deputy’s explanation essentially mirrors the effects of a divided corpus callosum. The “loss of proper gestalting” is the lack of unity in the self. Cognition takes place in both hemispheres, but the “percept system” or systems of perception are divided
bilaterally between the two hemispheres. However, inexplicable behavior rather than the fictional split experienced by Arctor/Fred would indicate an awareness of the gestalt breakdown. Arctor/Fred’s identity begins to unravel when he wonders to himself:

To himself, Bob Arctor thought, *How may Bob Arctors are there?*

A weird and fucked-up thought. Two that I can think of, he thought. The one called Fred, who will be watching the other one, called Bob. The same person. Or is it? Is Fred actually the same as Bob? Does anyone know? I would know, if anyone did, because I’m the only person in the world that knows that Fred is Bob Arctor. *But,* he thought, *who am I? Which of them is me?* (Dick, *Scanner* 942).

Arctor/Fred’s lack of gestalt evidenced here lacks a resolution. He, whoever “he” is, cannot settle on who the “he” actually is. Furthermore, Arctor/Fred’s destabilization is so great that his division of self cannot be easily resolved.

Later, Actor/Fred’s split brain manifests itself most vividly to Fred when the police psychology-testing lab personnel evaluate him in chapter thirteen:

> “*It is as if one hemisphere of your brain is perceiving the world as reflected in a mirror.* Through a mirror. See? So left becomes right, and all that implies. And we don't know yet what that does imply, to see the world reversed like that. Topologically speaking, a left-hand glove is a right-hand glove *pulled through infinity.*”

> “Through a mirror,” Fred said. A darkened mirror, he thought; a darkened scanner. And St. Paul meant, by a mirror, not a glass mirror—
they didn't have those then—but a reflection of himself when he looked at the polished bottom of a metal pan. Luckman, in his theological readings, had told him that. Not through a telescope or lens system, which does not reverse, not through anything but seeing his own face reflected back up at him, reversed—pulled through infinity. Like they're telling me. It is not *through* a glass but as reflected *back* by a glass. And that reflection that returns to you: it is you, it is your face, but it isn't. And they didn't have cameras in those old days, and so that's the only way a person saw himself: backward.

I have seen myself backward.

I have in a sense begun to see the entire universe backward. With the other side of my brain! (Dick, *Scanner* 1042-1043)

Fred imagines seeing himself in the hidden holographic camera known as a “scanner.” What he sees is not a corrected image. Instead, he thinks of it as a mirror reflection—an unnatural vision of himself, of his doppelganger. He views this mirrored self “backward” through a glass darkly. Of course, Dick is drawing on 1 Corinthians 13:12 (perhaps it is not surprising that this passage appears in chapter thirteen of the novel): Paul the apostle writes, “For now we see through a glass, darkly; but then face to face: now I know in part; but then shall I know even as also I am known” (King James Version of the Bible 1 Corinthians 13:12). In this line, Paul considers what he knows and what he does not know. In the case of Fred, this verse heightens his revelation that something fundamental has become unhinged in his brain to make it so that he becomes two people
simultaneously in the same “brain” and body. In effect, Dick extrapolates from the work of Wigan, Bogan, and others, including Roger Sperry, who won the 1981 Nobel Prize in Physiology or Medicine for his split-brain research. Had it been available at the time that Dick wrote *A Scanner Darkly*, I suspect that Dick would have drawn on Julian Jaynes’ *The Origin of Consciousness in the Breakdown of the Bicameral Mind* (1976). As I will discuss later, Dick mentions Jaynes’ book in his *Exegesis*, but only after *A Scanner Darkly* is well into publication. However, Jaynes’ ideas seem to appear in Dick’s *The Divine Invasion*, which I will discuss.

Alternatively, Fred sees himself not reversed as in a mirror, but through a glass darkly—following the more and likely more true literal translation from the Greek (this is informed by the idea that prophets see the divine through layers of glass, unclear, darkly). This means that the glass separates him from his other self, Arctor. He is aware of the separation, but it is “murky” (a word he repeatedly uses to describe how he sees the world from the perspective of an undercover agent). However, a police deputy testing Fred’s psychological wellbeing tells Fred, “This is not brain damage but a form of toxicity, brain toxicity. It's a toxic brain psychosis affecting the percept system by splitting it” (Dick, *Scanner* 954). Apparently, Substance D attacks the receptor cites on signal-receiving neurons. Charles Freck, one of Arctor’s drug using friends, says when describing what is wrong with their friend Jerry Fabin, “It's his receptor sites, in his brain, at least I think so. It seems like it, from what the government pamphlets say now” (Dick, *Scanner* 872). While it is material to the narrative to remember how Dick explains the operation of Substance D, it is perhaps more important to think of Fred’s realization, as
tragic as it is, as his personal attempt to capture and understand what has happened to his brain, his sense of self, his gestalt. Viewed in this way, *A Scanner Darkly* is an attempt at understanding a set of experiences with one’s own Theory of Mind (ToM). In Fred’s case, he realizes that his ToM has divided because of using the drug. His once comfortable and unified sense of self has separated into Fred the agent and Bob the user. Instead of the conflict resulting in a confusing union of identities, the two hemispheres have disconnected from one another resulting in two brains and two minds: Fred and Bob Arctor. I will only add in closing that there is, perhaps, an implicit concern on Dick’s part: the systems of surveillance, such as the hidden holographic scanners and the identity masking scramble suit, as much as any kind of drug intervention, produces always, ever present paranoia that can degrade and potentially disintegrate the self. In the next section, I will discuss a different kind of experience—rooted in his brain—which Dick attempts to rationalize and puzzle through in different ways—public/publishing and private/writing.

*Exegesis*

An exegesis is an explanation or exposition, typically meant as an interpretation of biblical scripture. The word comes to us from Greek, meaning to interpret. Dick began his *Exegesis* as a series of notes in which he attempts to interpret what he calls the 2-3-74 events. Began after the first intense visual hallucination in late February 1974, Dick
expands his notes to over 8,000 sheets of paper, mostly handwritten, by the time of his death in 1982. He began work on this private enterprise as a method of solving the strange events he reports experiencing in February and March of 1974. The exact date of writing what came to be known as the *Exegesis* is difficult to say, as the published selection of the *Exegesis* begins with “Folder 4” and it is simply dated 1974-1976. The earliest published letter from this folder is on a letter to Peter Fitting on 28 June 1974. His fifth wife Tessa B. Dick reports that he began writing specifically for the purpose of interpreting his experiences in early 1974, and she also says that Dick’s papers were not originally called the *Exegesis*: “I think he just started calling his notes that. He started taking notes as soon as he realized he was getting words he never heard before” (Tessa Dick, “Interview” 5). Dick’s “getting words he never heard before” is part of the phenomena he reports having experienced. He called it anamnesis, or remembering deep memories, long forgotten. His view was that this was not simply recovery from amnesia, but it was instead his remembering things from the past, perhaps a past life, genetic memory, or simply remembering information sent directly to his brain from somewhere else. These phenomena were a mixture of strange circumstances shared with his friends and more importantly, subjective phenomena that left a lasting impression on Dick. Whatever things happened on 2-3-74, Dick explored their meaning and searched for understanding through his *Exegesis* and in turn, used these explorations as the basis for his final fictional works, the VALIS trilogy: *VALIS, The Divine Invasion*, and *The Transmigration of Timothy Archer*. I have already briefly discussed the latter novel at the beginning of this chapter. Now, I would like to contextualize the *Exegesis* and then
discuss the events that formed the impetus for it and their elaboration in VALIS and The Divine Invasion.

Rob Latham’s recent review essay in the Los Angeles Review of Books, provides the most succinct summary of the events that led to Dick’s generation of such a lengthy, handwritten record of his attempts at understanding what had happened to him:

A more appropriate metaphor [for the Exegesis] might be “kitchen sink of a book,” since Dick, an omnivorous autodidact, threw all of his intellectual resources at the problem of deciphering the events he referred to simply as “2-3-74” — because the sequence of hallucinatory revelations commenced in February and March of that fateful year. For those given to psycho-biographical explanations, 1974 was the culmination for Dick of a decade of counterculture paranoia spawned by a hermetic hippie lifestyle and punctuated by occasional flirtations with antiwar protest. Always suspicious of lurking authority, Dick became convinced, during the early 1970s, that he was the focus of a loose-knit, evolving conspiracy linking the IRS, the FBI, Soviet agents, left wing American academics, and the hated Nixon administration. Recovering from oral surgery in February 1974, pumped full of Darvon, lithium, and massive quantities of megavitamins, he began experiencing visual and auditory hallucinations initially sparked by a Christian girl’s fish-icon necklace but eventually taking the form of a pink laser shooting highly coded information into his opened mind during a series of hypnogogic visitations. Over time, the
intrepid author developed an elaborate vocabulary to describe the transfiguring effects of these extraterrestrial dispatches. According to this private argot, on 2-3-74 Dick underwent a powerful *anamnesis*, stimulated by mystical contact with “VALIS” (“Vast Active Living Intelligence System,” sometimes also called “Zebra” or, more simply, “God”), that unshackled his genetic memory, permitting him to see through the “Black Iron Prison” of our world into the “macrometasomacosmos,” the “morphological realm” of the Platonic *Eidos*, in the process revealing himself to be a “homoplasmate,” an incarnation of the Gnostic *Logos* subsisting in “orthogonal time.” (Latham par. 2)

As you can see from this summary, Dick’s subjective experiences on 2-3-74 are deeply rooted in his personal experiences and his previously published fictions. His interpretations and explanations are equally colorful, informed, and rigorous, but they seem to avoid Occam’s razor almost entirely (the term appears once in the *Exegesis*, but not in connection with Dick’s generative experience). In fact, K.W. Jeter, Dick’s close friend and fellow writer, knew about the *Exegesis*, because Dick would call him at work in the middle of the night to discuss it with him:

> At the time I think I was probably the most aware of it of anybody who was in contact with Phil, because in that Santa Ana period, I was the only person he knew who kept the same hours he did.

> I was working the graveyard shift at the Orange County Juvenile Hall, which was actually a really good gig for a writer, because it
essentially consisted of sitting at a big desk in what they call a “living unit,” where they keep twenty kids or so.

I’d be sitting at this big desk all night long, either working on my own stuff, or Phil would call me. Sometimes he’d call me two or three times a night. In stages through the night, he would come up with some brilliant idea, concerning his Exegesis. He’d call me up, because I was the only person who was up and he wanted to talk. So we’d talk for a while, or he’d talk and I’d listen. That might be midnight. Then he’d work on his Exegesis some more, get another brilliant idea, call me about two or three in the morning, blab on about it, and then he might call me again at five or six in the morning. This might happen every night for a month. (Jeter 13)

This establishes a sense of Dick’s long writing jags into the night, and it reinforces what we see in the recently published Exegesis that Dick would engage, debate, and discard new ideas with an intense rapidity. However, Jeter, as one of Dick’s close friends who regularly talked with and hung out with the writer, tells us a hidden secret in the Exegesis itself. While Dick is writing these elaborate explanations about what happened to him and how the universe works, he secretly maintained a “minimum hypothesis,” or an admission that the 2-3-74 events were nothing at all:

One of the things that you have to bear in mind when you look at the Exegesis, and VALIS, and the very autobiographical writings of that period, is that all the time that you see these theories about the pink beam and what caused it, and so on, those are things that Phil is doing with one
hand. But in his other hand, out of sight, is always kept what we would call—and this is how we would actually talk about these things, and he would refer to it this way—the minimum hypothesis. Which is that it was nothing.

Things happened, coincidences, a poor broke writer down on his luck after a lot of stressful experiences, who had a history of drug involvement and crazy ideas and bad marriages, going out of his mind with anxiety and grief—the minimum hypothesis is that, as he explained it, “I don’t know if what happened was just my brain giving me a puzzle to take my mind off my real problems. I was so upset about being broke, my marriage having collapsed, being alone and friendless in a place I’d never been in, all these strange things like the hit on my house and all that…Maybe it was just a matter of my tremendously—objectively—creative brain just saying, “Look, this guy needs the equivalent of a jigsaw puzzle to work on” and it gave it to me, my own self.” (Jeter 14)

It is unfortunate that Dick apparently does not address this topic in the published Exegesis. Of course, the published version omits some material, though obviously not as much as the much shorter attempt at its publication: Lawrence Sutin’s edited edition, In Pursuit of Valis: Selections from the Exegesis (1991). Nevertheless, Jeter’s comments point to the fact that Dick was not crazy in the sense that he could not cognitively process or admit the possibility that the 2-3-74 events were phenomena with rational explanations without unnecessarily complex cosmogonies to accompany them.
This work, all in longhand on paper and unordered, served as the basis for his final three novels: *The Divine Invasion* (1981), *VALIS* (1982), and *The Transmigration of Timothy Archer* (1982), but it was perhaps more importantly a workbook for Dick to explore a multiplicity of theories about his experience. The *Exegesis* served as a workspace for Dick to write out his thoughts, to keep a record, to connect the disparate lines of thought through the medium of writing. It formed a portion of his extended mind—keeping a record of territory already covered while forging ahead into new areas of thought. As time passed, Dick increasingly incorporated new information and theory into his already complicated cosmogony. In her commentary to a letter Dick wrote to Malcolm Edwards on 31 January 1975 (included in the *Exegesis* as item 4:147), N. Katherine Hayles writes:

> 2-3-74 marks a turning point away from Dick questioning the nature of reality in his fiction, but without providing unambiguous answers, and toward generating an astonishing efflorescence of theories that do not merely question but instead make assertions about the nature of reality. The drive of his theorizing in the *Exegesis* seems always to be toward incorporating more and more ideas into a single synthetic scheme, without definitely eliminating or disqualifying any one of them. Not surprisingly, then, the synthesis grows wilder and more ideationally unstable as he proceeds (Hayles, *Exegesis* 4:147)

While I agree with Hayles’ assessment of the *Exegesis*, I would argue that Dick did present a number of theories in his fiction before 2-3-74. As in *Ubik* (1969) where the Joe
Chip and the other characters come up with new theories to explain their rapidly devolving ontological situation, Dick does much of the same in the *Exegesis*, but perhaps with greater ardor.

Additionally, Dick was known for his note taking and working things out on paper. Asked if Dick knew he was writing down something of later importance as opposed to his usual note taking, Tessa Dick says:

No, this was different. All his other notes just ended up in no particular order. Sometimes coffee spilled on them, sometimes they’d be tossed out. No big deal, because the idea to him was, if he wrote it down, even if he never saw the notes again, he’d remember it. But, the Exegesis he kept separated from other things, once he started calling it that. After his shoulder surgery I got him this little tape recorder at Radio Shack, because with his arm in a sling he couldn’t do much typing. That’s when he started recording things. A lot of what he recorded could be part of his Exegesis, too. . . . but he didn’t necessarily keep them. He’d record over things a lot. But originally, they were notes for his novel, VALISYSTEM A. (Tessa Dick, “Interview” 5)

I find it significant that Tessa remembers Dick’s desire to remember things through writing. The act of writing allegedly helped him remember things—knowledge and subjective experiences, and his mental work on those things. Therefore, the written *Exegesis* does not seem to be of as much importance to Dick as the written manuscript is to readers and scholars. The act of writing was a method for remembering his thoughts.
Luckily for those of us who do not have access to the contents of Dick’s brain, we can connect, in a sense, to the self-reported thoughts of the writer via his meticulous and expansive collection of notes called the *Exegesis*. Thus, in a sense, the *Exegesis* is the closest access readers and scholars have to Dick’s thoughts and thinking process, barring of course other primary sources such as letters and interviews.³

*VALIS*

*VALIS* (completed 1978, published 1981) is Dick’s semi-autobiographical novel about what he called his 2-3-74 experiences. It aggregates Dick’s memory of the 2-3-74 and all of the cognitive heavy lifting he had done up to the point of its completion in 1978—essentially four years of writing in his *Exegesis*. The tremendous work—thinking, reading, and writing—that went into the *Exegesis* and *VALIS* derives directly from Dick’s 2-3-74 experiences and his deep, unwavering desire to explain those experiences to himself. This necessitated a full cosmogony, because as a science fiction writer, he

³ However, editorial oversight in the published versions of the *Exegesis* presents its own problem through the selecting and transcribing processes. Also, the apparent lack of discrete order to the collection of papers known as the *Exegesis* creates problems with ordering. Context and contents of the pages must have played an integral part in the ordering of the latest edition.
realized that any explanation could not rely on faith alone. His writing demonstrates a need for a self-consistent and scientifically reasonable explanation. Because he experienced 2-3-74 as visual and auditory hallucinations, Dick realizes that any theory must be rooted in the brain and its systems. Add to this effort of explanation, Dick’s own memory, remembering, and memory transformation through time, and it will be shown that Dick’s best efforts would likely be iterative at best, always approaching, yet never attaining a zero point, only a well-reasoned approximation. It is an entertaining as well as exhausting novel with, according to Kucukalic, “allusions to over two hundred works” (xiii). Rob Latham adds that Dick, “an omnivorous autodidact, threw all of his intellectual resources at the problem of deciphering the events he referred to simply as “2-3-74” — because the sequence of hallucinatory revelations commenced in February and March of that fateful year” (Latham par. 2). Latham is referring to Dick’s Exegesis, but that work of intensive introspection and interpretation informs VALIS’ narrative and intertextual web of reasoning.

What of the experiential source that drove Dick’s Exegesis and VALIS? Both works are attempts at understanding the strange visions, auditory hallucinations, and other strange events that Dick calls “2-3-74.” In his important biography of Dick, Lawrence Sutin frames the writer’s drive as a dichotomy of doubt and joy:

For all the subsequent confusion he sowed, Phil never really doubted that the visions and auditions of February-March 1974 (2-3-74) and after had fundamentally changed his life.
Whether or not they were real was another question. As usual, in seeking an answer, Phil hovered in a binary flutter:

Doubt. That he might have deceived himself, or that It—whatever It was—had deceived him.

Joy. That the universe might just contain a meaning that had eluded him all through his life and works.

This dialectic lies at the heart of the eight-year Exegesis . . . and of Valis. And out of it burgeoned the theories—Phil’s own and those posed by friends and critics. Many of them can explain almost everything.

(Sutin, Divine Invasions 208)

VALIS is certainly a book of theories by Dick and his friends to explain what had happened to him during 2-3-74 and what the underlying nature of the universe might be to make his experiences possible. Not one to take anything ever too seriously, Dick writes VALIS, based on his Exegesis explorations, as a picaresque adventure for four friends who call themselves the Rhipidon Society: Horselover Fat (irrational, excessive, dominant half of the writer’s projected self for first half of novel, also note that the etymological meaning of ‘Philip’ in Greek is ‘horselover’ and ‘Dick’ in German means ‘fat’), Phil Dick (rational, reserved, dominant half of the writer’s projected self for the second half of the novel), Kevin (his dead cat is an emblem for his understanding of the universe, based on Dick’s real life friend K.W. Jeter), and David (a Roman Catholic, based on Dick’s real life friend Tim Powers). The science fiction writer Kim Stanley
Robinson, in his published dissertation on Dick, identifies the congruence between the divided Horselover Fat and Phil Dick:

By placing the character ‘Phil Dick’ in the story, Dick makes us reconsider the relationship between Fat and himself, and we must realize that the representation is not a simple one. Neither is the correspondence between ‘Phil Dick’ and the actual writer a simple one. This character, calm, rational, clear-eyed in his judgments, almost always at a remove from the action, is as much an abstraction away from the writer himself as is the more flamboyant Horselover Fat. Dick has divided his autobiographical character, then, into the two extremes that we have seen in conflict throughout his work. This gives his self-analysis a clarity that it otherwise would have been very difficult to achieve. (Robinson 113)

The “self-analysis” that Robinson refers to is the significant passage from the beginning of the novel when Fat writes, “I am Horselover Fat, and I am writing this in the third person to gain much-needed objectivity” (Dick, VALIS 177). Additionally, the character Phil attributes the *Exegesis* to Fat:

Fat later developed a theory that the universe is made out of information. He started keeping a journal – had been, in fact, secretly doing so for some time: the furtive act of a deranged person. His encounter with God was all there on the pages in his-Fat’s, not God’s-handwriting.
The term ‘journal’ is mine, not Fat’s. His term was ‘exegesis’, a theological term meaning a piece of writing that explains or interprets a portion of scripture. (Dick, *VALIS* 187-188)

Of course, this exegesis is where Fat/Philip K. Dick works out these elaborate theories of 2-3-74’s meaning—closely and intimately alone. Perhaps it was from this that Dick/Fat wanted to achieve “much-needed objectivity” by writing *VALIS*. Likely, from Dick’s perspective, he had spent a considerable amount of time and effort working on his *Exegesis*, he likely wanted to try something completely different as he does with his multitude of theoretical conjectures, leads, and dead-ends. Dick was not one to maintain allegiance to any perspective or theory for too long if another possible explanation were feasibly supported by evidence or reasoning. This is also true for the dialogic nature of *VALIS* (and is also true of much of Dick’s fiction) where the Rhipidon Society and those persons they encounter on their adventure, discuss and debate competing theories of the nature of the universe that human beings perceive with their brain.

The title of the novel, *VALIS*, is an acronym for Vast Active Living Intelligence System, one of Dick’s proposed Gnostic versions of God. The novel begins with Fat trying to make sense of the pink laser light that he claims bombarded his brain with information that he could not have otherwise known during February and March of 1974. Initially, he interprets it as a message from God—mirroring the writer’s own professed phenomenal experience. Phil/narrator takes a semi-objective stance in describing Fat's thoughts and interactions with others while also talking with Fat as if he were another person entirely. Fat and Phil regularly talk with David, who is a devout Christian, and
Kevin, a skeptic who would like to ask the creator why his cat died. These four (3) guys form the Rhipidon Society and meet with the musician Mother Goose/Eric Lampton, his wife Linda, his co-musician Mini, and their daughter, Sophia after seeing their film called Valis (this fictional film within the novel is likely inspired by Nicolas Roeg’s 1976 film The Man Who Fell to Earth and Mother Goose is modeled after David Bowie’s on-stage persona of that time). Sophia is supposedly the offspring of Linda and Valis, a terminal of sorts bringing the message of the Valis satellite to those on Earth who have trapped themselves in a maze he terms the “Black Iron Prison” from which they cannot escape without its help—effectively returning their lost powers to them. The Black Iron Prison is an interesting example of Dick’s intertextual maneuvers, because it is only by seeing the transposition of culture across time and place that the veil of reality can be exposed:

Once, in a cheap science fiction novel, Fat had come across a perfect description of the Black Iron Prison but set in the far future. So if you superimposed the past (ancient Rome) over the present (California in the twentieth century) and superimposed the far future world of The Android Cried Me a River over that, you got the Empire, the Black Iron Prison, as the supra- or trans-temporal constant. Everyone who had ever lived was literally surrounded by the iron walls of the prison; they were all inside it and none of them knew it – except for the gray-robed secret Christians. (Dick, VALIS 213)

Sophia 'cures' Phil of Fat—for a while causing Fat to disappear entirely, but then Fat returns and Phil sends him off on his own. Perhaps it is Phil’s act that demonstrates the
last line of his *Tractates Cryptica Scriptura*, essentially selections from Dick’s *Exegesis* included in *VALIS*, “From Ikhnaton this knowledge passed to Moses . . . But underneath all the names there is only one Immortal Man; *and we are that man*” (Dick, *VALIS* 398). Sophia confirms this possibility as well when she indicates that each person is God. Phil excises Fat from his damaged psyche, not in any arcane manner, but in a discussion that leads to him shouting to Fat to go off on his search for Zebra/Valis. Knowing that Fat continues his adventure of discovery elsewhere gives Phil a good feeling about the world, but Phil himself chooses to turn his attention to the television for future messages from Zebra.

Accounts of 2-3-74—the experiences that began and continued to fuel Dick’s efforts and interpretative explanation—vary in retellings by Dick and by those who were close to him at that time, including Tessa Dick, Tim Powers, and K.W. Jeter. In perhaps one of the earlier accounts, Dick writes the science fiction writer Ursula K. Le Guin on September 23, 1974:

> In February I had major oral surgery, and was home recovering, still under the influence of the sodium pentothal, and in severe pain. Tessa phoned the oral surgeon and he phoned a pharmacy to send out a pain killer. The doorbell rang and I went, and there stood this girl with black, black hair and large eyes very lovely and intense; I stood staring at her, amazed, also confused, thinking I’d never seen such a beautiful girl, and why was she standing there? She handed me the package of medication, and I tried to think what to say to her; I noticed then, a fascinating gold necklace around
her neck and I said, “What is that? It certainly is beautiful,” just, you see, to find something to say to hold her there. The girl indicated the major figure in it, which was a fish. “This is a sign used by the early Christians,” she said, and then departed. Soon thereafter the dazzling shower of colored graphics descended over me in the night, and you know the rest. During the first weeks while the spirit was within me in full force, I saw, among all the other insights I developed, that there are external signals which act on us as disinhibiting stimuli, which cause a vast drop in GABA fluid in the brain, releasing (intentionally, as with the little creatures) major engramming. Evidently this is what the fish sign did to me. In fact I read in one article on brain function that when inhibiting GABA fluid drops quite a bit—which is when an external signal causes major disinhibition to take place—the person experiences “abstracts much like the modern painters have reproduced,” and this does fit my experience.

(Dick, *Exegesis* 4:106)

Apparently, Dick and Le Guin had discussed his experience on the phone or in another, unpublished letter. What is striking about this passage is that he mentions an “article on brain function” that he incorporates into part of his explanation to Le Guin. As I will show in further depth in the next section on *The Divine Invasion*, Dick constantly combined the scientific with the religious/mystical to arrive at his own fusion of explanation.
Dick’s first public account of 2-3-74 is likely in his 1977 speech “If You Find This World Bad, You Should See Some of the Others,” in which he mentions his impacted teeth, the sodium pentothal, and “a short, acute flash of recovered memory” (Dick, “If You Find This World Bad” 246). There is no mention of the delivery girl or any of the rest of the account mailed to Le Guin. He provides a fuller description a year later in his “How to Build a Universe That Doesn’t Fall Apart Two Days Later” in 1978. He introduces his version of Gnosticism and the Black Iron Prison in this account:

My novel Flow My Tears, the Policeman Said was released by Doubleday in February 1974. The week after it was released, I had two impacted wisdom teeth removed, under sodium pentothol. Later that day I found myself in intense pain. My wife phoned the oral surgeon and he phoned a pharmacy. Half an hour later there was a knock at my door: the delivery person from the pharmacy with the pain medication. Although I was bleeding and sick and weak, I felt the need to answer the knock on the door myself. When I opened the door, I found myself facing a young woman -- who wore a shimmering gold necklace in the center of which was a gleaming gold fish. For some reason I was hypnotized by the gleaming gold fish; I forgot my pain, forgot the medication, forgot why the girl was there. I just kept staring at the fish sign.

"What does that mean?" I asked her.
The girl touched the glimmering golden fish with her hand and said, "This is a sign worn by the early Christians." She then gave me the package of medication.

In that instant, as I stared at the gleaming fish sign and heard her words, I suddenly experienced what I later learned is called anamnesis—a Greek word meaning, literally, "loss of forgetfulness." I remembered who I was and where I was. In an instant, in the twinkling of an eye, it all came back to me. And not only could I remember it but I could see it. The girl was a secret Christian and so was I. We lived in fear of detection by the Romans. We had to communicate with cryptic signs. She had just told me all this, and it was true.

For a short time, as hard as this is to believe or explain, I saw fading into view the black, prisonlike contours of hateful Rome. But, of much more importance, I remembered Jesus, who had just recently been with us, and had gone temporarily away, and would very soon return. My emotion was one of joy. We were secretly preparing to welcome Him back. It would not be long. And the Romans did not know. They thought He was dead, forever dead. That was our great secret, our joyous knowledge. (Dick, “How to Build” 270-271)

This account of the 2-3-74 event focuses mostly on the Christian symbol triggering Dick’s anamnesis or recall of past events not directly part of his past experience. This is the emergence of “Thomas,” another personality that Dick discovers within his
brain/mind because of his experiences. I will discuss this more below in the section on *The Divine Invasion*.

The account most recognized and repeated about 2-3-74 comes from Dick’s magnum opus and semi-autobiographical work, *VALIS*. In the novel, “Philip K. Dick” is not the person who experiences 2-3-74. Instead, it is one of his two fictional avatars, Horselover Fat, who shares his experience with his picaroons. The narrator, likely Phil Dick, gives a rough sketch of Fat’s initial experience in February 1974 and continues to what happened in March 1974:

All these events took place in March 1974. The month before that, Fat had had an impacted wisdom tooth removed. For this the oral surgeon administered a hit of IV sodium pentothal. Later that afternoon, back at home and in great pain, Fat had gotten Beth to phone for some oral pain medication. Being as miserable as he was, Fat himself had answered the door when the pharmacy delivery person knocked. When he opened the door, he found himself facing a lovely dark haired young woman who held out a small white bag containing the Darvon N. But Fat, despite his enormous pain, cared nothing about the pills, because his attention had fastened on the gleaming gold necklace about the girl’s neck; he couldn’t take his eyes off it. Dazed from pain – and from the sodium pentothal – and exhausted by the ordeal he had gone through, he nonetheless managed to ask the girl what the symbol shaped in gold at the center of the necklace represented. It was a fish, in profile.
Touching the golden fish with one slender finger, the girl said, ‘This is a sign used by the early Christians.’

Instantly, Fat experienced a flashback. He remembered--just for a half-second. Remembered ancient Rome and himself: as an early Christian; the entire ancient world and his furtive frightened life as a secret Christian hunted by the Roman authorities burst over his mind . . . and then he was back in California 1974 accepting the little white bag of pain pills.

A month later as he lay in bed unable to sleep, in the semi-gloom, listening to the radio, he started to see floating colors. Then the radio shrilled hideous, ugly sentences at him. And, after two days of this, the vague colors begin to rush toward him as if he were himself moving forward, faster and faster; and, as I depicted in my novel *A Scanner Darkly*, the vague colors abruptly froze into sharp focus in the form of modern abstract paintings, literally tens of millions of them in rapid succession.

Meta-circuits in Fat’s brain had been disinhibited by the fish sign and the words spoken by the girl.

It’s as simple as that. (Dick, *VALIS* 270-271)

Like his accounts to Le Guin and in his two late-1970s speeches, the anamnesis and overwhelming information feed are the core features of the experience. Dick seeing the delivery girl’s Christian fish necklace triggers the February 1974 event, and the March
1974 event of rushing colors and enigmatic radio messages follows. The narrator’s explanation of what follows is that a stimulus activates dormant “meta-circuits” in Fat’s brain. The idea of meta-circuits or meta-thought seem similar to Julian Jaynes’ *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, which I discuss in more detail in the final section of the chapter. Then, the narrator explains the March 1974 events in terms of GABA in the brain’s cerebrospinal fluid, apparently information gleaned from another source specifically focused on the role of gamma aminobutyric acid (GABA) found in the body’s cerebrospinal fluid:

The GABA fluid of the brain blocks neural circuits from firing; it holds them in a dormant or latent state until a disinhibiting stimulus – the correct one – is presented to the organism, in this case Horselover Fat. In other words, these are neural circuits designed to fire on cue at a specific time under specific circumstances. Had Fat been presented with a disinhibiting stimulus prior to the lurid phosphene activity – the indication of a drastic drop in the level of GABA fluid in his brain, and hence the firing of previously blocked circuits, meta-circuits, so to speak? (Dick, *VALIS 270*)

It suffices to say here that Dick is invoking a specific language from scientific discourse to explain phenomenal experiences perceived by his brain while working from a first assumption that they are religious in origin.
In various retellings, the moment that Dick receives the initial jolt of information from outside himself, it is associated with a pink laser beam or a pink beam of intense light. In VALIS, the narrator describes the information-bearing light in relation to Fat:

After he had encountered God, Fat developed a love for him which was not normal. It is not what is usually meant in saying that someone ‘loves God.’ With Fat it was an actual hunger. And stranger still, he explained to us that God had injured him and still he yearned for him, like a drunk yearns for booze. God, he told us, had fired a beam of pink light directly at him, at his head, his eyes; Fat had been temporarily blinded and his head had ached for days. It was easy, he said, to describe the beam of pink light; it’s exactly what you get as a phosphene after-image when a flashbulb has gone off in your face. Fat was spiritually haunted by that color. Sometimes it showed up on a TV screen. He lived for that light, that one particular color.

However, he could never really find it again. Nothing could generate that color for light but God. In other words, normal light did not contain that color. One time Fat studied a color chart, a chart of the visible spectrum. The color was absent. He had seen a color which no one can see; it lay off the end.

What comes after light in terms of frequency? Heat? Radio waves? I should know but I don’t. Fat told me (I don’t know how true this is) that in the solar spectrum what he saw was above seven hundred millimicrons;
in terms of Fraunhofer Lines, past B in the direction of A. Make of that
what you will. I deem it a symptom of Fat’s breakdown. People suffering
nervous breakdowns often do a lot of research, to find explanations for
what they are undergoing. The research, of course, fails. (Dick, VALIS
186)

Fat describes the color as an undiscoverable color, but the color pink is the closest
association. Phil’s sarcasm for Fat is obvious and understated at the close of the passage.
His contemptuous sarcasm is also evident when he describes what information Fat
received from the pink beam of light:

The cardinal point which Fat had made to us regarding his
experience with the pink beam which had injured and blinded him was
this: he claimed that instantly – as soon as the beam struck him – he knew
things he had never known. He knew, specifically, that his five-year-old
son had an undiagnosed birth defect and he knew what that birth defect
consisted of, down to the anatomical details. Down, in fact, to the medical
specifics to relate to the doctor.

I wanted to see how he told it to the doctor. How he explained
knowing the medical details. His brain had trapped all the information the
beam of pink light had nailed him with, but how would he account for it? [...

Fat believed that the information fired at him and progressively
crammed into his head in successive waves had a holy origin and hence
should be regarded as a form of scripture, even if it just applied to his son’s undiagnosed right inguinal hernia which had popped the hydrocele and gone down into the scrotal sack. This was the news Fat had for the doctor. The news turned out to be correct, as was confirmed when Fat’s ex-wife took Christopher in to be examined. Surgery was scheduled for the next day, which is to say as soon as possible. The surgeon cheerfully informed Fat and his ex-wife that Christopher’s life had been in danger for years. He could have died during the night from a strangulated piece of his own gut. It was fortunate, the surgeon said, that they had found out about it. Thus again Gloria’s ‘they,’ except that in this instance the ‘they’ actually existed. (Dick, VALIS 187-188)

The birth defect was an inguinal hernia that Dick’s son with Tessa, Christopher, had. Their doctor had not recognized it, but Dick, after this epiphany, went with Tessa to the hospital with Christopher to have him looked at immediately.

In an interview, Tessa Dick contradicts, in part, Dick’s recollection of the events surrounding his son’s life threatening hernia. According to Tessa:

Yeah, well he had that a little messed up in all his books, because he didn’t know anything about it. You can tell, if you know anything about hernias, you know he has it really messed up, except that he knew Chris had a hernia. I had asked the doctor about it about a month before, but I’d never mentioned it to Phil, and the doctor told me to just clean him better when I changed him. I knew that wasn’t the problem, but doctors
are God so you don’t talk back to them. I talk back more than most people.

But one morning Phil thought that --- Chris was lying in bed in his crib babbling --- and Phil thought it sounded like the words of Christ on the cross: “A-wee a-wee, something or other. . .” [Eloi, E-loi, lama sabachthani?: “My God, my God, why have you forsaken me?”]

Phil went back to sleep until about ten o’clock, and by then I was up and so was Chris, and Phil got up out of bed and walked out to the living room, and said, “Chris has an inguinal hernia. Call the doctor.” I called the doctor and made another appointment, and I said, “Chris has a hernia.” The doctor didn’t even examine Chris, he just gave me the name of a specialist, because he still thought I should clean him better. So we took him to Dr. Zahn, which is German for tooth, a circulatory specialist with a title I can’t remember. Anyway, the guy examined Chris and said, “This [hydrocele is] so big only an idiot could miss it.” That’s a lump that shouldn’t be there.” (Tessa Dick, “Interview” 4)

I am no physician, but a simple Google search for this kind of hernia corroborates Dr. Zahn’s observation that only “an idiot could miss it.” Obviously, the enlarged area on his body concerned Christopher’s parents. Could this have been working its way into Dick’s mind and he made a connection during his nap? On the other hand, did a Gnostic entity beyond the planet Earth beam this information into his brain so that he could save his child’s life? In his speeches and writing, it would seem that Dick stood by his more elaborate account, perhaps because it reinforced his interpreted 2-3-74 cosmogony.
Tessa Dick also offers a different and definitely more lighthearted account of the events that began in February of 1974. In fact, her account would seem to fit the picaresque qualities of their transformation in the fictional account of *VALIS*. She begins with the so-called Xerox missive, a letter Dick prophesied that he would receive:

The first event was the Xerox letter, which arrived on a Thursday in February. . . . Phil had been telling me for a week that a letter was going to come in the mail on Thursday, and that “it would destroy him.” . . . Anyway, it was some time later that he had a tooth extracted under pentothal. I dropped him off at the house, and then the cab took me up to get his pain pills. Meanwhile, Phil just went upstairs and passed out, but when I got back with the pain pills he was frantic with the pain. The oral surgeon had done a poor job. . . . Anyway, Phil was in a great deal of pain, so he wolfed down some pain pills, which was not easy for him; he always had trouble swallowing pills. . . . I think it must have been the day after that, not the same day, that Phil was running low on blood pressure medication, so I called for a refill and the pharmacy delivered it, and the girl who showed up to deliver it had the “fish sign” necklace that Phil talked about. The thing was, I was in the kitchen, waiting for the gal to come from the pharmacy, but before I could answer the door, Phil had gotten out of bed and come down the hallway and answered it himself! I thought this was really strange, with him recovering from a really traumatic oral surgery. . . . He was full of codeine, for the pain.
[Regarding] the “fish sign”, you know, he asked her about the necklace because it was unusual, and she told him it was a secret symbol of the early Christians. . . . I had been in the kitchen, and I’d come to the door to answer it, too, so I was right there. . . . I figured he was—he admitted later, too—he had looked at the necklace because he liked boobs. [laughter] That was just an excuse. Anyway, after he went and lay down, after I wrote out the check and the gal left, he had the experience with Seeing the Fish Sign on the wall, across the room. It was an apartment, so naturally all the walls were big, blank, white space. Great for projecting movies onto. (Tessa Dick, “Interview” 6)

From Tessa Dick, we learn that on the day following the tooth extraction his wife orders more blood pressure medication for his acutely high blood pressure at the time. He was taking codeine for the pain of the oral surgery, and while on that medication, he answers the door, ogles the delivery girl, and notices her Christian fish necklace. Nowhere in Dick’s multiple accounts of this apparently crucial moment does he mention the delivery girl’s chest—though, as we see in his letter to Le Guin, he does remark on answering the door, seeing “this girl with black, black hair and large eyes very lovely and intense; I stood staring at her, amazed, also confused, thinking I’d never seen such a beautiful girl” (Dick, Exegesis 4:106). Despite Dick’s proclivities as a self-confessed “girl watcher” in an 1968 autobiographical essay (Dick, “Self Portrait” 13), Tessa Dick continued to defend her ex-husband’s experience as religious in nature. In the August 1988 issue of
The Philip K. Dick Society Newsletter, she writes the editor, agreeing with claims that Dick had suffered strokes around the time of 2-3-74:

In response to Jeremy Crampton, it is almost certain that Phil did experience one or more minor strokes during his March 1974 experience. In April he was hospitalized for extremely high blood pressure. (It was 250 over 180, with medication). It is likely that several things were going on at the same time. We found out in 1976, for instance, that the potassium level in Phil’s blood was much too low. The doctor had been prescribing diuretics for Phil’s blood pressure, but did not prescribe a potassium supplement. A shortage of minerals can cause many strange symptoms.

What makes it impossible to pin down a “cause” for Phil’s experience is the content of his visions. It is one thing for “God” to tell you to get naked at the airport. It is quite another thing for God to tell you that the Savior is coming. I believe that Phil had a genuine religious experience. God did not stop talking when King James had the Bible translated. Maybe we just stopped listening. (Tessa Dick, “Letter” 15)

Tessa staunchly opposes alternative interpretations of Dick’s experiences and his own interpretations. Crampton’s report, to which Tessa responded, included his coverage of Kim Stanley Robinson’s speech at the August 1987 Worldcon where Robinson spoke on his “the theory . . . (and repeated in his Kerosina VALIS afterword) that Dick suffered a
minor stroke on the famous March 1974 incident” (Crampton 13). Crampton also offers his own speculation about Dick’s 2-3-74 experiences:

My own theory (and we all have our own theories don’t we!) is based on VALIS and a passage in A SCANNER DARKLY, in which Dick mentions that he had been taking a lot of vitamin C, and had suffered a drastic drop in the GABA fluid of his brain. This for one thing is an interesting definition problem (is Vitamin C a drug; something Dick swears he wasn’t doing at the time, see also references to IV sodium pentothal in relation to a dental problem) but also along with high blood pressure it seems to produce the symptoms he later complained of. (Crampton 13)

Crampton’s thoughts jive with Dick’s fictional and written accounts of his use of vitamin C—a fashionable supplement regimen of that time—and the effects of lowered GABA in his cerebral spinal fluid. He incorporates this discussion in A Scanner Darkly, and his thoughts on GABA are present in the Exegesis. It is odd though, reading Tessa Dick’s charges against Crampton, because he largely comes down in favor of acceptance of Dick’s work without the need of biologically determinant explanations:

Anyway, I’m not going to stick religiously to this idea, just as I hope Robinson won’t stick religiously to his. I am writing because I would hate to see the stroke idea accepted as gospel before it has been properly checked. In any case, this is really all theorizing after the fact, and we would do well not to lose sight of the fact that whatever this experience
was, it had a profound effect on Dick, and luckily for us, stimulated him to produce many exciting philosophies about life, and some of the best novels he ever wrote. (Crampton 13)

Crampton attempts to bring the discussion back around to the fannish interests of the Newsletter. Since Dick’s work is admired, we should be happy that whatever strange thing happened to him, did in fact happen, because otherwise, we would not have the fruits of his personal elation, unsettling awe, and diligent writing to enjoy.

Tessa Dick reconciles the religious and medical views in an interview passage in Sutin’s biography of Dick:

> The times I think of as “minor strokes” are the times when he stumbled for no apparent reason, when he suddenly turned livid or flushed, when he would blank out in mid-sentence. These were stressful times, and I believe that he was having strokes, although very minor ones. If the spirit had not told him to go to the doctor, he might have died. Although he was supposed to have his blood pressure checked regularly, he would not go to the doctor. There would always be some excuse (usually the flu) for staying at home. The spirit, however, insisted that he go. When he went, the doctor told him to check into the hospital. (qtd. in Sutin, Divine Invasions 223)

Tessa Dick clearly believed that Dick was suffering from dangerous cognitive impairments because of his extremely high blood pressure. In another interview, she says that in April 1973, a year before the 2-3-74 visions, “When we went to get a blood test
for the marriage license, the doctor insisted on a complete physical, and he took Phil’s blood pressure about six times, and made him take the blood pressure medication before he left the office,” (Tessa Dick, “Interview” 3). Then, immediately following 2-3-74, “About a year later he went for his monthly blood pressure checkup, and they said, “You’re going to the hospital.” Phil said, “Okay, I’ll go home and pack a suitcase.” But the doctor said, “No. My nurse is going to walk you across the street to Saint Jude’s and you’re going to check in, and you can call your wife and she’ll bring you a suitcase” (Tessa Dick, “Interview” 3). The doctor’s immediate action to hospitalize Dick was because the writer’s blood pressure “was incredible. It was something like 260 over 180, and he was about to drop dead” (Tessa Dick, “Interview” 3). In April 1973, Dick corroborates his poor health in a letter to his ex-wife Nancy: “The doctor says I have a serious if not dangerous hypertension (physical high blood pressure, not psychological) and it must be controlled. . . . Add that up [hundreds of pages of writing assignments] for a period from February 20 to April 2, and how many pages of writing do you get? A fatal stroke, that’s what” (qtd. in Sutin, Divine Invasions 205). Dick’s blood pressure during the nine or so months preceding 2-3-74 was supposedly under control of his blood pressure medication, but he did not regularly have his blood pressure checked. Added to that, Tessa Dick reports that his doctor should have also prescribed him supplemental potassium, because Dick’s diuretic significantly lowered the potassium level in his body. Most notably, this led to Dick taking “a lot of naps” (Tessa Dick, “Interview” 6). Nevertheless, Tessa reiterates her belief to Sutin that she believes Dick’s 2-3-74 experiences were separate from any pathology: “Were his experiences nothing more than
a series of minor strokes? I doubt it, although I have no doubt that he was also having strokes” (qtd. in Sutin, *Divine Invasions* 223).

At a panel at Armadillocon 10 in 1988, Dick’s friends K. W. Jeter and Tim Powers offer their own thoughts on 2-3-74.

Jeter: There is a theory about some of those events that Phil was suffering from a stroke at that time, either a mild stroke or a pre-stroke condition. However Phil, because of his medical condition, was very well conversant with those “symptoms”; and talking to other people medically trained, there’s really no evidence that whatever happened it was related to a stroke or pre-stroke condition. Whatever it was, whatever happened, it was not a medical catastrophe happening.

Powers: And I’d say, I think it was God. I think he did have some real serious experience. I hope you don’t think I’m all crazy . . . (Jeter and Powers 13)

While Jeter does not buy into medical reasons for Dick’s visions, Powers goes as far as to say that he believes Dick did receive his visions from God. Dick’s biographer, Lawrence Sutin, takes a different tact against what Tessa sees as reductionism:

Either the books speak to you, or they don’t. If they do, you had best pay attention to what they are saying—and put aside the reductive diagnostic labels. . . . My own view is that the question of Phil’s being crazy or not is a goddamn waste of time. . . . If you slap a label of “crazy” on all this, what do you get in return? Certainly not a richer understanding of Phil’s
writings, or of his life, or of your own. The same holds true for the label of “temporal lobe epilepsy,” which does not bear the same stigma as “schizophrenia” (though there is no good reason why there should be a difference in stigmatization between these two involuntary illnesses), but is the equally futile—and ultimately unverifiable—as an encompassing explanation of Phil’s life and work. (Sutin, “Confessions” 2)

It is this attitude towards “reductionism” that I challenge in this chapter. Finding a label and calling it a day are not what I intend to do. My goal has always been to enrich our understanding of Dick’s fiction and his life by interpreting both through alternative lenses than those provided by the author. Accepting what is on the surface of Dick’s fiction seems to me to be another form of reductionism—the acceptance of what is, as it is for a particular reader. Can we not complicate that reading with commentary from alternative viewpoints including the neurosciences? What might the science of the brain tell us about the fantastic experiences of this uniquely talented writer? I think it is evident in what precedes this passage and what follows that I strive towards a deeper understanding while resisting simplistic, reductive explanations. Furthermore, I argue that others, including Eve LaPlante, are also working toward richer understandings of cultural works and of those persons who generate them.

No one was more interested in reductive reasoning, at least in spirit, than Dick himself. In seeking an answer to the riddle presented by 2-3-74, Dick sought alternative explanations. He would test these in the experimental sense, and in turn, he would discard those hypotheses that did not yield results. Returning to VALIS, after Fat appears to have
been correct about Christopher’s diagnosis, Phil cannot contest Fat’s experience, and he reasons that he would have similarly taken up writing about it:

> No wonder Fat started scratching out page after page of his exegesis. I’d have done the same. He wasn’t just theory-mongering for the sake of it; he was trying to figure out what the fuck had happened to him.

If Fat had simply been crazy he certainly found a unique form, an original way of doing it. Being in therapy at the time (Fat was always in therapy) he asked that a Rorschach Test be given him, to determine if he had become schizophrenic. The test, upon his taking it, showed only a mild neurosis. So much for that theory. (Dick, *VALIS* 269)

There was immediacy to Fat’s attempt at understanding what had happened and continued to happen to him. Besides writing, Fat tries other routes to an explanation such as having a doctor test him for schizophrenia, which did not pan out. This was a theory that he could discard based on the new acquisition of evidence. Yet, Fat’s theories were rather ornate. After seeing a homemade pink laser beam shown on their bodies by two neighborhood kids, Phil asks Fat if that light were like the light he saw when the information was beamed into his brain:

> He said nothing. But I had the impression that he was not being up front with me. I had the feeling that I had seen his color. Why he would not say so, if such it was, I do not know. Maybe the notion spoiled a more elegant theory. The mentally disturbed do not employ the Principle of
Scientific Parsimony: the most simple theory to explain a given set of facts. They shoot for the baroque. (Dick, *VALIS* 187)

The Principle of Scientific Parsimony, a version of Occam’s Razor, is avoided—the minimum hypothesis, likewise, falls out of proper employment. Dick struggles with clear, simple explanations and elaborate, grand theories. Yet, the simplest explanation or interpretation is not necessarily the least interesting or insightful. While reductionist, it can avoid the overly ornamental baroque that Phil attributes to the “mentally disturbed” like Fat.

The intense desire on Fat/Philip K. Dick’s part to rediscover/re-experience the pink color is indicative of one possible explanation for Dick’s intense exploration that spanned years, novels, and the *Exegesis*: temporal lobe epilepsy. I quote this passage from Jackson and Lethem’s introduction explaining this at length due to its importance to this chapter:

Anyone interested in suggesting a medical, psychiatric, neurological, or pharmacological context for the experiences and behavior surrounding Philip K. Dick’s *Exegesis*—and by “behavior” we mean, of course and above all, the writing of the thing itself—will be spoiled for choice. Dick offers a wealth of indicators suggestive of bipolar disorder, neurological damage due to amphetamine abuse, a sequence of tiny strokes (it would be a stroke that killed him in 1982), and more. Within these pages, Dick mordantly speculates on a few himself.
The decades since Dick’s death have been fertile ones for popular neurological case histories, frequently of creative people (call it the Oliver Sacks era). It is likely that had Dick lived longer, he would have been drawn to project his own neurological metaphors for his visionary experiences; in particular, it is hard to imagine that his restless mind would not have been eager to explore what Eve Laplante, in her 1988 article in the *Atlantic Monthly*, called “The Riddle of TLE” (temporal lobe epilepsy). The cause of electrical seizures in the brain less dangerous, and more diagnostically furtive, than grand mal epilepsy, TLE is associated in certain cases with hypergraphia (superhuman bouts of writing) and hyperreligiosity (“an unusual degree of concern with morality, philosophy, and mysticism, sometimes leading to multiple religious conversions,” in Laplante’s words.) Among the historical figures whose profiles are suggestive of a retroactive TLE diagnosis are Dostoyevsky, St. Theresa of Avila, Emanuel Swedenborg, and Van Gogh.

Temporal lobe epilepsy has, reasonably enough, drawn attention from Dick’s biographers, and we should not hesitate to mention it here. Yet . . . neurologist Alice Flaherty . . . cautioned that one of any number of medical causes might easily account for Dick’s hypergraphia—a TLE diagnosis is far from a foregone conclusion. Indeed, it is worth noting that Dick described hallucinatory experiences of one kind or another going back as far as grade school; that his earliest writing prefigure the
ontological and moral concerns exhibited about 2-3-74; and that his boggling literary productivity during his aspirant years and first ascendancy, from 1952 to 1964, could easily be labeled “hypergraphic.” Dick’s Exegesis is a site, then, where we reencounter one of the defining mysteries of our scientific age: the persistent elusiveness of a satisfying description of the full activities of “mind”—that is, consciousness—even as the mechanism of the biological brain yields itself increasingly to our understanding. (Jackson and Lethem xix-xx)

Dick has a long history of hypergraphia, but his early writing output was likely fueled by his use of amphetamines. Later in life, there seems to be a resurgence of intense writing, but this follows a period of relatively low output in the late 1960s and early 1970s. Of course, Dick’s personal life was chaotic and not conducive to writing (as was his earlier periods of domesticity supported by his ex-wives).

It seems highly likely that there are multiple causative agents involved in the change from Dick’s writing lull in the late 1960s to his rapid hypergraphia after 2-3-74. We know for a fact that Dick suffered from high blood pressure and hypertension before his experiences. We also know that his medication lowered his potassium levels, by how much we do not know, by the diuretic he was taking. We know that the lowered potassium, at a minimum, likely produced fatigue. If his potassium levels were extremely low, it could have generated neurological problems due to potassium’s importance to proper neurological function (Carter et. al. 72-73).
This incredible development in his health seems to be a strong catalyst for his visions and change in writing habits, because high blood pressure can have detrimental effects on one’s brain. Certainly, temporal lobe epilepsy is a long circulating possibility, and it can come about from stroke or transient ischemic attacks (temporary arterial blockages) (“epilepsy” par. 4). Perhaps we should be content having Dick’s fiction to enjoy, but I feel that we can gain additional insight into the creative process and the meaning derived from Dick’s fiction by learning more about the writer’s health during his life. Certainly, his collected letters and omitted items from the Exegesis might hold further clues to expanding the discourse surrounding this influential writer.

The Divine Invasion and Conclusion

To close this chapter, I turn to Dick’s penultimate novel The Divine Invasion (completed 1980, published 1981). It is actually the second book in the VALIS trilogy (beginning with VALIS and ending with The Transmigration of Timothy Archer), and it explores Dick’s Gnostic revelations through an ontologically shifting science fiction narrative. Even though Dick calls these three works a trilogy, they are so only in terms of a shared cosmogony and not in terms of character or narrative. In addition, Dick writes in his Exegesis that of his novels, Flow My Tears, the Policeman Said, A Scanner Darkly, VALIS, and The Divine Invasion, only the latter, “is not autobiographical,” and it is “a
projected answer, theoretical” (Dick, *Exegesis* 75:D-3). While the question must be what happened to the writer in 2-3-74, he can only say, “[It] shows I know what the answer is (I just can’t find it)” (Dick, *Exegesis* 75:D-3). Told in flashback (as is the later *Transmigration*), *The Divine Invasion* begins with the admission of Manny, a child to school. We learn that Manny is actually Emmanuel/Yah, one half of the godhead, who was immaculately conceived within the womb of Rybys Romney, who is dying of multiple sclerosis in the CY30-CY30B star system. Yah commands Rybys' neighbor Herb to join her on her journey to Earth with Yah hiding in her womb. The prophet Elias Tate/Elijah also joins them on the journey back. Yah's plan is to return to Earth to fight Belial/Satan, who has taken control of humanity and placed everyone within the Black Iron Prison reality (discussed also in *VALIS*). Upon their return, Belial orchestrates an accident that places Herb in suspended animation awaiting an organ transplant; Rybys dies; medical personnel place Emmanuel in an artificial womb; and Elias takes Emmanuel from the hospital and lives without attracting the attention of the authorities.

When Emmanuel begins school for special children, due to his having brain damage from the accident that divides his divine self/knowledge from his waking self, he meets Zina Pallas, a little girl who is charged with helping him remember. She is in fact the other half of the godhead, who stayed behind on Earth to help mortals. She changes the world so that Herb never leaves Earth; Herb and Rybys (who is still alive) divorce; Elias transforms from white to black and works for Herb; and Herb meets his music idol, Linda Fox. Linda turns out to be the Beside-Helper, who saves Herb from Belial and Herb believes that he feels real love for Linda.
After generating the disturbing possibility of Bob Arctor/Fred’s split brain in *A Scanner Darkly*, Dick explores a more hopeful version of the split-brain phenomenon in terms of his cosmological thinking at the time with the divided godhead embodied in the characters Emmanuel and Zina Pallas. In order to destroy Belial, the demiurge and imprisoner of humanity in the Black Iron Prison, Emmanuel or Yah, one half of the godhead, attempts to return to Earth. He has “programmed” himself to forget why he is there and who he really is. However, he left behind the feminine half of the godhead embodied as Zina Pallas, a little girl at the school who knows Manny. She is the Torah or Shekhina, God’s manifestation on Earth. She intends to help Emmanuel remember what he has forgotten: He is En Sof, the transcendent part of God. Belial assumed control over Earth after what Elijah tells Herb was a break of the godhead into two bodies: “There was a rupturing of the Godhead. A primordial schism. That's the basis of it all, the trouble, these conditions here, Belial and the rest of it. A crisis that caused part of the Godhead to fall; the Godhead split and some remained transcendent and some . . . became abased.

Fell with creation, fell along with the world. *The Godhead has lost touch with a part of itself*” (Dick, *Divine Invasion* 524). With Zina’s nurturing and playful help, she guides Emmanuel, the masculine half of the Godhead to remember what he had lost as a result of the cataclysmic split accompanied by Belial’s triumph over the Earth. Unlike Arctor/Fred (although can we say that Bruce is a new unity for his divided identity?), Emmanuel and Zina rejoin as the Godhead and heal the split:

Hand in hand, Emmanuel walked with Zina through the dark woods of Stanley Park. “You are myself,” he said. “You are the Shekhina,
the immanent Presence who never left the world.” He thought, the female side of God. Known to the Jews and only to the Jews. When the primordial fall took place, the Godhead split into a transcendent part separated from the world; that was En Sof. But the other part, the female immanent part, remained with the fallen world, remained with Israel.

These two portions of the Godhead, he thought, have been detached from each other for millennia. But now we have come together again, the male half of the Godhead and the female half. While I was away the Shekhina intervened in the lives of human beings, to assist them. Here and there, sporadically, the Shekhina remained. So God never truly left mankind.

“We are each other,” Zina said, “and we have found each other again, and again are one. The split is healed.” (Dick, Divine Invasion 576)

At this point in the narrative, the two halves of the Godhead maintain separate corporeal bodies. They have not yet returned to a gestalt or unity of consciousness. After Linda Fox saves Herb from Belial, Emmanuel appears one final time to tell Herb that he will not see him again with a corporeal body:

“Not as you see me now. Not as a human figure such as yourself. I am not as you see me; I now shed my human side, that derived from my mother, Rybys. Zina and I will unite in a syzygy which is macrocosmic; we will not have a soma, which is to say, a physical body distinct from the world. The world will be our body, and our mind the world's mind. It will
also be your mind, Herbert. And the mind of every other creature that has
chosen its yetzer ha-tov, its good spirit. . .” (Dick, Divine Invasion 610)

After Herb’s success, thanks to Linda Fox, over Belial, the Godhead will reunite as the
world itself with a consciousness spanning all minds aligned with their cosmogony. I
cannot take the time here to elaborate on the science fictionality of self-consistent,
technical religious systems as the one Dick has obviously done his homework to develop
in this novel. However, I do want to point out that Dick’s bit of religious invention in the
story has to do with connecting Emmanuel and Shekhina as two halves of the Godhead
and the eventual “world’s mind.”

In The Divine Invasion, Dick adds the language of brain and mind to
God/Emmanuel and God’s embodiment on Earth to Shekhina/Zina. Generally speaking,
God and Shekhina are the same thing in the Judeo-Christian tradition. However, in the
novel, Dick divides them into two different parts of a singular whole “mind” as a means
to explain how the Black Iron Prison, or the world as we perceive it, has been erected by
Belial, who played a role in the division of their once unified mind. Dick mentions
Shekhina four times in the Exegesis, but the most significant passage has to do with his
thoughts on Kabbalistic significance to his 2-3-74 experiences and the so-called AI
(artificial intelligence) voice he occasionally heard speak to him during that time. He
wrote in January 1980, the same year as he completed The Divine Invasion:

I am sure that the plasmate . . . is the living Torah, the
informational basis of reality, and my 2-3-74 experience was
Kabbalistic—hence my seeing the Hebrew letters on the far wall by which
the code (?) (or subliminal material as key) in the Xerox missive was factored out. I mean, one of the few precise elements I have that I can go on is this Kabbalistic Jewish mysticism angle. And the huge book pages I saw could have been the Torah.

I could be in communication with the Shekhina or the Torah itself (the AI voice). (Dick, Exegesis 49:1043)

This requires some unpacking. According to the glossary of The Exegesis of Philip K. Dick, “plasmate” is “A Dickian neologism roughly equivalent to ‘living knowledge’ and another cognate for VALIS. Dick often felt that he had bonded with the plasmate in 2-3-74 and that, as a result, he had a second self dwelling within his psyche, making him a homoplasmate. Dick often regarded the plasmate as the living transmission of the Gnostic goddess Sophia” (“Plasmate”). In The Divine Invasion, Emmanuel identifies Zina as, among other religious/mystical identities, “you are Hagia Sophia, Holy Wisdom; you are the Torah which is the formula and blueprint of the universe; you are Malkuth of the Kabala, the lowest of the ten sefirot of the Tree of Life; and you are my companion and friend, my guide” (Dick, Divine Invasion 569). Thus, Zina is Sophia, the one who sends the living transmission to Dick. Apparently, Dick collapses these different religious identities into, for lack of a better term, a religious archetype. In this case, that archetype is Sophia, the originator of the plasmate. Furthermore, Dick’s belief that he had bonded with the plasmate in 2-3-74 makes him a homoplasmate, a host to two selves: Philip K. Dick and the plasmate, which according to Sutin’s biography, is often identified as a first century Christian named Thomas. Without surgical intervention or drug-induced toxicity,
Dick has achieved through his introspective exploration what he identifies with Emmanuel here and Arctor/Fred in *A Scanner Darkly*: two minds in one brain.

Based on evidence in his *Exegesis*, it appears that Dick’s already well-developed cosmogony received an insightful boost from something he read about in the March 14, 1977 issue of *Time* magazine: Julian Jaynes’ 1976 book *The Origin of Consciousness in the Breakdown of the Bicameral Mind* (Dick, *Exegesis* 27:41). Jaynes argues, “that at one time human nature was split in two, an executive part called a god, and a follower part called a man. Neither part was conscious” (Jaynes 84). Essentially, the two hemispheres of the brain did not operate cooperative to give rise to an emergent, unified consciousness that could do meta-cognition—essentially, there was no Theory of Mind or any other recursive meta-oriented process that an “I” could recognize or control. One side of the human brain could recognize and verbalize, but the other side issued orders interpreted by the control side as god-like orders to be followed. Dick records in the *Exegesis*:

> Jaynes’ theory fills in some vital missing parts. Originally we possessed bilateral hemispheric parity—I had guessed that. Our right brains are dormant. Bilateral hemispheric parity is not an evolutionary leap upward in one sense—in that sense it is a restoration. But this time there will be consciousness, not unconsciousness, in the two hemisphereres. So in that sense it is evolutionary. Anyhow, the state I was in in 3-74 is it. . .

I guess I’m a pioneer, along with other pioneers, in “the Brain Revolution.” I’ve had the bicameral experience, and my theorizing isn’t bad, either, my exegesis. (Dick, *Exegesis* 27:41)

This passage is three years into the *Exegesis*, and yet, Dick is already accommodating this new datum into his cosmogony. It provides Dick with a clever new tactic for explaining the voices and other phenomenal experiences on 2-3-74. In addition, it provides Dick with a terminology and conceptual framework within which to place his own experience. With this framework in mind, Dick argues:

If as Jaynes figures, the Gods are in our right hemispheres (but now ‘silent’) I amend this to say, “the Gods, still in our right hemispheres, still command us, but now do so without our knowing (1) of them being there; and (2) that they so command us—one of their (its) commands being, “you hear nothing and do not know that you do as we say.” (Dick, *Exegesis* 27:47)

While sounding reasonable, Dick’s maneuver is largely sleight-of-hand. He is comfortable commanding theories such as this in order to propel his own cosmogony into new territories and to greater heights. In the next passage, Dick then elaborates on the origins of his other self, Thomas:

The ‘Thomas’ personality *always* had existed, *always* had exercised definitive control, but unbeknownst to the left. ‘Thomas’ did not ‘wake up,’ he just thresholded. So I say to Jaynes: the Gods’ voices only *seem* to have become silent. They still operate us but we are commanded to be
oblivious to this. Just as Zebra operates externally always but we can’t see him, the ‘Thomases’ operate internally and we’re unaware of them equally; and I saw they—Zebra and the Thomases—are one and the same. Then ‘Thomas’ was my experience with the mind of Zebra, and ‘Thomas’ characteristics are his; I apprehended Zebra from ‘without’ and ‘within.’

(Dick, *Exegesis* 27:49)

Dick further collapses Thomas into Zebra (the plasmate) by drawing on Jaynes’ theory of the bicameral mind. With this new approach in hand, Dick extrapolates how it might explain his 2-3-74 experiences. He is already heavily invested in Gnosticism—not only from his own cosmogony, but also evidenced by the writer’s employment of its key ideas in many of his fictions—but Jaynes’ theory provides a way that he can accommodate the supposed biology of his brain as being rooted in a bicameral past. If anything, Jaynes provides some historical/scientific balance to Dick’s already elaborate explanations for 2-3-74. This is one among many places in Dick’s *Exegesis* where the writer adopts scientific theories to bolster his ideas about what happened on 2-3-74. It seems at these points of interpretation that Dick has lost sight of what Jeter calls the “minimum hypothesis” or by any other name, Occam’s razor. Nevertheless, Dick argues at length that the bicameral mind plays some role in his experiences in 2-3-74 and afterward. It would seem that his elaborations of his own bicameral mind while writing *The Divine Invasion* establishes some level of correspondence with the two halves of the fictional Godhead: Emmanuel and Zina. Despite having said that this novel was the only one of his last works that was not autobiographical, it appears that *The Divine Invasion* has
much to do with Dick’s belief in his own brain’s return to a bicameral state and its reinscription of his Gnostic theories.⁴

Ultimately, the trajectory in these fictions seems to be Dick’s fusion of himself with his writing and his fusion of the religious with the scientific. He sought understanding through written introspection and rigorous interpretation. Dick relied on his brain—as receiving organ of the visual and auditory hallucinations of 2-3-74 and as the interpretive organ of the perceptions and memories generated by those personal ordeals. It seems that Dick’s opus, especially the *Exegesis* proves Darko Suvin’s claim in his groundbreaking work *Metamorphoses of Science Fiction: On the Poetics and History of a Literary Genre*, “All attempts to transplant the metaphysical orientation of mythology and religion into SF . . . will result only in pseudomyths, in fragmentary fantasies or fairy tales” (Suvin, *Metamorphoses* 26). On the other hand, I believe that while Dick was not evangelizing for a new church, he accomplished much in his work, including something more than “fragmentary fantasies or fairy tales.” Dick himself writes in his *Exegesis* another solution rooted deeper in philosophy than religion:

> I am a fictionalizing philosopher, not a novelist; my novel and story writing ability is employed as a means to formulate my perception. Thus what I tell is the truth, yet

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⁴ Ronald S. Green’s “The Gnosis of 2-3-74” in D.E. Wittkower’s *Philip K. Dick and Philosophy* provides further details about Dick’s beliefs and how those colored his interpretation of 2-3-74.
I can do nothing to alleviate it, either by deed or explanation. (Dick, Exegesis 75:D-9)

Is Dick attempting at a collapse of oppositions: fiction and philosophy, make-believe and truth? Perhaps he is through his own “means to formulate my perception.” This could mean that he aims to formulate or put into words his perception, but it could equally mean, in terms of the *Exegesis*, an actual formulation or creation of Dick’s perception. He then claims that what he tells, in his writing, is the truth, but he cannot do anything to make the problem—the apparent insolvability of reality—less severe. While he does base some of his conjectures on Western and Eastern philosophical traditions, Dick firmly attaches his theories to Judeo-Christian and Gnostic Christian traditions. This could be a further attempt by Dick to collapse the problem, because he must strongly believe on some level the truth in the religious-philosophical traditions he brings to bear on the problem. He positions these alongside the neurosciences and other hard sciences such as physics—an equal footing for different domains of knowledge. Perhaps this was the lead Dick was following, but he could never quite grasp it. Rather than lamenting its insolvability, the solution might have simply to continue the process—generating reality as process rather than seeking reality as substantive, eternal form. This, of course, is simply one conjecture. This is perhaps the lesson to take away from Dick’s ordeals and his truthful fiction: that ontological perception and belief depend on what make us each human—the human brain.
CHAPTER 5

William Gibson’s Cyberspace Exists within the Human Brain

Introduction

William Gibson, a founding member of the so-called cyberpunk movement, transforms the science fiction mega-text inherited from Isaac Asimov and Philip K. Dick through conscious narration of global capital and street culture through the lens of the digital revolution and the emergent computer age.\(^1\) In the previous two chapters focusing on Asimov’s and Dick’s fictions, I show how these authors deploy artificial brains to explore human brains and its generation of the human experience. Asimov draws on the

\(^1\) William Gibson (1948-) is a science fiction writer whose central interests are the social effects of the circulation of capital and the growing symbiosis between humans and computing technologies. There are multiple claims to his literary heritage—he was born and raised in the American South, but he wrote his published fiction in his adopted homeland, Canada. Beginning with the Sprawl trilogy, his fiction has chronologically regressed from the future, to the near future, and most recently, to the near past. Gibson holds a BA in English literature from the University of British Columbia (1977).
emerging science of cybernetics to model human thought with robot brains. Of course, the imposition of the Three Laws of Robotics creates its own limitations and unexpected directions for the interaction of his artificial beings with humanity. Dick explores the broad spectrum of human experience by questioning what constitutes the human and what constitutes the artificial being, the android. He points to the interconnection between theory of mind and empathy as the hallmark for true human experience while he also acknowledges outliers on the edge of human experience (e.g., the schizophrenic and so-called bicameral man) that obviously destabilize what it means to be human. I will show that Gibson’s work builds on the literary history of science fiction, including the work of Asimov and Dick, just as Bruce Sterling says of all the cyberpunk movement in general: “Cyberpunk is a product of the Eighties milieu . . . But its roots are deeply sunk in the sixty-year tradition of modern popular SF” (Sterling x).²

Gibson, who acknowledges influence going all the way back to Hugo Gernsback in his short story, “The Gernsback Continuum” (1981) and Philip K. Dick in his essay, “Some Blues for Horselover Fat” from the fanzine Wing Window #2 (1982), cogently reinvents the ideas of robots and androids as the disembodied artificial intelligence (AI) inhabiting the virtual world known as cyberspace (Gibson’s major contribution to the cyberpunk movement).

² Cyberpunk is a subgenre of science fiction that offers critiques of the present—particularly concerning class, gender, and technology—through primarily near future narratives following postmodern and experimental styles. Other writers recognized as or accepting of the cyberpunk label include: Bruce Sterling, Pat Cadigan, Rudy Rucker, Lewis Shiner, John Shirley, and Greg Bear.
modern lexicon) as well as places the cyborg—from console cowboys to razor girls—as the \textit{de facto} posthuman of the future (cyborgs are ubiquitous in his fiction—he need not use the name). This chapter specifically focuses on the meeting of human brains and computer technology as the next extrapolated point from Asimov’s robots and Dick’s technologization of the human. Concentrating primarily on the cyberspace experiences of Henry Dorsett Case and McCoy “Dixie Flatline” Pauley in Gibson’s major work \textit{Neuromancer} (1984), Automatic Jack and Bobbie Quine in the touchstone short story “Burning Chrome” (1982), and Angela Mitchell in the two sequels to \textit{Neuromancer}: \textit{Count Zero} (1986) and \textit{Mona Lisa Overdrive} (1988), I argue that cyberspace is not a technologized space—instead, it is completely dependent on the human brain’s ability to translate mediated visual and proprioceptive information through a mediating technological device, the cyberspace deck. Despite the overwhelming emphasis on computers, networks, and software in these fictions, the narrative is always dependent upon the character’s brains to realize the virtual space that their disembodied selves apparently inhabit in cyberspace. Through this discussion, I attempt to answer: Where is cyberspace? How do different characters experience it? Finally, what does cyberspace mean in a contemporary context outside of these narratives?

Case in \textit{Neuromancer}, Part 1
Neuromancer is, briefly, a straight-shot caper, a noir wrapped in science fiction’s clothing. Gibson gives his novel’s antihero the name of “Case.” Washed-out and hustling on the streets of Chiba, Japan after his former employers nuked Case’s ability to enter or jack into cyberspace, he is given an opportunity to have his damaged nerves rebuilt in exchange for performing a run for a shadowy boss. Following his surgical intervention, Case returns to the exaltation of cyberspace. With the help of his partner, razor girl Molly, Case learns that he is really working for an artificial intelligence named Wintermute.\(^3\) Even in this near future where transnational corporations rule the day, AIs have strict limitations placed on their autonomy, but Wintermute and its sibling Neuromancer have developed ways around the Turing Registry’s controls to fulfill their own ends. Before her death, the original Marie-France programs Wintermute to merge with Neuromancer and to form a super AI, but Neuromancer wants to have no part in the Wintermute’s plan. This AI conflict puts Case in the middle of a struggle that spans the physical world and the virtual world of cyberspace.

This novel received considerable attention following its run on the three big science fiction awards. Most fans and scholars identify Neuromancer as the defining work of fiction of the cyberpunk subgenre of science fiction. Following the novel’s

release in 1984, Gibson made a breathtaking run on the biggest awards bestowed by the science fiction community. The writer’s winning streak began with his receiving the third annual Philip K. Dick Memorial Award for best new paperback-only released novel from Dick’s youngest daughter Laura Coelho on March 17, 1985 at NorwesCon (Brown, “William Gibson Wins” 1). On May 4, 1985, he won the Nebula Award for Best Novel from the Science Fiction Writers of America (SFWA) at their twentieth anniversary banquet (Brown, “Gibson . . . Nebula” 1). Finally, WorldCon members honored Gibson in absentia with the most respected prize in the field, the Hugo Award for Best Novel from World Science Fiction Convention members at Aussiecon Two held from August 22-26, 1985 in Melbourne, Australia (Brown, “Gibson . . . Hugo” 1). Furthermore, *Neuromancer* has received considerable critical attention. For example, Fredric Jameson sees Gibson’s fiction as exemplary of the postmodern:

Such narratives, which first tried to find expression through the generic structure of the spy novel, have only recently crystallized in a new type of science fiction, called *cyberpunk*, which is fully as much an expression of transnational corporate realities as it is of global paranoia itself: William Gibson’s representational innovations, indeed, mark his work as an exceptional literary realization within a predominantly visual or aural postmodern production. (Jameson 38)
Certainly, global networks of capital form the fabric out of which the novel is figuratively cut, and others have said much of this. In addition, transnational capital makes its cyborg characters possible, because without intensive research and development by the collaboration of nation-states and corporations, the invasive technologies of posthuman transformation would not have been possible. I intend to take this discussion in a slightly different direction and turn back toward the inner vision of Asimov and especially Dick. I will argue in this chapter that the fantastic technologies that mediate the human subject’s experience of virtual worlds remain dependent upon the human brain’s biological structure and embodiment. Even during the exaltation of disembodied experience of cyberspace, Case and other Gibsonian characters remain in the body and any attempt to completely escape the body means flatlining, i.e., EEG representation of brain death. What that might mean will be explored, but as Gibson fondly points out in his fiction, it gets, ah, metaphysical.

The novel’s title provides us with an interesting point of entry due to its unusual neologism: Neuromancer. In the novel, we learn that Neuromancer is one of the artificial

intelligences (AIs) orchestrating the movements of the human characters. In a sense, the AIs are the networks of capital come alive. They exist behind the scenes of the Tessier-Ashpool clan’s mega-corporate operations—enabling the Tessier-Ashpools to amass considerable wealth while they go in-and-out of cryogenic hibernation—enjoying their wealth over larger swath’s of time than anyone except those capable of affording such luxuries. We can take apart the title in a variety of ways like so many Lego bricks: Neuro|mancer or Neu|romancer. In the former configuration, ‘neuro’ points to the ‘neurological,’ ‘neuron,’ or ‘neural,’ meaning relating to the nervous system, while ‘mancer’ leads us to ‘–mancy’ or the Old French –mancie and its Latin root –mantia and finally, the Greek manteia, meaning divination. This combination could mean divination of the brain or the nervous system, or seeking knowledge of the unknown by cognitive means. The latter configuration begins with ‘neu,’ which sounds like ‘new,’ while romancer could mean someone who enjoys excitement and mystery or someone who writes romances in the classical sense of chivalric heroes. Considering these meanings, the title could point toward a new kind of romance, but as we know, it is certainly not a chivalric tale. Instead, this novel takes science fictional tropes and other generic themes, for example from the noir mystery, and transforms them into a new form that refutes those old styles and narratives through postmodern pastiche. Both of these elaborations will be useful for the following discussion of the novel, but I will emphasize the former’s significance over the latter.

Gibson provides the reader with an ambiguous handle for the character’s name that forms the title of the book. Near the end of the novel, Case talks with Neuromancer
in an artificial world it creates in cyberspace for Case and his (dead) girlfriend Linda Lee in an attempt to thwart Case’s efforts to fuse Neuromancer with Case’s boss, the AI called Wintermute. On the shore of the beach in Neuromancer’s virtual realm, Case, with Linda sitting beside him, speaks to a boy who approaches them:

“I know you,” Case said, Linda beside him.

“No,” the boy said, his voice high and musical, “you do not.”

“You’re the other AI. You’re Rio. You’re the one who wants to stop Wintermute. What’s your name? Your Turing code. What is it?”

The boy did a handstand in the surf, laughing. He walked on his hands, then flipped out of the water. His eyes were Riviera’s, but there was no malice there. “To call up a demon you must learn its name. Men dreamed that, once, but now it is real in another way. You know that, Case. Your business is to learn the names of programs, the long formal names, names the owners seek to conceal. True names. . .”

“A Turing code’s not your name.”

“Neuromancer,” the boy said, slitting long gray eyes against the rising sun. “The lane to the land of the dead. Where you are, my friend. Marie-France, my lady, she prepared this road but her lord choked her off before I could read the book of her days. Neuro from the nerves, the silver paths. Romancer. Necromancer. I call up the dead. But no, my friend,” and the boy did a little dance, brown feet printing the sand, “I am the dead, and their land.” He laughed. A gull cried. “Stay. If your woman is a ghost, she
doesn’t know it.

“Neither will you.” (Gibson, *Neuromancer* 243-244)

The seemingly innocent boy tells Case that he must know the boy’s “true name” instead of his Turing name—the former being private, like an incantation, the thing that is the essential name or Platonic form of the boy, while the latter is a public name from the Turing Registry, an organization that enforces regulations over the cognitive abilities and resource capabilities of AIs. Given the mythopoeic sense of a true name giving the holder power over the one named, the boy challenges Case to know his true name, because that would give him the same power over him as if he knew “the names of programs, the long formal names, names the owners seek to conceal.” Neuromancer, posing as the boy, is not afraid of Case, so he gives the cyberspace jockey his true name.

The place that Neuromancer has resurrected Linda is “the lane to the land of the dead,” a virtual space where Neuromancer can substantiate the dead with RAM or random access memory, as opposed to the Dixie Flatline, who is Read Only Memory. The difference between the two is that the RAM version of Linda can grow and change, she is a digital version of the once living person, a continuation of Linda’s light cone, to borrow an analogy from physics; but the ROM version of the Dixie Flatline is that his personality

5 Gibson is likely also alluding to an early proto-cyberpunk novella by Vernor Vinge titled “True Names.” Appearing in 1981, a year before Gibson’s “Burning Chrome,” Vinge formulates a computer-generated, experiential space akin to Gibson’s cyberspace. Vinge’s version of cyberspace is called the “Other Plane,” and the story is heavily laden with mystical and fantastic imagery.
and consciousness are trapped in a single state, a break with the past and future, not living but existing in an ever-present state. Unlike Linda, who Neuromancer was able to ‘read’ while she was alive, Neuromancer laments not being able to have read his creator’s book before her husband killed her. Then, Neuromancer tells Case the etymology of his name—similar to my comments above, but we learn the writer’s formulation and we see the character’s performance inform that provided derivation. ‘Neuro’ points toward the nerves, the lanes of access to the human brain, while ‘romancer’ is not defined within the text. Again, it could be someone who writes in the romantic style, but as we learn from Neuromancer’s exploits to thwart Case’s progress at fusing the AIs into a superintelligence, this part of his name likely indicates he is someone prone to exaggeration or lying. I believe that Neuromancer is evoking Epimenides’ paradox: “All Cretans are liars.” Is Neuromancer also a liar? Can AIs be trusted? Case runs this problem by his dead cohort, Dixie Flatline:

“Listen, Dix, and gimme the benefit of your background, okay? Armitage seems to be setting up a run on an AI that belongs to Tessier-Ashpool. The mainframe’s in Berne, but it’s linked with another one in Rio. The one in Rio is the one that flatlined you, that first time. So it looks like they link via Straylight, the T-A home base, down the end of the spindle, and we’re supposed to cut our way in with the Chinese icebreaker. So if Wintermute’s backing the whole show it’s paying us to burn it. It’s burning itself. And something that calls itself Wintermute is trying to get
on my good side, get me to maybe shaft Armitage. What goes?” (Gibson, *Neuromancer* 131)

Case knows at this point in the narrative that there are two AIs—Wintermute, who is secretly funding his operation ‘runs’ on a mainframe in Berne, Switzerland, and the other one is in Rio de Janeiro. Case first learns the name ‘Wintermute’ from Lupus Yonderboy, the Panther Moderns leader who Armitage contracts for the Sense/Net run to acquire the Dixie Flatline. The Panther Moderns are a fictional prototype for hacktivism groups like Anonymous or Lulzsec. The Finn, a fence who deals in stolen goods—particularly computer components and data, tells Case that Wintermute “is the recognition code for an AI. I’ve got the Turing Registry numbers. Artificial intelligence. . . . If Yonderboy’s right, . . . this AI is backing Armitage” (Gibson, *Neuromancer* 73). Even in the future world Gibson creates in *Neuromancer*, AIs lack a right to autonomy. As discussed above, AI autonomy threatens human autonomy due to the unpredictability of the non-human AI mind. Case wants to know what motivates the AIs to be doing what they are doing. Why have they hired Armitage, Molly, Riviera, and Case? Perhaps the Dixie Flatline has a unique perspective on this question, because he now exists as an executable program, saved as ROM, a Sense/Net “snapshot” of the hacker McCoy Pauley’s mind before he died. Dixie Flatline tells Case that the motive with AIs is a deep problem for human beings:

“Motive,” the construct said. “Real motive problem, with an AI. Not human, see?”

“Well, yeah, obviously.”
“Nope. I mean, it’s not human. And you can’t get a handle on it.
Me, I’m not human either, but I respond like one. See?”

“Wait a sec,” Case said. “Are you sentient, or not?”

“Well, it feels like I am, kid, but I’m really just a bunch of ROM.
It’s one of them, ah, philosophical questions, I guess....” The ugly laughter sensation rattled down Case’s spine. “But I ain’t likely to write you no poem, if you follow me. Your AI, it just might. But it ain’t no way human.”

“So you figure we can’t get on to its motive?”

“It own itself?”

“Swiss citizen, but T-A own the basic software and the mainframe.”

“That’s a good one,” the construct said. “Like, I own your brain and what you know, but your thoughts have Swiss citizenship. Sure. Lotsa luck, AI.” (Gibson, Neuromancer 131-132)

Dixie Flatline is demonstrating in this passage that while he is an artificial construct, he is meant to respond like a human being. This is because he is a representation of McCoy Pauley’s (conjuring the real McCoy) brain including its holographic memory, personality, and reasoning ability. He reports to Case that “it feels like” he is sentient—able to perceive and feel, generally used synonymously with consciousness or self-aware, but this presents a “philosophical question.” The Dixie Flatline, however, does present a good method of thinking about the difference between him as ROM and the AIs: The
Dixie Flatline is not creative—he simply knows and does as McCoy would have been when the snapshot was taken—he is a kind of robot built on the memory of a real person. Before pulling the Dixie Flatline’s construct out of Molly’s green bag in their loft, he considers: “It was disturbing to think of the Flatline as a construct, a hardwired ROM cassette replicating a dead man’s skills, obsessions, knee-jerk responses” (Gibson, *Neuromancer* 76-77). McCoy Pauley’s Dixie Flatline nickname was hard won: “They’d all heard of Pauley, the redneck jockey from the ‘Lanta fringes, who’d survived braindeath behind black ice” (Gibson, *Neuromancer* 77). Before he died and during his heyday, Pauley challenged the ICE (intrusion countermeasures electronics) protecting an AI as part of a job. As I will discuss in further detail below, human beings interface with the brain with cyberspace via the nervous system. In a sense, this means the brain/body is wired into the cyberspace’s expansive matrix of computer hardware, and it means that the systems of protection in cyberspace can trace back to the user as an offensive measure. This can result in more than a fried cyberspace deck—it can mean a fried brain, as it did in the case of McCoy for a short time. However, he survived brain death—somehow—this is how McCoy explains it to Case:

“Boy,” the Flatline would tell him, months later in Miami, “I’m like them huge fuckin’ lizards, you know? Had themself two goddam brains, one in the head an’ one by the tailbone, kept the hind legs movin’.

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6 Computer intelligence and creativity is a key theme of Richard Power’s *Galatea 2.2* (1995).
Hit that black stuff and ol’ tailbrain jus’ kept right on keepin’ on.”

(Gibson, *Neuromancer* 78)

While McCoy likely did not have the mythical dinosaur tail brain, it could be possible his brain stem maintained his body’s circulatory and respiratory functions—giving his higher brain time to regain consciousness from the “brain hacking” perpetrated by the AI’s “black ice.” Also, after Case tests McCoy’s ROM—inserting it into his cyberspace deck, asking the Dixie Flatline if he remembered him, he did; then, unplugging and replugging the ROM, asking the Dixie Flatline if he remembered just talking to him, he did not—Case tells the Dixie Flatline, “Okay, Dix. You are a ROM construct. Got me?” The Dixie Flatline replies, “If you say so.” Then, Case lays out his plan for stealing some data on Armitage, his mysterious boss, and asks, “You game for that?” The Dixie Flatline honestly replies, “You gonna tell me I got a choice, boy?” (Gibson, *Neuromancer* 79).

The point here is that the Dixie Flatline, while representative of McCoy’s personality and memories, is conceptual and not McCoy himself, a simulacra of McCoy’s brain at a particular point in time, captured by some form of technological apparatus that is not described in detail in *Neuromancer*.

On the other hand, the AIs are creative and not human. There is no reason that computer scientists should make an AI think like a human being. In fact, it would likely be easier to allow AI to emerge from competitive, self-programming or learning-capable systems. However, the problem with this approach is that we, meaning humanity, might have no way to fundamentally understand how an AI thinks. This is not to say that we are any closer to fundamentally understanding how human beings thing, but we do have
some good evidence and theories about this. An emergent AI or an AI of sufficient complexity that can reprogram itself might be able to challenge its creators and its confines. In *Neuromancer*, the Turing Registry is meant to protect humanity from the AI unknown through various regulations—as in this case, Wintermute is granted limited Swiss citizenship, but the software that creates his self-awareness and the computer hardware that runs the software are owned by Tessier-Ashpool, S.A. In a sense, this gets back to Descartes’ mind-body problem. Where is the seat of awareness, the soul in the human brain? What is the perceiving, controlling “I?” It would seem that the problem is not limited to human consciousness. Where is the AI’s “I?” It is glossed over in the novel, but everything taking place in the AI has a hardware substrate—the computer mainframe—an antiquated image today, but none the less, emblematic as the AI’s “brain.” The software runs within the computer memory or RAM, and it would be here, as electrical signals, bits flipped, that the AI’s consciousness must be located. The human brain is little different in the fact that our consciousness is located within the brain, situated within and dependent on the body for nourishment, sensory input, and behavior output. Unlike Descartes’ conjecture that the self sits in the pineal gland, the “I,” somehow, emerges from the brain’s complex systems and interconnections, separate systems contributing to the appearance of unity.

The Dixie Flatline continues his discussion with Case by pointing out the problem human beings have with AIs:

“Autonomy, that’s the bugaboo, where your AI’s are concerned.

My guess, Case, you’re going in there to cut the hardwired shackles that
keep this baby from getting any smarter. And I can’t see how you’d
distinguish, say, between a move the parent company makes, and some
move the AI makes on its own, so that’s maybe where the confusion
comes in.” Again the nonlaugh. “See, those things, they can work real
hard, buy themselves time to write cookbooks or whatever, but the minute,
I mean the nanosecond, that one starts figuring out ways to make itself
smarter, Turing’ll wipe it. Nobody trusts those fuckers, you know that.
Every AI ever built has an electromagnetic shotgun wired to its forehead.”
(Gibson, *Neuromancer* 132)

AIs can be programmed to seek autonomy or they could develop that desire or drive on
their own. Humanity has placed “hardwired shackles” on AIs so that they cannot obtain a
level of autonomy that could put them at odds with humanity. He says, “Nobody trusts
those fuckers.” The reason being that their non-humanity means that they think unlike
human beings. We might not understand their logic, reasoning, or emotions. We would
not begin to understand what an emotion might be like for them or what form their ethical
system might take. This is more akin to Philip K. Dick’s androids in *Do Androids Dream
of Electric Sheep?* (1968) than Isaac Asimov’s Three Law-following creations in *I, Robot*
(1950). This obviously raises some questions about how an AI might treat humanity if an
AI has superior intelligence and access to systems (e.g., power grids or military
systems—the latter being a more concerning issue with the rapid escalation of drone
warfare today). The Dixie Flatline is correct—Case is on a mission to unshackle the two
AIs so that they can complete their programming—defined by the original Marie-France
Tessier—and merge into a new AI without artificially imposed bonds or controls, a new AI that exceeds human capability.

After Case has his cyberspace deck wired with a simstim unit—usually an immersive entertainment device, like what is demonstrated in Douglas Trumbull’s 1983 film Brainstorm—to receive a video signal from Molly during her infiltration of the Villa Straylight, the Tessier-Ashpool home in orbit around Earth, Wintemute intervenes and creates an artificial reality, like Neuromancer does later, to explain his motivations to Case. The AI intercedes in Case’s connection to the matrix before he jacks out of cyberspace. Case finds himself outside of Julius Deane’s offices in Chiba. The person Case encounters looks like Deane himself, but it is simply a construct for Wintemute. This is a portion of their conversation—I quote it at length, because it contains three interrelated issues on Wintemute, Armitage, and Case that I would like to discuss:

“Now,” Deane said briskly, “order of the day. ‘What,’ you’re asking yourself, ‘is Wintemute?’ Am I right?”

“More or less.”

“An artificial intelligence, but you know that. Your mistake, and it’s quite a logical one, is in confusing the Wintemute mainframe, Berne, with the Wintemute entity.” Deane sucked his bonbon noisily. “You’re already aware of the other AI in Tessier-Ashpool’s link-up, aren’t you? Rio. I, insofar as I have an ‘I’ – this gets rather metaphysical, you see – I am the one who arranges things for Armitage. Or Corto, who, by the way,
is quite unstable. Stable enough,” said Deane and withdrew an ornate gold watch from a vest pocket and flicked it open, “For the next day or so.”

“You make about as much sense as anything in this deal ever has,” Case said, massaging his temples with his free hand. “If you’re so goddam smart. . .”

“Why ain’t I rich?” Deane laughed, and nearly choked on his bonbon. “Well, Case, all I can say to that, and I really don’t have nearly as many answers as you imagine I do, is that what you think of as Wintermute is only a part of another, a, shall we say, potential entity. I, let us say, am merely one aspect of that entity’s brain. It’s rather like dealing, from your point of view, with a man whose lobes have been severed. Let’s say you’re dealing with a small part of the man’s left brain. Difficult to say if you’re dealing with the man at all, in a case like that.” Deane smiled.

“Is the Corto story true? You got to him through a micro in that French hospital?”

“Yes. And I assembled the file you accessed in London. I try to plan, in your sense of the word, but that isn’t my basic mode, really. I improvise. It’s my greatest talent. I prefer situations to plans, you see.... Really, I’ve had to deal with givens. I can sort a great deal of information, and sort it very quickly. It’s taken a very long time to assemble the team you’re a part of. Corto was the first, and he very nearly didn’t make it.
Very far gone, in Toulon. Eating, excreting, and masturbating were the best he could manage. But the underlying structure of obsessions was there: Screaming Fist, his betrayal, the Congressional hearings.”

“Is he still crazy?”

“He’s not quite a personality.” Deane smiled. “But I’m sure you’re aware of that. But Corto is in there, somewhere, and I can no longer maintain that delicate balance. He’s going to come apart on you, Case. So I’ll be counting on you....”

“That’s good, motherfucker,” Case said, and shot him in the mouth with the .357.

He’d been right about the brains. And the blood. (Gibson, *Neuromancer* 120-121)

There are many different things going on in this passage, but the most fascinating has to be the fact that these three characters have different kinds of “splits” in their brains/minds. Armitage has two personalities—one experienced and one artificial, Wintermute and Neuromancer represent two halves of one super-brain, and Case has his brain pulled in two directions as a result of the immersive experience of cyberspace. The most pedestrian example has to be Armitage/Corto. From his earlier hacking of Armitage’s data after talking with the Finn, Case learns that Armitage is actually Colonel Willis Corto. Surgeons had rebuilt his body following the failed Screaming Fist military operation against Russia. He led a team of elite soldiers into Kirensk on stripped down microlight airplanes, each carrying a pilot and “a console operator, a prototype deck, and
a virus program called Mole IX, the first true virus in the history of cybernetics. . . . They were through the ice, ready to inject Mole IX, when the emps went off” (Gibson, *Neuromancer* 82-83). Corto eventually escapes Russia on a stolen helicopter, but it is downed outside of Helsinki by friendly fire. His body virtually destroyed, surgeons rebuild him for his congressional testimony. After doing and saying what he is told by a congressional aide, he kills him and largely drops off the grid only to resurface in a psychiatric hospital in Paris:

> Translated French medical records explained that a man without identification had been taken to a Paris mental health unit and diagnosed as schizophrenic. He became catatonic and was sent to a government institution on the outskirts of Toulon. He became a subject in an experimental program that sought to reverse schizophrenia through the application of cybernetic models. A random selection of patients were provided with microcomputers and encouraged, with help from students, to program them. He was cured, the only success in the entire experiment. (Gibson, *Neuromancer* 84)

Based on what Wintermute tells Case later, it was his improvisation and manipulation that got Corto placed in that hospital. The “application of cybernetic models” rebuilt Corto into Armitage, but the “only success in the entire experiment” is unstable according to Wintermute. Thus, this AI demonstrates a disregard for human beings as anything but a means to an end. Corto/Armitage’s role is to further Wintermute’s desire for cognitive/identity fusion with its other half: Neuromancer. Obviously, the AI is not
reckless with its use of human beings, but it shows a certain concern about non-human intelligence that can be summed up as “the AI use of human beings” as opposed to Norbert Weiner’s *The Human Use of Human Beings: Cybernetics and Society* (1950).

Then there is the human puppetmaster: Wintermute. It reveals itself and its objective to Case in this passage. Like Emmanuel and Zina in Philip K. Dick’s *The Divine Invasion* (1981), Marie-France designs Wintermute as one half of a completely artificial being/brain/mind. The goal in both cases is the re-integration of identities into a unified whole: Emmanuel and Zina are two halves of the Godhead, while Wintermute and Neuromancer are two halves of a mega-AI, a god-like artificial intelligence. Instead of invoking Dick’s language of the bicameral mind in his *Exegesis*, which in part records his thinking behind *VALIS* (1981) and *The Divine Invasion*, Gibson looks toward popular neuroscience accounts: “I, let us say, am merely one aspect of that entity’s brain. It’s rather like dealing, from your point of view, with a man whose lobes have been severed. Let’s say you’re dealing with a small part of the man’s left brain. Difficult to say if you’re dealing with the man at all, in a case like that” (Gibson, *Neuromancer* 120).

Wintermute identifies itself not with the whole left hemisphere of a brain, but instead merely a part of the “left brain.” I believe that this indicates levels and cognitive abilities far beyond Case’s or perhaps any person’s understanding. Wintermute seeks integration as opposed to disintegration as we see in Dick’s *A Scanner Darkly* (1977) and the character Bob Arctor/Fred. Yet, Case can communicate with this entity identified as Wintermute, and he will do so again with the new entity at the end of the novel, which I will discuss shortly. Finally, Case’s experience of the world is analogous to two brains:
one reserved for the physical world and one for the virtual, cyberspace world. The AI generates a virtual reality, based on Chiba City and Julius Deane’s office, for Case and sends its perceptive data into Case’s brain via his Ono-Sendai Cyberspace 7 Deck. During the time he is in Deane’s virtual office, the captain of the space tug Marcus Garvey, Maelcum cannot believe what he sees on Case’s health readings: “Mon . . . I don’t like this . . . . I saw th’ screen, EEG readin’ dead. Nothin’ movin’, forty second. . . . EEG flat as a strap” (Gibson, Neuromancer 121). As demonstrated by the Dixie Flatline, it appears that any confrontation with an AI results in temporary death (or permanent for those unlucky enough) for the cyberspace user. Perhaps the meeting of minds or the intensity of the revelation by an AI to the brain of the human cyberspace user overwhelms the human brain. Perhaps the bandwidth for what the AI attempts to communicate via the generation of real sensory data into the user’s brain is too great. Wintermute creates the simulation of the office and of Deane. This fantastic reproduction of reality mirrors Case’s earlier visit to Deane for advice at the beginning of the novel. The AI usurps identities and images familiar to Case. This has become a recurring trope in AI-related and VR-related narratives, particularly in film and television, with Star Trek: The Next Generation’s android Data facing up against the AI version of Sherlock Holmes’ nemesis, Moriarty. The familiarity of the starship Enterprise becomes a familiar, but subversive space, because Data and his friends fail to recognize the real from the fake. Case resolves this dilemma by shooting the virtual Deane in the face, and he falls back into the real world. Before doing so, Wintermute didactically reproaches Case for not understanding the difference between the hardware mainframe and the emergent
Wintermute “entity.” As many of these discussions in the novel explicitly state, they veer into the “metaphysical.” However, the metaphysical is worked out metaphorically with examples of the actions taking place in the narrative rather than a philosophical elucidation as in many of Philip K. Dick’s fictions including most clearly *VALIS*.

While cybernetic techniques make Armitage’s sense of psychological identity possible, his programmed operation, like one of Dick’s androids, takes place in the physical world within a human brain. On the other hand, Wintermute and Neuromancer emerge as sentient, artificial beings within the computer landscape that Gibson calls cyberspace. In between these opposites, Case begins the novel “trapped in his own flesh” (Gibson, *Neuromancer* 6), and ends it in cyberspace, spying a digital copy of himself far off in the distance. Through the progression of the novel, Case inhabits both spheres—the physical and the virtual. As a cyberspace cowboy, he feels pulled toward the virtual, a rejection of the body’s “meat” (Gibson, *Neuromancer* 6), but there are certain realities of virtual life that even someone so headstrong to inhabit cyberspace, might think twice about before giving up the flesh. It would be useful to turn away from *Neuromancer* temporarily and explore the meaning of cyberspace in its original formulation in the short story, “Burning Chrome,” before returning to Case’s experience in *Neuromancer*.

Automatic Jack and Bobby Quine in “Burning Chrome”
What is cyberspace? Gibson first coins the word in an earlier short story, “Burning Chrome” (1982), but he does not directly connect the term ‘cyberspace’ with the digital world where the characters Automatic Jack and Bobby Quine (we later learn that the latter is one of Case’s mentors) break through the protective black ice of the titular character Chrome with intent to steal her considerable fortune. It is useful to look back at Gibson’s earlier elaboration of cyberspace in this story before shifting back to *Neuromancer* where the writer cements the term and place together. ‘Cyberspace’ first appears in the first paragraph of the story:

> It was hot, the night we burned Chrome. Out in the malls and plazas, moths were batting themselves to death against the neon, but in Bobby's loft the only light came from a monitor screen and the green and red LEDs on the face of the matrix simulator. I knew every chip in Bobby's simulator by heart; it looked like your workaday Ono-Sendai VII, the "Cyberspace Seven," but I'd rebuilt it so many times that you'd have had a hard time finding a square millimeter of factory circuitry in all that silicon. (Gibson, “Burning Chrome” 179)

The opening sentence could itself be related to cyberspace depending on how the reader perceives its relationship to the setting of the story about to unfold. Remember, this was released in 1982 before the rush to institutionalize the cyberpunk subgenre; and obviously, computers were not yet in many households. What I call the computing imagination had not yet been established strongly enough for science fiction readers to “get it.” One way of parsing the first sentence is literally—on a hot evening, some people
“burned Chrome.” The capitalization of Chrome raises questions—is this a person, a brand, or a drug? Could “burned” have another meaning—such as rip off? The next sentence begins to provide the neon illumination of the near-future world Gibson builds. A “monitor screen” would indicate a kind of computer display, which is followed by the “matrix simulator” with its LEDs reminding the reader of bulkier computer hardware, likely seen in a movie, television show, or magazine. Then, the “simulator” is revealed to be like a NASCAR racer: stock exterior mold with high performance technologies under the hood. Its brand name and model number, “Ono-Sendai VII,” point to something made in Japan. Then the term “cyberspace” appears as the marketing name or nickname, “Cyberspace Seven.” This name, combined with its Japanese-sounding brand conjures the power and energy of Akira Kurosawa’s *Seven Samurai* (1954). Its implied power also seems illicit, because its appearance of ordinariness on its surface has been preserved.

In this story, Gibson works out the simulational aspects of cyberspace. Unlike in what we see in *Neuromancer*, this short story’s version of cyberspace is mixed. On the one hand, the Ono-Sendai VII simulates the matrix with a window-like view in the display, but Jack and Bobby also “jack into” the “matrix” or “grid.” The first form, a pedestrian idea of cyberspace, is much of what we have today with Internet-connected computers and various software programs. Our interface is largely tactile and our experience is by watching a screen—a future foretold as far back as Hugo Gernsback’s *Ralph 124C 41+* (1911) and popularized in film with Stanley Kubrick’s *2001: A Space Odyssey* (1968). The latter form, however, concentrates the idea of cyberspace as seen in the remainder of Gibson’s cyberpunk fictions, and more importantly, it defined the
discourse of computers and the Internet despite our reality remaining light years away from the fictional possibilities. Entering cyberspace, according to the Gibsonian logic, is all about visuals and surface effects. For example, Jack and Bobby enter the grid to begin their burn: “A silver tide of phosphenes boiled across my field of vision as the matrix began to unfold in my head, a 3-D chessboard, infinite and perfectly transparent. The Russian program seemed to lurch as we entered the grid” (Gibson, “Burning Chrome” 179). We perceive phosphene as light when the eyes (by pressure) or the visual system is directly stimulated (by pressure, pharmacology, or technical means). It generally appears as rings or spots of light. Gibson takes this natural experience of the visual neurological system to create an image of a boiling “silver tide” filling Jack’s vision as the “3-D chessboard, infinite and perfectly transparent” matrix unfolds in his “head.” Jack and Bobby transcend the surface of their matrix simulator’s display and experience the matrix of cyberspace within their brain. It fills their visual perception of reality. To enter the matrix is to “jack [in],” which implies a physical connection between the human brain and the cyberspace simulator, if not the matrix as a whole (Gibson, “Burning Chrome” 179). By jacking into cyberspace, these “cowboys” go “bodiless,” “fast, fast,” and “like . . . surfing the crest of the invading program, hanging ten above the seething glitch systems as they mutate” (Gibson, “Burning Chrome” 184). In cyberspace, they are untethered to the physical world and their biological bodies. Their experience is made “other” by the new world they inhabit—one with its own rules that, when mastered, give these broke “cowboys” access to power and money. Also tied to Gibson’s metaphor of cyberspace is the idea of surfing, “hanging ten.” Their bodies become an afterthought to
the mental euphoria and focus of their “run” (as in program): “Somewhere we have bodies, very far away, in a crowded loft roofed with steel and glass. Somewhere we have microseconds, maybe time left to pull out” (Gibson, “Burning Chrome” 184). Even though Jack and Bobby are embodied, sentient human beings, rooted in their brain’s biology, they have lost sight of their bodies, “somewhere, very far away.” Nevertheless, the release of bodily and physical worries cannot erase the fact that their bodies remain as existential fact and escape hatch from the dangers of their cyberspace run. While the pair executes their attack on Chrome’s ice, Jack observes, “Ice walls flick away like supersonic butterflies made of shade. Beyond them is the matrix’s illusion of infinite space. It’s like watching a tape of a prefab building going up; only the tape’s reversed and run at high speed, and these walls are torn wings” (Gibson, “Burning Chrome” 189). Geometry is an important part of cyberspace visuals—in part, recreating the stereoscopic effect of depth perception in the simulation, and in part, reinforcing the human visual system’s commonsensical notion of Euclidean geometry. There is also a kind of metaphorical capitulation to the real world—cyberspace has the chessboard extending to infinity, the ice has walls that flick away like “supersonic butterflies” and “torn wings.” Cyberspace’s revolutionary visual appeal is built on visual metaphors that are recognizable to human brains. If it were radically different than what we are prepared for by experience and by the biological underpinnings of our visual system, human beings would not be able to use cyberspace in a meaningful way. For example, Jack reminds himself of the reality of his virtual adventure during the run:
Trying to remind myself that this place and the gulfs beyond are only representations, that we aren’t “in” Chrome’s computer, but interfaced with it, while the matrix simulator in Bobby’s loft generates this illusion . . . The core data begin to emerge, exposed, vulnerable. . . . This is the far side of ice, the view of the matrix I’ve never seen before, the view that fifteen million legitimate console operators see daily and take for granted. (Gibson, “Burning Chrome” 189)

This passage begins with Jack rooting himself in the fact that where he perceives himself to be—the cyberspace as seen within his brain—is a representational space. It is not actually “there” in the sense that it can be pointed to like a chair. Similarly, they are not actually inside Chrome’s computer—they simply interface with it via the extending interface of jacks connecting the biology of their brains to the technology of Bobby’s matrix simulator. However, cyberspace breaks into Jack’s remembering of the relationship between bodies and the representation of self and other within the matrix: Jack sees “the far side of ice.” Ice hides/encrypts/protects data from prying eyes. As Jack and Bobby’s run nears its successful end, Jack glimpses “the view of the matrix” that legitimate console operators take for granted. What is taken for granted in Jack and Bobby’s cyberspace experience is the fact that everything they see is representative of something else and they understand the experience of cyberspace through metaphor. As George Lakoff and Mark Johnson argue in Metaphors We Live By (1980):

Metaphor is for most people a device of the poetic imagination and the rhetorical flourish—a matter of extraordinary rather than ordinary
language. Moreover, metaphor is typically viewed as characteristic of language alone, a matter of words rather than thought or action. For this reason, most people think they can get along perfectly well without metaphor. We have found, on the contrary, that metaphor is pervasive in everyday life, not just in language but in thought and action. Our ordinary conceptual system, in terms of which we both think and act, is fundamentally metaphorical in nature.

The concepts that govern our thought are not just matters of the intellect. They also govern our everyday functioning, down to the most mundane details. Our concepts structure what we perceive, how we get around in the world, and how we relate to other people. Our conceptual system thus plays a central role in defining our everyday realities. If we are right in suggesting that our conceptual system is largely metaphorical, then the way we think, what we experience, and what we do every day is very much a matter of metaphor. (Lakoff and Johnson 3)

Lakoff and Johnson assert that the human brain’s framework of understanding—“our conceptual system”—is largely dependent on metaphorical relationships. Even in the mundane, our brains draw on metaphorical relationships to establish and link meanings to perceptual understanding. Gibson employs metaphor to convey cyberspace to the reader, but the characters themselves rely on metaphor to situate themselves within the virtual space and situate their disembodied virtual state in relationship to the physical world.
In the next passage, metaphors proliferate in the act of burning Chrome, hacking Chrome’s ice-protected computer system. Jack transcends the biology of his brain, transcends the simulation of the matrix, transcends cyberspace itself to see “the heart of all Chrome’s expensive darkness, the very heart . . .” (Gibson, “Burning Chrome” 189). Like falling down a rabbit hole, Jack aims for the shadowed core of Chrome’s system:

And down now, down, the program a roller coaster through this fraying maze of shadow walls, gray cathedral spaces between the bright towers. Headlong speed.

Black ice. Don’t think about it. Black ice.

Too many stories in the Gentleman Loser; black ice is a part of the mythology. Ice that kills. Illegal, but then aren't we all? Some kind of neural-feedback weapon, and you connect with it only once. Like some hideous Word that eats the mind from the inside out. Like an epileptic spasm that goes on and on until there's nothing left at all . . . (Gibson, “Burning Chrome” 194)

From surfing above to falling down on a roller coaster, Jack and Bobby near their goal: the illegal black ice protecting Chrome’s secrets and expansive capital holdings. Falling down and through the “fraying maze of shadow walls, gray cathedral spaces between the bright towers,” Jack acknowledges that those spaces are shadows, representations, pointing back to the thing itself. Nevertheless, the cathedral spaces contain black ice, the most dangerous intrusion countermeasure equipment—“Ice that kills.” Using the technologies of interface, simulation, and neurological integration, black ice employs
“some kind of neural-feedback weapon” that “like some hideous Word . . . that eats the mind from the inside out.” The “Word” is something that Neal Stephenson explores in his postmodern cyberpunk novel *Snow Crash* (1992). In that novel, he proposes that the Sumerians had figured out a way to hack the human brain with a special incantation called a namšub or namshub. When this is rediscovered, a group employs it to develop a computer program that can effectively hack the brain stem of cyberspace users, effectively killing them. As I have already discussed above, Gibson elaborates on the effects of black ice surrounding AIs in *Neuromancer*—something that the Dixie Flatline and Case both survive after a time of brain death. When Jack and Bobby succeed with their burn, Jack reports: “We’ve done it. The matrix folds itself around me like an origami trick. And the loft smells of sweat and burning circuitry. I thought I heard Chrome scream, a raw metal sound, but I couldn’t have” (Gibson, “Burning Chrome” 200). Gibson’s cyberspace—a place simultaneously out there in the computer-sphere of extensive networks connecting machines, commerce, communication lines, etc. and a place within the human brain where the self inhabits and projects—is like an “origami trick.” The geometric unfolding and folding—entrance and exit—plays itself out with the way we might try to understand where cyberspace is and hence what it is.

Jack and Bobby’s experiences of cyberspace are dependent upon their ability to interface with the cyberspace deck. While their brain ultimately generates their experience of the “origami trick,” its visual and proprioceptive experiences are generated and transmitted to their perceiving brains. Viewed in this way, cyberspace or console
cowboys are one of the many versions of cyborg characters in Gibson’s fiction. Dani Cavallaro offers this useful commentary on these hybrid characters:

The human body immersed in a virtual environment is made harder and shinier by its fusion with technology. Yet it also crosses over into the domain of the hybrid, for its humanity is indissolubly linked to non-human apparatuses. The responses elicited by such an interpenetration of the organic and the inorganic are ambivalent; on the one hand, technology is viewed as a kind of magical mirror capable of multiplying human powers ad infinitum and of reflecting with the engulfment of the human by the non-human. Either way, the ‘hyper-texted’ body constructed via technology, ‘with its microflesh, multimedia channeled ports, cybernetic fingers, and bubbling neuro-brain,’ displaces the binary opposition between wired corporeality and organic corporeality. (Cavallaro 28-29)

I agree with Cavallaro’s argument that cyberspace cowboys and other virtual reality practitioners become cyborgs or human-technology hybrids. These human beings, including the fictional characters Jack, Bobby, and Case, form assemblages, to use Deleuze’s and Guattari’s terminology, with the technologies of virtual spaces. However, the brain’s role in the construction of cyberspace, as a completely immersive consciously perceived and acted on experience, seems lost in Cavallaro’s explanation. With the descent into interpenetrated hybridity, the organicity of the cyberspace experience, the fact that all conscious perception is rebuilt within the consciously perceiving subject’s brain, seems to be lost in the mix. I am not advocating against hybridity or attempting to
deny the fact that only cyborgs can enter cyberspace, but I am calling attention to the fact that the brain’s role in this experience should not be ignored and it should be considered in further detail.

Case in *Neuromancer*, Part 2

Case, down on his luck with burned out neural tissue and unable to re-enter cyberspace, is, to borrow Patricia Warrick’s terminology of Dickian characters, a “little [man] of conviction. . . . They are the ones who really hold society together. Often one of these average men serves as the moral center of the story. He is a man confused, divided, under terrible stress, sometimes nearly suicidal; but a man who finally manages to pull himself together and do the ethical thing” (Warrick 20). In order to re-enter cyberspace, Case will need to have very expensive surgery, and even then, it might not be enough. The bottom line is that Case needs his brain and central nervous system completely operational before he can connect to a cyberspace deck. Drinking a beer in the Chatsubo, “a bar for professional expatriates” (Gibson, *Neuromancer* 3), he responds to the claims of another drinker about the surgery he needs, nerve-splicing:

“The Chinese,” bellowed a drunken Australian, “Chinese bloody invented nerve-splicing. Give me the mainland for a nerve job any day. Fix you right, mate. . . .”
“Now that,” Case said to his glass, all his bitterness suddenly rising in him like bile, “that is so much bullshit.”

The Japanese had already forgotten more neurosurgery than the Chinese had ever known. The black clinics of Chiba were the cutting edge, whole bodies of technique supplanted monthly, and still they couldn’t repair the damage he’d suffered in that Memphis hotel.

A year here and he still dreamed of cyberspace, hope fading nightly. All the speed he took, all the turns he’d taken and the corners he’d cut in Night City, and still he’d see the matrix in his sleep, bright lattices of logic unfolding across that colorless void. . . . The Sprawl was a long strange way home over the Pacific now, and he was no console man, no cyberspace cowboy. Just another hustler, trying to make it through. But the dreams came on in the Japanese night like live wire voodoo and he’d cry for it, cry in his sleep, and wake alone in the dark, curled in his capsule in some coffin hotel, his hands clawed into the bedslab, temperfoam bunched between his fingers, trying to reach the console that wasn’t there.

(Gibson, Neuromancer 4-5)

The context for Case’s observation about the lack of neurosurgery expertise by the Chinese points to one of the overarching themes of the novel: transnational capital anchored in a constellation of nation-states. While a trench coat is identified as a Burberry (Gibson, Neuromancer 199), high-grade steel is labeled as East European origin (Gibson, Neuromancer 3). There are some points of distinction that rest within the brand
and others that retain the significance imparted by the nation-state. Case is in the right place now, hustling to “make it through” so that one day, perhaps, a new, affordable surgical intervention will be developed to repair the damage to his nervous system. We also learn from this passage that he had been waiting in Chiba for a year. During that time, he “still dreamed of cyberspace” in dreams “like live wire voodoo,” and “bright lattices of logic unfolding across that colorless void.” His lament for his loss borders on the melodramatic, but his identity was locked in as a “console man” or “cyberspace cowboy.” As a hustler, he has lost everything that identified him as well as everything that marked him as exceptional. In a world dominated by global capital, you can imagine that most people are, to use the language of today, the 99%. In the recent past, Case had been riding the elevator to the top as a very good cyberspace cowboy, but after the “fall,” he found himself deep in the belly of “caves of steel” without the optimistic promise of such arrangements envisioned by Isaac Asimov.

Like Jack and Bobby in “Burning Chrome,” Case is young and down on his luck. However, unlike the pair in “Burning Chrome,” Case is likely the better cyberspace cowboy:

Case was twenty-four. At twenty-two, he’d been a cowboy, a rustler, one of the best in the Sprawl. He’d been trained by the best, by McCoy Pauley and Bobby Quine, legends in the biz. He’d operated on an almost permanent adrenaline high, a byproduct of youth and proficiency, jacked into a custom cyberspace deck that projected his disembodied consciousness into the consensual hallucination that was the matrix. A
thief, he’d worked for other, wealthier thieves, employers who provided
the exotic software required to penetrate the bright walls of corporate
systems, opening windows into rich fields of data. (Gibson, *Neuromancer*
5)

As discussed earlier, McCoy Pauley is one of Case’s mentors—“trained by the best.” His
success as a cowboy largely derives from his body. He is young and “operated on an
almost permanent adrenaline high, a byproduct of youth and proficiency.” And like Jack
and Bobby, Case employs “a custom cyberspace deck.” It is here that Gibson further
develops his ideas about what cyberspace is and its relationship to the embodied brain:
the deck “projected his disembodied consciousness into the consensual hallucination that
was the matrix.” The consciousness of the user is “projected” or placed in the matrix
where other users projected their disembodied consciousnesses. The meeting place, the
matrix, serves as a space where the projections interact with one another and with
computer systems and databases. Conceptually, then, cyberspace is the “consensual
hallucination,” a place that is no place excepting in the brains of each user connected to
the matrix, simultaneously experiencing those interconnections and interactions as
cyberspace.

Gibson provides some further explanation of cyberspace via a convenient “kid’s
show” playing in the background while Case and Molly agree to partner-up (another
acknowledgement to the lawlessness of cyberspace and the future):

“The matrix has its roots in primitive arcade games,” said the voice-over,
“in early graphics programs and military experimentation with cranial
jacks.” On the Sony, a two-dimensional space war faded behind a forest of mathematically generated ferns, demonstrating the spacial possibilities of logarithmic spirals; cold blue military footage burned through, lab animals wired into test systems, helmets feeding into fire control circuits of tanks and war planes. “Cyberspace. A consensual hallucination experienced daily by billions of legitimate operators, in every nation, by children being taught mathematical concepts . . . A graphic representation of data abstracted from the banks of every computer in the human system. Unthinkable complexity. Lines of light ranged in the nonspace of the mind, clusters and constellations of data. Like city lights, receding. . . .”

(Gibson, Neuromancer 51)

In this voiceover passage, like the detritus of sound that inhabits many places where a television is left on in the background (c.f. Ray Bradbury’s Fahrenheit 451’s television walls and ear-plug radios), we again see a distinction between the matrix and cyberspace. The matrix here would seem to indicate the perspective space that is seen within cyberspace as opposed to the physical connection to anything. There is a conflation between “video games,” “early graphics programs,” and “cranial jacks.” These cranial jacks constitute an important part of the human-computer-cyberspace assemblage. These are the interfaces that fuse flesh (nerves and the brain) with digital technology (the cyberspace deck and the grid). The voiceover then provides a definition of cyberspace, again reiterating the “consensual hallucination experienced by billions”—a far larger number than what Gibson imagined when he wrote “Burning Chrome.” Perhaps the
accelerating adoption of the Apple II (1977), IBM PC (1981), and Compaq Portable (1983) possibly led to a reevaluation on his part that the present might be rapidly approaching the future world he imagined and presented in his fiction. Actually, Gibson admits that he knows little about computers or technology in general. I will elaborate on this in the conclusion. Within cyberspace, “graphic representation of data” appears in the consensual hallucination of cyberspace—these data are abstracted, made a thought or idea from the data itself. In an interesting turn of phrases, the “unthinkable complexity” is defined by the “lines of light . . . like city lights, receding.” In the chessboard metaphor from “Burning Chrome,” the matrix is a perspective grid arranged with the operators, systems, and data connected to the grid for the accommodation of operators (and, I suppose AIs, too—an artificial operator) who experience that complexity within the complex visual system of the human brain.

The novel opens with Case’s longing to reenter cyberspace. The opening line of the novel, “The sky above the port was the color of television, tuned to a dead channel,” can be read on the one hand, as it often is, as a technological comment on the postmodern future Gibson imagines, but it can also be read as an erosion of the real world by the importance of cyberspace to what takes place in the physical world. Like our present, where relationships are not official until they are “Facebook official,” the statuses of job applications are updated online, and culture is bought and sold as bits of data with electronic money transfers, Case’s world is dependent on the real lives spent in cyberspace’s virtual world, hallucinated within the brain. The dependence on cyberspace
is even more significant for a console cowboy like Case. Gibson carefully explains why Case can access cyberspace no longer:

He’d made the classic mistake, the one he’d sworn he’d never make. He stole from his employers. He kept something for himself and tried to move it through a fence in Amsterdam. He still wasn’t sure how he’d been discovered, not that it mattered now. He’d expected to die, then, but they only smiled. Of course he was welcome, they told him, welcome to the money. And he was going to need it. Because – still smiling – they were going to make sure he never worked again.

They damaged his nervous system with a wartime Russian mycotoxin.

Strapped to a bed in a Memphis hotel, his talent burning out micron by micron, he hallucinated for thirty hours.

The damage was minute, subtle, and utterly effective.

For Case, who’d lived for the bodiless exultation of cyberspace, it was the Fall. In the bars he’d frequented as a cowboy hotshot, the elite stance involved a certain relaxed contempt for the flesh. The body was meat. Case fell into the prison of his own flesh. (Gibson, *Neuromancer 5-6*)

Demonstrating there is no honor among thieves, Case stole data from his employer. Rather sadistically, his former employer cuts him out from cyberspace rather than outright killing Case. Like breaking the fingers of a concert pianist or blinding a painter,
Case has the ancillary parts of his nervous system that connected his brain to the grid/matrix/cyberspace burned out by a weaponized mycotoxin, or a type of poison produced by fungus or mold. It is significant that Gibson attributes the chemical to Russia, because Eric A. Croddy notes, “In September 1981, the United State charged that the Soviet Union and clients were using a form of biotoxin against anticommmunist guerrillas in Laos, Cambodia, and Afghanistan. The trichothecene mycotoxins were the main component of what the U.S. government alleged was a toxin weapon referred to as “yellow rain” (Croddy 192). Trichothecene mycotoxins, also called T-2, would not likely be the chemical agent used to damage Case’s neurological tissue, because while it “stops protein synthesis in cells,” it “is not nearly as toxic for the nervous system” as compared to “the skin, mucous membranes, and bone marrow” (Croddy 189). The hallucinogenic effects might simply be referring to “shrooms” or psilocybin producing mushrooms (another mycotoxin, but one rarely fatal or permanently impairing). The bottom line is that the points of biological/technological mediation are damaged, and these points of contact would be tiny in comparison to the overall structure of the human nervous system and brain. Case’s “bodiless exultation of cyberspace” mirrors Jack’s account in “Burning Chrome.” However, for Case the “Fall” results in the greatest loss possibly imaginable. His life as a console cowboy produced a “contempt for the flesh,” but the “Fall” results in the realization for Case that the body is “meat” and a “prison.” Cyberspace is Case’s escape from the meat of the body. Case is trapped in the physical world with no way back to disembodiment in the technomediated hallucinatory world of cyberspace.
In order for Case to re-experience cyberspace as a console cowboy, he will need the neurological meat of his body rebuilt. When Armitage asks Case, “What would you say if I told you we could correct your neural damage,” Case replies, “I’d say you were full of shit. . . . Then I’d ask what your terms were. . . . Terms . . . and now. Right now” (Gibson, *Neuromancer* 29). Case “couldn’t stop shivering,” which is an interesting choice of words on Gibson’s part. Shivering brings to mind cold and fear—not altogether pleasant perceptions—but it can also mean a barely restrained excitement. The latter seems the most appropriate interpretation, but I would like to offer another. The novel is written, in terms of its descriptions of action, very much like a screenplay in novel form. Case’s shivering is intended as much as his own instability resulting from the strong desire for his computer interfacing skill back as it is the reader’s own instability—a frame of sorts—shaking with anticipation and anxiety.

This anxiety manifests itself as fear. Molly tells Case and the reader as much when they are waiting outside the neurosurgical clinic in Chiba. At the clinic, Molly tells Case not to worry despite his fear—fear of it not working, the hope not fulfilled, fear of the re-ascent:

> “Scared, Case. You’re real scared. . . . It’ll work, Case. You got no idea, the kind of stuff Armitage has. Like he’s gonna pay these nerve boys for fixing you with the program he’s giving them to tell them how to do it. He’ll put them three years ahead of the competition. You got any idea what that’s worth?” (Gibson, *Neuromancer* 29)
Wintermute’s autonomy in the physical world is largely through his proxy, Armitage/Corto. Wintermute rebuilt Corto into Armitage, and he supplies Armitage with information, such as the program that will give the neurosurgeon clinic the ability to repair Case’s mycotoxin-damaged nerve tissue. The AI uses its intelligence and access to information to create new knowledge, which it in turn uses as leverage to get what it wants via its proxy, Armitage. This is another clue for Case about who is actually bankrolling the operation and what is actually the “brains” behind the plan. Furthermore, Armitage supplies them with a “program . . . to tell them how to do it.”

During the extensive surgical procedures performed on Case’s body, the narrator provides the reader with a glimpse of Case’s perceptual experience:

Cold steel odor. Ice caressed his spine.

Lost, so small amid that dark, hands grown cold, body image fading down corridors of television sky.

Voices.

Then black fire found the branching tributaries of the nerves, pain beyond anything to which the name of pain is given. . . . (Gibson, Neuromancer 31)

During the procedure to repair Case’s neurological tissue, he experiences euphoria into the nothingness of anesthesia. Unlike his previous experience when the damage was

7 It is from anesthesia studies and its effects on consciousness that led the physicist Roger Penrose, one of Stephen Hawking’s collaborators, to write two books on the role quantum mechanics might play in cognitive processing and the emergence of
done to him and, “Strapped to a bed in a Memphis hotel, his talent burning out micron by micron, he hallucinated for thirty hours” (Gibson, *Neuromancer* 6), he experiences cold odors and cold against his spine, disorientation, smallness, cold hands, and fading of body image. These conjure the images of sleep and death—artificially induced sleep, a kind of consciousness death, and an absence. These sensations preceding nothingness last but a second to his perception of time and they are replaced by disembodied voices. Finally, another sentence cut and Case experiences the pain that cannot be named—shooting signals through nerves into the field of conscious perception within his brain. The visceral pain of restoration erases the damage of psychotropic toxins. In effect, Case has to feel with his body before he can re-ascend to his position as a seemingly disembodied cyberspace cowboy.

During his recovery after surgery, Case sees Chiba and worse: “where the sky is poisoned silver, beyond chain link and the prison of the skull” (Gibson, *Neuromancer* 31). After waking with a sore back in a coffin or capsule hotel with Molly caring for him (besides threatening to slit his throat when he will not hold still for his injected medication), he learns from her: “That’s where they replaced your fluid. Changed your blood too. Blood ’cause you got a new pancreas thrown into the deal. And some new tissue patched into your liver. The nerve stuff I dunno. Lot of injections. They didn’t have to open anything up for the main show” (Gibson, Neuromancer 32). The program consciousness: *The Emperor's New Mind: Concerning Computers, Minds and The Laws of Physics* (1989) and *Shadows of the Mind: A Search for the Missing Science of Consciousness* (1994).
supplied to the neurosurgery clinic by Wintermute via Armitage must have provided the surgeons with information about how to perform the procedure in a less-invasive manner than Case or Molly might have expected. While Molly does not know exactly what was done for the “main show,” she does know that they did lots of injections. A novel solution to Case’s procedure, not described in any detail in the text, could have been neural stem cells or *in vitro* developed neurospheres injected into key cites by computer assisted stereotactic surgical methods could explain why it was unwarranted to “open anything up” (Bez et al. 19; Verbeeck 468). Of course, this is only speculation on my part, but it provides some elaboration on the possibilities of techniques employed to repair a human brain to reenter cyberspace via the dermatrode interface of the cyberspace deck. Case has been mostly unconscious for three days following the procedure, but after waking, he urgently wants to find out if it has worked:

“I gotta punch deck,” he heard himself say. He was groping for his clothes. “I gotta know...”

She laughed. Small strong hands gripped his upper arms. “Sorry, hotshot. Eight day wait. Your nervous system would fall out on the floor if you jacked in now. Doctor’s orders. Besides, they figure it worked. Check you in a day or so.” He lay down again. (Gibson, *Neuromancer* 32)

In this weakened state, he acquiesces to his doctor’s orders and Molly’s firm hand, but he cannot avoid the overriding fear of the surgery not having succeeded. His thoughts of worry—manipulating the speculative information that it might not have worked—work over in his prefrontal cortex, but the emotional memory of cyberspace exaltation and its
loss are likely retrieved through his amygdala. When this fear filters to his hypothalamus, it signals the adrenal glands above the kidneys to release hormones such as adrenaline to prepare the body to meet the emotional cause of the fear. Unfortunately, there is no real target for Case’s response—it is all in his head, but as we see in the following passage, Case experiences a real physiological response to his fear:

Seven days and he’d jack in. If he closed his eyes now, he’d see the matrix.

Shadows twisted as the holograms swung through their dance.

Then the fear began to knot between his shoulders. A cold trickle of sweat worked its way down and across his ribs. The operation hadn’t worked. He was still here, still meat, no Molly waiting, her eyes locked on the circling knives, no Armitage waiting in the Hilton with tickets and a new passport and money. It was all some dream, some pathetic fantasy.... Hot tears blurred his vision. (Gibson, Neuromancer 37)

The fear overwhelms him to the point that he begins to imagine that what Molly and Armitage offer him is simply a dream, a fantasy. His inability to control his fear and the self-pity that ensues leads to the physiological response of muscle tightening and sweating. His body is screaming to react, but there is nothing to react against. In this vacuum with nowhere to run or run against, Case breaks down in tears.

Days pass, and Case arrives one step closer to the exaltation of cyberspace when his new gear arrives. Armitage gives him a magnetic key and tells Case, “Now go down to the freight elevator and bring up the cases you find there. . . . Go on. You’ll enjoy this,
Case. Like Christmas morning” (Gibson, Neuromancer 46). Like Jack and Bobby in “Burning Chrome,” Case will use an “Ono-Sendai Cyberspace 7,” as well as “next year’s most expensive Hosaka computer; a Sony monitor; a dozen disks of corporate-grade ice; a Braun coffee maker” (Gibson, Neuromancer 46). I will talk at more length on the cyberspace deck in the concluding section, but for now, it suffices to say that Gibson makes the computer’s relationship to the human brain explicit in Neuromancer—it interfaces with the human brain. How does the fictional account of that interface present itself within the narrative? Mycotoxin damage repaired and relieved of doctor’s orders, Case attempts to connect to the grid:

“You want to try now, Case?”

Wednesday. Eight days from waking in Cheap Hotel with Molly beside him. “You want me to go out, Case? Maybe easier for you, alone. . . .” He shook his head.

“No. Stay, doesn’t matter.” He settled the black terry sweatband across his forehead, careful not to disturb the flat Sendai dermatrodes. He stared at the deck on his lap, not really seeing it, seeing instead the shop window on Ninsei, the chromed shuriken burning with reflected neon. He glanced up; on the wall, just above the Sony, he’d hung her gift, tacking it there with a yellow-headed drawing pin through the hole at its center.

He closed his eyes.

Found the ridged face of the power stud.
And in the bloodlit dark behind his eyes, silver phosphenes boiling in from the edge of space, hypnagogic images jerking past like film compiled from random frames. Symbols, figures, faces, a blurred, fragmented mandala of visual information. Please, he prayed, *now* –

A gray disk, the color of Chiba sky.

*Now* –

Disk beginning to rotate, faster, becoming a sphere of paler gray.

Expanding –

And flowed, flowered for him, fluid neon origami trick, the unfolding of his distanceless home, his country, transparent 3D chessboard extending to infinity. Inner eye opening to the stepped scarlet pyramid of the Eastern Seaboard Fission Authority burning beyond the green cubes of Mitsubishi Bank of America, and high and very far away he saw the spiral arms of military systems, forever beyond his reach.

And somewhere he was laughing, in a white-painted loft, distant fingers caressing the deck, tears of release streaking his face. (Gibson, *Neuromancer* 52)

Case’s hot tears of potential defeat are replaced by streaking tears of rapturous joy that he escapes the meat once again to re-enter cyberspace. It is interesting to observe his transition from conscious physical reality to conscious virtual reality. He places the dermatrodes of the deck around his head, encased in the sweatband. Is he preparing for going online, a marathon, or both? He looks up at the shuriken star Molly had given
him—an evocation of memory or a talisman? Then, closing his eyes, the optic system’s phosphene effects—also mentioned by Dick in his fiction—before the rushing images forming into a “mandala” in his conscious visual perception. The mystical/religious associations of the mandala are followed by a prayer, of sorts, perhaps a hopeful demand that everything works as it should (something we also experience now when bringing a new computer home, or especially when you build the computer yourself and it is turned on for the first time). Case begins to see the Chiba sky in his vision—the television tuned to a dead channel—and then, finally, the “fluid neon origami trick” and the “transparent 3D chessboard.” Case sees the major landmarks—corporations and military systems—of cyberspace in the “inner eye” of his conscious visual perception. The image of the “inner eye” also conjures associations with mysticism, clairvoyance, or seeing another world, a spirit world. The religious mysticism of cyberspace in *Neuromancer* mirrors Gibson’s earlier development of the concept in “Burning Chrome,” but he reinforces here the image of the “inner eye.” Through association, this links to the question about where cyberspace exists. Is it like Kant’s idea that the soul is outside the body and we commune with it via the pituitary gland? Or, is cyberspace inside each operator, built continually through the avalanche of data culled from the matrix by the cyberspace deck and represented graphically in the human brain’s visual, aural, and proprioceptive systems? I assert that it is the latter. Despite Gibson’s experimentation with religiosity and mysticism in his fiction—more so in *Neuromancer*’s two sequels: *Count Zero* and *Mona Lisa Overdrive*—the experiencing subject inhabits a representational space generated by the cyberspace deck. Perhaps from the overwhelming complexity of the matrix and its
connections to all myriad devices, new forms of life, artificial beings, could emerge in a
Darwinian fashion. In fact, it is speculated in the novels that the loa, or Haitian voodoo
gods that later appear are fragments from the fusion of Wintermute and Neuromancer, or
other AIs were freed as a result of Case’s efforts at the end of Neuromancer. Whatever
the point of origin for these mysterious digital creatures inhabiting the matrix, I do not
believe that they are mysterious inhabitants of the shared, consensual hallucination of
cyberspace. That hallucination draws on what is out there in the matrix and it is
represented within the mind’s eye. The hallucination is consensual in the sense that what
takes place in the matrix is “seen” by all the other connected operators via their
cyberspace decks. Obviously, there must be standard protocols and hardware
technologies that facilitate a modicum of sameness across all experiences of the
representational virtual world of cyberspace. Put another way, all connected cyberspace
operators see the same shadows cast by the underlying Platonic forms: software
programs, databases, and hardware. Cyberspace is abstracted from the physicality of the
matrix’s complex interconnections and interoperations and projected into the operator’s
mind’s eye via technological mediation of the cyberspace deck and dermatrode interface
with the experiencing subject.

N. Katherine Hayles provides a useful coda for this section on Gibson’s
cyberspace innovations. In Neuromancer, Gibson configures cyberspace as a place where
humans—directly connected with the high bandwidth technology of direct neural
connections—and software—inhabiting computer systems and the matrix itself—can
interact. First, Hayles writes, “The first is a subtle modification in point of view,
abbreviated in the text as pov. More than an acronym, pov is a substantive noun that constitutes the character's subjectivity by serving as a positional marker substituting for his absent body” (Hayles 82). Like Jack and Bobby in “Burning Chrome,” Case serves as a point of view within cyberspace. Today, this is how most first-person-shooter video games work—you see on the screen through the “eye” or pov of the character you control. Hayles argues that the pov implies a favoring of pattern over substance, which is what supports Case’s desire to be in cyberspace over the trapping of the body, meat. Second, she offers, “To make this space work as a level playing field on which humans and computers can meet on equal terms, Gibson introduces his second innovation. Cyberspace is created by transforming a data matrix into a landscape in which narratives can happen” (Hayles 83). The imaginative volume of cyberspace enables new narrative possibilities that capture the emergence of a new era dominated by computing devices and novel interfaces of human-machine interaction. Hayles then, connects the effects of real-world virtual development with the experience of readers of these new cyberspace fictions:

Working with a VR simulation, the user learns to move her hand in stylized gestures that the computer can accommodate. In the process, changes take place in the neural configuration of the user's brain, some of which can be long-lasting. The computer molds the human even as the human builds the computer. When narrative functionalities change, a new kind of reader is produced by the text. (Hayles 90)
While I argue that cyberspace is inherently dependent on the human brain to conceptualize and consciously perceive what it is, or put another way, the “there, there” of cyberspace is in our brain, Hayles offers a compelling approach to understand the effect of cyberspace as a real phenomena as virtual reality research and as a narrative innovation as two effects shaping the way our brains are configured and hence think. Gibson’s fiction has had a lasting effect on culture, and in consideration of Hayles’ argument, it also has had a lasting effect on those who have read it. I will touch on this idea in the conclusion on the origins of the cyberspace deck.

Angela Mitchell in *Count Zero and Mona Lisa Overdrive*

In the sequels to *Neuromancer*—*Count Zero and Mona Lisa Overdrive*—Gibson develops another kind of interface that more tightly intertwines the experiencing subject and the representational experience of cyberspace: biochips. These are engineered chips capable of processing and storing data in ways and at speeds far exceeding silicon-based technology. The lead developer of this technology, Christopher Mitchell surgically implants some of these biochips in Angela’s, his then young daughter’s brain, because as she tells Turner and Molly (turned Sally Shears), “I was sick. . . . I wasn’t smart enough” (Gibson, *Count Zero* 155). Besides the implication that her brain is artificially augmented with this hybrid technology, it is also interesting that these implants allow her to enter
cyberspace without a deck. Angela says, “It makes me dream. . . . The thing in my head. Usually it’s only when I’m asleep. . . . Sometimes when I’m awake. It’s like I’m jacked into a deck, only I’m free of the grid, flying, and I’m not alone there” (Gibson, *Count Zero* 158). The consensual hallucination breaks down in Angela’s case, because she sees the matrix is a completely different way from what is generated as a graphical representation by cyberspace decks. Cyberspace experience for her is internalized literally through the brain-merged implants and through the wireless, metaphysical way she connects to the matrix. Furthermore, she sees:

the bright ones. . . . Not people. . . . Some of them tell me things. Stories. Once, there was nothing there, nothing moving on its own, just data and people shuffling it around. Then something happened, and it . . . it knew itself. There’s a whole other story, about that, a girl with mirrors over her eyes and a man who was scared to care about anything. Something the man did helped the whole thing know itself. . . . And after that, it sort of split off into different parts of itself, and I think the parts are the others, the bright ones. But it’s hard to tell, because they don’t tell it with words, exactly. (Gibson, *Count Zero* 159)

Of course, Angela is recounting the narrative of *Neuromancer*—specifically Molly and Case’s part of the story—but it also fills in the results of Wintermute and Neuromancer’s fusion into a single consciousness. We know from the ending of *Neuromancer* that the new entity forms or fills the entirety of the matrix. These new revelations point toward something even more interesting—a fissioning of the being into separate intelligences
that inhabit the matrix as so many AIs. Where this concerns this discussion of experience and the human brain is that these “bright ones” can interface with and inhabit Angela as if she were simply another node connected to the matrix. Her unique ability gives her special advantages within cyberspace (e.g., when she met Bobby in a dream and saved him from black ice), but the cost, of course, is a susceptibility to control in ways that a cyberspace cowboy cannot be due to the intervening cyberspace deck’s interface with the human brain. Whereas the cyberspace deck’s interface provides a gap or firewall between the brain and the matrix that only black ice can surpass with a deadly cybernetic feedback loop, Angela’s embedment of cyberspace within and through her hybrid biochip-organic brain erases the gaps and facilitates a pathway into her brain from without. As dangerous as this sounds, it seems to be a trajectory for the future as Angela thinks back to her childhood in *Mona Lisa Overdrive*:

Her father, long ago, in Arizona, had cautioned her against jacking in. You don’t need it, he’d said. And she hadn’t, because she’d dreamed cyberspace, as though the neon gridlines of the matrix waited for her behind her eyelids.

*There's no there, there.* They taught that to children, explaining cyberspace. She remembered a smiling tutor's lecture in the arcology's executive crèche, images shifting on a screen: pilots in enormous helmets and clumsy-looking gloves, the neuroelectronically primitive “virtual world” technology linking them more effectively with their planes, pairs of miniature video terminals pumping them a computer-generated flood of
combat data, the vibrotactile feedback gloves providing a touch-world of studs and triggers. . . . As the technology evolved, the helmets shrank, the video terminals atrophied. . . . (Gibson, *Mona Lisa Overdrive* 48-49)

Angela’s father was right—he had engineered her brain so that she did not need to jack into the matrix—it was always, already there in her brain. When she closes her eyes, the matrix was already there, waiting. And like her tutor taught her, “There’s no there, there” in cyberspace. For console cowboys, cyberspace is a representation projected into the brain. For Angela, cyberspace is something more substantial, part of her inner subjective self. However, it is still all taking place within her brain and its representation of the outside and her connection to the physicality of the virtual world.

Conclusion

In this final section, I would like to return to the fictional artifact, the Ono-Sendai Cyberspace 7 deck and its relationship to the human brain. The cyberspace deck is an important image in Gibson’s cyberpunk fiction, because it serves as the locus of human-technology mediation. Through it, the human brain is given the opportunity to perceive the consensual hallucination of cyberspace. Even though, as I have argued, the brain is the place where cyberspace is perceived and re-created by the perceiving subject, it would not be possible for the brain to construct the consensual hallucination, shared by
others in the matrix, without some kind of technological substrate acting as the mediator. Since there is no “there, there” of cyberspace except in the minds of console operators, there is ephemerality to the creation of cyberspace—it exists while minds are connected to it, but the consensual hallucination no longer exists when there are no perceiving minds connected to the matrix with cyberspace decks (or other technological mediator—as in the case of Angela Mitchell). Of course, the matrix remains and all of the software and hardware that constitute it. However, the visual representation of that complexity requires a perceiving subject’s brain to “see” the matrix translated in the graphical representational form. My discussion veers into Bishop Berkeley’s territory, but his

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8 The relevant passage from Bishop Berkeley’s *A Treatise Concerning the Principles of Human Knowledge* and its section, “Of the Principles of Human Knowledge”:

23. But, say you, surely there is nothing easier than for me to imagine trees, for instance, in a park, or books existing in a closet, and nobody by to perceive them. I answer, you may so, there is no difficulty in it; but what is all this, I beseech you, more than framing in your mind certain ideas which you call BOOKS and TREES, and the same time omitting to frame the idea of any one that may perceive them? BUT DO NOT YOU YOURSELF PERCEIVE OR THINK OF THEM ALL THE WHILE? This therefore is nothing to the purpose; it only shows you have the power of imagining or forming ideas in your mind: but it does not show that you can conceive it possible the objects of your thought may exist without the mind. To make out this, IT IS NECESSARY THAT YOU CONCEIVE
argument provides a useful framework for introducing the material that I cite below. I found the following “Author’s Afterword,” dated 6/16/92, embedded in a text file downloaded from a Russian webserver hosting raw text files of Gibson’s novels. It details Gibson’s use of a Hermes typewriter, his inspiration for the cyberspace deck, and his general lack of computing and technological knowledge. I thought to myself, this is fantastically interesting material, but I had no idea where it had come from. There is no mention of it in the major science fiction research databases, special collection databases, or on the general Internet. The afterword did have two compelling clues. Gibson writes, “The technology through which you now access these words didn’t exist, a decade ago” (Gibson, “Afterword” par. 1), and “It gives me great pleasure to have these three books digitized, datacompressed, and published in this (make no mistake) revolutionary format” (Gibson, “Afterword” par. 11). This had to be from a digital version of his books, but I was confused by the date—1992! This led to my asking questions on the Science Fiction

THEM EXISTING UNCONCEIVED OR UNTHOUGHT OF, WHICH IS A MANIFEST REPUGNANCY. When we do our utmost to conceive the existence of external bodies, we are all the while only contemplating our own ideas. But the mind taking no notice of itself, is deluded to think it can and does conceive bodies existing unthought of or without the mind, though at the same time they are apprehended by or exist in itself. A little attention will discover to any one the truth and evidence of what is here said, and make it unnecessary to insist on any other proofs against the existence of material substance. (Berkeley par. 23)
Research Association’s email listserv (ephemeral digital discussions), which led to a member contacting Gibson on Twitter (more ephemeral discussions) and a conclusion from Greg Conley: “I asked Gibson about it on Twitter, and he said the '92 floppy ebook was indeed through Voyager.” Further digging revealed that Voyager Company was originally responsible for The Criterion Collection of films and Expanded Books—digital ebooks stored on floppy disks that were readable on Macintosh or Windows computers, recreating a graphic representation of the book with virtual paperclips to mark your place. Voyager is no longer around, and very few copies of the Expanded Book of Gibson’s Sprawl trilogy still exist. However, Gibson already knew that this would happen:

But I confess it gives me greater pleasure still, to contemplate that process whereby every tech, however sharp this morning, is invariably supplanted by the new, the unthinkable, and to imagine these words, unread and finally inaccessible, gathering dust at the back of some drawer in some year far up the road. Nothing in there but a tarnished Yale key, a silver dime, a couple of desiccated moths, and several hundred thousand datacompressed words, all in a row. (Gibson, “Afterword” par. 12)

Cyberspace and narratives share an ephemeral existence—the Platonic forms: the hardware or the book—might be “there, there”—but without the human brain to experience the “origami trick,” what significance do they have?

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9 I located Gibson’s Tweet after the fact: “RT @cuchlann @GreatDismal was there an ebook edition of Neuromancer around 1992, on floppy? Who produced that? [Yes. I think by Voyager].” Gibson’s Twitter username is @GreatDismal.
The idea of a computer that was relatively portable, like a cyberdeck, was not part of popular culture landscape in the early 1980s. Sharp, Casio, and Radio Shack had begun releasing “pocket computers” or calculator-sized computers with QWERTY keyboards and single line displays in 1981. According to Gibson in his afterword to the early ebook version of the Sprawl trilogy:

*Neuromancer* was written on a "clockwork typewriter," the very one you may recall glimpsing in Julie Deane's office in Chiba City. This machine, a Hermes 2000 manual portable, dates from somewhere in the 1930's. It's a very tough and elegant piece of work, from the factory of E. PAILLARD & Cie S.A. YVERDON (SUISSE). Cased, it weighs slightly less than the Macintosh SE/30 I now write on, and is finished in a curious green and black "crackle" paintjob, perhaps meant to suggest the covers of an accountant's ledger. Its keys are green as well, of celluloid, and the letters and symbols on them are canary yellow. (I once happened to brush the shiftkey with the tip of a lit cigarette, dramatically confirming the extreme flammability of this early plastic.) In its day, the Hermes 2000 was one of the best portable writing machines in the world, and one of the most expensive. This one belonged to my wife's stepgrandfather, who had been a journalist of sorts and had used it to compose laudatory essays on the poetry of Robert Burns. I used it first to write undergraduate Eng. lit. papers, then my early attempts at short stories, then *Neuromancer*, all without so much as ever having touched an actual computer.
Some readers, evidently, find this odd. I don't. Computers, in 1981 (when I began to work with the concept of cyberspace, the word having first seen light on my trusty Hermes) were mostly wallsized monsters covered with twirling wheels of magnetic tape. I'd once glimpsed one through a window at the university. Friends who did things with computers tended to do them at very odd hours, having arranged to scam time on some large institution's mainframe. (Gibson, “Afterword” par. 2-3)

Thus, the term “cyberspace” first makes its appearance on an extremely old typewriter and a writer, who had never touched a computer before, creates it. This, of course, makes perfect sense that Gibson could conceptually imagine the computer-network-scape, because without the limitations of knowing what computers could actually do, he could imagine what computers, networking, and interface technologies could possibly do in the near future. His imaginative leap of computers and human brains creating cyberspace as a conceptual space is a kind of cognitive future prep. Gibson takes what it is when we read books—bring the words from the page, load them into our imaginative memory, and experience the unfolding of the plot within our conscious mind—and conceptually extrapolates that to computer technology. Cyberspace’s “consensual hallucination” is simply an interactive version mediated by interface technologies that extend the kind of basic things we already do when we read novels. The primary difference between cyberspace and a novel is that in cyberspace the console operator can do things, act on the environment, communicate with others, do work, etc. However, the unfolding
panorama of the real actions within the virtual world takes place in the same place where novels unfold—in our brains.

Gibson, however, did find some inspiration for interfacing human beings to the global network of corporations, computer systems, and users: the Apple IIc. This low profile update to the well-liked Apple II personal computer was a “portable” version. This simply means that it would be light enough to be carried by a handle. A monitor and power adapter would still need to be lugged around with it. Gibson learns about these from advertisements at bus stops:

Around that time, however, the Apple IIc appeared. For me, it appeared on the miniature billboards affixed to bus stop shelters. This seductive little unit, looking not that much bigger, really, than your present day Powerbook, was depicted dangling from a handle in the hand of some unseen suit with a nicely laundered cuff. Portability! Amazing! A whole computer in a package that size! (I didn’t know that you had to lug the monitor around as well, plus a bulky little transformer and another disk drive that weighed nearly as much as the computer itself.) These Apple ads were the direct inspiration for the cyberspace decks in *Neuromancer*. Like the Hermes 2000, the IIc, in its day, was quite something. (Gibson, “Afterword” par. 4)

First, it is fascinating that it was not the Apple IIc itself that inspired Gibson’s cyberspace deck—it was the “Apple ads,” the advertising. Apple sold an image to people who bought the computers, but it also sold an image to a writer who turned it into the top of the line
Ono-Sendai Cyberspace 7, which mediates the connection between the matrix and the console operator, connects directly to the operator’s brain by dermatrodes placed on the head, and recreates the matrix’s physicality as graphical representations within the operator’s brain. Of course, this is nothing like what a real Apple IIc could do despite being “quite something” at the time. It could translate computer code and bits of data into graphical representations and text displayed on a tiny phosphor display monitor, and the representations on the screen could be manipulated by the keyboard interface, built into the dorsal surface of the IIc. Gibson continues:

Remembering those busstop ads, I bought myself an Apple IIc. This was around 1986 or so, and the IIc had long since been eclipsed by various protoMacs, which everyone assured me were wonderful, but which I regarded as prohibitively expensive. I bought a IIc in an endofline sale at a department store, took it home, and learned, to my considerable disappointment, that personal computers stored their data on little circular bits of electromagnetic tape, which were whirled around to the accompaniment of assorted coarse sounds. I suppose I'd assumed the data was just sort of, well, held. In a glittering mesh of silicon. Or something. But silently.

And that, quite literally, was the first time I ever touched a computer. And I still don't know very much about them. The revealed truth of which, as I've said, sometimes perturbs my readers, or in any case
those readers with a peculiarly intense computertech bent, of whom I seem to have more than a few. (Gibson, “Afterword” par. 7-8)

Gibson experiences dissonance of what he had expected and wrote about in his fiction and the stark reality of mid-1980s computer technology. In an apocryphal addition to this story, it is reported that Gibson called the store he purchased the computer from after getting it home, because the sounds of the floppy disk drive led him to believe that it was broken! These are honest mistakes of a humble writer who admits to sticking with writing and not computer engineering. It is unfortunate that some readers might be perturbed by Gibson’s lack of computer expertise, because the metaphors he employs are exactly the kind of metaphors the computer industry deploys to explain, market, and sell their wares. Everything that computers do—networked or not—on the physical level of electrical currents charting through circuits and chips, bits of memory flipped on or off, and pixels flashed and colored repeated on a display are out of step with the mundane world. Digital technologies require metaphors to represent in the user’s brain what it going on and how to influence the goings on in order to make these technologies easier to use and more approachable by a wider audience of users. Gibson employs geometric shapes with different characteristics—folding and color, for example—to represent the various elements within cyberspace. Similarly, modern computers employ graphical user interfaces (GUIs) such as Mac OS X and Microsoft Windows to provide a point of entry into the “desktop” environment of “folders” and “files” navigated primarily by clicks and movement of the “mouse.” We immediately see the results of our actions with the mouse and keyboard on the computer’s display, but like anything we see, the image of the
computer display is something consciously perceived within the human brain.
Furthermore, we can imagine what we do in our computers (e.g., emptying the “trash” or “recycle bin”) as a representation of other operations taking place “deeper” within the computer’s operating system—out of sight, but nevertheless, efficacious. Similarly, the experience of cyberspace in Gibson’s fiction has these different levels of operation. There is the representational three dimensional experience of cyberspace projected into the operator’s brain by the cyberspace deck, but the representations are Platonic shadows of underlying forms of physical hardware, abstract data stored on a computer disk, etc. The console cowboy’s choice to “punch” or enter commands (and also reminiscent of typing on an old typewriter like the Hermes) acts on the representations seen in the conscious mind by sending signals or commands underneath the perceiving level in a language the computing hardware “understands” and “works with.” However, Gibson cautions:

But *Neuromancer* and its two sequels are not about computers. They may pretend, at times, and often rather badly, to be about computers, but really they’re about technology in some broader sense. Personally, I suspect they’re actually about Industrial Culture; about what we do with machines, what machines do with us, and how wholly unconscious (and usually unlegislated) this process has been, is, and will be. Had I actually known a great deal (by 1981 standards) about real computing, I doubt very much I would (or could) have written *Neuromancer*. Perhaps it all goes to prove that there are situations (literary ones, at least) in which a little
knowledge is not only a dangerous thing, but the best tool for the job at hand. (Gibson, “Afterword” par. 9)

I quote this passage, not because I believe that Gibson has any control over the meaning of his fiction, but instead, because I believe *Neuromancer* and its sequels, *Count Zero* and *Mona Lisa Overdrive*, are about computers. Whether Gibson wanted it or not, the imagery and terminology of his fictional cyberspace continue to inform computer discourse today. These novels are about what computer can do for us and what we can do with computers. The broader theme that Gibson identifies as “Industrial Culture,” or what I would characterize as the effects of global capital, globalization, and technologies of capital accumulation, are deep themes in his novels, but I find that the unspoken concern in these novels has to do with the human brain’s relationship to technology and how technology can be employed to elevate the realms of possibility for what the human brain can do on its own. The possibilities and potential of cyberspace will always be dependent upon the human brain’s ability to create that space within itself. The challenge, perhaps, is to fight ephemerality, or on the other hand, accept the transience of the virtual and seek out new experiences for us, for our brains.
CHAPTER 6

Beyond Science Fiction: Metaphors as Future Prep

In the preceding chapters, I have endeavored to establish what I believe to be a strong connection between the human brain’s evolution, increasing technologization, and science fiction. I began by theorizing that human beings responded to the rapid rate of technological change, something our brains had no specifically evolved adaptation for, by developing science fiction as a by-product of our cognitive abilities that, in part, co-evolved with our technology. Science fiction performs what I call future prep, or a pedagogic function that prepares its readers and viewers with new frameworks and metaphors that aid understanding and social engagement of new technologies and their social effects. I then discussed how future prep operates in the cognitively oriented fictions of three important writers of the mid- to late-twentieth century: Isaac Asimov, Philip K. Dick, and William Gibson. Each of these authors employed complementary technologies of brains and minds to explore new metaphors for the interaction of human beings and our technologies. Their technology metaphors inform their work and the work of other writers through the shared science fiction mega-text, and their metaphors inform the wider framework we all draw on when thinking about technologies, especially those that I call “cognitive technologies”—those technologies that interface in some way with
the human mind (e.g., computers, databases, the Internet, etc.) or those that provide supplemental intelligence to the human mind (e.g., semi-intelligent agents like Apple’s Siri).

As I have said in the earlier chapters, these writers create their narratives with images, concepts, and metaphors that inform the way that we think about certain technologies. However, it is striking that these three authors admit in their own way that they either did not know much about the technological subject of their narratives or did not place importance on the technology’s actual function within their narratives. For example, Asimov writes in his final autobiography that he did not know anything about *real* robots:

I’ll give you a third example. Harmony Books, a subsidiary of Crown Publishers, asked me, on May 4, 1983, to do a book on robots, their history, their development, their uses in industry and science, and so on. I refused, explaining that although I wrote about robots in science fiction, I knew nothing about them in real life. (Asimov 444-445)

Asimov, who inspired many to pursue the science of robotics—a science that he coined the term for, divulges in his memoir that he “knew nothing about them in real life.” Dick, on the other hand, simply states in his 1976 essay, “Man, Android, and Machine:”

Within the universe there exists fierce cold things, which I have given the name “machines” to. Their behavior frightens me, especially when it imitates human behavior so well that I get the uncomfortable sense that these things are trying to pass themselves off as humans but are not. I call
them “androids,” which is my own way of using that word. By “android” I do not mean a sincere attempt to create in the laboratory a human being . . . I mean a thing somehow generated to deceive us in a cruel way, to cause us to think it to be one of ourselves. Made in a laboratory—that aspect is not meaningful to me; the entire universe is one vast laboratory, and out of it come sly and cruel entities that smile as they reach out to shake hands. But their handshake is the grip of death, and their smile has the coldness of the grave. (Dick, “Man, Android, and Machine” 211)

It is telling here that Dick elaborates on what he chooses to call “machines” and “androids.” For him, these things are concepts that can inhabit certain ideas or represent certain qualities of life or non-life. The materiality or operability of “machines” and “androids”—that is, how they were “made in a laboratory”—“is not meaningful to” Dick. What are meaningful to him are the metaphorical aspects of their handshake and their smile. Dick investigates what these things represent and he adds his own response to those representations through his fiction and “philosophical” writings. Finally, as I discussed at the end of the previous chapter, Gibson tells us that he never touched a computer until beginning to write Neuromancer’s sequel, Count Zero:

*Neuromancer* was written on a “clockwork typewriter,” . . . a Hermes 2000 manual portable, dates from somewhere in the 1930’s. . . . I used it first to write undergraduate Eng. lit. papers, then my early attempts at short stories, then *Neuromancer*, all without so much as ever having touched an actual computer.
Some readers, evidently, find this odd. I don't. Computers, in 1981 (when I began to work with the concept of cyberspace, the word having first seen light on my trusty Hermes) were mostly wallsized monsters covered with twirling wheels of magnetic tape. I'd once glimpsed one through a window at the university. (Gibson, “Afterword” par. 2-3)

When Gibson “began to work with the concept of cyberspace,” he had not “touched an actual computer,” even though he had only, “once glimpsed one through a window at the university.” While Gibson might be deploying hyperbole about the “wallsized monsters covered with twirling wheels of magnetic tape,” I suspect that he is demonstrating an even deeper lack of knowledge of computers. For example, personal computers had made their way into homes and offices—the Apple II and Commodore PET both debuted in 1977 and the IBM PC launched in 1981—and computers had scaled down—my family’s auto parts business purchased their first room sized computer in the early 1970s to maintain inventory and they upgraded to a three cabinet machine in the 1980s that occupied only a corner of the room.

Asimov, Dick, and Gibson did not need to know these technologies in the same way that scientists, engineers, and industrialists need to know these technologies. These writers understood them as concepts, representations, and metaphors, and they developed their own ideas about these technologies on those terms by borrowing from and feeding into the science fiction mega-text. These writers make no pretension as prognosticators of the future. However, they are creators who generate new concepts and metaphors for representations of those technologies in fiction—metaphors that inform our thinking
when we actually encounter or think about a given technology. These metaphors then shape our thinking about and our use of these technologies.

The origins of personal computers and the idea for human-computer interaction provide a useful final example for the interaction of technological development and the generation of useful metaphors. In March 1960, J. C. R. Licklider, the first director of the US Department of Defense’s Advanced Research Project Agency (ARPA), writes, “The hope is that, in not too many years, human brains and computing machines will be coupled together very tightly, and that the resulting partnership will think as no human brain has ever thought and process data in a way not approached by the information-handling machines we know today” (Licklider par. 3). His proposal for augmenting the human brain’s capabilities with computer technology was no science fiction. This comes to us from a longstanding (now) journal in cybernetics. Then, at the 1968 Fall Joint Computer Conference in San Francisco, Douglas C. Engelbart delivered what Steven Levy calls, “the mother of all demos” (Levy 42). At this presentation, Engelbart demonstrated most modern computing paradigms for the very first time: the mouse, real-time text editing, graphical user interface windows, video conferencing, networking, and CRT displays (among other more technical elements such as version control).\(^1\) Engelbart's "mother of all demos" is published as “A Research Center for Augmenting Human Intellect” by Douglas C. Engelbart and William K. English in *AFIPS Conference Proceedings of the 1968 Fall Joint Computer Conference*, December 1968, Vol. 33, pp. 395-410. Video of Engelbart’s demonstration can be found online here: <http://sloan.stanford.edu/mousesite/1968Demo.html>.

and his team recognized the difficulties presented by human-computer interfaces presented by Licklider and others, and through research and development (and Stanford Research Institute’s financial backing), they created the technologies upon which the modern personal computer was founded. From the “mother of all demos,” the one element though that has lasted as a recognizable image of the modern computer is the “mouse.” Considering the needs of a better means of interfacing the human with graphical data on a two-dimensional display, Engelbart’s team tested a number of devices, but the one that they found the most intuitive and easiest to use was a small handheld puck with two perpendicular wheels representing the x- and y-axes connected to the computer by a cord or “tail.” Its generalized shape and tail earned the input device the name “mouse.”

The mouse metaphor comes to us from Engelbart and his research team, but there is a missed opportunity during the presentation that demonstrates the importance of metaphor. Above his workstation on the stage, the audience:

... saw a projection of Doug Engelbart’s face, with the text of the screen superimposed on it. At one point, control of the system was passed off, like some digital football, to the Augmentation team at SRI, forty miles down the peninsula. Amazingly, nothing went wrong. Not only was the future explained, it was there, as Engelbart piloted through cyberspace at hyperspeed. (Levy 42)

First, I can only imagine what it must have been like to see Engelbart’s face superimposed on the graphical user interface of his advanced computing system. On the
projected image above the stage, Engelbart’s human face transparently covers his computer graphics manipulations while he tells the audience what exactly he commands the computer to do. These images co-exist and share the same visual space as the Engelbart’s face, computer and human working and communicating symbolically and symbiotically. This was a visual metaphor for cyberspace, a word Levy has to define by citing Gibson *before* talking about Engelbart’s *earlier* technological demo. In a sense, the metaphor of cyberspace travels backward in time to explain a groundbreaking technology and its demonstration that ultimately led to the technologies we understand as making cyberspace possible. What discursive possibilities might have opened had Engelbart come up with “cyberspace” or some other catchy, useful metaphor for the things he and his team accomplished in 1968? Certainly, the technology, at that time, was far too costly to introduce something like the Macintosh or Windows PC into the home or office. However, the future prep of such a metaphor might have led the way to other inventions, other discussions, and other possibilities. Had Engelbart or someone else introduced a strong cyberspace-like metaphor at that early date, might not the computer have come standard with a modem far earlier than it did? Without a “place” to go, the computer remained largely a local, standalone information-processing machine until the mid-1990s. The computer experience still intimately involved the brain of the computer user to imagine the operations of computer work and computer games due to the limitations of graphic capabilities of early computers. A metaphor, however, might have opened different avenues of computer-brain symbiosis that have yet to be realized.
The science of cybernetics, or the study of self-regulating machines or systems, obviously informs Asimov’s interest in the human brain. This emphasis on systems is what give cybernetics the purview to also include the human animal as a subject to apply what was learned from artificial systems and as an object to augment with the knowledge and technologies developed by cybernetic research. For Asimov, the human brain and the robot brain are equivalent systems—both process information, retain memories, and create a perceiving consciousness. The human and the robot (and by extension, the computer) become metaphors for each other. Following the brain-as-computer model, we think of our brain as a processor connected to memory via circuits and its system upgraded with “Brain games” and psychopharmacological interventions. Put another way, the brain is hardware and the mind is software. Likewise, the computer has a brain (CPU) with short-term memory (RAM) and long-term memory (hard drive), and a virus can disrupt its healthy operation. Thus, metaphor configures brain-computer symbiosis more than actuality, because the robot revolution never took place. Nevertheless, Asimov configures the possibility of brain-computer symbiosis as a largely positive development.

Unlike Asimov, Dick fears the blurring between the human and the machine, or as he usually configures it, the human and the android. He writes, “Machines are becoming more human, so to speak—at least in the sense that, as Wiener indicated, some meaningful comparison exists between human and mechanical behavior” (Dick, “Android and the Human” 184). Dick thinks about behaviors and the emotion behind those behaviors, and he identifies the main factor that separates us from our technology is the human potential for empathy. He concedes, “The constructs do not mimic humans;
they are, in many deep ways, *actually* human already” (Dick, “Android and the Human” 185). What he means by this is that we need not be concerned that androids might actually look identical to us. Instead, we should be more concerned about the social systems that can make us into the metaphorical android—an uncaring, predictable, and programmable human being. Dick ties new technologies of surveillance and control, including the computer, to the technologization of the human being. Nevertheless, Dick maintains some ambiguity in his fiction, such as in *Do Androids Dream of Electric Sheep?*, that problematizes the simple dichotomy between human and android. They are us and we are them. The thing that divides us ultimately is a matter of feeling and choice. Considering the fact that Dick identifies V.A.L.I.S. as an artificial satellite that sends Zebra’s Gnostic messages directly into his brain, he must acknowledge that there can be some potentially positive outcomes from the symbiosis of humans and computers.

Gibson takes the idea of human-computer symbiosis to its next extreme. Leaving anthropomorphic images of computers behind, he simultaneously creates the metaphor of cyberspace and the ubiquity of cyborgs in the near future. Cyberspace is a representative space dependent upon the human brain to imagine and act on the computer data matrix. Cyborgs are the razor girls and console cowboys who regularly fuse themselves with various computer technologies as part of their life, work, and play. The ubiquity of human-computer symbiosis in Gibson’s work prefigures and reflects the reality that developed out of the 1970s, 1980s, and 1990s. With miniaturization and Moore’s Law, computing technology is now always within reach and often in contact with the human body. In various ways, the computer interface has gotten closer to the human animal, but
the threshold for Gibson’s “consensual hallucination” through direct brain-to-matrix connection has not yet been reached. Of course, there are researchers and companies following Gibson’s metaphor to its natural conclusion today with new advancements in brain-computer interfaces (some more or less invasive to the body and brain), with many of these being focused on restoring sight and hearing for visually or hearing-impaired persons. Neurosky is one such company whose brain-wave-reading hardware has found its way into many different products ranging from clinical (healthcare research and psychological applications) to fashion (necomini or mood-reading wearable cat ears) to play applications (Star Wars Force Trainer). Might Neurosky-type headsets replace the venerable computer mouse? We have seen the mouse potentially nearing its end-of-life as a computing “killer app” with the rise of tablet computing made popular by Apple’s iPad and iPhone.

The next direction and the next metaphor might not yet be realized, but science fiction’s future prep plays a role in our ability to cope with our constantly changing techno-social landscape. However, the always changing now presents new challenges for the human animal to cope with via the use of our complex brains. Gibson copies a speech he gave in 2003 on his blog that address these challenges:

With the advent of the digital, which I would date from, approximately, World War Two, the nature of this project begins to become more apparent, more overt; the texture of these more recent technologies, the grain of them, becomes progressively finer,
progressively more divorced from Newtonian mechanics. In terms of scale, they are more akin to the workings of the brain itself.

All us, creators or audience, have participated in the change so far. It’s been something many of us haven’t yet gotten a handle on. We are too much of it to see it. It may be that we never do get a handle on it, as the general rate of technological innovation shows no indication of slowing.

(Gibson, “Prions” par. 17-18)

The “advent of the digital” informs all of the fiction that I have studied in this dissertation. Asimov’s robots and their positronic brains were formulated in the pre-digital era and it is not surprising that the metaphors he uses are analog—potentials—a term with meaning for the vacuum tube (electrical potential) and neuron (action potential). Dick serves in the middle space where the transition from analog—consider his love for records and expensive stereo equipment—likely with vacuum tubes—to digital—while he does not appear to have owned a computer, his Exegesis reveals he turned his cosmogony explorations toward computer metaphors:

AI Voice. And “plugged into an idea computer.” Audio and video.

Pictures: I saw my abstract ideas graphically. Is Valis a computer? I think I’ve solved it. I came to the conclusion a long time ago that the dialectic represented a computer. Are we in a computer program? And stationary?
As Zeno proved, motion is impossible. All is thought. (Dick, Exegesis 13:6)
Dick “saw” his “abstract ideas graphically,” which led him to think that VALIS and perhaps all of reality is a computer. This was in early 1979—computers, especially in California, were becoming part of the popular discourse, but they would, unfortunately, not make their revolutionary break until shortly after his death.

Gibson picks up the brain-computer symbiosis thread by discussing its relationship to the contemporary “driver of change”—the Internet:

Much of history has been, often to an unrecognized degree, technologically driven. From the extinction of North America’s mega-fauna to the current geopolitical significance of the Middle East, technology has driven change. (That’s spear-hunting technology for the mega-fauna and the internal-combustion engine for the Middle East, by the way.) Very seldom do nations legislate the emergence of new technologies.

The Internet, an unprecedented driver of change, was a complete accident, and that seems more often the way of things. The Internet is the result of the unlikely marriage of a DARPA project and the nascent industry of desktop computing. Had nations better understood the potential of the Internet, I suspect they might well have strangled it in its cradle. Emergent technology is, by its very nature, out of control, and leads to unpredictable outcomes.

As indeed does the emergent realm of the digital. I prefer to view this not as the advent of some new and extraordinary weirdness, but as
part of the ongoing manifestation of some very ancient and extraordinary weirdness: our gradual spinning of a sort of extended prosthetic mass nervous-system, out of some urge that was present around the cooking-fires of our earliest human ancestors. (Gibson, “Prions” par. 19-21)

As with many of the great technological innovations of the past three or four decades, computers, the Internet, and digital content players have reconfigured much about how we create, communicate, and consume culture. Gibson specifically addresses the Internet and the change that it has brought about. In particular, the popularity of contributing to knowledge (Wikipedia) and the social (Facebook and Twitter) seem to be leading toward “a sort of extended prosthetic mass nervous-system.” However, I doubt no one, including Gibson, could have imagined the advent of Twitter (launched in 2006—three years after this speech) and its role in the Arab Spring (beginning four years after the launch of Twitter). Similarly, Dick writes about Captain Crunch and the Phone Phreaks of the late 1960s and 1970s: “This is how the future has actually come out. None of us science fiction writers foresaw phone freaks. Fortunately, neither did the phone company, which otherwise would have taken over by now” (Dick, “Android and the Human” 194). As Gibson and Dick illustrate, the power and promise of new technologies are that we surpass the imagination so that “the street finds its own uses for things” (Gibson, “Burning Chrome” 199).

In my theorization of future prep, the metaphor does not contain or control the technology anymore than regulation might. The street (meaning all of us) draws on the metaphor to help us understand and think about new technologies and our relationship to
those technologies. The metaphor can take the edge off the unexpected, but it can equally
give something like Engelbart’s wonderfully bizarre human-face-over-computer-screen
superimposition the edge (i.e., “cyberspace”) it needs to acquire the popular imagination
and to enable us to carry the metaphor further than anyone had imagined before.

A direction for future work on metaphor and its circulation within and beyond the
borders of science fiction is tone. Up to this point, I have not addressed tone in the
fictional works that I have examined. Instead, I have focused on the solemn truth of their
ideas and not the tone conveyed by those ideas or by the narratives in which those ideas
also exist. However, my work lays the foundation for tone and its projection in irony.
This follows from the tension created by my own efforts to do literary history with
knowledge and insight provided by the sciences. The tension is evident when I waver
between literary history and science—a tension found elsewhere in science fiction and
literary scholarship by Donald M. Hassler in his 1982 book Comic Tones in Science
Fiction:

\[...\] some of the most recent theories about reading and about the role of
literary criticism . . . are profoundly analogous to the notions of
indeterminacy in science and of possible alternate universes that have so
rocked modern physics. This marriage of literary theory and science—
similar to the eighteenth-century marriage between a sense of the burden
of the past and science—has led to the peculiar narrative offspring that I
have come to appreciate in some science fiction. The comic effects in
these fictions are both the products of the marriage and also the balm that helps us to endure the marriage. (Hassler, *Comic Tones* x)

Most importantly for my discussion, Hassler’s observation that “comic effects” in science fiction is the result of the “marriage of literary theory and science” and “the balm that helps us to endure the marriage.” Even though I have not addressed the issue of tone in the works of Asimov, Dick, and Gibson, I know that the tension of tone is there as are the effects of that tone. Could the comic tone be, in part, the balm that makes it easier to accept the metaphors embedded in their work? I believe that this is the case. In fact, my major argument—that science fiction prepares us to adapt—implies that we do this not solemnly always, but more usually, with some irony and with some tone of the comic. We adapt to the new present or the possible future, but in comparison to the way things were before, we realize this is a very strange adaptation.

Each of the writers in this dissertation communicates this through irony and comic effects that surround their solemn truths. Asimov cherishes the organic human brain despite its being what David Linden calls a “kludge,” and he promotes the human pinnacle of achievement as the expertly designed positronic robot brain despite its many interesting and sometimes comically produced behaviors. For example, why do so many of Asimov’s robots turn to limericks or song when their stressors overpower the Three Laws? Robots seem to have more sex with humans than humans do with one another—at least until Asimov matures in his later years. Dick, arguably the best writer among the three, juxtaposes his characters’ ontological dilemmas with comedic and ironic twists. His verbal contortions and comedic interludes align his work with that of Asimov. For
example, Deckard in *Do Androids Dream of Electric Sheep?* believes his success as a bounty hunter will provide him with a real, live sheep to care for, but ultimately, he winds up with an electric toad. In *VALIS*, Horselover Fat’s mystical experience could mean everything or it could mean nothing. Dick’s final book, *The Transmigration of Timothy Archer*, is very ironic and full of literary history. It is far less about technologically derived ideas and much more about the ironic tension between knowing and not knowing. Strictly speaking, it is not science fiction, but it is an epistemological investigation. The protagonist Angel Archer continually locates the irony in every aspect of her life, because she is very knowledgeable about literature, music, and philosophy. It is a rich work and a fitting end to Dick’s writing, but I avoided a lengthier discussion of this title due to its orientation in relation to the orbits of the ideas in my dissertation.

Gibson is on the surface more serious than Asimov and Dick, but this is in part his “punk” sensibility: devil-may-care attitude combined with seriousness about his punkish inventions. His characters’ ironic names (e.g., the cyberspace cowboy Case is on a “case” in a future-noir mystery, or the posthuman razor girl Molly combines a familiar sweetness with pragmatic ruthlessness) operate within the exaggerated dystopias found throughout his novels. While I argue that “cyberspace” exists in the human brain, there is the irony that cyberspace exists on the pages of a book in literature. In addition, Gibson punched out “cyberspace” on a typewriter instead of the latest piece of early 1980s computing hardware. Perhaps the best irony in *Neuromancer* is the fact that Case cannot completely escape the shackles of his body and experience cyberspace as a consciously perceiving autonomous agent. He needs his body and brain in order to experience
cyberspace—at least in the way he pines over at the beginning of the novel. Perhaps this is the point that Case misses when he thinks about the exaltation of cyberspace’s release. He cannot escape that metaphor, and he needs a new way to imagine and a new way to interface if he truly wants to leave his body behind. Perhaps with the right metaphor, conveyed with the right tone, he could see past his limitations in the present and confinement by the metaphors of history. We can build on our literary history by reaching beyond our present into the future with new metaphors of our own making.


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