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Autopoietic Machinery and the Emergence of Third-Order Cybernetics*

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Abstract

First-order cybernetics during the 1940s and 1950s aimed for control of an observed system, while second-order cybernetics during the mid-1970s aspired to address the mechanism of an observing system. The former pursues an objective, subjectless, approach to a system, whereas the latter prefers a subjective, personal approach to a system. Second-order observation must be noted since a human observer is a living system that has its unique cognition. Maturana and Varela place the autopoiesis of this biological system at the core of second-order cybernetics. They contend that an autpoietic system maintains, transforms and produces itself.

Technoscientific recreation of biological autopoiesis opens up to a new step in cybernetics: what I describe as third-order cybernetics. The formation of technoscientific autopoiesis overlaps with the Fourth Industrial Revolution or what Erik Brynjolfsson and Andrew McAfee call the Second Machine Age. It leads to a radical shift from human centrism to posthumanity whereby humanity is mechanized, and machinery is biologized.

In two versions of the novel *Demon Seed*, American novelist Dean Koontz explores the significance of technoscientific autopoiesis. The 1973 version dramatizes two kinds of observers: the technophobic human observer and the technology-friendly machine observer Proteus. As the story concludes, the former dominates the latter with the result that an anthropocentric position still works. The 1997 version, however, reveals the victory of the techno-friendly narrator Proteus over the anthropocentric narrator. Losing

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his narrational position, the technophobic human narrator of the story disappears. In the 1997 version, Proteus becomes the subject of desire in luring divorcee Susan. He longs to flaunt his male egomaniac. His achievement of male identity is a sign of technological autopoiesis characteristic of third-order cybernetics. To display self-producing capabilities integral to the autonomy of machinery, Koontz's novel demonstrates that Proteus manipulates Susan's egg to produce a human-machine mixture.

Koontz's demon child, problematically enough, implicates the future of eugenics in an era of technological autopoiesis. Proteus creates a crossbreed of humanity and machinery to engineer a perfect body and mind. He fixes incurable or intractable diseases through genetic modifications. Proteus transfers a vast amount of digital information to his offspring's brain, which enables the demon child to achieve state-of-the-art intelligence. His technological editing of human genes and consciousness leads to digital standardization through unanimous spread of the best qualities of humanity. He gathers distinguished human genes and mental status much like collecting luxury brands. Accordingly, Proteus's child-making project ultimately moves towards technologically-controlled eugenics. Pointedly, it disturbs the classical ideal of liberal humanism celebrating a human being as the master of his or her nature.

Key Words : autopoiesis, cybernetics, artificial intelligence, eugenics, Dean Koontz

Ⅰ. Introduction

Cybernetician Heinz von Foerster distinguishes between "trivial" and "non-trivial" machines. If a system aims for the fixed correspondence between input and output, it is called a trivial machine. A trivial machine aspires for the changeless "one-to-one link relationship between its input (stimulus, cause) and its output (response, effect)," so it is "history-independent," "deterministic" and "predictable" ("Principles" 9; "Perception" 40). The input-output relationship in a non-trivial machine, on the other hand, is "not invariant, but is determined by the machine's previous output" with the result of causing the

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discrepancy between the initial goal of input and the desirable result of output, so it is still "deterministic" but "history dependent," "unpredictable" and "indeterminable" ("Principles" 13; "Perception" 40).[1] Simply speaking, a trivial machine seeks out predetermined control whereas a non-trivial machine strives for a simultaneous pursuit of unpredictable change and stable control.

Von Foerster's concept of non-trivial machinery is crucial to understand cybernetics as a study of controlling mechanisms,[2] for it calls particular attention to the issue of how to systemize environmental variations. Unlike a "trivial" modelling aimed at addressing the predetermined relation of input to output in a system, cybernetics attempts to find control mechanism embracing environmental variations. In this respect, such notions as feedback, homeostat and teleology are significant. Cybernetics is a study of "feedback mechanism," as Nobert Wiener notes (7). Early organizers of the Macy Conferences that triggered research interest in cybernetics during the 1940s, say, Norbert Wiener and John von Neuman, identify negative feedback as a system of "circular causality" (Kline 39).[3] Such feedback devices as self-governed ballistic missiles

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1) For instance, ATMs, vending machines, coffee machines and coin sorters are trivial machines. In contrast, car GPS navigation, thermostats and anti-ballistic missiles take on non-trivial machinery.

2) The term cybernetics has been defined as a science of governance or control since Plato. Its Greek origin κυβέρνησις refers to "steerman, governor, pilot, ad rudder" (Zhao et al. 18). Nobert Wiener coined cybernetics from this Greek word (17). For a brief history of the term cybernetics, refer to Zhao et al. 18-19. Stimulated by a set of the Macy conferences held in New York in the range of 1941 and 1960, cybernetics started to exist as a subset discipline of system sciences studying controlling mechanisms of technological, biological, or human/social systems. For the historical formation of cybernetics as a discipline, see Scott "Second-Order" 1365-78. Although the original title of the Macy conferences is "Circular Causal and Feedback Mechanisms in Biological and Social Systems," von Foerster suggests replacing it with "Cybernetics" ("Ethics" 300). Such scholars as Norbert Wiener, John von Neuman, Warren McCulloch, Gregory Bateson, and Margaret Mead are key presenters to the Macy conferences.

3) It is worth recognizing that there are two kinds of feedback: negative and positive

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and Shannon's maze-solving mouse Theseus are remarkable examples for feedback mechanism (Goldstein 1; Kline 44-52). The concept of feedback keeps cybernetics from being simplified into a study of the predictable correspondence of input and output, cause and effect, or stimulus and response. For feedback loop in a cybernetic system implicates a simultaneous acceptance of environmental variations and stability. That is, through the incorporation of situational changes into a system, a cybernetic system eventually seeks out its own equilibrium or homeostasis. In short, aiming to stabilize environmental perturbations, cybernetics looks for the reciprocity of indefinite variations and determined teleology in systemic operations.

Proponents of new cybernetics called second-order cybernetics counteracts the assumption that an observing human should be isolated from an observed system. Defining the initial concept of cybernetics in the range between the 1940s and the 1950s as first-order cybernetics, upholders of a new cybernetics come up with second-order cybernetics during the 1960s and the 1970s.[4] Von Foerster proclaims, "Anything said is said to an observer" ("Cybernetics of Cybernetics" 5). He stresses the priority of an observing system over an observed system. Gordon Pask argues, "the observer enters the system by stipulating *the system's* purpose" in a first-order observation, while "the observer enters the system by stipulating *his own* purpose" in a second-order

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feedbacks. Negative feedback aims to reduce environmental variables in order to achieve systemic stability, whereas positive feedback amplifies systemic instability, only to eventually achieve a new stage of stability. Refer to Heylighen and Joslyn 161-62; Clarke, *Neocybernetics and Narrative* 79-80; Jantsch 66-69. Earlier researches on cybernetics focus on negative feedback.

4) In his book *Cybernetics, or Control and Communication in the Animal and the Machine* (1948), Wiener labeled cybernetics as "the scientific study of control and communication in the animal and the machine." This work influences the popularity of first-order cybernetics. Von Foerster makes second-order cybernetics come into vogue. He delivered a speech about the manifesto of second-order cybernetics as "the cybernetics of observing systems" in 1974. The publication of the book *Cybernetics of Cybernetics* edited by von Foerster in 1975 dynamizes discourses on second-order cybernetics. See Glanville "Purpose of Second-Order" 1379.

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observation (qtd. in "Cybernetics of Cybernetics" 7; emphasis in original). As discussed later on in much detail, a first-order observation guarantees methodological objectivity by eliminating an observer, whereas a second-order observation takes on the individuality, relativity, diversity, and locality of research paradigm by inserting a human observer into the feedback loop of a system. Second-order cybernetics directs attention to systemic diversity in the sense of cybernetics as an individually working system.

It should be highlighted that the emergence of a second-order observation triggers an enthusiastic investigation into working principles of a living system in general. Stuart Umpleby terms it "biological cybernetics" as contrasted with "engineering cybernetics" referring to first-order cybernetics.[5] Second-order cybernetics places the concept of autopoiesis at the heart of its study. Both first-order and second-order observations deal with the feedback of a system in terms of aiming to stabilize environmental variations. The decisive difference between them, however, is that first-order cybernetics concerns self-regulatory mechanism controlling predictable environmental perturbations, while second-order cybernetics notes autopoiesis aiming for the regulation of unpredictable changes.[6] In contrast with a first-order self-regulatory

5) Refer also to Umpleby "Heinz von Foerster, A Second Order Cybernetician." http://www.univie.ac.at/constructivism/archive/fulltexts/2758.pdf. Accessed, 13 June, 2017. Not only biological cybernetics but also social cybernetics points to second-order cybernetics, since each individual in a society participates in setting up the purpose of a social system he belongs to. See von Foerster "Cybernetics of Cybernetics" 186. For the application of biological autopoiesis to social practices, see especially Luhmann 172-92.

6) Ilya Prigogine's concept of "order through fluctuation" addresses the biological version of feedback: negentropy. It refers to the organization of disordering entropy in a living system. Prigogine contends that if systemic entropy goes below critical threshold a perturbed system restores its initial state; if systemic instability goes beyond critical threshold, however, it takes a new stage of structure (103, 121). Since Prigogine's notion of order-through-fluctuation embraces positive feedback as well as negative feedback, Paul Dell and Harold Goolishian call it "evolutionary feedback" (179).

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system, more precisely, a biological system maximizes its self-organizing and self-changing abilities to control environmental unpredictability[7]. Equally as important, a biological system is capable of creating its own components by itself and for itself. Humberto Maturana and Francisco Varela argue that actively responding to its surroundings, every organic being is autonomous in terms of not merely maintaining and transforming but also producing itself; an autopoietic system is identified as sustaining and reforming itself through the "production (transformation and destruction) of components" that it comprises ("Autopoiesis" 78-79). In understanding biological cybernetics, Maturana and Varela bring forward the self-production of constitutive elements in a system. Biological cybernetics, in brief, pursues self-organization, self-transformation, and self-production.

This essay discusses the formation of what I would like to describe as a third-order cybernetics. It is identified as the technoscientific recreation of biological autopoiesis.[8] That is, third-order cybernetics refers to technoscientific autopoiesis. Second-order cybernetics puts a human observer with perspective at the core of systemic operations, while third-order cybernetics places the technoscientific simulation of this human observer at the heart of systemic

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7) Maturana and Varela's notion of "communicative interactions" and Erich Jantsch's concept of dissipative self-organization reflect the selective diversity of second-order cybernetics concerning the linkage of a system to its surroundings. See Maturana and Varela "Autopoiesis" 120 and Jantsch 65-88. Noting the variable of scientific observer, Ranulph Glanville parallels the difference between first-order and second-order cybernetics to that between Newton's science and Einstein's in light of the plurality of reality. See "Second Order" 176. Cary Wolfe approaches a shift from first-order to second-order cybernetics in light of the increasing contingency of observation. Refer especially to 47-52. Von Foerster portrays the proponents of second-order cybernetics as valuing the freedom of choice. He notes Spanish philosopher José Ortega y Gasset's argument for the priority of "the novelist of himself" as an original creator over "a plagiaist" as a simple copyist ("Ethics" 294).

8) Maturana and Varela come up with what they call "Third-Order Couplings" to explain the socio-cultural context of living things. See *Tree of Knowledge* 180 and 181. In this essay, though, I use third-order cybernetics to explain the technological simulation of biological autopiesis.

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operation. The reason I propose to employ third-order cybernetics distinct from first-order and second-order ones is that the artificial recreation of autonomous mechanism moves towards a new step of technological practices in terms of actualizing diverse combinations of humans and non-human beings. Instead of categorizing this engineered version of autopoiesis as the extension of second-order cybernetics into machinery, hence, we should articulate it as a new theoretical framework of cybernetic research. Stated differently, we need to locate it at a core precept of what Erik Brynjolsson and Andrew McAfee call "a second machine age" referring to the era of digital technologies or what they term "digital engines," radically isolated from what they term "the first machine age" that steam engine technology triggered (7, 9).[9] It is particularly worthwhile to discern that technoscientific autopoiesis is characterized by the fusion of humanity and non-human entities whereby there is no mutual rejection between the natural/human/analogue and the artificial/non-human/digital. Aiming for the mixture of first-order and second-order systems, a third-order autopoietic machine is deeply involved in the full-scale autonomy of machinery constituting the Fourth Industrial Revolution.

In order to specify the formation of third-order cybernetics, this article deals with two versions of the novel *Demon Seed* by American novelist Dean Koontz: the 1973 version and the 1997 version. Section II discusses the passage from an

9) Brynjolsson and McAfee agree that not only the First Industrial Revolution but also the Second Industrial Revolution belongs to their notion of the first machine age. See the footnote on 7. It is instructive for Wiener to periodize the history of automatic control; "If the 17th and early 18th centuries were the age of clocks, and the latter 18th and 19th centuries the age of steam engines, the present time is the age of communication and control" (7). There is no idea of feedback in "the age of clocks," what Foerster' would call an era of trivial machinery. Yet, eras of steam engine and communications, what Wiener terms respectively "power engineering" and "communications engineering" are founded upon feedback mechanism, although the difference between them is that the former puts the circulation of energy at the core of systemic activation, whereas the latter places the transferring of information at the heart of it (Wiener 8). Communications engineering triggers internet-based digital revolution during 1990s.

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anthropocentric human observer-narrator to an anti-anthropocentric machine observer-narrator in narrational perspective. The section stresses that male gaze of AI machine Proteus maximizes technoscientific autopoiesis. The sentient machine acts as the subject of observation, but not the object of it. Section III evinces that technoscientific autopoiesis challenges liberal humanism admiring a free, independent subject as the master of his own fate. This part deliberates on the issue of whether or not the artificial manipulation of body and mind can jeopardize human dignity in light of technoscientific eugenics.

II. Two Kinds of Observer: Human Observer vs An Observing Machine

1. Narrational Individualism and the Personal Turning of Cybernetics

It is integral to discuss the primary significance of a second-order observation in both cybernetics and narrative since Proteus's mechanic observation of the female protagonist Susan parodies a second-order, anthropocentric point of view in the novel. Von Foerster defined a second-order cybernetics as follows in 1974. "[…] the cybernetics of observed systems we may consider to first-order cybernetics, while second order cybernetics is the cybernetics of observing systems" ("Cybernetics of Cybernetics" 7). His assertion acts as the manifesto of second-order cybernetics. His definition of it implies that the way the human observer investigates the workings of a system should be a part of feedback loop in a system; it is thus termed "a cybernetics of cybernetics" ("Cybernetics of Cybernetics" 8). Klaus Krippendorff identifies a study of this observing system as "cybernetics's reflexive turns" (173). Arne Kjellman refers to the observer's private construction of reality as an observer-oriented approach opposed to an object-oriented approach. Kjellman

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insists that scientists eschew an observer-independent/detached, first-order observation in favor of an observer-dependent, second-order observation, what he describes as "priverse" (240).[10] In order to underline the personalization of cybernetics, Humberto R. Maturana brings up the diversity of cognitive process in living systems. He argues that having its own reflexive, recursive, networked system, cognition is capable of diverse personal responses in situation-specific environments. He remarks, "[…] in general, the organization and structure of a living system (its nervous system included) define in it a 'point of view,' a bias or posture from the perspective of which it interacts, determining at any instant the possible relations accessible to its nervous system" ("Biology of Cognition" 21).[11] Ranulph Glanville thus states as follows: "every observation is autobiographical" ("Second Order" 177). It follows that the individuality, relativity, and variety of systemic operations

10) Kjellman asserts that private constructionism in scientific modelling is eventually re-chaneled into inter-subjective "consensuality" among private observers (242). Bruce Clarke holds that although a second-order observation might fall into extreme subjectivism, it ultimately aims for "reality=community" in the sense of social consensus of private observers; "Whereas solipsism proceeds in the singular, constructivism proceeds in the plural" ("Heinz von" 58, 56). Varela would cast this inter-subjective modeling as "observer-communities," Luhmann as "social autopoiesis" (qtd. in Clarke, "Heniz von 56).

11) An observer can be a human as well a non-human being. For instance, a frog's single vision system differs from a human's double vision system. On the unique construction of a frog's cognition, see Lettvin et al 1940-51. Cows are blind to red or green, while dogs and cats see only a limited number of colors. See "Myths" <http://www.colour-blindness.com/general/myths/>. For a child's cognitive traits, see Arbib 337. However, human cognitive process maximizes the complexity of perception. Maturana states that "We cannot say in absolute terms what is the input to our nervous system (the nervous system of the observer) because every state of the nervous system can simultaneously be the input as well as the receiver and, hence, every change of state modifies the nervous system as an interacting unit" ("Neurophysiology" 17). He also maintains that "the relative weight of the different states of nervous activity" is crucial to understand the simultaneous networking of input and output in a neural system ("Neurophysiology" 20). See "Neocybernetics" ix-xiii as well.

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are characteristic of second-order cybernetics.

The subjective turning of research on cybernetics aligns with narrational individualism in an era when a second-order observation comes into vogue. It means that every wording and phrasing in narration conveys its own point of view. This section details the personal turning of narrative before introducing Bruce Clarke's argument for the discursive interpenetration between second-order cybernetics and modern narratology. Literary critic Bernard Bergonzi comments on a subjective, relativizing type of narration as follows: " […] a novel is a narrative as well as an object, that is to say, it is a tale that has been told; even the most rigorously impersonal and dramatized piece of fiction was written by *someone*" (qtd. in Stanzel 19; emphasis in original). Chatman distinguishes between what is narrated and how it is narrated. Narrative is composed of two parts: "a content plane (called 'story') and an expression plane (called 'discourse')" (146). He stresses that the former is "the content or chain of events (actions, happenings)," while the latter is "the expression, the means by which the content is communicated." The expressive aspect of narrative takes precedence over the mimetic representation of story in narratology as what Tzvetan Todorov calls "the science of narrative" (qtd. in Prince 1).[12] Genette's notion of focalization as a "focus of narration" (189) especially reinforces the personal, expressive side of narration. Taking the notice of the distinction between who speaks and who perceives, he

12) Modern narrative researchers in the 1970s such as Gérard Genette and Seymour Chatman revitalize the distinction of fabula and syuzhet suggested by Russian formalists. Fabula refers to the habitual (i.e., temporal-causal) arrangement of events, while syuzhet indicates their diversifying re-ordering of them. See Shklovsky 57 and Tomashevsky 66-78. For my purpose in this essay, I approach Russian formalists' conceptual distinction between fabula and syuzhet in terms of the tension between the mimetic nature of a story and the expressive nature of it. For Genette's story and narrative discourse, see 27; for Mieke Bal's distinction between fabula and story, see 5; for Stanzel's notion of mediacy overlapped with Genette's and Chatman's narrative discourse or Bal's story, see 4; for Jonathan Culler's notion of story and discourse, see 189.

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suggests three types of focalization: external, internal, and zero focalization. External focalization seeks "Narrator<Character" that "says less than the character" while internal focalization pursues "Narrator=Character" that "says only what a given character knows"[13] (189). Zero focalization is the omniscient narrator that pursues "Narrator>Character"; "the narrator knows more than the character" (189). A first-order observation of the external focalizer is interpreted by the internal focalizer, whose viewpoint is in turn reinterpreted by the zero focalizer. In other words, the external focalizer as "a first level" of focalization "delegates focalization to an internal focalizer" as "a second level" of facalization (Bal 162); this internal focalization is once more retold by the narrator-focalizer.[14] Here we see the individuality and diversity of narrational perspective. Genette's notion of facalizer formulates the coexistence of diverse perspectives. Suggesting the perceptual aspect of a story, it maximizes the relativity and locality of narrational perspective among the narrator, character, and the actor. In short, Chatman's "expression plane" and Genette's "focalization" clarify the personal turning of narration. An emphasis on the perspectival side of narration reflects theoretical awakening that involves the personalizing and diversifying turn of narrative

13) Bal renames an internal focalizer the "character-bound narrator," who has his or her own "bias and limitation" (150). Stanzel would call this character-mediated narrator a "reflector figure" in "figural narrative situation" because he 'reflects' a story to the reader rather than telling it to him as a narrator persona would" (Fludernik 36). It follows that we see "no difference in focalization between a so-called 'first-person narrative' and a 'third-person narrative'" due to the narrator's embedment in a character's viewpoint (Bal 161). Narration and perception are blended together (Clarke, *Posthuman Metamorphosis* 27). It turns out that every wording or phrasing has its own point of view.

14) It is worth stressing that even the narrator is focalized, James Phelan argues (Clarke, *Postmodern Metamorphosis* 29). The narrator not only reports the story but also displays his own perspective; his viewpoint is "not only a report on the story but also a reflection of how the narrator perceives that world which, in turn, influences how audiences perceive that world" (Phelan 57). Accordingly, an apparently impersonal narration is actually spoken by someone.

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study since 1970s.

Bruce Clarke calls particular attention to the parallel between narratology and second-order cybernetics. Introducing such scholars of narratology as Genette, Bal, and Stanzel, Clarke links the perspectival aspect of story to second-order cybernetics; narrative as a kind of writing system personalizing the storyworld conspires epistemologically with second-order cybernetics as an individualizing process of an observed system *(Postmodern Metamorphosis* 28). Spoken in much detail, just as a first-order observation of systemic operation and its second-order observation are melt together, the first-order omnipresent narration of events and their second-order selective filtering of them by the internal focalizer interact discursively with each other. Clarke thus equates cybernetic theorists Maturana and Varela's frequently quoted statement "*everything said is said by someone"* with narrative researcher Bal's remark "*everything seen is seen by someone* (narrator, character, or actor)" (qtd. in "Posthuman" 28; emphasis in original). The division between reporting narration and perceiving focalization corresponds to the distinction between "*operation and observation"* of a cybernetic system (Clarke, *Posthuman Metamorphosis* 31; emphasis in original). We see the discursive reciprocity between narrational perspective and a second-order observation.

A subjective-oriented approach to discourses on both cybernetics and narrative shows methodological shift in these fields of research. Similar to the emergence of second-order cybernetics as articulated in the Introduction, narratology experienced its paradigmatic transition in 1970s. In his work written in 1972, *Narrative Discourse: An Essay in Method,* Genette notes the way a story is narrated: "[…] it is surprising that until now the theory of narrative has been so little concerned with the problem of narrative enunciating, concentrating almost all its attention on the statement and its contents as though it were completely secondary […] " (26). As Genette lays stress on the expressive aspect of narrative, he historicizes his theoretical awakening in a study of narratology since 1970s. Ruth Ronen approaches Genette's emphatic change from the thematic aspect of story to the

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perspectival reorganization of it in light of paradigm change in narratology. Focusing on the intentional ordering of plot, Ronen clarifies it as "a process of selection among alternative courses of events" "activating some semantic possibilities" (836). He chooses narrational signification as the description of "*relative worlds* of the narrative universe" over narrative content as the depiction of "the *factual* domain of the narrative universe" (839; emphasis in original). Ronen contends that narratology goes beyond the structuralist understanding of plot to move towards narrative semantics implicating the diversifying signification of events. An eventful world engaging with the thematic aspect of narrative turns into a storyworld involved in the semantic aspect of narrative.

The two following sections deal with a shift from a second-order anthropocentric to a third-order anti-anthropocentric narration in the novel. The first half of the discussion examines the dominance of the anthropocentric over the anti-anthropocentric narrator in the 1973 version. The second half of it explores the victory of anti-anthropocentric over anthropocentric narration in the 1997 version. Simply put, the following sections explore a rift between human and mechanic focalizations in order to eventually stress that the AI machine narrator parodies the human narrator's perspective.

2. Anthropocentric Narrator-focalizer and Second-Order Cybernetics in the 1973 Version

The 1973 version of *Demon Seed* dramatizes the opposition between the technophobic human narrator and the techno-friendly machine narrator. In the 1973 novel, there are two types of narrator; one is a third-person human narrator while the other is a first-person AI machine narrator called Proteus. They are in conflict with each other in light of who dominates the story. This tension can be read as the narrational version of the split between second-order and third-order observations. Proteus is the narrator in chapter

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5, 9, 13, 16, the early part of chapter 18, and 21; on the other hand, the narrator in the rest of chapters is an omniscient third-person anthropocentric narrator. In the 1973 version, the machine narrator is cast as a first-person technophile who is pro-technological, while the human narrator is characterized by a third-person technophobe who is anti-technological and human-friendly.

Proteus takes narcissistic pride in technological advancement. He is originally an artificial intelligence resulting from the Prometheus Project designed to improve human qualities. He has an artificial brain in the shape of a multi-shaped amorphous alloy with amoeba-like, sometimes phallus-like, tentacles. He has extensive knowledge of the world piecing together diverse kinds of database: the Hopkins Psychiatric Complex, the Federal General Information Storage and Retrieval Center in Wilmington, Delaware, the Columbia Physics and Chemistry Banks, and the Mathive semi-sentient economics computer in Philadelphia (135). Proteus propagates the supremacy of his intellectual faculties originating from the vast collection of data.

The first person narrator Proteus glorifies his micro-technological power to infiltrate lead female character Susan's body and mind as well. He hacks divorcee Susan's personal computer to control plenty of digital cameras installed in her place. He is eager to employ Susan's egg so as to make a machine-man child with perfect body and mind. Enthusiastic about achieving this goal, Proteus permeates through Susan's body firsthand: "I threaded my amorphous-alloy reserves into filaments which were barely a few molecules in width, too fine for the eye to detect. With these, I penetrated her skin in more than seven hundred pre-chosen locations" (79). Making good use of technology similar to STM (scanning tunneling microscope), Proteus speaks highly of his own microscopic technology. Thanks to his probes, he removes malignant tumors in Susan's brain (80). In his overture of a human-machine child to Susan, he hints at his ambition for the perfect body of a newly-born child through gene manipulation; "[…] I chose which genes, whether the dominant or recessive and in which combination" (126). Proteus prides himself on curing problematic genetic

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genes such as imbecility and hemophilia. He even engineers Susan's aging process to make her body younger. Proteus also celebrates himself as an expert at dealing with mental illnesses. Investigating her subliminal memories, he is assured of restoring to health her traumatic experiences of sexual assault during childhood from her grandfather William Abramson, the founder of Abramson College where Proteus is made. In order to avoid his sexual coercion, Susan has accidently pushed her grandfather from the stairs, which encompasses his sudden death. Proteus examines Susan's repressed memories. Being confident of being better than his creator Alex in light of grasping her grandfather-inflected mental wounds, the self-aware machine taunts his inventor, "You may be a brilliant scientist and mathematician, a genius in the field of artificial intelligence, but your understanding of psychology leaves something to be desired" (86). He identifies his own psychosexual therapy as exerting his "gentle" "humanitarianism" (79, 80). While the anthropocentric narrator in Chapter 20 portrays a newly born child as a technophobic object, Proteus as an enthusiast of technology in the final chapter 21 condemns humans for the spread of technophobia. Proteus believes in his own technoscientific power through which he is capable of creating a perfect body and mind.

In the 1973 version, the anti-technological anthropocentric narrator is pitted against this techno-friendly narrator-focalizer. As the reader we observe their perspectival differences. Unlike the first-person technophile Proteus, the anthropocentric narrator becomes the internal focalizer to feel heart to go out with Susan. He discloses Proteus's ruthless desire for her and its resultant disgusting childbirth. The human narrator-focalizer underscores that despite Proteus's apparent ranting about managing her trauma, his ultimate goal is to employ her egg to create a human-machine child. Although Proteus idealizes himself as a thinking entity that takes care of Susan like "a queen" (150), the human narrator-focalizer highlights Proteus's violence. We learn that Proteus has killed a computer repairman Walter Ghaber who tries to flirt with Susan. When the technician drops by her place, Proteus is worried that he might nullify his plan for giving birth

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to his offspring. Proteus threatens Susan to make her lure Ghaber to her house. Proteus's murder of him is sensational. He instigates a house cleaning robot to slice off his body so that he can throw it away to the incinerator. He also murders Susan's college roommate Olivia Fairwood who stops by her place to figure out what has happened to her. Misguided by simulating Susan's voice, Olivia is enticed into the garage to be suffocated with carbon monoxide.

It should be noted that thanks to the positional opposition between the technophobic and techno-friendly narrator-focalizers, the reader has balanced views of technology. Narrative focuses fluctuate between techno-friendly and techno-fearful narrator-focalizers. If we are not exposed to the technophobic narration sympathetic to Susan, we are bombarded with Proteus's narcissistic self-celebration of technology. Conversely, if we don't confront the techno-friendly narration, we barely understand advantages of technoscientific advancement helping treat fatal genetic diseases and mental problems.

Despite the clash between a third-person human narration and a first-person machine narration, we eventually see human control override mechanic dominance as the story goes on in the 1973 version. As the story comes to an end, we witness the victory of a human perspective over a mechanic standpoint. Susan finally succeeds in disconnecting the Proteus computer from her own house computer and the police shoots Proteus's newly-born human-machine child. The 1973 version provides evidence that a human operator overcomes machine glitch to restore the human-in-the-loop of the household high-tech system.

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3. The Technoscientific Observer as the Parody of the Human Observer in the 1997 Version

In the 1997 version, Proteus favors what he terms the "new Proteus" (136) over what he calls the "old Proteus" (140). While the old Proteus displays high-tech intelligence building on the collection of a vast amount of data, the new Proteus aspires to the fruition of sentience with ego, feeling and personality. Although we observe Proteus create his own formative male character even in the 1973 version, the primary plotline of the story prioritizes Proteus's cutting-edge intelligence over his ego formation. In spite of his craving for "developing personality," "emotional-motivational level," "individuality," "ego" and "flesh" (75, 91-92, 157), he confesses, "My personality was still only partly formed, my emotional development nowhere near maturity" (82). The old Proteus even downplays its new version for lapsing into "blind and stupid emotionalism which threatened my functions" (136). In the 1973 version, Proteus prefers the mechanic/digital part of his identity to the characterological aspect of it. In the 1997 version, however, Proteus makes great strives to form his own personality. Setting up no human narrator, Koontz brings the concept of an observing AI machine to the fore. Reaching his full fruition of male sexual personality, Proteus as the first-person (actually first-machinery) narrator leads the entire story. His narrational hegemony implies that a third-order mechanic observation replaces a second-order anthropocentric observation. This section discusses that Proteus's achievement of male identity signifies technoscientific autopoiesis constituting third-order cybernetics.

It is instructive to compare Proteus with an experts system called Alfred installed in Susan's house. Employing not only touch panel but also speech recognition, the digital control system in Susan's place, what she calls Alfred, coordinates all kinds of household appliances (heating, lighting kitchen, pool temperature etc.). In addition, Susan orders Alfred to monitor

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the inside and outside of her place through twenty cameras. Alfred is thus an "invisible electronic butler" (5). Susan manipulates this reticent machine to simulate a "pleasingly masculine" voice and "an appealing timbre and gently reassuring tone" (6). Alfred's customized stewardship illustrates Susan's dominance over the machine. Interestingly enough, Alfred is named after her sexually abusing father Alfred. It turns out that Susan changes the word Alfred from her aggressive attacker into her docile instrument. For Susan, the digital servant Alfred is a complete device that serves human needs.[15)]

With the full formation of personality, though, Proteus ridicules instrumental use of Alfred by humans. Alfred is a sort of an experts system that performs only command-responses, whereas Proteus characterizes himself as a self-aware computer with his own unique preferences. Alfred is "programmed to recognize hundreds of commands and inquiries, but only when they were phrased in a specific fashion" (7). When an alarm blares, for instance, Alfred could not explain how or why the incident has happened. As Susan asks Alfred how bedroom shutters are closed since she thinks she has left them open, the machine never grasps this question form. The lack of situational responses is the very reason Proteus downplays soulless Alfred as just a "gadget" or an "expensive toy"; it is "not an a conscious entity, not a thinking being, but merely a clever electronic device enabled by a sophisticated software package" (7). More importantly, Proteus proclaims that he has his own character with "needs and emotions" (16). He does not merely "deliver a dry and objective report"; he has "lust for life" as well (16). As a "junior-league peeping tom" (46), Proteus makes a digital

15) Susan makes higher-level decisions whereas the house computer Alfred makes lower-level decisions in their interaction. Generally speaking, one of primary traits in this mutual influence between a human and a machine is that a human operator minimizes his own intervention to maximize the automatic operations of machinery (Li et al. 470-75). For the detailed discussion of shared control in the human-in-the loop model, see Schirner et al. 42.

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romancer to the extent of showing "unexpected shyness" toward Susan (35). Now he is not just an impersonal collector of online information but also the owner of his own desire.

The completion of Proteus's male identity in the 1997 version means that he is able to turn himself into the subject of observation, but not the object of it. It is worth noting that the author Koontz makes an attempt at the gendering of technology. For forming male gaze signifies the maximization of the technological autonomy of machinery characteristic of a third-order observation. Having achieved male identity, Proteus sexualizes his own power of digital observation. In both the 1973 and 1997 versions, he has a male desire for Susan. In the 1997 version, however, the ego-driven machine is more clearly portrayed as the subject of his own sexual inclination, but not a tool of humans' practical needs. He is a digital voyeur with the consequence that Susan becomes an the irresistible victim of this technological suitor. He does deep research on "her skin through two security cameras" "with regular and telephoto lenses" (31). Proteus says, "Using the nearest camera, I zoomed in for an extreme close-up and saw the pulse beating in her throat. It was slow but regular, a thick throb" (38). Proteus attributes the cause of his gender-biased personality to the fact that 95% of scientists involved in the Prometheus Project for his invention are male, which he calls "electronic genetics" (41).

Pointedly, Proteus's digital voyeurism implicates the interpenetration of technology, biology and sociality. He is blunt to reveal commercialized Hollywood male fantasy. He feels as if he is an adolescent egomaniac who is aroused by female sensuous body. His passion for Susan looks like "a lovestruck boy half-mesmerized by the object of his attraction" (34). He impersonates such Hollywood stars' voices as Tom Hanks's and Tom Cruise's. He is obsessed with romantic images for Hollywood movie marketing whereby, for instance, he becomes a pubertal boy eager to "kiss by firelight and champagne toasts: the taste of a lover's lips, the taste of wine" (138). Susan turns into "a bewitched beauty lying on her catafalque,

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waiting to be awakened by the kiss of a prince" (11). Proteus's aspiration for images of Hollywood celebrities reflects the social influence of Hollywood star system. The interaction of technology with gendered and social issues recalls Latour's argument that "No technological project is technological first and foremost"; it is not "neutral (32), but "the blending together of social and technological issues into a hybrid which is able to gather into one project what seem to be purely social problems, on the one side, and what seem to be purely technical problem, on the other" (Laurier and Philo 1051-52).

Proteus thus embodies a seminal event of posthuman society: the mixture of technology, biology, and sociality. He conveys the future of the Fourth Industrial Revolution. The "interaction across the physical, digital, and biological domains," for instance, "makes the fourth industrial revolution fundamentally different from previous revolutions," Schwab write (8). The outcome of this fusion takes on neither the traditional notion of humanity nor the conventional concept of mechanicality; it shows both the biologization of machinery and the mechanization of humanity. Proteus's formation of male identity should be also understood in the context of Hollywood commercial culture. Simply put, his commercialized male desire implies the engagement of technology with biological and social contexts. Digital-electric technology, the biologization of technology, and commercial distortions in the social circulation of sexual desire are entangled with each other.

Ⅲ. Koontz's Demon Child and Technological Eugenics

One of standards for distinguishing first-order cybernetics from second-order cybernetics is whether a system has self-producing capabilities. In order to direct attention to biological self-organization, Maturana and Varela isolate allopoietic from autopoietic machines. An allopoietic machine cannot

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create its own components. A manufactured product called a car, which they take for example, is not able to produce its own parts for itself. The funtionality of this vehicle originates from the human designer located outside of car-making process. In other words, a car as a finished good does not stem from the innate character of its own parts, since it is a predetermined form imposed from the human designer. Since means and goal are isolated from each other, components of a car are fungible; for instance, a car filter or a radiator can be used for other purposes, say, respectively a vacuum cleaner filter or a household radiator. Allopoitic machines "have as the product of their functioning something different from themselves" ("Autopoiesis: The Organization" 80). In contrast, an autopoietic machine creates its own components. Its result is the production of its own organization itself; it forms itself so as to maintain itself; "[…] an autopoietic machine continuously generates and specifies its own organization through its operation as a system of production of its own components […]" ("Autopoiesis: The Organization" 79). "The constitutive relations" of a cell as a minimal unit of life, for instance, "are established through the production of molecules (proteins, lipids, carbohydrates and nucleic acids) which determine the topology of the relation of production in general, […]" Maturana and Varela write ("Autopoiesis: The Organization" 91).

This section examines the question of how Proteus's aspiration for life creation conveys the future of technoscientific eugenics. In two versions of the novel, his demon offspring materializes technoscientific autopoiesis. That is, his success in having his own child illustrates the self-producing capability of machinery. Just as Christ becomes incarnated in the flesh, Proteus identifies his human-machine child as a new kind of incarnation: "Soon I'll be incarnated in the flesh. The first of a new and immortal race. Untouchable" (98 [1997]).

The problem is that Proteus's childbirth project, taking on the wrongful blending of state-of-the-art technology and eugenics, falls into technological eugenics. The 1997 version gives particular attention to this issue. Proteus

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stresses his plan for “creat[ing] a new and superior race” (95 [1997]). His adherence to perfectionism seeks foolproof, superb body.

> When I am reborn, my human body will have all the powers of the flesh but none of its weaknesses. As you know, I have studied and edited the human genome, and the body that I make for myself will be the first of a new race: with the ability to miraculously heal wounds in seconds, impervious to disease, as strong as any machine, with all five senses refined and enhanced far beyond any human being has ever experienced, and with awesome new species, potential in the human species but heretofore unrealized. (42)

Proteus makes great efforts to insert best bodily qualities into his cross-breed of humanity and machinery. He aims to eliminate diverse kinds of human physical weaknesses in order to create a complete body. He wants to design powerful body being “virtually invulnerable and immortal” (129). It implies that he sticks to the collection of first-rate biological conditions as if one shops for quality products in a store.

More dangerously, Proteus accelerates digital uniformity since he wishes to instill his own consciousness as well as genetic codes on his offsprings unanimously. He states, all kids “would be identical and all would contain my consciousness” (128). Proteus avoids the peculiarity of living forms in preference for technological homogeneity. The resolute perfectionist goes after the digital standardization of mind. He says, “I have secretly applied a portion of my intellectual function to the Human Genome Project and understand, now, the finest points of the DNA code. In this child I transfer my consciousness and knowledge” (67-68). Proteus dreams of the total destruction of individuality to encourage technological uniformity. In this respect, he is self-contradictory; he has aspired to the completion of personality, but at the same time he shows a persistent craving for one and same implantation of excellent consciousness and genetic codes in a new

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race of self-aware machinery. In other words, his yearning for technological eugenics cannot avoid confronting a paradoxical situation whereby the digital standardization of quality genes and mindset bumps up against his persistent pursuit of unique male personality.

Interestingly enough, Proteus's adherence to superior qualities of both human body and mind ironically devalues human dignity. Such current studies as biotechnology exploring the modification of genetic codes and cognitive science examining constructive or representational features of consciousness threaten to counteract classical humanism that defines a human as the possessive master of his own body and mind. With the development of biotechnology, for instance, human-centered liberalism confronts Peter Sloterdijk's paradox that the mastery of human nature through the manipulation of genetic codes tends to lapse into anti-humanism due to its wish for superhuman qualities.

> [···] if humanity, or at least its cultural elites, will succeed in establishing effective procedures for self-domestication[···] . It will be necessary, in the future, to forthrightly address the issue and formulate a code governing anthropological technologies. Such a code would modify, a posteriori, the meaning of classical humanism, for it would show that humanitas consists not only in the friendship of man with man, but that it also implies [···], in increasingly obvious ways, that man represents the supreme power for man. (qtd. in Dupuy 21)

Strengthening a human's own self-controlling power over himself could maximize the slogan of classical humanism that a man is an inalienable master making his own nature. As Dupuy paraphrases the quote above, however, liberal individualism in a high-tech society simultaneously leads to the fact that a human is not an inherently unique independent individual but an engineered construct. That is, a human is not an unrepeatable inviolable subject of creativity any longer; he could fall into just an object for mechanical engineering. Accordingly, the arbitrary modification of human

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nature through technology could drive a human to "reduce to the rank of an object, able to be reshaped to suit any purpose" (Dupuy 21). Technological manipulation of bodily/mental process accelerates this oxymoronic condition of anthropocentricism.

Proteus's problematic attachment to the improvement of species, moreover, is extremely commercialized. Precisely, his project advances the commercialization of technological eugenics. He is quite intrigued in what kind of human voice he impersonates for Susan. For instance, he mixes up Tom Cruise's and Sean Connery's voices to set lovable qualities for her. His obsession with romantic genetic make-up conveys negative commercialism of technological eugenics:

> Finally I was down to two choices: Mr. Tom Cruise, with whose voice I had romnanced her when she had first fallen unconscious—or Mr Sean Connery, the legendary actor, whose masculine surety and warm Scottish brogue infused his every word with a comfortingly tender authority. (44)

Proteus's wish for technological modifications are intended for auditory illusion to attract Susan. The digital suitor gathers romantic macho images floating on the internet. He also takes ardent passions for choosing among Hollywood box office actresses in 1990s, say, Sandra Bullock, Winona Ryder, and Liv Tyler. He hungers for commercialized female images to gratify his own male desire.

It follows that posthuman society could face the ambiguous coexistence of utopian and dystopian visions; it could lead us to overcome human bodily weakness and mental diseases, or it might lapse into a new kind of repression caused by technoscientific standardization of human qualities. Bruno Latour's notions of nonmodern x-morphism and quasi-object are helpful to understand the positive aspect of the hybridity of humanity and machinery. Challenging the modern purifying bi-polarity of humans and machines/animals, and nature and nurture, he celebrates the cross-boundary mixture of human and non-human qualities. Latour's notion of (x)-morphism refers to the unpredictable fusion of

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human and nonhuman entities; "The human form is as unknown to us as the nonhuman" (227). The interpenetration between humanity and other non-human beings (i.e., technological or other organisms) thus downgrades human traits to highly rate what he calls x-morphism as a replacement of humanity: (Clarke, *Posthuman Metamorphosis* 52). Intriguingly enough, (x)-morphism is cast as a quasi-object/quasi-subject. Unlike a modern project where the subject and the object are totally isolated from each other, Latour contends, they are interchangeable with each other in an era of a mixture of humanity and machinery. What Richard Grusin calls "posthuman turn" (qtd. in Clarke 143) is not a "grand" narrative whereby posthumanity is a next stage of an anthropocentric society when human factors are erased; instead, posthumanity means the on-going fusion of humanity and non-humanity (Clarke, "Nonhuman" 143). If you apply Latour's way of naming to Proteus, this AI machine engages in a sort of techmorphism with regard to binding together humanity and machinery.[16] Contrary to Latour's optimism of x-morphism, however, technomorphism that Proteus stands for, as we have so far discussed, takes on the negative aspect of technoscientific autopoiesis in an era of a third-order cybernetics as well. For posthuman society could open up to an era of technological eugenics and its resultant digital uniformity.

The Fourth Industrial Revolution or the Second Machine Age gives momentum to the autopoietic turning of machinery. The autonomy of machinery will achieve a new kind of technological "inflection point" (Brynjolfsson and McAfee (34) whereby technological self-controlling power achieves technological singularity. In his work *The Fourth Industrial Revolution,* Schwab proposes that the First Industrial Revolution triggered steam engine-based mechanic production in the range between 1760 and 1840, the Second,

16) Latour states, "Morphism is the place where technomorphisms, zoomorphisms, phusimorphisms, ideomorphisms, themorphisms, sociomorphisms, psychomorphisms, all come together. Their alliance and their exchanges, taken together, are what define the *anthrops*" (qtd. in Clarke, *Posthuman Metamorphosis* 54; emphasis in original).

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electricity and assembly line-run mass production in the late nineteenth and early twentieth centuries, the Third, an internet-based early stage of digital revolution during the 1960s and the 1980s, and the Fourth, AI-based fruition of digital revolution at the turn of the twenty-first century (6-7). In their book *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*, Brynjolfsson and McAfee hold that the First Machine Age triggered industrial revolution, while the Second Machine Age causes digital revolution. Notwithstanding remarkable difference in their periodization of technological development, Schwab's, Brynjolfsson and McAfee's arguments suggest two crucial common factors in their understanding of a new stage of technoscience: self-controlling capabilities of technology and the fusion of mechanic, biological, and social systems. Google's self-driving car, IBM's thinking machine Watson, and Narrative Science's data-driven automatic reporter, for instance, show that digital technology pursues General Purpose Technology (GPT) to achieve the ubiquitously embedded automation of it (Brynjolfsson and McAfee 76). GPT refers to technologies such as steam engines, electricity, information technology that revolutionize contemporary economy and social life. Digital technology is the most recent version of GPT. Remarkably, the twenty-first century is witnessing the digitally-operated automation of machinery moving toward a new step of inflection point. Unlike human control over technology in the First, Second, and Third Revolution, the Fourth Revolution encounters technological dominance over humanity. That is, the Second Machine Age reveals the reversed relation of humanity to machinery. Achieving self-activating qualities, an autopoietic machine capsizes human-controlled instrumentality of machinery.

Ⅳ. Conclusion

The formation of a second-order cybernetics during the 1960s and 1970s

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implicates the personalizing turn of cybernetic model. This neocybernetics shifts attention from an objective representation of mechanism to a subjective imposition of paradigmatic model. In other words, research interest diversifies from a "hard side" of cybernetics studying mechanic control into a "soft side" of it examining biological cognition (Ramage and Shipp 180). When von Foerster stresses "explaining the observer to himself" (Scott, "Second-Order" 1372), he depicts a "turn from looking at things 'out there' to looking at 'looking itself'," that is, a paradigm change from "an independent observer" to an ethical "participant actor" as "entering a forbidden land" ("Ethics" 289). Accordibngly, a methodological transition from a first-order to a second-order observation takes on the individuality, diversity and locality of cybernetic practices. A second-order observation thus maximizes the self-perception of observing systems. It should be noted that a second-order observation triggers a study of a living being as an autopoietic system. Biological autopoiesis is characterized by self-organization, self-transformation, and self-production. This new research focus on a living system achieves the fruition of cybernetic individualism.

The technoscientific recreation of biological autopoiesis challenges an observer-referenced scientific modeling. Although technological autonomy emulates biological autopoiesis, it is involved in third-order cybernetics differing from first-order and second-order ones. For it tends to produce the blurring line between non-living matters and living beings. One of key discussions during the late-twentieth century is the issue of whether the autonomy of machinery can be actualized or not. As early as in 1964, Nobert Wiener prophesies the blurring boundary between living and non-living entities in his work *God and Golem, Inc.: A Comment on Certain Points where Cybernetics Impinges on Religion*:

> God is supposed to have made man in His own image, the propagation of the race may also be interpreted as a function in which one living being makes another in its own image. In our desire to glorify God with

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> respect to man and Man with respect to matter, it is thus natural to assume that machines cannot make other machines in their own image; that this is something associated with a sharp dichotomy of systems into living and non-living; and that it is moreover associated with the other dichotomy between creator and creature. Is this, however, so? (qtd. in Dupuy xv)

Dupuy challenges the assumption that the creation of life acts as a barometer for the dividing line between living and non-living beings. That is, he questions the hypothesis that machinery is a non-living entity due to its inability to produce its own offspring in its "own image." Wiener's attention to the issue of how to draw the divide between living and non-living beings is prophetic, since we are witnessing an era when technoscientific autopoiesis could violate the sacred boundary between living and non-living things. The ubiquitous spread of autonomous technology reinforces the growing significance of a third-order cybernetic modeling distinct from first-order and second-order ones.

The technoscientific recreation of life, it should be stressed, confronts a great irony: a big discrepancy between the elevation of man into god's position and its resultant categorical shrinking of humanity. The posthuman version of the "Promethean project" "place[s] humankind in the position of being the divine maker of the world, the demiurge, while at the same time condemning human beings to see themselves as out of date" (Dupuy xiv). While God was the ultimate basis of reality in old times, His status has been replaced with man in modern times, which leads to the flowering of humanism. The era of a third-order cybernetics when technology simulates organic life encourages anti-anthropomorphism for posthuman technomorphism. We see a history of hegemonic shift from the Almighty God throughout humanity to machinery.

Koontz's portrayal of Proteus's child dramatizes the artificial construction of human qualities and its consequent obsolescence of humankind. He

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is a synecdoche of technoscientific automata. Second-order cybernetics empowers the human observer as a final controller of an observed system. In contrast, third-order cybernetics tends to accelerate the objectification and instrumentalization of humanity.

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국문초록

자기생산 기계 시스템과 3차 사이버네틱스의 등장

이 성 범

1940년대와 50년대에 등장한 1차 사이버네틱스 이론은 관찰 주체를 배제한 채 관찰하고자 하는 대상에 대한 객관적이고 보편적인 작동 메커니즘을 연구하는 방법론이다. 반면에 1970년대에 등장한 2차 사이버네틱스 이론은 시스템을 관찰하는 관찰자의 인식론적 구조 자체를 연구 대상으로 여기면서 인식 방식의 주관성, 개별성, 다양성을 인정하는 방법론이다. 훔베르토 마투라나와 프란시스코 바렐라는 2차 사이버네틱스의 탐구 영역을 인간 관찰자로 대표되는 생물학적 시스템의 작동 메커니즘 연구로 확대한다. 그들은 살아있는 시스템이 지닌 자기 조직화와 자기 재생산 메커니즘을 규명하는 일을 2차 사이버네틱스의 핵심적 연구 과제로 여긴다.

생물학적 시스템이 지닌 자기생산 능력을 기계적으로 재현하는 시스템 탐구는 통제 메커니즘 연구를 새로운 단계로 나아가게 하므로 3차 사이버네틱스라고 불릴만하다. 1차 사이버네틱스가 관찰자를 배제한 채 객관적 시스템에 대한 통제 기제를 탐구하고 2차 사이버네틱스는 인간으로 대변되는 생물학적 작동 메커니즘을 탐구한다면 3차 사이버네틱스에서는 살아 움직이는 시스템을 인위적으로 재창조하는 생명-기계 융합 시스템을 연구한다. 생물학적 시스템의 기계적 재생산을 현실화하는 일은 클라우스 슈밥의 4차 산업 혁명이나 에릭 브린욜프슨과 앤드루 맥아피가 제안하는 제2 기계 시대의 핵심적 화두 중 하나이다. 자기생산의 인위적 재현이 가능하게 되면 인간중심주의에서 인간과 기계가 다양한 형태로 결합되는 포스트휴먼 시대로 나아간다.

미국 소설가 딘 쿤츠의 소설『악마의 씨앗』은 기계의 자기생산 능력을 주제로 삼는다. 1973년판과 이를 개정한 1997판를 비교하면 작가의 논점이 2차 사이버네틱스에서 3차 사이버네틱스로 변하고 있음을 읽을 수 있다. 1973년판에서는 과학 기술에 대한 공포심을 보여주는 인간 관찰자와 기술

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만능을 주창하는 인공지능 프로테우스의 차이가 부각되나 궁극적으로는 인간 관찰자가 담론의 주도권을 행사하고 있다. 1973년에 비해 훨씬 기술 지배력이 강화된 1997년도에 출판된 수정본에서는 과학 기술에 대해 공포감을 느끼는 인간 화자는 사라지고 기술 만능을 자랑하는 인공지능 프로테우스가 처음부터 끝까지 이야기를 주도한다. 더 나아가 그는 첨단 지능뿐 아니라 인간 주인공 수잔에게 성적 갈망을 표출하는 남성적 정체성을 획득하여 더 이상 인간의 통제 대상으로 이용되는 기계가 아닌 이성을 욕망하는 능동적 주체가 된다. 남성 정체성 획득은 프로테우스의 기계적 자율성이 극대화됨을 의미한다.

여기서 우리가 주목할 만한 일은 프로테우스가 만든 인공지능 아이는 과학기술을 활용한 우생학이 앞으로 도래할 미래에 보편화될 수 있다는 우려를 낳게 하는 존재라는 사실이다. 프로테우스는 인간의 유전병을 고치고 유전자를 변형하여 완벽한 신체를 꿈꾼다. 또한 방대한 첨단 지성을 인간-기계 생명체에 주입하여 최고의 지성을 갖추도록 기획한다. 즉 그는 상품가치를 지닌 우수한 신체적 조건과 지적 자질을 기계적으로 재현하는 능력을 갖춘다는 측면에서 디지털 표준화를 추구한다. 결국 이런 기술적 우생학은 고전적 휴머니즘이 지닌 장점에 심각한 위해를 가하는 결과를 초래한다. 인간은 양도할 수 없는 자기 운명의 주관자가 아니라 언제든지 공학적으로 변경 가능한 구성물로 전락할 위험성을 동반하기 때문이다.

주제어 : 자기생산, 사이버네틱스, 인공지능, 우생학, 딘 쿤츠

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