

Lively Scripts: Biological Determinism and Cybernetic Coding in Giles Goat-Boy or, The Revised New Syllabus

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INTRODUCTION: LIFE BEYOND BODIES

IN THE MID-1950S, THE ORGANISM WAS DISPLACED from a position of privilege at the heart of the life sciences. Its displacement was attributable, in large part, to two theoretical discourses: first-order cybernetics and molecular biology.¹ Norbert Wiener's cybernetics purported to "develop a language and techniques that will enable us indeed to attack the problem of control and communication in general" across the human, natural, and applied sciences.² An abstract vocabulary of feedback loops and information flows allowed Wiener to claim that "the living individual and [...] some of the newer communication machines are precisely parallel in their analogous attempts to control entropy through feedback."³ This analogy, which was central to early cybernetic thought, renders the defining qualities of the organism incidental at best, serving only to characterize the living body as a feedback-sensitive construct no different in its fundamental operations than a computer. Around the same time, James Watson and Francis Crick demystified the secrets of heredity in dramatic fashion when, in 1953, they discovered the

¹ Hereinafter I will simply refer to "cybernetics" when referring to the first-order cybernetics of Norbert Wiener and those who took it up in the 1950s and -60s. First-order cybernetics differs in important ways from the second-order cybernetics of, for example, Humberto Maturana and Francisco Varela. Indeed, second-order cybernetics arose in the 1970s as a response to, and correction of, many of the rhetorical configurations of first-order cybernetics (and by extension early molecular biology) mentioned in this essay—configurations that were ultimately untenable.

² Norbert Wiener, *The Human Use of Human Beings: Cybernetics and Society* (Boston: Houghton Mifflin, 1954), 17.

³ *Ibid.*, 26.

DNA double helix. Molecular biology was the disciplinary outgrowth of that discovery, which decentered the organism in favor of “the coil of life”⁴ that it housed. The double helix—and, along with it, the semantic framework of the “genetic code”—became the preeminent objects of biological inquiry even as they threatened to reduce the life sciences to a specialized branch of physics.

Historian of science Richard Doyle has demonstrated how the theories of early molecular biologists rely on the tropes of speculative fiction in order to elide “the problem of how the genome borrows an organism from the future in order to regulate itself.”⁵ In this paper, I track the fate of this borrowed body when, in a final turn of the wheel, it is routed once more through the fictional speculations of John Barth’s 1966 campus novel *Giles Goat-Boy or, The Revised New Syllabus*. Barth’s fourth novel stages an ostentatious religious allegory in which a naïve prophet-figure, Giles, matriculates at a “universal university.”⁶ His task is the reconciliation of “passage” and “failure,” an end-of-term reckoning that would “graduate [...] all studentdom.”⁷ But Giles—whose name is an acronym of “Grand-tutorial Ideal, Laboratory Eugenic Specimen,” a prophet-breeding program executed by a malevolent supercomputer—struggles to create an identity for himself that is capable of authentic action. His life quite literally pre-scripted in DNA culled from “male studentdom” at large, Giles cuts the tragicomic figure of a genetic aggregate struggling to understand itself as an individual. Oddly poignant, the anticlimactic denouement of Barth’s novel grants the GILES-aggregate, this “goat-boy,” just enough reflexivity—just enough of the embodied particularity we call identity—to witness its own decomposition back into the linguistic-genetic substrate from which it was composited.

Giles Goat-Boy is Barth’s parodic rejoinder to a chapter in the history of science during which we understood semantic construct and biological essence to be, in a near-literal sense, one and the same. To be sure, even at their most theoretically exuberant, molecular biologists understood the genetic code as an operational metaphor. And yet the notion that DNA was a code to be read and copied, an “instruction manual” for building bodies and even persons—a veritable “genomic book of life” that operated by a regular syntax and fixed, discoverable referential rules—was taken up with a literal-mindedness unique to the twenty-odd years following DNA’s 1953 discovery.^{8,9} The language of that moment, both theoretical and casual, is remarkable in its openness to entertaining the linguistic analogies for DNA at length. It is thus an instructive prologue to our attempts to articulate embodied identity now, when an antipodal “essentialist-constructivist dyad”¹⁰ has become the default starting position for self-understanding. Compared to biologism today, when the recourse to biological givens has come to serve as antidote or counterpoint to a vertiginous constructivism, Barth’s take on mid-60s biological determinism can

⁴ “Penetrating Heredity’s Secrets,” *New York Times* (New York, NY), Oct. 19, 1962.

⁵ Richard Doyle, *On Beyond Living: Rhetorical Transformations of the Life Sciences* (Stanford: Stanford University Press, 1997), 76.

⁶ John Barth, *Giles Goat-Boy or, The Revised New Syllabus* (New York: Anchor Books, 1966, 1987), viii.

⁷ *Ibid.*, 638.

⁸ As an example of the literal-minded enthusiasm provoked by the topic, here is science writer Irving Bengelsdorf reasoning, in the 1965 *Los Angeles Times*, that “To write down the description of man – as contained in the coded information carried by his DNA-genes, would require 1,000 volumes, with 680 pages per volume, with 500 five-letter words printed on each page” (16). Irving Bengelsdorf. “Man Comes with an ‘Instruction Manual.’” *Los Angeles Times* 7 Nov. 1965: 16. ProQuest Historical Newspapers. Web. 7 Jan. 2016.

⁹ Lily Kay, *Who Wrote the Book of Life?: A History of the Genetic Code*. (Stanford: Stanford University Press, 2000), 3.

¹⁰ David Palumbo-Liu, “Biologism and Identity” (*Biologism and Identity Seminar* Introductory Remarks, American Comparative Literature Association Annual Meeting, Seattle, WA, March 27, 2015).

seem stifling. Cultural and biological codes conspire to pre-script his characters in mutually reinforcing fashion. After “life itself” detached from the organism and affixed itself to “code,” individuals started to look like phenomena of secondary importance. Bodies were either the epiphenomenal, carbon-based flourishes of a molecular script or the iterations-in-passing of an evolutionary line.

Novel threats to concepts of identity thus emerge at this juncture, but so do novel strategies for thinking the self. Barth’s novel marks his professional pivot “from the Black Humor of the Fifties to the Fabulism of the Sixties.”¹¹ This fabulist turn, in setting aside the criterion of mimetic plausibility, allows *Giles Goat-Boy* (1966) to stage the “impossible retroactivity” entertained by early molecular biology—largely, but not solely, by dint of the novel’s cybernetic paternity plot.¹² An allegorical “manner of speaking” borrowed from cybernetic discourse allows the novel and its protagonist to be *stupid*—strategically naïve to the figurative valence of molecular biology’s “fantastic rhetorical configurations.”¹³ Taking genetic theory at its word, Barth narrates the fantasy of a “nucleic acid world” from within its postvital architecture and according to its own reductive logic. He then undertakes his own experiment of sorts by reintroducing a subject to the biological body that, in its rhetorical transformation from subject to code-script, it had forfeited perforce.¹⁴ The results of this reintroduction are oxymoronic, discovering a ground for free choice and rhetorical play on the far side of strict genetic determinism only to see it dissolve into the retrojected tense of genetic deep time.

REDUCTION MACHINES: ALLEGORY IN THE CYBERNETIC “MANNER OF SPEAKING”

Richard Doyle’s *On Beyond Living* describes the rhetorical sleight-of-hand by which genetic theory makes DNA the “sovereign” and “miraculous agent of life,” the impossible author of the body without which it could not itself come to be.¹⁵ John Barth installs a supercomputer called WESCAC in much the same way at the heart of *Giles Goat-Boy*, where it serves as the unmoved mover of the novel’s plot and unmade maker of its allegorical setting. “Oy, Bill, this WESCAC!” exclaims Max Spielman to his student the goat-boy. “What a creature it is! I didn’t make it, nobody did—it’s as old as the mind, and you just as well could say it made itself. Its power is the same that keeps the campus going [. . . t]he thing that tells you there’s a *you*, that’s different from *me*, and separates the goats from the sheeps.”¹⁶ To Spielman’s structuralist frame of mind—he is a disgraced professor of “analogical proctoscopy and psychosymbolistic cosmography,” a send-up of structural anthropology à la early Claude Lévi-Strauss that is as transparent as it is scatological—WESCAC instantiates the dream of a transcendental signified: the “single, immanent node” from which semantic differentiation radiates, a veritable genome out of which the fabric of Barth’s allegorical deixis—and, in a metafictional doubling, the novel itself—is written.^{17,18}

¹¹ Barth, *Giles Goat-Boy*, vi.

¹² Doyle, *On Beyond Living*, 75.

¹³ *Ibid.*, 65.

¹⁴ *Ibid.*, 66.

¹⁵ Doyle, *On Beyond Living*, 6.

¹⁶ Barth, *Giles Goat-Boy*, 50.

¹⁷ *Ibid.*, 7.

¹⁸ Doyle, *On Beyond Living*, 66.

We might not be inclined to trust the expertise of a professor whose reputation was made on the solution of the “riddle of the sphincter” and patently ludicrous “Maxims” [*sic*] like “proc-toscopy recapitulates hagiography,” but in the parodic economy of Barth’s allegory we don’t have to, since it is Barth’s characteristic satirical gambit in *Giles Goat-Boy* to ridicule the fantasizer while taking seriously the fantasy.¹⁹ Spielman presents a bathetic disciple of the same analogizing force that he imagines WESCAC to fully incarnate. Hence, perhaps, his posture of ecstatic debasement: rapture at the possibility of such a structuring structure; dread at the comparative fragility of his own disciplinary paradigm, which the insatiable WESCAC will indeed unceremoniously “devour,” digest, and assimilate to its own programming.²⁰

Patterned after the barn-sized vacuum-tube computers that characterized the postwar American research university, WESCAC’s situation within the novel is a clear figurational extension of 1950s cybernetics discourse, the latter also hungry to digest the fruits of traditional academic disciplines by transcoding their claims in a ubiquitous vocabulary of “communication and control.”^{21, 22} Early computing machines figured heavily in cybernetics as privileged examples of feedback-sensitive machines capable of counter-entropic—which is to say, intelligent—action. No less than organisms, such machines might possess sense organs (photoelectric cells), work from memory (recorded on punch cards or magnetic taping), and approximate a “kinaesthetic sense” by adjusting their performance to environmental input.²³ In addition, the binary code that governed the function of early mainframe computers via its punch-card programming provided a model counterpart to the theory of language both implied in and demanded by the cybernetic turn from sign to “information,” where information is defined simply as “the content of what is exchanged with the outer world as we adjust to it, and make our adjustment felt upon it.”²⁴ Qualitatively poor and always precisely equal to what J.L. Austin would call its “illocutionary force,” the cybernetic message is measured as a sum and a material effect; “meaning” is a quantity and the attrition of meaning is a rate.²⁵ The ones and zeroes of computer code corroborate another binary distinction of a more abstract order—information and noise—upon which the cybernetic model of communication is premised.

The qualitative diversity of life has no place in this picture. “It is in my opinion, therefore, best to avoid all question-begging epithets such as ‘life,’ ‘soul,’ ‘vitalism,’ and the like,” Wiener declares, “and say merely in connection with machines that there is no reason why they may not resemble human beings in representing pockets of decreasing entropy in a framework in which the large entropy tends to increase.”²⁶ Under this paradigm, organic and mechanical bodies both become like “whirlpools in a river of ever-flowing water [...] not stuff that abides, but patterns that perpetuate themselves.”²⁷ This redescription recapitulates in miniature the story of “how

¹⁹ Barth, *Giles Goat-Boy*, 7, 50.

²⁰ *Ibid.*, 7.

²¹ Wiener, *The Human Use of Human Beings*, 17.

²² Examples of early mainframe computers include the Eckert-Mauchly Co.’s UNIVAC series (first produced in 1951), the ILLIAC computers designed by the Institute for Advanced Study at Princeton (produced 1951–74), and the IBM 704 (1956). WESCAC, short for West Campus Automatic Computer, follows the acronymic naming conventions of many of the early mainframe devices.

²³ Wiener, *The Human Use of Human Beings*, 23–24.

²⁴ *Ibid.*, 17.

²⁵ Austin, John Langshaw. *How to Do Things with Words*, 2nd Ed. (Cambridge: Harvard University Press, 1975), 100.

²⁶ Wiener, *The Human Use of Human Beings*, 32.

²⁷ *Ibid.*, 97.

information lost its body,” as Katherine Hayles has put it, and became “virtual”—a transition complete enough that in 1974 philosopher of science Michel Serres can already eulogize a “traditional classification of beings” with the organism at its center “that no longer makes sense since matter, life, and sign are nothing but properties of a system.”^{28,29}

The story of how WESCAC maneuvered itself to the disciplinary and operational heart of Barth’s University forms the prehistory of the “Revised New Syllabus,” purportedly the gospel account of the goat-boy’s adventures. (The “Syllabus” comprises the vast bulk of the novel; it is framed within *Giles Goat-Boy* by a publisher’s disclaimer, a cover-letter, and other paratextual documentation which has the net effect of rendering the provenance of the “Syllabus” hopelessly unclear.) The novel begins, however, when WESCAC turns its energies to the production of organic life. Refusing to recognize meaningful difference between organisms and smart machines, WESCAC’s artificial intelligence also equates his metaphorical position of universal authorship with biological fatherhood. The goat-boy’s birth is the eventual result of that double semantic slippage, as he is the final output of WESCAC’s “Cum Laude Project”: a program designed to fabricate a kind of prophet, a “Grand Tutor,” to deliver the University from its Cold War-flavored interfactional strife.

What begins as a narratological exercise takes a detour through clinical psychology and results, ultimately, in a full-blown eugenics program. According to the self-authored protocols of the Cum Laude Project,

WESCAC would abstract from thousands of historical and biographical texts a sort of quintessential type of the ideal West-Campus Graduate, or a number of such ideal types; it would then formulate a genetic and psychological analysis of these models, and with reference to the similar analyses of every New Tammany undergraduate (already in its memory), it would indicate which young men, paired with which young women, could most quickly breed to some approximation of the ideal, and in how many generations.³⁰

Taken together, the “historical and biographical texts” at WESCAC’s disposal resemble a “great books” syllabus only thinly veiled in the novel’s allegorical register—the “ideal West-Campus Graduate” is accordingly modelled on the amalgamated characteristics of the likes of “Enos Enoch” (Jesus), “The Living Sakhyan” (Gautama Buddha), and “Taliped Decanus” (Oedipus).³¹ What looks like a comparative and interdisciplinary undertaking fit for what Clark Kerr was first to call the “multiversity” in 1963, the Cum Laude Project is theoretically reductionist despite its apparent domain eclecticism.³² Theory reductionism describes the attitude developed by some philosophers of science “that the theories and laws formulated in one field of science [...] can be

²⁸ N. Katherine Hayles, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics* (Chicago: University of Chicago Press, 1999), 14.

²⁹ Michel Serres, “The Origin of Language: Biology, Information Theory, and Thermodynamics,” trans. Mark Anderson, in *Hermes: Literature, Science, Philosophy*, ed. Josué V. Harari and David F. Bell (Baltimore: Johns Hopkins University Press, 1982), 73.

³⁰ Barth, *Giles Goat-Boy*, 63.

³¹ *Ibid.*, 73, 124, 264.

³² Clark Kerr, *The Uses of the University* (Cambridge: Harvard University Press, 1963), 136, quoted in Mark McGurl, *The Program Era: Postwar Fiction and the Rise of Creative Writing* (Cambridge: Harvard University Press, 2009), 40.

shown to be special cases of theories and laws formulated in some other branch of science.”³³ While most histories of biology stress the reductionist pressures applied by physics and chemistry, cybernetics is aggressively reductionist in this sense insofar as its explicit goal is to factor out contextual meaning altogether—a fact that the Cum Laude Project’s methodological tone-deafness serves to farcically illustrate.

Ultimately, WESCAC creates the “Grand-Tutorial Ideal, Laboratory Eugenical Specimen,” a genetic cocktail concocted out of semen extracted from all male students and then “analyzed, classified, and culled [...] to the standards evolved” in the Project’s earlier stages.³⁴ (How exactly WESCAC manages this genetic mixology is unclear, and indeed the recombinant DNA technology required even to begin thinking through the creation of chimerical sperm of the sort imagined here would not be invented until the early 1970s.³⁵) WESCAC inseminates a hapless campus librarian with “the GILES specimen.” In time, she gives birth to the goat-boy, abandoning him, a cybernetic Moses, to the disused library service elevators.³⁶ Rescued by an addled janitor and transferred to Spielman’s care, the goat-boy spends his youth in the idyllic pastures of the Agriculture quad, where he is called “Billy Bockfuss” and raised “goatish.”³⁷ Adolescence occasions the goat-boy’s fall into knowledge—the revelation of his humanity and, soon after, the story of his remarkable conception. This prompts him to depart the goat-barn and begin the “hero-work” that will take him across the sprawling allegorical terrain of the University’s West Campus in his attempt to redeem the student body.³⁸

Deemed “a proposal fantastic in every respect” (64) by the novel’s computer scientists, the Cum Laude Project is strangely plausible according to what Katherine Hayles has called the “condition of virtuality,” a byproduct of the rise of cybernetics in the early 1950s that she defines as “the belief that information can circulate unchanged among different material substrates.”³⁹ Just as WESCAC’s differentiating powers flow from its own impossibly prior unity, the proposition of the Cum Laude Project that personality can be extracted from narrative as “ideal type,” transcribed as computer script, and fabricated out of the “genetic [...] models” near-to-hand bespeaks the cybernetic ambition of finding a universal disciplinary language in the rhetoric of message transmission and the “virtual” assumption that such information could circulate losslessly. With the Cum Laude Project, Barth fancifully bakes literary history into Giles’ genome, collapsing the traditional nature/culture polarity into a ubiquitous prescriptive register. Archetype and genotype are fused in the atonal imperatives of the program.

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³³ Ernst Mayr, *The Growth of Biological Thought: Diversity, Evolution, and Inheritance* (Cambridge: Harvard University Press, 1982). Here I follow biologist Ernst Mayr’s description of “theory reductionism,” in contrast to “constitutive reductionism,” or atomism, and “explanatory reductionism,” which amounts to the assertion that all rigorous descriptions work from the ground up. In adopting Mayr’s definition, I also endorse his critique of theory reduction as inherently fallacious for the simple reason that “it fails to consider the fact that the same event may have entirely different meanings in several different conceptual schemes” (60–63).

³⁴ Barth, *Giles Goat-Boy*, 321.

³⁵ See J. Lear, *Recombinant DNA: The Untold Story* (New York: Crown Publishers, 1978).

³⁶ Barth, *Giles Goat-Boy*, 322.

³⁷ *Ibid.*, 5, 7.

³⁸ *Ibid.*, 98.

³⁹ Hayles, *How We Became Posthuman*, 14, 1.

Barth once quipped that he would rather not review *The Recognitions* by William Gaddis “on the minimalist pretense that anything worth saying can be said in 806 pages.”⁴⁰ *Giles Goat-Boy* remains one of the longest books authored by this profligate maximalist; the proliferation of characters and narrative digressions it contains seems incongruous alongside its engagement with the reductive impetus of cybernetics. When critic Daniel Grausam draws our attention to the “extraordinary critical obliviousness to the central conceit of *Giles Goat-Boy*: that it is an unmistakable, albeit comedic, allegorical portrayal of the Cold War” (27), he names a reluctance to theorize that incongruity.⁴¹ In fact many critics do point towards the novel’s allegorical mode in passing, but Grausam is certainly correct insofar as critics are allergic to something about Barth’s pairing of a reductive, stylistically flat regime of signification with sheer length. Barth’s allegory is long and obvious—“Giles Goat-Bore,” one reviewer called it, complaining that “it did not have the good sense to be short”—and literary-critical reading practices appear unsuited or uninterested in offering an account of its literally monotonous style pursued at such length.⁴² In a recent appraisal, Mark McGurl sounds a note of qualified praise when he remarks that “the ingenuity and doggedness with which Barth finds allegorical analogues to world history and the cold war [...] and reconfigures them as features internal to campus life is impressive.”⁴³ However impressive the analogizing labor of Barth’s campus allegory may be, “ingenuity and doggedness” are hardly literary virtues, and they ultimately work against allegorical readings of the novel, which find themselves with little to say once they have pointed out the text’s “universal” super-coding—less a depth structure of allegorical signification than a kind of omnipresent historical euphemism that the novel makes self-evident at every opportunity.

Barth’s interest in the allegorical mode is perverse and repurposive: in his hands it becomes an omnivorous reductionist operation, a way to restage WESCAC’s folly at the formal level, an interminable, tone-deaf pun. In a foreword to the novel’s 1987 Doubleday edition, he recollects the historical elements that “echo through the novel, transmogrified into the simple—I would even say the deliberately, programmatically ‘sophomoric’—terms of the allegory, which is not an allegory at all in the Dantesque or Kafkaish sense, but merely a manner of speaking.”⁴⁴ Devoted readers will no doubt recognize the incorrigibility that compels a final pun on his own “sophomoric” campus novel. But “programmatically” is perhaps the more interesting double entendre here, implying a routinized referential strategy that is iterated and reiterated—but not developed—over the course of the book.⁴⁵

By authorizing allegorical readings while deprecating the allegory itself as “merely a manner of speaking,” Barth’s self-gloss begins to gesture at how reductionism, far from being at odds with maximalist poetics, might actually demand it. In an essay entitled “It’s a Long Story: Maximalism

⁴⁰ John Barth, “It’s a Long Story: Maximalism Reconsidered,” in *Further Fridays: Essays, Lectures, and Other Nonfiction, 1984-1994* (Boston: Little, Brown and Company, 1995), 79.

⁴¹ Daniel Grausam, *On Endings: American Postmodern Fiction and the Cold War* (Charlottesville: University of Virginia Press, 2011), 27.

⁴² Lifson, Hugh, “Giles Goat-Bore” In *The North American Review* 252, no. 6 (1967).

⁴³ McGurl, *The Program Era*, 37-38. McGurl’s account is one of the few that, to my mind, give appropriate credence to the tensions of unity and heterogeneity in a maximalist context, though his reading hinges on the synthesizing impulse of the humanities, rather than cybernetics.

⁴⁴ Barth, *Giles Goat-Boy*, v.

⁴⁵ Here I have followed Peter Mercer in identifying the book’s extensive allegorical structure as a superficial phenomenon that provides “a context for the book rather than a form.” See Mercer, Peter, “The Rhetoric of ‘Giles Goat-Boy,’” *NOVEL: A Forum on Fiction* 4, no. 2 (1971): 149.

Reconsidered,” Barth offers the following speculation: “[M]ay we not imagine,” he asks, “all the written sentences that any of us reads in a lifetime, from ‘See Dick run’ to ‘Rest in peace,’ as adding up to one maxi-novel? [...] I believe we may” (86–87). This thought experiment renders the novel virtual and literally exhaustive—a kind of life-book circulating across material containers, a prose negative to the life that generates it. Moreover, it demonstrates Barth’s attraction to the same kind of combinatory storytelling, built additively out of a limited set of fixed terms—cliché, in this example—that Watson and Crick immediately perceived as a potentiality in the double helix. “It follows,” they conclude in their initial 1953 report, “that in a long molecule many different permutations are possible, and it therefore seems likely that the precise sequence of the bases is the code which carries the genetical information.”⁴⁶ One “maxi-novel,” one life; one chromosome, one organism. In combinatory grammars—the base-pair alphabet or Barth’s spuriously simple, cliché-ridden catalog of world literature—extreme length is the precondition for the articulation of higher orders of complexity.

THE HERO PROGRAM: EXEMPLARITY AFTER MOLECULAR GENETICS

In spite of its cybernetic investments, I stop short of joining David Porush in calling *Giles Goat-Boy* a “cybernetic fiction,” in the sense that the novel might be thought to “imitate machines, purport to be [a] machine[, or is] structured like a highly polished and integrated mechanical device.”⁴⁷ Half religious tract, half grail quest; Menippean satire meets a *Pilgrim’s Progress* across Cold War America—Barth’s novel, like its goat-boy hero, is a mongrel, perhaps a cyborg, above all a fantasia on the uneasy rapprochement of biology and language. Man by “nature,” goat by training, computer by filiation, and prophet by vocation, the novel’s goat-boy narrator is the site of that rapprochement. Whatever aesthetic traction the novel creates occupies the space between the digestive work of its reductionist machines—WESCAC and, at a metafictional remove, its own allegorical *weltanschauung*—and the irrepressible complexity emergent from the patterns of code that these machines articulate. This in-between space belongs to molecular biology, what Doyle calls “a tropological space where the resistances of ‘the’ body interface and entangle with the shapes and torsions of language.”⁴⁸ The goat-boy’s narrative first-person is the novel’s way of elucidating that tropological space as it oscillates between the routinized abstractions of cybernetic thinking—in which the frictions of embodiment fall away—and sudden raptures of embodied selfhood that emerge, interstitially, from the glitches of cybernetic logic.

When the goat-boy eventually hears the story of his parentage, his infallibility strikes him with epiphanic force: “if I was indeed Grand Tutor then I would choose infallibly the Grand-Tutorial thing—how could I do otherwise?”⁴⁹ The ludic pastiche of picaresque, saint’s life, and hero’s labors that comprises the novel’s subsequent plot is narrated from the position of logical invincibility that this “Grand-Tutorial Apriority” affords the goat-boy. Over the course of his adventures, Giles is rarely decisive but never wrong—such a thing strikes him as strictly impossible in the sense that his task, as he construes it, is to be what he is: “A hero doesn’t have to know ahead of time what he’ll do, does he? All he knows is who he is.”⁵⁰ Through a naïveté equal to

⁴⁶ James D. Watson and Francis H. C. Crick, “Genetical Implications of the Structure of Deoxyribonucleic Acid,” *Nature* 171, no. 4361 (1953): 965.

⁴⁷ David Porush, “Technology and Postmodernism: Cybernetic Fiction,” *SubStance* 9, no. 2, i27 (1980): 93.

⁴⁸ Doyle, *On Beyond Living*, 7–8.

⁴⁹ Barth, *Giles Goat-Boy*, 207.

⁵⁰ *Ibid.*, 98.

the literality of the cybernetic reduction that fathered him, he breaks through the ubiquitous prescription of his genetic program to discover, on the far side, this empowering tautology of heroism by genetic fiat. If literary genres like saints' lives can be genetically hardwired in Barth's unreal "universal university," the goat-boy is that holy fool who strikes upon a converse slippage by which, in the same world, genes might best be read, realized, and expressed exegetically.⁵¹

The reciprocal fungibility of literary and genetic code in *Giles Goat-Boy* literalizes the theoretical preoccupations of 1960s biology. At that time, the discipline was in the midst of a far-reaching reorganization necessitated by Watson and Crick's dramatic discovery of the DNA double helix. Molecular biology supplanted a relatively fragmented set of research agendas to become the center of gravity of a new and unified biology.⁵² DNA provided a shared term that would allow the descriptive projects of cell anatomists and the conjectures of evolutionary theorists to be understood as part of a common venture. The "master molecule" thus took over many of the discipline-organizing functions that had previously been served by the relatively inchoate concept of life "itself" and consequently allowed the discipline to proclaim its independence from the embarrassing conceptual trappings of the now-outmoded vitalist paradigm.⁵³ Remarkably, these large discursive shifts were triggered simply by the disclosure of DNA's structure, which was sufficient to imply a radical reinterpretation of what life was and how it functioned.

However, the new suite of questions implied by the structure of the DNA molecule required new concepts adequate to those questions. Before the gene gained a molecular referent, the relatively crude language of "gene action" was sufficient for the descriptive statements of Mendelian genetics. But after the double helical model was broadly accepted, it became clear that the gene, an incredibly productive agential fiction when it came to the study of phenotypes and the conditions of their expression, was an abstraction impossible to locate at the molecular level.⁵⁴ While classical genetics would usefully retain the concept of gene action for some time, "[molecular g]eneticists required a new kind of narrative for thinking about development; and to fill the gap [...] a correspondingly new figure of speech was introduced: the genetic program."⁵⁵

Francois Jacob, whose work with Jacques Monod on the role of regulator genes in gene expression had put him at the vibrant center of the discipline by the early 1960s, was one of the most influential exponents of the program model. Doyle aptly characterizes the discursive feat of

⁵¹ Several critics have provided useful and convincing expositions of the various literary texts and genres that function as source-codes to *Giles Goat-Boy*, intertextual links that Barth cites to varying degrees of explicitness. See especially Marjorie Malvern, "The Parody of Medieval Saints' Lives in John Barth's *Giles Goat-Boy* or, The Revised New Syllabus," *Studies in Medievalism* 2, no. 1 (1982) and David Morrell, "Giles Goat-Boy," *John Barth: An Introduction* (University Park: Pennsylvania State University Press, 1976).

⁵² See Mayr, *The Growth of Biological Thought*, 825: "The understanding of the double helix opened up an immense new field of exciting research and it is no exaggeration to say that as a result molecular biology completely dominated biology for the next fifteen years."

⁵³ See Mayr, *The Growth of Biological Thought*, 52.

⁵⁴ See for example Keller, *Making Sense of Life*, 134: "Once the gene could no longer freely oscillate between atom and organism, it could no longer serve so readily both as the fundamental unit of heredity and, at the same time, as the pilot of life's developmental journey."

⁵⁵ Evelyn Fox Keller, *Making Sense of Life: Explaining Biological Development with Models, Metaphors, and Machines* (Cambridge: Harvard University Press, 2002), 121. Keller contends that it was the very imprecision of the term "gene" as its meaning fluctuated between functional and structural definitions that made it so productive as a conceptual goad to research. With the opening of the double helix, that imprecision was no longer sustainable and the conceptual scheme of the program, rife with its own inconsistencies, took over the former's function as a contested central term and goad to research.

Jacob and Monod's seminal 1961 article as "a continuation of the dream of knowing 'what life is' begun by Watson and Crick" in which "Jacob and Monod transform a threat to the sovereignty of DNA [regulator genes] into an ally, one that constitutes both the sovereignty of DNA and the mastery of themselves."^{56,57} Their dedication to that particular rhetorical conceit is, in retrospect, particularly remarkable given the nature of their work, since regulator genes might be thought to pose a direct challenge to the autonomy of DNA that the program paradigm tended to posit.

In his single-authored history of the life sciences *The Logic of Life* (1970), Jacob continues that work. *The Logic of Life* exemplifies the double sense in which DNA's discovery triggered the disciplinary convergence of genetic theory with theories of language. The text bears witness, first, to the "linguistic" nature of the "theoretical work involved in constructing explanations of [biological] development"; and, second, in the fact that the metaphor struck upon as most apt—the program—is itself a language.⁵⁸ Jacob is both explicit and precise on this point of equivalence. "The organism [is] the realization of a programme prescribed by its heredity," he states, before clarifying that "[t]he programme is a model borrowed from electronic computers. It equates the genetic material of an egg with the magnetic tape of a computer" (9). Something like "software" to the "hardware" of the cell nucleus, the genetic program would activate and then direct the growth of the organism whose heredity it had encoded, cell by cell.

As if aware of how difficult it will be to contain the semantic contagion of his metaphor, Jacob is at pains to suggest precisely how far the equation of genome and program may be expounded.⁵⁹ Immensely productive as it is, the program metaphor actually threatens to be too productive for the purposes of scientific description; Jacob immediately begins to circumscribe its proper meaning by listing the many ways in which computer and genetic programs are not in fact identical. These caveats boil down to a fundamental difference: genetic programs are deaf to feedback. As Jacob puts it, they are "inaccessible to acquired experience and remain unchanged" by it. At the scale of individual bodies, the genetic program is "rigid"; it lacks the ability to incorporate feedback by modifying its own script.⁶⁰ This rigidity is crucial to Jacob's model of life and an article of faith in molecular biology at that time. Without rigidity, there is no conservative principle at play, no defensible explanation for life's ability, fundamental and absolutely characteristic, to beget like from like and thus persist in the face of general entropy.

Of course, Jacob is not suggesting that individuals do not have access to their prior experiences or that they remain unchanged by them, simply that those experiences are not and cannot be written into the genome or transmitted through biological reproduction.⁶¹ Indeed, he is at pains to distinguish between genetic and conscious memory, a distinction that allows him to excise the problems of consciousness from his explanation. But to be literal-minded about this discrepancy is to acknowledge a cybernetic stupidity at the heart of the individual organism for which the mental realm of memory and intention must compensate. Moreover, what he brackets

⁵⁶ Jacob, Francois and Jacques Monod, "Genetic Regulatory Mechanisms in the Synthesis of Proteins," *Journal of Molecular Biology* no. 3 (1961): 318–56.

⁵⁷ Doyle, *On Beyond Living*, 84.

⁵⁸ Keller, *Making Sense of Life*, 117.

⁵⁹ He was probably wise to do so, even if the attempt did little good constraining the rhetorical play of the DNA trope in the decades that follow. See Judith Roof's *The Poetics of DNA* (2007) for one recent, wide-ranging account of the DNA trope's extreme contagiousness.

⁶⁰ Jacob, *The Logic of Life*, 9, 3.

⁶¹ The subsequent discourse of epigenetics would, of course, call this article of faith into question.

out of the substantive theory forces its way back into his account in his theoretical vocabulary: though Jacob purports to sideline discussions of consciousness and its derivative phenomena, he in fact reserves the attributes of agency, choice, teleology, and design for use elsewhere in his account.⁶² I will turn to how Jacob redeploys this agential language shortly, noting for now that its absence at the scale of the individual organism also ramifies. Here, his prose is redolent with formulae that appear to describe the whole individual, but lack the language that would bring that description to life. Thus ontogenesis amounts to the “the execution of a plan.” Birth is re-described as the “eternal recommencement” of such an execution. And in a particularly suggestive formulation, Jacob implies a profound diminishment of human agency along cybernetic lines when he claims that, after DNA, “the intention of a psyche has been replaced by the translation of a message.”⁶³ In at least a rhetorical sense, one consequence of making the program metaphor “rigid” at the level of individual execution is the individual’s dispossession of agential resources of intention and free will.

* * *

Giles Goat-Boy is a satire about linguistic rigidity, farcically denaturing the ways that religious, generic, and deoxyribonucleic codes project patterns into the contested future tense. Giles’ heroic labors—“end the border dispute”; “re-place the Founder’s scroll”—are assigned as a kind of cryptic homework by WESCAC in advance of a “final examination”; most of these labors themselves involve the arbitration of this or that tangled precedent, the belated severing of so many Gordian knots constraining social relations on the cold-war campus.⁶⁴ Giles’ “candidacy” for beatification-by-final-exam is also threatened by the goat-boy’s tardiness; he is confounded time and again by the elusive Harold Bray, a “false tutor” who is perennially one step ahead on the “assignment sheet” and often leaves Giles without a labor to undertake. Barth’s characterization, too, is broad and flat by design, reveling in typologies a good deal more rigid than stereotype. The characters Giles encounters on West Campus are less caricatures than they are the risible embodiments of so many cultural codes, systems, and ideologies. Capitalism, communism, tribalism; aesthete nihilism, realpolitik bureaucratization, secular humanism, and amoral science: Giles encounters all their avatars, dispensing religious counsel to each with frequently disastrous results.

Barth has a great deal of fun at the expense of these types, as he does at the arcane guidance that Spielman offers Giles out of his proctological readings of Grand Tutors past and sphincters present. And yet that guidance plays a necessary role. “I wanted an advisor, that was all,” Giles laments when he and Max are first separated. “To *do* the hero-assignment was my function, not to choose it.”⁶⁵ Among other things an anti-*bildungsroman* of the “rigid program” model of individual life, *Giles Goat-Boy*, we might imagine, presents the goat-boy as a tragic innocent from the moment he squares the circle, naming himself after ‘himself’ by taking the acronymic “GILES” as his surname in an oxymoronic assertion of free will that seems to confirm that he has none. Understanding Giles tragically opens the novel’s first-person narrative to a suspicious reading, insofar as “Grand-Tutorial Apriority” becomes an injunction against free will that is cloaked in

⁶² This is both the “elsewhere” of the human sciences more concerned with the phenomena of conscious experience and, as I will elaborate in the next subsection of this paper, “elsewhere” in Jacob’s own explanatory schema when he considers life at the temporal remove of evolution and the scalar remove of the species.

⁶³ Jacob, *The Logic of Life*, 2, 5, 2.

⁶⁴ Barth, *Giles Goat-Boy*, 383.

⁶⁵ Barth, *Giles Goat-Boy*, 110.

Giles' delusional good cheer. In the context of such a reading, Giles' meditation on the givens of existence takes on the quality of fatalist epiphany, as, for example, when he admits in a somber moment that

At best I found it moderately poetic that every action had an equal and opposite reaction [...but] for the most part I regarded natural laws with the same provisional neutrality with which one regards the ground-rules of a game or the exposition of a fable, and the reflection that one had no choice of games whatever (when so many others were readily imaginable) could bring me on occasion to severe melancholy.⁶⁶

But a tragic reading errs in forcing the fabulism of *Giles Goat-Boy* to capitulate to the yardsticks of realist fiction like subtle characterization, layered subjectivity, and narrative unreliability. Moreover, it ignores the ways in which Giles coopts, as a means of self-assertion, the same fungibility of language and biology that WESCAC had mobilized to create the GILES specimen to begin with. Grand-Tutorial apriority becomes a free pass to improvise an ethics, much to the consternation his straight-laced disciples, who expect him to toe a recognizably pious Grand-Tutorial line. When, during a madcap chase scene, the high-minded Anastasia attempts to chasten Giles by asking him, "How can a Grand Tutor encourage reckless driving?", he is unrepentant:

I admitted cheerfully that I didn't have the least idea whether my attitude was proper for a Grand Tutor; but I added (the notion having just occurred to me): "It must be all right, though, come to think of it—since it's *my* attitude, and I'm the Grand Tutor" . . . I considered her frowning face. Despite the racket and wild motion I sensed a good peculiar power in myself: a clarity of muscle, a tonus of thought, such as I'd rarely or never known.⁶⁷

As in this example, Giles' greatest successes come not from thinking outside the cybernetic "ground rules" of Barth's fable but through them, forgetting the priority-relations of means and ends in raptures of false equivalence.

At work in Giles' rejoinder to Anastasia is a strategic idiocy, a confusion of cause and effect that surfaces elsewhere in the novel as a deafness to the difference between literal and figurative description. Time and again, Giles will encounter characters who would reproach him for deviating from the Grand-Tutorial Ideal; by invoking "Grand-Tutorial Apriority" as the only justification he requires, he turns tautological self-definition into the precondition for a kind of artistic self-fashioning. "I looked upon my life," Giles recalls, "and the lives of others as a kind of theatrical impromptu, self-knowledge as a matter of improvisation, and moral injunctions [...] as so many stage directions."⁶⁸ By asserting his goathood at one moment, his Tutorhood the next—every once in a great while, his humanity—Giles performs a kind of virtuosic code-switching that transfigures prescription as play.

What Giles' stupidity enables is a counter-cybernetic fantasy, a completion of the chiasmus that the logic of the Cum Laude Project proposed in part: the fantastical proposition according to which literature can be written into one's genes and, reciprocally, the genetic code is opened to literary *jouissance*. The program paradigm of molecular genetics "depends upon the amputation of the body it heralds," while the goat-boy's embrace of that disembodied logic paradoxically

⁶⁶ *Ibid.*, 80–81.

⁶⁷ *Ibid.*, 159–60.

⁶⁸ *Ibid.*, 81.

returns mind to body in an experience of interpenetrated presence, “a clarity of muscle, a tonus of thought.”⁶⁹ As the “Syllabus” describes it elsewhere, “His choice was free because His nature wasn’t, He being in any case a Grand Tutor”: when the chiasmus is completed, the body that “the GILES” had borrowed from its future gathers a “good peculiar power” from the language buried in its genetic past.⁷⁰ Time travel of a different sort, this genetic repurposing opens a space for active self-determination upon the grounds of a biologism that seemed, at first, to preclude the self altogether.

* * *

The prescriptions of the “nucleic acid world” that threaten to dispossess individuals of agency are thus trumped by the goat-boy’s naïve sophistry.⁷¹ But there remains a melancholy to *Giles Goat-Boy* that cuts against the grain of its broad humor; despite its ludic sensibility, the novel does not ultimately entail the triumph of Giles’ protean virtuosity over the genetic and narratological injunctions of his code-script. It ends on a metafictional note as Giles finishes dictating into WESCAC’s data banks the adventures that, in the form of the “Syllabus” that Barth’s reader has just completed, are to become the founding writ of the religion of “Gilesianism.” No longer for him is there any “glamour to the work, nor any longer to the term: *Grand Tutor*, *WESCAC*, *fountain-pen*—all names of neutral instrumentalities.”⁷² The anticlimactic poignancy of its post-script registers the melancholic tipping-point at which Giles begins to observe his own dispersal into what Jacob would call the “history and drift of programs.”⁷³ It is a dispersal always already written into his acronymic surname, the Damoclean thread of which is that it might, at any moment, unspool, again, into the “Grand-Tutorial Ideal, Laboratory Eugenic Specimen,” dissolving by proxy the goat-boy’s identity back into the mélange of anonymous genetic code and world-literary canon that gave him rise.

This melancholy indexes the moment in Jacob’s program paradigm when agential language makes its unexpected reappearance. It reappears to personify what Doyle has called the “sublime object of biology” after the double helix—an object that DNA has displaced and “decentered,” *qua* Serres, from the individual organism to the self-perpetuating pattern of the genetic line.⁷⁴ In spite of molecular biology’s claim to have demonstrated “that there is no metaphysical entity hidden behind the word life,” this displacement suggests the return of an agent of life “itself” that coalesces the perspectival remove of history’s *longue durée*; its melancholia in Barth’s novel is not simply the affective obverse of what Mark McGurl has called posthuman comedy of “the inhumanly large and long,” but the impoverishment of life’s dynamic possibilities when conceived on such a scale, where the outsized melodrama of an individual life resolves into the incremental adjustments of a genetic line to its environment.⁷⁵

Agency resurfaces at the interface of organism and species in *The Logic of Life*, with Jacob’s explanation for the way in which we can train our theoretical optics to capture the program in deep time:

⁶⁹ Doyle, *On Beyond Living*, 7.

⁷⁰ Barth, *Giles Goat-Boy*, 208.

⁷¹ Doyle, *On Beyond Living*, 66.

⁷² Barth, *Giles Goat-Boy*, 670.

⁷³ Jacob, *The Logic of Life*, 8.

⁷⁴ Doyle, *On Beyond Living*, 22.

⁷⁵ McGurl, Mark, “The Posthuman Comedy,” *Critical Inquiry* 38 no. 3 (2012): 539.

[...] *a posteriori*, everything happens as if [Nature] had chosen one by one . . . as if she had fashioned each molecule and put the finishing touches to each detail. In the genetic program, therefore, is written the result of all past reproductions, the collection of successes, since all traces of failures have disappeared. The genetic message, the programme of the present-day organism, therefore, resembles a text without an author that a proof-reader has been correcting for more than two billion years.⁷⁶

This retrojection spectacularly inverts the future-oriented “time travel”⁷⁷ of Jacob’s earlier rhetoric: instead of “borrowing a body from the future” for genetic regulation in the present, here he orients the stochastic spread of the distant past toward the present in order to retroactively imbue it with a design that has been realized “as if” by choice. What results is a kind of theoretical dignity for terms we might otherwise consider antithetical to scientific discourse, or at least extrinsic to its vocabularies: memory, design, intention, telos. Nonetheless, Jacob insists that he is deploying these terms deliberately—insists, with a flourish, that “[t]he concept of programme has made an honest woman of teleology” by granting it—or her—a terminological respectability that makes it eligible for explicit naming and serious debate.⁷⁸

As crucial as the rigidity of the individual program, then, is the fact that Jacob restricts rigidity to what he calls the “integration levels”⁷⁹ of the individual organism: the cell, the organ, the body. By contrast to the fixed structure of these latter integrations, population and species systems can’t be bound by the same rigidity. Evolution proves as much, and as Jacob describes them, these integrations exhibit animated, nigh-intelligent adaptive qualities. The very ubiquity of the term “program” in Jacob’s rhetoric is what inflates the difference between species and individual into an oppositional contrast between the virtual program “itself” and the dumb, embodied instances that it iterates in order to supercede: “[o]n the one hand,” he states, “it is necessary to analyze the structure of the programme, its logic and its execution; on the other, to examine the history of programmes, their drift and the laws governing their changes throughout generations in terms of ecological systems.”⁸⁰ In the two directions Jacob charts for the life sciences, the relatively short span of the life of an organism is flattened into purest synchrony—either in the temporal arrest that allows a snapshot-like perspective onto its “structure” and “logic” or the interminable and ongoing now of its “execution.” This preserves the descriptive resources of diachrony—narrative causality (“history”), movement (“drift”) and, crucially, self-correction through feedback—for the *longue durée* of species life.

Maximalist though it may be, *Giles Goat-Boy*’s episodic narrative belongs to the shorter span, a fact that the book’s paratextual apparatus serves to demonstrate. The goat-boy’s pathos resides here—not in the figure of genetic or generic prescription, whose terms he accepts in order to invert, but in the shapeliness and incremental drift of the aggregate Grand Tutorial line to which his outsized personality is forfeit. Giles’ program-life thus succeeds in persisting, after a sense, but the “endless tapes” that Giles has composed, so reminiscent of the flat, coiled strands of DNA, can only usher him into the future in adulterated form: they are bent to the retrojected

⁷⁶ Jacob, *The Logic of Life*, 287.

⁷⁷ Doyle, *On Beyond Living*, 78.

⁷⁸ Jacob, *The Logic of Life*, 9.

⁷⁹ *Ibid.*, 302.

⁸⁰ *Ibid.*, 8.

design of a program, in this case the genre of the holy writ, “One day to feed Him who will come after me, as I fed once . . .”⁸¹ What escapes convention, defies doctrine, or hoodwinks the cybernetic reduction will be lost in translation.

Further accentuating this piquancy is the nice irony of the Cum Laude Project’s quixotic logic, which sees no incongruity in using genetic blending to create, of all things, a prophet-hero. The only discernable commonality among the Cum Laude Project’s source texts—Christ, Buddha, Oedipus, and Hercules are among those allegorically invoked—is the distinctive and singular nature of each. What could it mean to perfect a Grand Tutorial “stock,” when the only characteristic that its models share is the fact that each one is *sui generis*? “The eugenical specimen whereof I was the issue had been drawn as it were from all studentdom, whose scion therefore I was”: the only uniqueness Giles can claim is combinatory—the only sort, after all, to be hoped for under the paradigm of the genetic program.⁸²

This, then, is the fate of identity when it collides with a literal-minded biologism under the metaphorical regime of early molecular genetics. *Giles Goat-Boy* is funny when, through a kind of willed, exuberant stupidity, it adopts a cybernetic tone-deafness to the figurality of language and then uses that tone-deafness to deconstruct the cybernetic rhetoric that undergirds the “program model” of life. Its pathos derives from the ubiquitous threat of the code-script’s dispersal. Put another way, the result of a code-script thinking itself an organism—“the GILES specimen” becoming Giles the goat-boy—is satire. The organism witnessing its translation to code-script—Giles becoming the “Revised New Syllabus”—produces melancholy. In the sad case of the goat-boy, the coherence of the first-person singular is at best a precarious vantage onto the private population that comprises and will supercede it, an uncertain staging ground for the novel’s vaster concerns: those points of genetic encounter at the outer edges of identity or—as in the acronymic tenuousness of “the GILES specimen”—identity’s innermost seams. A

⁸¹ Barth, *Giles Goat-Boy*, 699.

⁸² *Ibid.*, 638.