

The Runaway Sign: Semiotic Adaptation in Literary Analysis

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This article derives a notion of adaptation as a semiotic process from the work of Jesper Hoffmeyer and the Copenhagen-Tartu school of biosemiotics, suggesting it as a way of considering fictional writing on genetics and evolution both empirically and analogically. Hoffmeyer extends the Darwinian concept of adaptation as species transformation in response to environmental pressures, to suggest “ecosemiotic interaction structures” across different life forms in an ecosystem, which respond to and produce change – biological, psychological, social, geological – at different levels of experience (196). “Semiotic adaptation” would understand adaptation as a regional ecological process involving the production and interpretation of signs at openings of what I call different “semiotic economies,” discrete systems of managed sign relations. These openings are marked by events of signification that produce moments of what psychoanalyst Gregory Bateson calls “runaway” (316), and what philosopher-chemist Isabelle Stengers, in a discussion of entropy, calls “far-from-equilibrium” (244). Along these lines, I read significations of reproduction in Doris Lessing’s *The Marriages Between Zones Three, Four and Five* (1980). I suggest that processes of change are written as a form of ecosemiotic adaptation; on an empirical level, re-writing genetic reductionism-as-biological determinism into a version of “epigenetic” inheritance; on an analogical level, considering the stakes and possibilities of long-term change at moments of ecological emergency. Empiricism and analogy work coextensively in the text in a speculative “ecology of practices” (Stengers vii) around processes of adaptation.

Biosemiotics draws from the philosophy of Charles Sanders Peirce, both the wide scope of his sign theory and his writing of evolution, which offer ways of thinking of life processes as the production and interpretation of signs. Peirce undertakes a search for a “genuine triadic relation,” rather than dyadic relations of juxtaposition or negation derived either only from reason or only from “less comprehensible phenomena” (6.322). This is important for Peirce because the question of genuine triadic relations is “a better, because more definite, formulation of how life first came about” (“Evolutionary Love” 322). For Peirce, the question of life is a

semiotic concern, semiosis conceived across different levels of experience. Andrew Reynolds describes Peirce's semiotic as "Hegelian dialectical idealism meets Darwinian evolution and statistical thermodynamics" (6), a description which gestures to the different axes Peirce works across in the search for this "genuine triadic relation" in semiosis, "resuscitat[ing] Hegel, though in a strange costume" (Peirce 1.42). In "Evolutionary Love," he argues that evolutionary change in Hegel resembles anancasticism (evolution by necessity or determinism), in which "development [goes] through certain phases, having its inevitable ebbs and flows, yet tending on the whole to a foreordained perfection" (362-3). He distinguishes this from tychism (evolution by chance or Tyche, associated with Charles Darwin), and agapasticism (evolution by creativity, as he finds in Jean-Baptiste Lamarck). While Peirce understands Tyche as a living process, he has more sympathy with Lamarck's "evolution by the force of habit" (359). "Evolutionary Love" is an socio-economic critique as much as suggestion for evolutionary theory; Peirce condemned what he read as Darwin's extension of "politico-economical views of progress to the entire realm of animal and vegetable life" (357), which he reads as a "greed philosophy" analogous to the last gambler left at a gaming table after everyone else has cut their losses (362). (This critique is more applicable to Herbert Spencer's theory of selection via competition in *Principles of Biology* (1864), than Darwin's theory of adaptation via selection in *On the Origin of Species* (1859).) Peirce suggests joining tychism as arbitrary and fallible selection (as opposed to biologist August Weismann's deterministic theory of heredity (1889)), to the possibility of improvement suggested in anancasticism, in a version of evolution as "genuine agapasm," in which "advance takes place by virtue of a positive sympathy among the created springing from continuity of mind" (362). This spontaneous intergenerational transmission from parent to offspring would be gradually replaced by habit through heredity, heredity extended across physiological and speculative experience. For Peirce, all three kinds of evolution are at work at any given point in processes of growth, without clear definition between them, not necessarily equating to increasing "complexity."

The element of learning as the production, negotiation of (and, necessarily, the fallibility of knowing) signs is critical for Peirce's idea of symbolic growth. He suggests that any event of signification involves a triadic relation between sign and object in which the relation between them is mediated by an "interpretant," which is

made into a sign through this relation. This three-way negotiation produces a “symbol,” distinct from an icon or indice. Hence, Peirce’s much-quoted assertion, “We think only in signs” (2.302). He explains, “The Interpretant, or Third, cannot stand in a mere dyadic relation to the Object, but must stand in such a relation to it as the Representamen itself does” (2.156). The Representamen (sign) is already split in relation to “its” object, which is also the object of the interpretant. Semiotician Mihhail Lotman writes, “Peirce, the non-orthodoxical pragmatist, proceeds from the standpoint that one can reach truth only through practice” (83), practice as a kind of experiential inscription involving the work of interpretation as symbolic growth, not restricted to consciousness (a description of mind Peirce finds troubling). Saussure’s treatment of signs, on the other hand, is “insistently negative,” argues Lotman. What Lotman calls Saussure’s apophatic treatment of signs, in which “every sign has a pure form which is not present in text, but only represented in it” (83) leads Roland Barthes to posit a subject’s encounters *with* signs (even as part of the text), rather than *as* sign(s), as James Williams has observed (40-45). A broader discussion of (Peircean) semiotics and (Saussurean) semiology in literary analysis would consider semiotic adaptation within a longer reflection on Barthes (1970, 1975, 1977) next to Umberto Eco (1978) and Michel Riffaterre (1983). More generally, a genetic-typological paradigm in some recent literary criticism draws semiotic mobility into distinct patterns or traits, what Emily Apter calls “inbuilt typologies” (57), which move from place to place, transformed by their environments, but which maintain an implicit functional integrity, even if fractured and inaccessible to exegesis.

An approach influenced by Peirce would draw ruptures out of the functional stability of symbols to consider how signs move in fragments around systems, often into dysfunction. For Peirce, “the highest kind of symbol is one which signifies a growth, or self-development” (2.11). As his semiotic develops, he draws gesture, speech and emotion into semiosis as lived manifestations. Jacques Derrida argues that in Peirce’s theory, in contrast to Saussure’s, “No ground of nonsignification – understood as insignificance or an intuition of a present truth – stretches out to give it foundation under the play and the coming into being of signs”; rather, “the genetic root-system refers from sign to sign” (48). For Derrida, Peirce’s sign theory displays a kind of semiotic movement: “The self-identity of the signified conceals itself unceasingly and is always on the move” (49). This movement allows Derrida to

suggest the immotivation of the trace as “an operation and not as a state, as an active movement, a demotivation, and not as a given structure” (51). As Floyd Merrell writes, “It is a matter of signs perpetually becoming something other than what they are” (“Semiotics and Literary Studies”).

The theoretical implications of Derrida’s reading of Peirce are echoed in biosemiotics, which draws together phenomenological and empiricist argumentation. Hoffmeyer writes, “[E]xperiences appear to us as analogue codings of meaningful parts of our surroundings” (180). Biosemiotics would extract the concept of evolution from the epistemological hold of the Modern Evolutionary Synthesis, a combination of Mendelian genetics and natural selection, developed in the UK during the 1930s and 40s by mathematician-biologist J. B. S. Haldane, population geneticist Sewell Wright, and statistician-biologist R. A. Fisher, and given its name by biologist Julian Huxley, brother of Aldous.¹ In this paradigm, writes Hoffmeyer, “organisms begin to be treated as black boxes, operated upon by the external forces of mutation and environmental selection” (174). In place of this, Hoffmeyer suggests “an evolutionary history of experiential existence” derived from studying “complex adaptive systems that form dynamic wholes that are not just “epiphenomena,” but are capable of exerting causal power over their own components and of exhibiting both formal and final causality” (174-6). Derrida’s argument that the signified is always concealed and on the move can be drawn into this argument as a challenge to the “black box” or unit-thinking of the Modern Synthesis; Hoffmeyer argues that “virtuality” would be understood as *something* in the world, “built into life from the beginning, and overcoming the idea that a life is fundamentally non-living” (176). This last assertion contradicts the argument that life forms are passive, pre-programmed representations of immutable genetic material, passed on through DNA replication. “Living” here would mean active, in flux, with agency and determining power, not only with regard to technological intervention, but also in terms of responsivity and adaptation across different levels of experience.

This agency of the living is not a question of perfectibility, but of adaptation. This has implications for “epigenetic” processes of genetic expression and development. Hoffmeyer writes, “Seen from the biology of biosemiotics, a human life does not necessarily start at conception” (155). Rather, the family – as living entanglement of cultural and genetic inscriptions extended across generational and

geographic variation – is biosemiotics’ evolutionary individual, as opposed to Darwin, for whom it is the organism. An epigenetic understanding of genetic inheritance would suggest that the genetic slate is not wiped clean at the point of conception; rather, genetic expression can be inherited from one generation to the next. That is, there is something like the memory of genetic activation or silencing, or changes in chromatin position, that go on throughout an organism’s lifetime that may be passed on as part of its genetic inheritance, as opposed to mutations as permanent changes in the DNA sequence of a gene, passed on during zygote formation. Hoffmeyer writes that what psychologist James Mark Baldwin calls “organic selection mechanisms” imply the appearance of developmental adaptation in the lifetime of individual organisms, caused by “the great series of adaptations secured by conscious agency”: “imitation, gregarious influences, the lessons of pleasure and pain, and of experience generally, and reasoning of means to ends” (202). Given the limited knowledge about “what it means to *know*, neurobiologically speaking,” in Hoffmeyer’s words (170), the idea of “conscious agency” is as tenuous as the conceptual stability of the “gene.”²

In *Evolution in Four Dimensions* (2005), epigenetics theorists Eve Jablonka and Marion Lamb describe different kinds of inheritance systems at work in evolution. “Not everything inherited is genetic,” they argue; behavioural, epigenetic and symbolic systems can also have both “direct and indirect influences on evolutionary change” (107). This line of thinking would move evolutionary theory from a gene-centred approach, “because it is no longer necessary to attribute the adaptive evolution of every biological structure and activity, including human behaviour, to the selection of chance genetic variations that are blind to function” (2). Symbolic inheritance would not be constituted by the passive transmission of what Richard Dawkins, in *The Selfish Gene* (1976), calls cultural “memes,” units of information in the brain that take the physical form of neural circuits, which are passed on through a competitive system of exchange, where memes fight each other for dominance in the collective psyche. This model of symbolic transmission looks suspiciously like advertising in a system of technologized mass reproduction. Echoing Peirce, Jablonka and Lamb argue that signs “become symbols by virtue of being a part of a system in which their meaning is dependent *both* on the relations they have to the way of objects and actions in the world are experienced by humans, and the relations they have to other signs in the cultural system” (200). This understanding works across to epigenetic events during

development, which occur through interactions between genome and its surrounding environments. Epigenetics would re-cast the genome from master programmer, to what biologist and philosopher of science Evelyn Fox Keller calls a “responsive organ” (2014).

Hoffmeyer, Jablonka and Lamb’s arguments about symbolic adaptation and inheritance can be drawn into a comparison with Peirce’s idea of symbolic growth. In Peirce’s writing, Thirdness is more or less restricted to the life of the mind. Biosemiotics has applied Thirdness across “mental” and “natural” worlds (although for Peirce the mind extends to inanimate objects), taking from Peirce the idea of different levels of experience in any one event or system of signification(s), what I call semiotic economies. Outlining a semiotic economy requires some epistemological restriction. On the side of empiricism, objects of biology, sociology and psychoanalysis (“gene”, “family”, “mind”) might be suggested; in analogy, semiotic economies might take the form of different regions of governance. Peirce’s idea of Thirdness introduces the possibility of reading within and across their different disciplinary constraints. Growth occurs when this third element is at work, creating an opening, and with it, the work of adaptation. This would place Saussure next to Peirce in a manner similar to Derrida’s reading in *Of Grammatology*, with Thirdness not as a calculable element, but a principle of operation and “active movement” in an event of signification.

In this adaptive operation, some “thing” – not unit or calculable component – tends to escape, given that this operation necessitates conflict. Furthermore, the change induced is not necessarily quantitative, and economies run the risk of falling back into their former states. Bateson argues that adaptation is not an efficient economy, but involves trial and error, and “error is always biologically and/or psychically expensive” (274). In his theory of schizophrenia, “runaway” may be induced when the interaction of two codes come into conflict, analogic and digital, throwing a subject out of equilibrium. Bateson describes this as “a patient’s failure to recognize the metaphoric nature of his fantasies,” when what is usually a triadic constellation of messages (for example, “as if” as an interpretive phrase) is understood to be direct and “natural,” and “the metaphor of the fantasy is narrated and acted upon in a way which would be appropriate if the fantasy were a message of the more direct kind” (190). That is, when metaphor is received empirically. This moment can result in destruction, but it can result in a reconfiguration of the system. In a discussion of entropy, Stengers

understands far-from-equilibrium as a moment of radical possibility, in which “the very identity of the system can be transformed” (244), producing a “new configuration of requirements and obligations” that make up a system’s “self-organization” (245). In semiotic terms, this transformation necessitates some unforeseeable loss of meaning, as regional significance falls into disuse. These two moments, as the interplay of dyadic and triadic semiotic constellations risking loss, mark a site of adaptation.

Drawing together these two thinkers in their theorisations of disequilibrium addresses the task here, as Bateson and Stengers stress the need for cross-disciplinary understandings of change, not restricted to its use in one or two disciplines, but opened up across various epistemological pathways. On the side of constructing knowledge from experimentation, Stengers’s cosmopolitical project suggests an “ecology of practices” that would take scientific passion and indeterminacy as founding constraints in “ethical experimentation” exploring the coexistence of epistemological “beings” across disciplines (vii-viii). Bateson develops his theory of schizophrenia around a notion of stochastic change that “occurs at the boundary points between the segments” of different regions (264). The examples that constitute his theory of schizophrenia are genetic mutation, learning, and change in family organization, but this list is not comprehensive. Important here is the idea of change occurring at epistemological boundary points, in the confrontation of what I call semiotic economies. This idea of change ruptures the supposition of the internal cohesion or sovereignty of these economies, the “self-identity” of their signification. Importantly, this change is “stochastic” and not readily available for calculations of probability. Stengers’s suggestion for an ecology of practices towards a “diagnosis of becomings” shares this theorisation of change, which she describes as a struggle against probabilities. In a diagnosis of becomings, she writes, “it is a question of creating words that are meaningful only when they bring about their own reinvention, words whose greatest ambition would be to become elements of histories that, without them, might have been slightly different” (12-13). One of the recurring topoi of *Canopus in Argos: Archives* (1979-83) – and throughout Lessing’s later writing – is this speculation on possibles, rather than the representation of historical and biological determinations of change based on the intersections between demarcated units of experience taken as self-evident – that is, based on divisions between class, race, gender, nationality, language and so on. In the reading here, I look at how adaptation between and within

semiotic economies produces a version of evolution dependent not only on collusions between these units, but their destabilization at moments of runaway.

It might be borne in mind that the *Canopus in Argos: Archives* series appeared as Southern Rhodesia, Lessing's childhood country, was transitioning into Zimbabwe; more broadly, a concept of national progress tied to the rhetoric of developmentalism was being used as a central tenet for access to emerging markets. Both Elizabeth Maslen and Ursula Le Guin read *Canopus* as Lessing putting her cards on the table in response to world events. For Maslen, this shows a "peculiar brand of courage" (21); for Le Guin, in her review *Shikasta*, it is almost unreadable moralizing ("Doris Lessing's First Sci Fi Book"). Certainly, these are texts about teaching, and are their own forms of instruction, but the mystery here (Le Guin observes a lack of it) is how Lessing mimics rhetorical gestures of developmentalism, globalization and the science it draws support from, re-writing these forms of knowledge through analogy into another kind of empiricism. As Maslen argues, the "irresistibly obvious equations" (19) about race relations and colonization in *Canopus* are banked in another project: writing a version of historical change which would leave behind perpetual "murdering and destroying" (20) justified by regional ideologies. This can be allied to struggles in the scientific community during the 1970s, if read alongside Richard Lewontin and Stephen Jay Gould's challenges to sociobiology with the argument for "biological potential," the dominant language of biology not yet sufficiently modified to offset the imaginative hold of genetic idealism. I suggest that Lessing is writing in another disciplinary language, perhaps, in her words, to put "fresh life" into "dingy clichés" by putting them in unexpected contexts ("Oppressors").

The five regions that constitute the topography of *The Marriages Between Zones Three, Four and Five* are closed off from each other, functioning as discrete semiotic economies. Al Ith and Ben Ata enter the text as archetypal representatives of and for their respective zones. In the sense of Peirce, they are "icons," and their semiotic economies function iconographically – that is, the relationship between sign and object is assumed to be a "natural" representation based on resemblance or signified truth (Derrida 45). Ben Ata knows what he means when he says, "woman," and Al Ith knows what she means by the word, "love." In Zone Four, a horse is a mode of transport, in Zone Three, a companion. In Zone Four, sex is for male pleasure and female fertilization, and rape is a necessary task for maintaining fraternal

governance; in Zone Three, reproductive labour is distributed between groups of men and women, not only a task for the female body, but shared out in an understanding of embryonic development that extends the male role well past the point of conception. The novel puts the symbol of reproduction to work across these semiotic economies, drawing into this movement questions of gender and heteronormativity at a social level, and genetic and developmental influences at a biological one; “learning” extends beyond individual subjectivity into multi-regional interpretation, which “leads to a change in the disposition of the organism for a different behaviour” (Hoffmeyer 459). Through Ben Ata and Al Ith’s marriage, symbolic constructions of “reproduction” in their respective zones conflict as the protagonists negotiate the process, from heteronormative intercourse, to foetal development, to birth, to child-care. This negotiation does not imply a transformational process, but an adaptive one; in adaptation, some “things” are lost in the process of trial and error, which, to repeat Bateson, is “biologically and/or psychically expensive.” These losses cannot be predicted and thereby supplemented by pre-emptively calculating them into the system.

The marriage between Al Ith and Ben Ata is for the purpose of ameliorating low birth rates in their respective zones. As Al Ith says, “We have gone wrong somewhere. Both our Zones” (57). The exogamous partnership is a biopolitical instruction from unseen imperial rulers to stimulate genetic variation and population growth, rather than a locally-decided allegiance for political or economic purposes. The imperative for forced inter-breeding is dependent on female reproductive labour and heteronormative sexual relations, necessarily monogamous on the side of the female, to be carried out. Such an imperative regulates what Gayatri Chakravorty Spivak has called “reproductive heteronormativity.” Spivak argues, “It is in terms of that norm that society is made: legal structures, religious structures, affective structures, residential structures” (193). Both zones are complicit in this, their societies organized in different ways around reproduction through and of their governing structures. In Zone Three, men and women have equivalent freedoms, and it is implied that sexuality is understood to have many more divisions than homosexuality/heterosexuality; nonetheless, as a colonial outpost, Zone Three is bound to the law of the “Providers,” an interplanetary imperial government. (We do not know whether this is Canopus or Sirius; both empires carry out eugenic experimentation, and are subsequently forced to adapt and eventually give up this mode of governance in the

next two *Canopus* novels, *The Sirian Experiments* (1980) and *The Making of the Representative for Planet 8* (1982).) The Providers institute the biopolitical right “to ensure, sustain and multiply life, to put this life in order”; that is, “a right to *foster* life [*un pouvoir de faire vivre*]” (Foucault 138). The order for heteronormative reproduction as a response to low birth rates is a way for the Providers to ensure and prolong imperial rule, over and above Al Ith and Ben Ata’s power as sovereign representatives. At the same time, the Providers depend on Ben Ata and Al Ith’s performances of sovereignty (Al Ith acts to save Zone Three, Ben Ata to ensure his bloodline’s influence) for the order to be fulfilled. The governing logic binds both Zone Three and Zone Four to a common semiotic economy that divides gender across the line of reproductive labour.

Clare Hanson suggests that the writing of eugenics in the *Canopus* novels suggests a certain authorial sympathy with the perpetrators of utilitarian forced breeding projects. She argues that this takes Lessing “closer to a eugenic perspective in which individual rights and freedoms are subordinated to the need to develop or preserve the race” (88). Certainly, this is the purpose of the arranged marriage between Al Ith and Ben Ata. However, the marriage’s effects go beyond the eugenic instruction of the Providers; while Al Ith and Ben Ata complete their task, its biological emphasis is displaced into a broader ecology of cross-regional adaptation. The partnership forces a series of negotiations between Al Ith and Ben Ata on intercourse and reproduction, placing an “as if”-as-sign between their particular sign systems. While Al Ith and Ben Ata fulfill the reproduction order, it is not carried through without questioning and eventually reconfiguring these conditions, in both zones. These negotiations lead into a consideration of developmental conditions for embryo, foetus and child. Change – finally characterized by “continuous movement” across the zones (298) – is effected not only through the biological imperative of genetic variation and population growth, but also through learning various non-genetic factors in development and inheritance; broadly speaking, in adaptive evolution, understood in biosemiotic terms.

Al Ith’s movement into Zone Four introduces the function of interpretative signification between Al Ith and those she comes into contact with – Ben Ata, Dabeeb, Jarnti, the women’s resistance group – altering the local system from an iconographic semiotic economy to a symbolic ecology. It puts things out of sync. The first conversation between the two rulers, on the subject of child-raising and sex, is

interrupted by Ben Ata raping Al Ith. There is a rupture on both sides, but it is not simultaneous. For Ben Ata, the rape itself does not function as a breach (according to the protocol of Zone Four, it is a commonplace task for men), but is the effect of a rupture produced by Al Ith's assertion, "There is more to mating than children" (46). This provokes a struggle within Ben Ata. Ben Ata's sexual experience has up to this point been limited to wartime rapes, in which "those who wept or who struggled in a way he recognized he did enjoy, and began to tame slowly" (45). For Ben Ata, male-female sexual communication is limited to reading the different degrees of the struggles and weeping of women. In response to Al Ith's statement, he "groan[s] out loud and strike[s] his fists hard on the floor beside him" (46); Al Ith's further suggestion that sex is a "skill" in her Zone marks a tipping point. The rape is a retroactive "task" for Ben Ata, implied to function as such by ritualized conduct: "He put his hand over her mouth in the approved way" (47), a censorship of female sexual license in response to its verbal articulation. For Al Ith, unconsensual sexual violence is a new sign; her gaze is described as "quite blank," her expression, converted into an empty space, signifying his active negation of her assertion, his attempt to instruct her that there is no more to mating than children. "She" – the fertile female body permeable for male penetration and insemination – functions as an open blank for the male task of female censorship and the female task of reproductive labour.

Yet, this scene also marks a change in Ben Ata immediately following the rape: "[A]lready embarrassed, [he] showed his feeling that all was not right by a gesture of concern most unusual in him: he twitched her dress down again and removed his hand from her mouth quite gently" (47). Ben Ata's gesture of concern and Al Ith's blank gaze manifest a moment of "runaway" directed toward trauma or grief, the first rupture to their respective symbolic orders. If Ben Ata's second rape is read as a repetition, then it would seem the runaway moment following the first rape has no effect on the significance Ben Ata attaches to the female body. Yet, after he rapes Al Ith a second time, his embarrassment is replaced by shame and grief, marking the difficulty of his learning from Al Ith, and, simultaneously, the gradual loss of his previous symbolic configuration of sexual activity and arousal:

Her ways seemed too difficult for him, or at least unfamiliar, or out of his reach just then. And his were striking him as crude ... he could only complete the

entry and the possession by taking a furtive glance at the bruise he had inflicted, and this itself now shamed him so that as he spurted he groaned and then lay still. He was filled, amazingly, with grief. (62)

This act is not a simple repetition of the first. Ben Ata now sees that Al Ith's eyes are not only "open" but also "desolate," an observation that had not occurred to him during struggle and weeping of the women he has previously raped. He understood those previous struggles only as sexually provocative and therefore as invitations for him to "tame" the women brought to his tent. The point of orgasm in this second scene of rape – and thus the possibility of insemination – carries with it "shame" and "grief." Significantly, this shame is produced by Ben Ata finding the bruise he has inflicted sexually arousing. The bruise on Al Ith's face signs for male dominion over the female body, marking Ben Ata's orgasm with Al Ith's trauma; "he" is split into a general social economy of male violence directed against unconsenting female bodies, and "Ben Ata" in a particular encounter with "Al Ith."

Something has changed between these two scenes of rape. While the event of rape remains materially identical, it carries a different significance. Between these two scenes, Al Ith's blue dress functions as an interpreting sign, negotiating Ben Ata's encounters of Al Ith as character whom he has a duty to host as fellow sovereign, and a universal female body that he is used to dominating and subjugating. At first, he is offended by her choice of dress, finding it un-arousing; female dress in Zone Four is for the purpose of facilitating male sexual excitement, the obligatory costume for a vessel that either struggles, weeps, or bears children. Ben Ata's first "gesture of concern" is transmitted through negotiating this symbol of female permeability: he twitches down Al Ith's blue dress, covering her back up, an acknowledgement that the dress might function not only as a tool of male arousal, but also of female self-protection. If lifting up the dress is only a confirmation or completion of its signifying function, Ben Ata's gesture of twitching it back down extends and reconfigures its purpose, not for Al Ith, but in his own understanding.

The dress appears again when Al Ith makes an assertion about the "general damp" of Zone Four's climate:

“Oh, come now, it isn’t as bad as that,” he said. “You’ll see, when the sun is up, and things have dried off. We have some very pleasant days down here, you know.”

“I hope so! Feel my dress, Ben Ata!”

But this invitation put them back again. It was certainly not coquetry, and to be invited to feel her dress for any other reason affronted him. He took a fold of the dark blue stuff between thumb and finger, and pronounced it damp. (57)

Ben Ata is right to assume that Al Ith’s request is not a sexual invitation, but it is a sexual instruction. If female dress signs for male arousal in Zone Four, where female body and dress are interchangeable, both objects for stimulating male pleasure, then Al Ith is drawing attention to the possibility of female arousal. The “general damp” of Zone Four and the “damp” of Al Ith’s dress are drawn together, the labial anatomy mapped onto the “fold” of the dress. Ben Ata’s touch both mimics and moves the autoerotic touch of the first rape scene (where he “fingered himself to see if he was up to it (47)”) into a positive response to her request that he touch “her.” The drawing together of two sites of dampness might also sign for a different form of physiological sexual excitement in Zone Four. Drawn into a relation with the “general damp” of Zone Four, the dress functions as an instruction to Ben Ata about immanent possibilities of female sexual arousal, not necessarily bound to heteronormativity or reproduction. This is, however, a physiological instruction; an invitation from Al Ith is yet to arrive. As it stands, the women of Zone Four use coquetry as part of an informal barter system extended beyond institutionalized prostitution. In the secret song festival, fearful of censorship, the women – wives – sing, “I’ll make him hunger, / And languish and anger, // And give me his pay, / A corporal’s pay” (132-33). As the anthem of Zone Four’s (documented) resistance movement, the song is part of a counter-economy within the logic of fratriarchal governance, passed on word-for-word, gesture for gesture, a secret but inherited marking between women of the instituted line between wives and mothers, brothers and sons (there are no fathers in Zone Four).

Al Ith’s instruction of Ben Ata is not just a correction of Oedipus, but a tutoring away from unconsensual sexual violence as the primary reproductive performance of Zone Four. The Oedipus correction would limit the adaptation at work in Zone Four to the transition from fratriarchy to patriarchy, son to father. There is more at stake –

signifying the figure of “woman” away from the signification of reproductive vessel and primary labourer of child-care. Maternal love-as-labour is assumed by the menfolk, rather than shared. In Zone Four, children are the possessions of their parents. Ben Ata talks about them in terms of ownership and property, and he does not accept that an adopted child can provoke the same feeling in Al Ith as her “own” child: “‘I suppose you feel about them exactly as you do about your own,’ he said, and this was a mimicry” (46). Despite the implication of mockery, Ben Ata’s question is not rhetorical, given that he has no experience with his own children, whose number and existence he only assumes, conceived by raping unknown women during military campaigns. He expects mothers to have strong ties to their children, but does not know if he should expect the same from Al Ith as character. As their interaction continues, “she” is fractured into different possibilities, translated from the self-evident sign of “woman” (fertility permitting permeability), into an incalculable collection of unknowns. There are paths here he cannot traverse, because they are not accessible only through his own semiotic economy; he must, in Bateson’s terms, “learn to learn” (274).

The issue of adoption introduces another dimension into the semiotic operation of reproduction in Zones Three and Four: the question of biological and environmental influences over development. For Ben Ata, the line between the two is clear, the former suggesting paternal possession and maternal care, the latter secondary or even unimportant. Social structures for child welfare that extend beyond the nuclear family have no place in Zone Four. By contrast, Zone Three has some understanding of what can be read as “epigenetic” influences on embryonic and post-natal development. Encountering the human Yori, a Zone Three agriculturalist, Al Ith considers the possibility that she may already be pregnant after Ben Ata’s two rapes, and how different her pregnancy would be in Zone Three:

When she had been pregnant – and after what care, and thought, and long careful choices – in the past, she had, as soon as she had been sure, chosen as beneficial influences for the child, several men who, knowing why they were chosen, and for what purpose, co-operated with her in this act of blessing and gracing the foetus [...] They were the Fathers of the children just as much as the Gene-Fathers were. These men formed a group who, with the Gene-Mother, and the

women who cared for the child, considered themselves joint-parents, forever available to her, or him, any time they were needed, collectively and individually. (72)

The ritual of choosing “beneficial influences” for the developing foetus appears as a folkloric understanding of pregnancy. However, the idea of different kinds of parents having a direct influence on foetal development resonates with the theory of embryonic development in epigenetics, while making the empirical claim (also) analogical. The embryologist C. H. Waddington’s case study for his “epigenetic landscape” model (1957) is the different developmental pathways open to a cell during embryonic development, his attempt to synthesize genetics, embryology and evolution. Concerned with developmental mediation in the conversion of genotype into phenotype, Waddington undertakes a process-based approach to biology, with events, rather than objects, as his primary point of departure. Waddington’s method assumes developmental interactions between “gene” and “environment” (a distinction he finds suspicious), and the influence of these interactions on development.

Al Ith’s description of embryonic and foetal development in Zone Three – the idea that the child in her womb might be “fed by [Yori’s] essences,” “hear his words and be nourished” (72) – implies that this process is in flux, open to external stimuli, and that events outside the uterus might affect the child’s growth. She describes a sharing out of biosemiotic work in parental care. Yori would not influence foetal development as father in the sense of a private, primary responsibility, but as part(s) of a network of influences surrounding the child. Paternity is distributed among biological and social influences as part of an extended support system. Thus, informal development – as non-governmental, communal or clandestine processes for supplementing institutional deficiencies in welfare provision – is not needed in Zone Three as it is in Zone Four.

This understanding of a child’s development is coded between Al Ith and Ben Ata into a conversation about male and female labour. Al Ith explains that in Zone Three, different forms of work are not distributed through gender divisions, her leadership functioning in a facilitative rather than feudal sense, and men “bake, and farm, and herd, and grow, and trade and mine and smelt and everything there is to do with the different ways of feeding children, mentally and emotionally, and the keeping of archives and maintaining Memory and making songs and tales[.]” Ben Ata replies,

“All that is women’s work” (125). Ben Ata’s understanding that cultural memory and development are the task of women, given that his is a society in which the most valued tasks are distributed among men, holds the implicit assumption that this work is secondary to the inheritance passed on via male insemination. The archive on which he places most value is his genetic inheritance, with endless military campaigns for securing borders a way of ensuring its continued influence. This plays out in his jealousy of Kunzor, Al Ith’s Zone Three “husband,” whom he assumes – “defensively” – to be “a finer fellow than me in every way possible” (126). Ben Ata here is thinking about (genetic) influence as a competition, the battle to win the struggle of natural selection of his own gene products against those of other males. His understanding of reproduction is tied to his military pursuits: reproduction is a battle between men for the right to inseminate the female body, played out through reading the institutionalized management of differences in class, nationality and language as self-evident truth.

In the mid-1970s, Ben Ata’s assumptions about the division of male and female labour, and the primary work of genetic goods in determining inheritance, were played out in biological discourse through the publication of E. O. Wilson’s *Sociobiology* (1975). Wilson’s book sparked the so-called sociobiology debate during the late 1970s, which stemmed from his argument that social behaviours that result in labour divisions of gender and class are genetic products selected and passed down as dominant traits throughout human history. Even in the most “primitive” societies, he argues, the division of labour and the concession of the “weak” to the “strong” is found. With regard to gender, he argues that “many of the peculiar details of human sexual behaviour and domestic life flow easily from [the] basic division of labour” into (male) hunters and (female) foragers, gatherers and nurturers (293). Wilson is dismissive of social reform, doubting the Darwinian benefit of a “planned society,” because the majority of people in a society regard the codes they live by as “beyond question”; human beings are, Wilson claims, “absurdly easy to indoctrinate,” so much so that indoctrinability is an “essentially biological question” (286). Sociobiology was not so much a working example of interdisciplinary argumentation, but a reduction of social communication to biological programming – not only in terms of the roles people play, but the steadfastness that characterizes their performances.

There is nothing new in this line of argumentation, argues evolutionary biologist

Stephen Jay Gould: “[B]iological determinism has always been used to defend existing social arrangements as biologically inevitable – from “for ye have the poor always with you” to nineteenth-century imperialism to modern sexism” (“Potentiality vs. Determinism” 258). Its usefulness in defending the status quo has given biological determinism “consistently good press from established media throughout the centuries,” he writes (258). There are two problems, however: first, the implicit political claim that Gould, Richard Lewontin and others identify in Wilson’s arguments on the inefficacy of social and political reforms that would attempt to change existing social inequities, “yet another defense of the status quo as an inevitable consequence of ‘human nature’”; Wilson’s arguments, rather than illuminating a complex world of interconnections between biological processes and social relations, “uphold the concept of a world with social arrangements remarkably similar to the world which E. O. Wilson inhabits” (Allen et al.). Moreover, Gould points out, “no evidence exists to support it” (258). For Gould, Wilson’s arguments rely on dubious claims about stable and dominant genetic products that code for certain behaviours-as-traits (determined by social categorization) – a neat and familiar, but generally unproven, thesis of classical genetics.

Gould argues instead that humans are “flexible animals that contain a vast range of potential behaviour” (259). However, while behavioural plasticity offers a challenge to determinism, *Marriages* does not present it, uncritically, as an epistemological “good.” Zone Three’s plasticity theory echoes the work of Soviet scientists during the 1930s and 40s; most famously, Trofim Lysenko’s neo-Lamarckian hybridization practices in agriculture, and Ivan Pavlov’s theory of classical conditioning as a model of learning.³ The possibility of environmental conditioning lent itself to Leon Trotsky’s idea of “the reshaping of man” into an “object of the most complicated methods of artificial selection and psycho-physical training” (“Literature and Revolution”), comparable to Zone Three’s model for developmental theory. While Al Ith transmits a kind of epigenetic knowledge to Ben Ata, there has been no need in her zone to make these arguments before, or to have to intervene directly in decisions about the possible absence of influences or the presence of ‘negative’ ones during the child’s development. “Her children, in the past – those she had borne personally – were viewed more as a summing up or a confluence of influences and heritage” (192). Communicating possibilities to Ben Ata about his role in a child’s development – more

broadly, the distribution of parental labour – forces Al Ith to consider the possibility of what she understands as damaging influences on the child, and whether they will have the detrimental effect she assumes they will.

Learned heredity should not replace the element of chance, the text suggests. The Zone Three archivist admits that their conditioning has resulted in a “general malaise, or stagnation, in Zone Three (but such a word was hard to use in our beautiful land),” and “our songs, our stories, had not changed for a very long time” (175). Without interruption, the system of symbolic, genetic, behavioural and epigenetic inheritance has run into a “positive feedback loop,” where unchecked repetition has led the stability of this system into disequilibrium. The low birth rates of Zone Three – a result of endogamous reproduction among isolated populations – are symptoms of this disequilibrium. Zone Three’s xenophobia and resistance to change is shown when Dabeeb leads a diplomatic mission to Zone Three to find Al Ith. The archivist reports, “Everything about [the Zone Four women] was condemned, and this reflected badly on Al Ith” (282). Returning for the last time from Zone Four, Al Ith is alienated by her former people, and undergoes exile as a form of punishment, her sister Murti’s attempt to quarantine Al Ith’s changed significance, now that Al Ith is no longer “our Al Ith” (294). She wants to prevent Al Ith from “creating disorder,” a phrase that Murti herself cannot articulate in a conversation with Ben Ata; he must supply it for her (292). While able to observe Al Ith’s “runaway” from a position of assumed semiotic stability, Murti does not yet have the words to describe the changes already at work in Zone Three.

Describing Zone Three as a “feminist utopia,” as Marsha Rowe and Ursula Le Guin do, would miss out its internal “runaway,” casting Al Ith’s movement into Zone Three as a feminist correction of Ben Ata’s Oedipus complex. Rowe describes Al Ith’s zone as “a feminized world, one in which women are independent and men do women’s work” (200). But, as she is quick to imply, a reading of *Marriages* as a feminist instruction manual on correcting male psychoses would disappoint; Rowe finds the narrative focus on female dress and heteronormativity not sufficiently politically feminist. Rather, she argues, Zone Three is a utopia in the vein of William Morris, “a steady expression of the longing for a society of equality of conditions” (203). Rowe reads *Marriages* as a fable of transformation – the gradual progress across the Zones to the kind of society described by Morris.

Rowe's reading places Zone Three in a hierarchical relation to Zone Four, leaving out the critical narrative stance towards both zones as they operate within closed semiotic economies. If "feminist utopia" is taken as an ideal, then its material conditions and negotiations – including symbolic possibilities of sexuality and costume – risk being either overlooked or undermined. This hierarchical positioning is similar to what Joseph Fracchia and Richard Lewontin call "transformational theories of cultural evolution," in which cultural evolution is understood "unfolding process [in which] the possibility of each successive transformation is dependent on the completion of a previous step of transformation to provide the initial state for the next change" (61-2), not dissimilar from Peirce's criticism of anancasticism.

The possibility for long-term change in symbolic meaning is located in the transmission and interpretation of memory across the different zones through "songs and tales," but this is not a one-way movement. The archivist writes in the concluding sentences:

There was a continuous movement, from Zone Five to Zone Four. And from Zone Four to Zone Three – and from us, up the pass. There was a lightness, a freshness, and an enquiry and a remaking and an inspiration where there had been only stagnation. And closed frontiers. For this is how we see it now. The movement is not all one way – not by any means. (298-9)

These sentences draw together different regions of stochastic change – atmospheric "lightness," epistemological "enquiry," biological "remaking," and cultural "inspiration" – and inscribe them as different forms of a continuous movement between previously-closed frontiers. Separate and closed-off economies of social and biological meaning are reconfigured into an ecology of experiential learning, in a broad sense. The biopolitical imperative is not abandoned, but displaced. The indeterminacy of movement through this ecology marks what Fracchia and Lewontin call "the contours of history," as opposed to the "analytical lines" of proximate semiotic economies (78).

There is a final moment of runaway whose correction is neither disclosed nor promised, when Al Ith loses her symbolic agency by leaving for Zone Two, and any claim to the sign of "woman" across Zones Three and Four. With her departure, an undetermined interpretative significance falls into disuse, at least in this text.

Resigning her significance in the ecological text (“resign” here can be permitted to mean both “give up” and “repeat”), “she” functions as an icon for future symbolic movement, keeping the frontiers open: an image in paintings, the subject of songs and stories, the protagonist of this particular archive, a pure form that can only appear in representation to those remaining. Her interpretative agency as sign is passed on as a kind of gift, without a guarantee of future signification. “She” is left to the archivist (who is also her father), who worries about representing what really happened between Al Ith and Ben Ata, their marriage now the subject of the archive he has been tasked with constructing. His fears gesture to a different frontier, one that traces the impossibility of an immediate relation between sign and object. Throughout the text, the archivist has worried about the constitution of truth, a lesson performed by the text’s creation of a semiotic ecology between insulated economies, whose effect is deferred until after Al Ith’s departure. The text ends with a contract of residual influence, signed by the archivist in someone else’s name, tied to the possibility of no citation.

I have suggested reading *The Marriages Between Zones Three, Four and Five* as a narrative of “semiotic adaptation.” I place this reading in contrast to interpretations that would read it as a fable of eugenic or social perfectibility, a transformational narrative plotted through the gradual improvement of societies along biological and social lines. In the *Canopus* novels, perfectibility is a theme, but not a suggestion, and stochastic change and adaptive flexibility appear as modes of living freedom. In drawing out the empirical and analogical writing of adaptation through the reconfiguration of the sign of “reproduction” in *The Marriages Between Zones Three, Four and Five*, I have sought not to identify further objects for study, but to suggest a mode of literary analysis that reads change across different semiotic economies, an experiment placed somewhere in the field of Stengers’s suggestion for an “ecology of practices.”

Notes:

¹ For a thorough account of the Modern Evolutionary Synthesis, see Stephen Jay Gould (2002), especially chapters 2 to 5.

² For a longer discussion of the history of the gene-concept and the move in genomics to the study of gene function, see Evelyn Fox Keller, *The Century of the Gene* (2000), particularly the Introduction and Chapter 3.

³ See also William deJong-Lambert, *The Cold War Politics of Genetic Research* (2013).

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