



## rhizomes.07 fall 2003

### Zoography Mark Zuss

"The man of the future will be filled with animals" Rimbaud



[1] Posthuman specters haunt contemporary social discourse, serving multiple agendas and interests. The posthuman, if it is arriving, reprises cultural processes by which the colonial and Republican citizen-subject was given coherent form. Incising new boundaries and extensions of embodiment, I propose that the advent of new biopolitical technics presents one means by which the grain of daily life might be recoded and administered..

[2] In the following I present a critique of a presiding and vigorous rhetoric of the posthuman. Microbiology, genetics and cybernetics share close research and institutional alliances. As technologies of the self, innovations produced through 'informatic' and 'genomic' interventions challenge key modernist values and concepts of the natural, the human and the epistemic status of the subject. Genomic and 'life science' technologies, in concert with cybernetics, and Artificial Life, lay claim as emergent, 'bioinformatic' paradigms for a 'posthuman' culture.

[3] The new technics emerge as potential privatized management of the range and choices of 'natural' embodiment, in setting the terms and forms for regulating reproduction, health, illness and the image of the human. As contemporary forms of technics, the informatic and genomic paradigms are specific practices and knowledges representative of what Paul Rabinow calls 'biosociality', influencing the human fabrication of the future. (1) A general cultural anxiety is evident in the debates over the potentials of the new technics. Self-appointed defenders of liberal democracy like Francis Fukuyama, appear on the defensive in the face of a technology that exceeds the very deregulated 'posthistory' of an unfettered free market. Fukuyama stands in opposition to those proselytizers of a liberating technophilic posthumanity, like Donna Haraway. Despite his own influential declaration of the 'end of history' after the fall of the Berlin Wall, he affirms the perduring value and existence of a core human nature, which has "provided a stable continuity to our experience as a species. It is, conjointly, with religion, what defines our most basic values. Human nature shapes and constrains the possible kinds of political regimes, so a technology powerful enough to reshape what we are will have possibly malign consequences for liberal democracy and the nature of politics itself." (2)

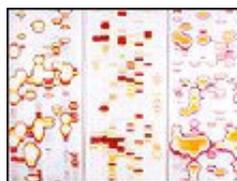
[4] This inquiry is an attempt to develop a pragmatics of the 'posthuman.' The 'posthuman' or *zoographic* pragmatism I propose considers the new genetic and digital technologies as specific and determinate forms of contemporary biopower. They represent new codifications of disciplinary practices and forms of life management and the erasure of the public health choices. Considering the thought of a purportedly 'posthuman' subjectivity in

pragmatist terms, raises questions of the effects of the diverse encounters between the human and the informatic, the genome and the cybernetic management of subjects. I wish to encourage a historically nuanced consideration of the potentials set into motion by emergent technologies in general, in their capacity to be implemented to serve specific, though often diffusely defined, social interests. The hybrids of technoscience represented by the new fields of genomics, proteomics and nanotechnology have the capacity to transform existing forms of recognition of embodiment and *everyday life*.

[5] While controversy I directed now primarily around the potential ecological effects of genetically modified foods, their safety and environmental impact, this inquiry is concerned with genomics as a specific historical manifestation and practice of technics. It is my abiding interest to keep open the problematization of 'life' forms in its genetic, cellular, organic and inorganic extensions. Raising a historical and anthropological perspective to ground this inquiry allows for drawing out some of the multiple and, ultimately, indeterminable, facets of the new interventions genomics brings to contemporary cultural formation. Perennial questions of embodiment and technological dematerialization, as illustrated in expressions of 'transgenic art' discussed below, become central. In the following, I will survey the genomic and informatic paradigms as actualizations of technics, in their varied ethical, practical and theoretical potentialities and in purported renovation, surpassing and redrawing of the limits and relations between the human and the non-human, the artificial and the natural world.

### Genomic Capital

[6] Whether through somatic cell line, or more auspiciously, through germ line therapies now capable of altering the transmission of genetic makeup of offspring, the limits of the human are transforming. The concept of the human as a discrete, singular biological species is itself mutating. Genetic configurations of the possible are now extending the muscular and nervous systems, prostheses and hybrids of bacteria and host, hominid and machine, cell and digital chip. In addition to cell lines and genetic material, transgenic plants and animals are being developed and introduced into the ecosystem where their interactions cannot be adequately anticipated. Hybrids of hybrids, of the genetic legacy, monoclonal, recombinant DNA cloning, and somatic and germ line technologies are knowledges that reorient the relations and forms of *zoe*, nature, and its social and individual embodiments. Acting through a microphysics and micropolitics of bodies, a biosocial episteme is inaugurated in the activities of this techne, their effectivity realized, as the power of the molecular to act upon other molecular bodies.



[7] Prevailing discourses of genetic engineering are hyperbolic in their claims for human enhancement and disease control. Each gene now identified is patented, making the molecular structure of what we have known as human the private property of biomedical and pharmaceutical multinationals. This can readily yield to conditions of control as extensions of existing medical and technological management of human populations— setting the conditions for who thrives and determining the countenance, stature and image of the posthuman. As technologies of biopower, they represent potentially unprecedented magnitudes of surveillance. Centers formerly housing nuclear weapons research and development, including Lawrence Livermore, Los Alamos and Oak Ridge laboratories are using their unparalleled IBM supercomputing prowess to track and record the genome. They are the points of production of new knowledges and powers for a micropolitics of genetic agents, alleles, gene markers, bacterial hosts, vectors and mutation flows.

[8] Genomic potentials participate in a generalized contemporary vertigo of identity, doubly confounding modern biological and sociocultural forms of human recognition and regulation. Genomic interventions disturb formerly sacrosanct divisions between the human and the animal, as well as between the apparently fictive borders between the animate and the inanimate. Fabrication of genetic material, in transgenic animal crops, embryonic stem cells, polymerase chain reaction synthesis of dna, and the increasing variety of forms of reproductive technologies, including cloning in the animal world, all call attention to an alignment of the technics for transforming the `nature` and relations within and between bodies and populations. No longer regulated by archetypes of race, or blood purity, the new physiognomies of the human are being transfigured in the micromanagement of cells, genes and the vitalized `information`, including the dna `profiling` being introduced by police agencies, that can be transferred.

[9] New differentiations and integrations are becoming possible in the technologies of self fabricated by the genomic paradigm. Germ-line therapies in particular challenge the shape of future bodies and their constitution. In September 1998, the Center for Responsible Genetics, which monitors the new genomic research initiatives, announced an `action alert` in response to W. French Anderson's proposed projects, as reported to *Business Week*, at the University of Southern California School of Medicine in Los Angeles. [\(3\)](#) Anderson's team attempted to cure both a rarely occurring immune disorder and a form of anemia, both caused by genetic defects, by the insertion of new genes into the fetuses of animals. Anderson's proposal extended to treatment of humans. The alterations to the somatic cells are capable of being carried over to the reproductive, germ line cells. Traditional and modernist representational tableau of gender, race and class are being challenged by forms of genomic biopower, as the emerging, if contested practice of germ line therapies makes evident.

### Informatic Subjects

[10] A primary site for the rhetoric of the posthuman has come from the apostles of cyberculture and cognitive science. Richard Doyle traces Artificial Life's (AL) development from the Santa Fe Institute in the 1980s. He quotes Christopher Langton, one of its first exponents, stating that AL

"is the study of man-made systems that exhibit behaviors characteristic of natural living systems. It complements the traditional biological sciences concerned with the analysis of living organisms by attempting to synthesize life-like behaviors within computers and other artificial media." [\(4\)](#)

[11] As a vigorously funded and supported research program dedicated to fabricating life-like behaviors, AL's ethos manifests a renewed vitalism in attempting to delineate the origins and essences of life processes and intelligence. Departing from Norbert Wiener's first generation of cybernetic culture and its commitment to the central dogma of the `code-script`, `program` or informational processing nature of machine and organism, researchers like Langton, Moravec, Steels and Minsky, seek `second order emergence`, or the capacity of complex systems to alter, modify and develop their own programs. N.Katherine Hayles distinguishes two generations of research programs and practices by differences in that

first-order emergence denotes any properties that are generated by interactions between components, that is, properties that emerge as a result of those interactions, in contrast to properties inherent in the components themselves. Among all such emergent properties, second-order emergence grants special privilege to those that bestow additional functionality on the system. [\(5\)](#)

[12] AL researchers frequently lay claim to non-carbon based manifestations of life forms, as self-organizing and replicating systems, in complexity and the capacity to evolve. In a review of recent AL research, Claus Emmeche states that "complex-system research is at risk of being driven into an advanced form of essentialist thinking with

its continual assertions that life is a collective property in complex self-organized systems that can emerge from many media" [\(6\)](#) .

[13] Both Doyle and Hayles hear the echo of nineteenth-century vitalism at work in the cutting edge simulations and models of AL laboratories. The attempt to synthesize and digitally replicate the core features that make life possible are evident in AL's statements of purpose. For Doyle "A-life seeks to derive the formal nature of the living system, life's algorithm, by abstracting it from its material, carbon-based prison.." [\(7\)](#) Whereas nineteenth-century vitalists sought to analyze the vital force and reduce it to its components, AL researchers, in Hayles' view, are attempting to synthesize and build on the structural elements, of life-like processes, in which it could become possible to "procreate by emergence." [\(8\)](#) Doyle cites Langton, who, like Hans Moravec, who would have us 'download' consciousness onto a disk, that "life, as a physical process, could 'haunt' other physical material. AL can contribute to theoretical biology by locating life-as-we-know-it within the larger picture of life-as-it-could-be". Doyle recognizes this 'rhetoric of computational vitality' as more than hyperbolic self-promotion and speculation. In his analysis, "it is a dream grounded in the history of automata and life, a dream based on the scientific desire to know what life is." [\(9\)](#)

[14] The most vigorous defense and critique of posthumanity are present in feminist criticism. For Donna Haraway and Sherry Turkle the hybrid interfaces of an emergent and evolving cyberidentity permit unprecedented relational matrices to take shape. In shifting and liminal interactions, gender is performed. Gender identity is radically contextual, comprised now by both virtual and real social bodies. The real increasingly appears as an image or a hypertexted self in chat rooms and MUDs, a shape shifting multiplicity. The 'intimate machine' of Turkle's 'culture of simulation' purposely blur all boundaries of gendered embodiment. Within the new social relations of knowledge and the exchange of information hypertexted sexual personae enjoy freedom of expression unavailable in RL. For Turkle, a feminist hybrid subject combines women within a realm of positive freedom, in relations of power- the new circuits of desire of digital transfer. [\(10\)](#) The cyborg woman subject compels agency in the enabling conditions provided by a technology of the terminal subject. She-it forms new relational potentials and possibilities released from modernism's scripts of bounded gender relations and representations. [\(11\)](#)

[15] Lee Quinby ably critiques the cyborgian model idealized by Haraway and Turkle, in questioning the dematerialization at work in their fabrication. Claiming that all cyborgs are not born the same, Quinby worries over Haraway's "flattening out of subjectivity into the cyborg and her full-scale slide from metaphor to ontology" in which we are made to expect that "all cyborgs were the same and all hypertext formations cast a single shadow." [\(12\)](#) While she accepts the possibility of body-machine identities as presenting a problemization of the oppressive and instrumental interests of technoculture for feminism, Quinby does not accept that cybertechnologies will vitiate embodiment. For Quinby, the terminal subject of virtual reality and cyborg identities follows along an inherent hostility to gendered bodies: "from the Book of Revelation to the Heaven's Gate website, denial of embodiment has been a heterosexist obsession that defines itself oppositionally to women's bodily excess and lesbian and gay sexuality." [\(13\)](#) The distinctions between material and immaterial embodiment, living and non-living and human and non-human systems expand the reach of second order researchers exponentially beyond their first order predecessors. The parallels constituted earlier between genetics and information, between material substrates and energy, programs and codes makes a qualitative shift in purpose and paradigm. To Doyle it is "evaporation of the difference between living and non-living systems" which, as rendered by AL's 'rhetoric of computational vitality', "once housed in an invisible unity, then a 'secret,' life now finds itself without an address." [\(14\)](#) Doyle finds support in AL emissary Ed Regis, who states unequivocally that "we would like to build models that are so lifelike that they would cease to be models of life and become examples of life themselves." [\(15\)](#)

[16] Among the problems raised by complex-systems and genomics research practices alike, are the questions of whether any privilege remains intact for organic material forms and relations over inorganic matter, and, conversely, the inviolability of forms of life to interventions that conjoin these traditionally separated categories of

understanding, identity and practice. This problematization includes consideration of forms of life and life-forms in terms of 'collective properties,' whether as self-organizing, complex or autopoietic systems. With regard to genomics in particular, is this technoscientific enterprise expediting the self-organizing quality of emergent systems, serving as a catalyst for an inherent 'second-order' generativity in natural and artificial systems alike? In the framework of this inquiry, genomics becomes a technics of dispersive or rhizomatic complexity, one in which the modernist human subject participates within shifting ensembles, assemblages or clusters of life-forms, forms of life and self-organizing matter.

[17] Lily Kay places the development of a 'molecular vision of life' in the institutionalized research agendas established through the Rockefeller Foundation. Kay examines the emergent molecular and genetic paradigm through the concentration of capital and resources at Caltech in particular in the 1920s and 1930s. Redirecting biological research from the sullied aftereffects of explicitly eugenics orientated programs and the blemish of the Buck vs. Bell decision allowing for forced sterilizations, the newly emboldened 'Sciences of Man' nonetheless set out to create a 'social physics', intended to produce a coherent body of applied research concerned with the control of contemporary social relations. Kay claims that the Rockefeller Foundation's "officers and their scientific advisers sought to develop a mechanistic biology as the central element of a new science of man whose goal was social engineering." (16) The popularity of programs for social or human engineering arose in the early years of this century. Kay documents how the term 'human engineering' resonated with the Progressive Era's faith in technological progress and a belief, among the scientific and intellectual elite, in its ability to transform human nature. "Midway during the 1910-1920 decade the term 'human engineering' came to denote the application of scientific principles and technical methods to social and educational process associated with the maintenance of social order: stable families, work groups, and rational management of changing sexual and racial relations." (17)

[18] The new molecular vision was explicitly instrumental. Kay cites that the LSRM made clear that the funding was reserved not for "the promotion of scientific research as an end in itself; its motive was not *sheer curiosity* as to how various human and social phenomena came to be and are; the interest in science was an interest in one means to an end. (18) For Kay, the Rockefeller generated science agenda was set into motion as the "surest foundation for a fundamental understanding of the human soma and psyche-and ultimately as the path to rational social control." (19)

[19] The intellectual curiosity driving the organization and development of research agenda are instrumental in finding the means and ends to exploit, harness and control the definition of 'life sciences'. In constraining the limits of the human and its rational organization within a technoscientific reduction of the meaning of natural causation, the molecular vision and its genomic descendants continue the projects of human and animal engineering. Codifying the natural and the animate in determinate regulatory patterns accelerates the means and ends to any interests that seek to restrain, expand or blur the boundaries of the 'human' the organic and the animate. An enduring human engineering agenda, one that is heavily freighted with the specter of former eugenic projects, pervades the development and social reception of these fields. Currently, strong local and international protests are being organized against GMFs and high-tech agribusiness control, as in the dramatic negative reception of Monsanto's Roundup-Ready Terminator gene.

[20] Under Max Mason's directorship, the Foundation shored up projects that sponsored the 'salients' of a concentrated, interdisciplinary research program that aided, potentially in allowing capital investments and interests to be served through the possibility of perfecting the means of regulating the reproduction, behavior and conditions of labor. Kay quotes Mason expounding on these salients as constituting a research efforts "directed to the general problem of human behavior, with the aim of control through understanding. The Social Sciences, for example, will concern themselves with the rationalization of social control; the Medical and Natural Sciences propose a closely coordinated study of the sciences which underlie personal understanding and personal control. Many procedures will be explicitly co-operative between divisions. The Medical and Natural Sciences will, through

psychiatry and psychobiology, have a strong interest in the problems of mental disease.” (20)

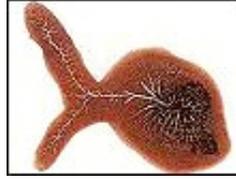
[21] Among the questions raised by historians of the molecular, by Kay, Rabinow and Keller, among others, is that of the situating the human within the molecular and genetic paradigms. For Kay it is an issue of thinking the “directionality and modality of seeking knowledge,” (21) tracing how the molecular vision is reductive and concentrates attention to identities at the level of the smallest units of activity. In the Rockefeller Foundation’s archival statements this is pronounced as a concern on a level of analysis made possible by the new centrifuges, electron microscopes and spectroscopic tools being developed and implemented with the research programs. In particular, Kay points to molecular biology developing its own ‘locus of life phenomena’ between the region of 10-6/10-7 cm levels. As she points out this “region was the main functional domain of the new biology” having important effects for the “form and content of research”. Under Warren Weaver’s stewardship, a kinship to physical models was ensconced that allowed for analogies between cellular and subatomic organization and research was conducted with attention directed to the “ultimate littleness of things.” (22) For Kay the “question arises whether life is molecular or it is only the vision that is molecular. By studying macromolecules, do we study the salient attributes of life, or only a molecular representation of life, one of many possible representations of animate nature?” (23)

[22] In both the molecular biological and exobiological research programs the question of the limits and place of the human are central. Both evince a determination of the conditions, units and structures of life forms. The molecular vision of life incorporates what Keller and others call the ‘central dogma’ of dna as the transmitter and vehicle of all pertinent information concerning the possibilities and expressions of life. (24) The genetic model as developed from the earlier molecular biology programs of this century have generally exorcised embryological research projects, giving privilege to investigations of the nucleus of cells and to the chromosomal architectures of organisms in funding, publicity and prestige. Genetic projects are now challenging former divides between animate and inanimate milieus in new hybrid and modified agriculture.

[23] I wish to indicate the distinctive features of a genomic based technics. Genomic and informatic practices imply significant orientation and reformulations of modernist epistemological values. Their implications concern extensions as well as departures, and alliances and tensions between rival paradigms within technoculture, scientific practice and philosophical tenets of embodiment, interiority and materiality. Four general distinctions marked by a genomic or zoetechnic episteme are constituted by its challenges; first, to the pliability and limits of the relations of form and matter, making for a reappearance and genetic inscribed repetition of classical hylomorphist questions and expressions of vitalism. Among these are the relative degree of independence and causality generated by form, pattern and structure. As efficient causes, the new genomic models are autopoietic, self-generating and replicating forms of information, which for Hayles are ‘inscription’ patterns distinguished from any ‘incorporation’ or instantiation in matter, whether organic, inorganic or combinations of both. This marks the second distinctive feature of a genomic techne: the degree of abstraction and autonomy of ‘information’ over energy and material embodiment, and the consequent mutability of genes, cells, tissues, organs, reproductive processes, prostheses, and ‘life-forms’ or forms of life in general.

[24] Deriving from these two orientations is the question of reduction, analysis and synthesis within the techne of genomics and informatics. For molecular biologists and embryologists a reductive level of analysis has been necessary in explaining the function of genes and their relations in cellular growth and development. Genetics has participated further by sponsoring a reductionism that would attempt to explain cellular and organismic expressions of behavior, disease, health at the unit level of single genes. At the same time, genomics, under the spell of an ‘informatic’ and computational model, attempts a false holism or synthetic explanation of living processes in the hyperbolic cliches of master codes and secrets to living processes that welcomes back a variant of vitalism humming in Celera’s genome decoder machines. As an effect of these three distinctive features, the

fourth remains the problematic over the nature of embodiment, health and reproduction. At the present, the possibilities and potentials for intervention, whether at the somatic, germ line, tissue level, as developing in research on embryonic stem cells, as well as the telomerase edges of dna that could presumably extend longevity, remain within the control of a deterritorializing technocultural elite. Private enterprise maintains a sovereign control over the development of forms of embodiment and corporeality, the patenting of all the prospectively valuable genes, dna replication processes like pcr, and germ line therapies.



## Technics and Culture

[25] Utilizing the paleontological investigations of Leroi-Gourhan as a starting point, I wish to trace, in a genealogical sense, the place of the new genomic paradigm. It is my intent to question the claims for a surpassing of the human, as a mode of subjectivity, within a historical and anthropological consideration of technics. [\(25\)](#)

[26] Technology and culture have always coexisted, reciprocally enabling the pursuit of specifically human extensions of the species' knowledge and power over nature and itself. The new genomic technics pose important challenges to the limits of the species' discrete integrity and identity, its biological determination increasingly susceptible to mediations and mutations. Whether the productions of the new technologies are ameliorative or destructive, remains an open question subject to democratic participation in their deployments from the laboratories to the clinics, doctors and managers of health care.

[27] Technical forces are productive and produced, working through human and nonhuman relations. They find actuality through the coordination of discursive practices of biology, pedagogy and the new informatics. The place of technology in contemporary culture requires scrutiny of its specific functions and historical articulations within and between institutions, social practices and forms of constituted experience and subjectivity. Human material culture has often been complex enough to engage several, sometimes rival modes of technology and ways of knowing the world while retaining social cohesion.

[28] As contemporary expressions of a perennial, yet differentiating development of technics, the new paradigms are cultural practices that extend, while confounding, foundational tenets of modernist subjectivity, embodiment and experience. Their distinctive power, in producing novel artifacts, values and forms of (dies-) embodiment, is a priority. Carl Mitcham calls for a "history of ideas about technology – that is, the study of how different periods and individuals have conceived of and evaluated the human making activity, and how ideas have interacted with technologies of various sorts." He provides a valuable starting point for such an inquiry, presenting differentiating models and the meanings of techne from antiquity and the Classical world. [\(26\)](#)

[29] From an anthropological perspective, technics are inherent to material culture and embodiment, in varying modes and networks of social organization. As forms of exteriorization of the body, whether agricultural, and now increasingly transgenic products, implements or tools for hunting, carving or smelting metals, they are present in differentiated technological systems allowing for particular cultural organization and the appropriation of aspects of environmental niches into which they are inseparably integrated.

[30] Bernard Steigler presents technics as originary, a formative matrix for social relations. Technics embodies temporality as anticipation and a sense of futurity. For Steigler and Richard Beardsworth, who both draw on the

paleontological work of Leroi-Gourhan, technics are never exterior to cultural form and expression. Technics, in this pan-human perspective, comprise the potentials afforded by the physical, historical milieus from which prevailing, discursive practices develop. Thinking the history of the human and the possibility of its surpassing into the 'posthuman' or 'transhuman' constituted through relations generated by technics involves a perspective appreciative of differences in how cultures organize their activities in reproducing material and symbolic systems. For Steigler, a complementarity is at work insofar as the technical is perennially "inventing the human, the human inventing the technical." (27)

[31] For Leroi-Gourhan, "the whole of our evolution has been oriented toward placing outside ourselves what in the rest of the animal world is achieved inside by species adaptation." (28) The emphasis here is on the presence of technology as extension, prosthesis and supplement. This is to accent a modal, developmental perspective on technical evolution, or as Saul Ostrow phrases it in the context of digital communication technologies, our "becoming the object of technological developments that were once secreted within our body" (29). As an expression of the technical tendency to exteriorize memory, Leroi-Gourhan argues that "our techniques, which have been an extension of our bodies since the first Australanthropian made the first chopper, have reenacted at dizzying speeds the events of millions of years of geological evolution until, today, we can already make an artificial nervous system and an electronic intelligence." (30)

[32] Commenting on Steigler's *Technics and Time*, Beardsworth considers technics immanent to knowledge, production and representation. As a groundless ground, technics provides the conditions of possibility allowing for signification and representation, as in Derrida's depiction of the *gramme* and program; each material inscription, bearing marks, is an actualization of the virtuality of an originary arche-writing, the supplementary, exteriority of becoming and difference. Beardsworth writes:

following the thesis of 'arche-writing', technicity is the originary supplement to all forms of life, this supplementarity appears as such within the human species qua the technical specificity of the human. As a result, technicity can be reduced neither to the structure of a means nor to that of instrumentality, as the metaphysical tradition from Meno to Heidegger conceives it. It is the way in which life lives. (31)

He calls for critical work articulating the "differences between various forms of technicity (genetic, cellular, organic, inorganic, etc.)." (32)

[33] In Steigler's reading of technics, temporality is primary. For Steigler, technicity is the matrix in which all experiences of temporality are given contour. Technics is a structuring that not only includes human activity and the claims of distinctively human practices with the non-human, but as a primary, evolutionary framework for representation, in organizing and patterning of spatial and temporal relations. The future invents the present through technics in 'structural couplings' that defer any originary exteriorization process. The modernist epistemic subject has historically crystallized as a form of being that affirms the separate partitions of experience and reflection, subjectivity and embodiment within interior and exterior domains of knowledge and relation. Steigler's rendering of the anthropological record as trace or Derridean *gramme*, entails acknowledging that the 'question of the name of man' is the grammatological question of difference, the default or lack of origin from which any externalization could ever emerge. The *gramme* "structures all levels of the living and beyond, the pursuit of life by means other than life." Steigler quotes Derrida, whose work drew from Leroi-Gourhan, who asserts that the *gramme*, qua technics, structures all "genetic inscription up to the passage beyond alphabetic writing to the orders of the logos and of a certain homo sapiens". (33) It is a reading brings complexity to the humanist folds of interiority and subjectivity.

[34] The mutabilities of the subject and its cultural functions are always open to new folds, pliable within invented

traditions and their purported futures. I identify the writing of these virtual futures as acts of *zoography*. I wish to avoid both extremes that delineate these futures: both a technophobic reflex on the one hand, and various emancipatory, and ultimately market driven construals. These zoographic encounters require consideration of any particular organization of technical forces as transformative relations of power, or as Paul Rabinow observes, a 'combat of forms,' in the administration, maintenance and control of populations, precipitating historically specific forms of biopower.

[35] In the specific context of his discussion of Rousseau's *Essays on Language*, Derrida employs the term zoography as it pertains to the myth of the origin of writing in the *Phaedrus* in which writing is likened to a "painting of the living which stabilizes animality." (34) Deliberately reenvoicing Derrida and Beardsworth's notion of an arche-writing, zoography is intended as a provisional marker for a way of thinking through the complex mimetic interplay of power through specific new technologies that manage living and non-living systems alike. In Steigler's reading of Leroi-Gourhan's sense of an originary technics, constitutive of human culture, "technological lineages are a relation of the human to matter analogous to zoological lineages." (35) In this perspective, the technical is combinatory, like genetics or digital interfaces, a structuring simultaneously of matter and the 'human' fabricator. Homo faber is constituted in the processes that structure social relations and subjectivity through technics.

Technics constitutes temporality, as artificial memory supports and cultural reserves that extend and elaborate; in the paleolithic record, it is actualized as extensions of the anatomic and skeletal in the formation of flint chips. It is an exteriority that unfolds the labyrinthine interiors of modernism's monadic epistemic subject. Attending to Leroi-Gourhan's paleolithic documentation of the relations between corticalization and technics, Steigler regards the development of distinctly human technics working through and expressive of a 'mirror proto stage' in which "the differentiation of the cortex is determined by the tool just as much as that of the tool by the cortex: a mirror effect whereby one, looking at itself in the other is both deformed and formed in the process." (36)

[36] As a problematic, technoculture disquiets the partitions of liberal democratic states' grounding distinctions between the public and private, the discursive and the natural, interiority and exteriority and corporate and corporeal. In Steigler's reading "technics evolves more quickly than culture." (37) As a force fostering 'permanent innovation' technics regulates the languages of being and representation. The indistinction between life forms and their management through the new technics of biopower are 'untimely' forays. In Nietzsche's perspectival gambits, the new artifices are expressions of a mastery over nature, encoded in the rhetoric of progressive scientific development acting in the interest of the health of humanity. Forms of technoculture, including genomic and informatic research and development, have aggregated formerly disparate practices, ascending to the role of primary generators for the control and management of cultural relations, institutions, knowledge production and forms of subjectivity.

[37] Techne is the spinning disc, a mechanism of a persistence of the will to self-mastery. The terminal subject gives expression to what Nietzsche considered a 'ruthless curiosity', an interlinking site for the new technologies of the self. Accumulating subject positions, the genomic and informatic subject remains in thrall to representation. Alterity and difference remain compelled by the logic of identity and the propriety of non-contradiction. Fabricating the same in globalizing digital or genetic informational flows, the new paradigms and technics generate idealized phantasms in capitalism's own over-productive clonings and mutations. Generated in the increasing convergence of digital and genetic disciplinings of experience, and in compulsion to infinite accumulation, the split screen subject is as volatile as the digital market's own mutations. The new informatic subject has traded its humanist shell, the individual commodity form of competitive individualism which it bids and sells in simulacral shares. For Nietzsche, who wrote in the swelter of a Darwinian zeitgeist, a parallel question of value and relation prevailed in the manifestations of human mastery: "a new problem— today I should say that it was the problem of science itself, science considered for the first time as problematic, as questionable." (38)

## Zoographics

[38] The new genomic and informatic techne generate distinctly inflected discursive practices of everyday life. Their current ubiquity serves to model new variations on the humanist epistemic function of the subject, Genomic and informatic bodies present the possibility of new subjectivities and the casting off of the individual as interiority, new twists in the skein of modernity – the rewriting of the nature of embodiment that I call a zoography, or a new loop in technics tangled webs of the human and animal, nature and mind, matter and form. Genomics, inscribed and encoded in informatics' signs is one instance of zoography, a generalized economy of life-processes and the differentiations of difference and becoming; genetic engineering one actualization of a zoographic virtuality without origin or telos. Genomics and informatic techne are one mode materializing the productive plenitude of technical tendencies; as a zoography, they are forms of writing and revision of genes in scripts for the management of a new 'nature.'

[39] Zoographics is intended here as a portmanteau term for techniques, methods and technical practices, such as transgenic agriculture, ex vitro reproductive technologies, dna profiling, and somatic and cell line therapies. Through these varied and divergent practices of bipower daily life and identities are materially regulated, discursively maintained and made normative in its patterned relations. The interiority of the acting human agent is displaced. Reinscribing the domains by which a sovereignty is instantiated and resisted, zoographics addresses the biopolitical practices that discipline the continua of the animal, the inanimate and the human set into motion by the new naturalism of genomic and informatic designs of life. The forms of recognition for subjects, identity and difference are being reconfigured. The representation of the human and its relations to the objects of its activity recode the normative, juridical supervision of life processes and experiences, engineering untimely hybrids that implicate the subject function, and are often perceive as sundering the legacies of Enlightenment dualisms. One site for the a zoographic recoding has appeared in the work of 'transgenic' artists.



[40] Alba, an albino rabbit glows phosphorescent green in the dark. Born with the assistance of geneticists, a fluorescent protein (EGFP), a synthetic variant of a naturally existing gene expressed in the jellyfish *Aequorea victoria*, was introduced through zygote microinjection. For Eduardo Kac, its designer, Alba exemplifies a living instance of "transgenic art." [\(39\)](#)

[41] For Kac the green fluorescent bunny (GFB) project is a "complex social event that starts with the creation of a chimerical animal that does not exist in nature". In his articulately philosophical review of the purpose and intent of his transgenic artwork projects, Kac lists several key objectives. Among them is an ongoing "contestation of the alleged supremacy of DNA in life creation in favor of a more complex understanding of the intertwined relationships between genetics, organism and environment", a challenge to notions of biological normalcy and viability, and a sharing and caring for "genetic material across traditional species barriers." Most important perhaps is his call for an "expansion of the present practical and conceptual boundaries of art making to incorporate life-invention." [\(40\)](#) Kac is at pains to clarify that his transgenic art is not a breeding project. He claims that the innocuous genetic interventions he has established in various projects allow for interactive and dialogic relations to develop between species. He sponsors an aesthetic that would emphasize the "social rather than the formal aspects of life and biodiversity." Taking to task established notions of genetic purity, he encourages projects that manifest and work

within the “fluidity of the concept of species.

[42] Kac is joined by a growing number of artists contributing to critiques of genetic experimentation. In the “Paradise Lost and Found: Picturing the Genetic Revolution” exhibit held at Tang Teaching Museum in Sarasota, Springs, New York, artists like Bradley Rubenstein, Karl Mihail, Tran Kim-Trang, Eduardo Kac, Julian LaVerdiere, Heather Ackroyd and Dan Harvey, continue an emergent aesthetic intervention into the technoscience of genetic engineering.

[43] While some of the artist-inventors involved in transgenic artworks like Julian Laverdiere give expression to a general cultural anxiety regarding the loss of the human and the potential for the unlimited production of monstrosities, Kac advocates the formation of transgenic social subjects. The domestication of creatures like Alba would also entail a concomitant domestication of humans. For Kac, “transgenic art is a mode of genetic inscription that is at once inside and outside the operational realm of molecular biology, negotiating the terrain between science and culture.” [\(41\)](#)

[44] New genomic hybrids like Alba, like the golems and Frankensteins of the popular imagination are kin to the marvels and monstrosities of medieval bestiaries with their dog headed cynocephali, prodigious twins or the gryllus with its neckless leonine head quizzically imposed on its feet. The new machinic beings making their untimely appearances are combinations of human and animal, of living forms with inorganic and technical prostheses. The new monsters are more likely to be installed as ‘upgrades’ of the politics of visibility animating racism and class marked differences. They are likely to manifest in the first wave of somatic cell enhancements, appearing as gene altered realizations of perduring standards, attractive biomorphs, and postmodern renditions of the classic, athletic Nordic phenotypes, as portrayed in the film *Gattaca*, in which a future technological society is organized around genetically controlled classes. *Gattaca*’s dystopia is distinctive in its presentation of a fully operative genomic culture. Class and race have effectively been transcoded into a genetic caste structure. The protagonist has managed to pass, enabling him full entitlement of the genetic brahmins who all social functions and activities, including the vaunted space flight training academy he work in and where he aspires to be selected as a mission participant. For Halberstam and Livingston, the specter of the new hybrid monsters and goddesses is upon us, in making its appearances the

rough beast that now slouches towards the next century is not monstrous simply by virtue of its status as a non-species: posthuman monstrosity and its bodily forms are recognizable because they occupy the overlap between the now and the then, the here and the always: the annunciation of posthumanity is always both premature and old news. [\(42\)](#)

[45] It is necessary to consider the politics of genomic and informatic developments as they saturate new biosocial relations. Neither entirely novel or unprecedented, they express an zoographic arrangement of technics deployed as a dominant mode of thinking relations, of the production of culture and nature, as well as the symbolic valences of gendered embodiment, sexuality and difference. As Ansell-Pearson has claimed, “the environment is an artificial world. There can be no return to a naive nature, and attempts to establish once and for all a natural order or balance on which to base an ethics or politics of technology is utterly foolish. There is only an excess of technics.” [\(43\)](#) Their untimely interventions interrupt cultural expectations, importantly including the epistemic subject and its natural, habitable world and reconfigure social and symbolic relations. Technics, as the form ‘through which life lives itself’, as Beardsworth, Leroi-Gourhan and Steigler propose, is a perennial process of differentiation, adaptation and reinvention of the material relations constitutive of cultural production. The acceleration of techniques for intervening into the tissue of daily life and the body, digital terminals and liminality of life processes are productions of an unregulated industry. In thinking the inextricable linkings between zoe and polis, the new techne have become invested with the sovereign rights to regulate, define and intervene in decisions over life and death. Informatic and genomic processes abruptly intervene, their discoveries germinating in a curiosity founded in

profit and property through the instrumentation of life processes.

[46] Extracting its price, techne's terminal and genomic subjects are circuits and resistances in the vaulted ends of history, class conflict, gender and racial difference. The genomic subject is another fold – its bioengineered bodies networks of alternating currents of sexuality, crossing points for raced projects and their purported obliteration. Its future is commanded by privately financed, often venture capital initiatives whose sovereign rhetoric of transformation, longevity, 'sustainable agriculture' through transgenic crops and 'immortal' cell lines, disguise the continuity of humanist assumptions regarding identity and the management of difference. Its tropes cavort across a present charged with animals, electronic and mechanical prostheses, all extensions of humanism's outmoded embodiments. In one of the more nuanced renderings, by Halberstam and Livingston, "the posthuman does not necessitate the obsolescence of the human; it does not represent an evolution or devolution of the human. Rather it participates in redistributions of difference and identity." [\(44\)](#)

[47] In a similar vein, N.Katherine Hayles portrays the continuity of the human and the posthuman as a history that affirms a dematerialized cognition over embodiment. Hayles discerns the specificity of the "posthuman" in the development of technologies that prize 'informational pattern over material instantiation.' In a stance that deeply disturbs the entrenched and defenders of liberal humanism like Fukuyama Hayles argues that "the posthuman view configures human being so that it can be seamlessly articulated with intelligent machines. In the posthuman, there are no essential differences or absolute demarcations between bodily existence and computer simulation, cybernetic mechanism and biological organism, robot teleology and human goals". [\(45\)](#) It is a rhetoric that portrays transethnic, transgender, transnational subjects announcing a 'posthuman' mode of existence, and a passing beyond the historical scarifications color and gender have imprinted on the surfaces of daily life. In this context, Steigler's comment is apposite, that it is not useful to participate in "emptying the human of all specificity, but radically challenging the border between the animal and the human." [\(46\)](#)

### **Genomic Sovereignty**

[48] The genomic is constructed of forms and values vitalized within contingent alliances, mergers and interventions such as Venter's decoding machine in Celera's long and illusory race with the NIH for a complete mapping of the human genome. Embryonic and stem cell development, as its very accessibility to researchers, is also an instance of the problematization set into motion in the forms that, as much as the purported values implicated, genomics takes on. It would not be unfair to claim that as the forms of life and life forms that are actualized in genomics, humanist values about the sanctity of life in general and the natural and the human are renegotiated. The instability of traditional humanist values are a consequence of the new genomic hybrids and mutabilities of genetic and molecular 'information.' As increasingly disembodied forms are presented, nostalgic reclamations of the human person and its corporeality are intensifying. Biologic forms, often more potential than actual, drive the exchange value of bodies, identities and cultural representations.

[49] Forms and values, now uneasily negotiated arrangements and compromises between ethical precepts and market strategies, are now made unstable, posing problems regarding both the human and its engineered 'posthuman' successor. Through the new technics new problematizations arise that ripple across the humanist plain. Forms and values, the human and its others in the animate and inanimate, are in question. As the diastole and systole of a sovereign logocentric representation, they are reconfigured through the questions genomics sponsors in challenging the fixity and essences ascribed to life processes and the human subject. Harnessing research funding and institutional cooperation, as in the case of Caltech's ascendance in the early 20th century or in Venter's Celera, genomic capital is determining and adjusting the productivity of what had been the universal human subject and its embodied forms. Through the new hybridities of bacterial, insect and animal genes, organs and tissues, the heterogeneity of bodies is increasingly subject to disciplinary knowledges that are capable of regulating and homogenizing embodiment or of serving to disperse former borders and representation in

generating new expressions of difference.

[50] A genomic sovereignty now instantiates alliances and complicities of biopolitical practices - as a hegemonic, though disunified, competitive cluster of research agendas, funding arrangements, genomic and biotechnical investments incorporate the heterogeneous. Akin to the bacteria they frequently scrutinize, genomic capital entities constantly consume and reproduce each other. *Zoe*, the substratum of life processes, now discernable at the genetic level, are placed in distinct value relations, transitional states and markets in a representational economy as patentable forms, data bases, archives established by the specific assemblages by which *bios* sets its meters and reads its vital signs. Genomics extends knowledges and powers over the body, releasing energies and limits on the powers of bodies to act.

[51] Genomic research challenges different populations in particular ways. The hybrid cell structures recently announced, though not new as scientific interventions, stir social anxiety in their challenge to what constitutes the properly and distinctly human and its 'natural' processes of conception, development and expression. The increasingly slippery limits between the human and the animal, and life forms from inanimate material substrates, raise the specter of the creation of new monsters. Geneticist Francois Jacob describes the emergence of cell theory in the context of early modernism's natural science, one in which the concern for mutations or 'monsters' and their status has undergone change, becoming integrated into the practices of modern biological science. Jacob quotes Geoffroy Saint-Hillaire who said that "monstrousness is no longer a random disorder," an apt statement for the by now well established ability of removing and then replacing the nucleus of a cell with that of another species, as evidenced in the recent cow-human embryonic stem cell disclosures. In Jacob's internal history of biology "teratology, the study of monsters, was to provide biology with one of its main tools of analysis." (47)

[52] The genomic technic participates in an ironic inversion of the grounding premises of the autonomous and monadic subject. As a subjectivity formed in an originary differential of power to forms of political and juridical sovereignty, the epistemic subject also existed apart from non-human 'nature.' Sovereignty, constituting the citizen-subjects of the emergent Republican states, also implicitly defined the extensions of human dominion over the natural world of animals and inorganic matter. Whether appearing in the rules of endogamy, immigration patterns, circumcision, the availability of reproductive technologies, the contemporary exercise of sovereignty is increasingly a genetic and molecular biopolitics, as in the new recombinant somatic and stem cell interventions being patented as inventions. Genomics participates in at least a partial sundering of the biological level of differences thought to comprise the distinctive species form of homo sapiens. Its technics, arising from human practice, are now being given free rein in transgenic, xenopant and machinic interventions that alter humanism's balancing scale upon which the biological distinctions are founded. (48)

[53] The new technics reproduce and augment existing zones of indetermination between species, forms of life and matter. The particular instantiation of a cluster of new relations, as in the cow-human embryonic cell, or in animal organ transplants, should not preclude consideration of the limits and connections established between technics, culture and language in contemporary life. Despite the ascendant hyperbolic rhetoric emerging from 'life science' multinationals like Monsanto, specific sites of intervention, interest and limits to scientific competence are appearing; technoculture's 'flyrooms', laboratories and arsenals realize historically particular expectations, developing means for the control of a specific 'biosocial' vision for intervening into the shapes and performance of culture through its techniques for managing possible futures.

[54] Posthuman, hybrid and terminal subjects are inflected by digital and genomic grammars; they develop, erupting as forms of becoming from fashionings and fictionings of techne. Invented and maintained by specific communities of practice, the posthuman is taking form out of the crafting of knowledges and power that market familiar forms of human identity for other hybrids. These communities of practice, in thrall to finance capital, both informatic and genomic, are diverted floodwaters. The new technics release an erotics of the singular, at once

volatile and vanishing; in calculable risks and, in service to 'capital time', their currents shape, discard and shift the substances of experience.

[55] Technoculture, considered itself as a new hybrid, is productive of its own strange progeny; making indeterminate the spaces and temporal relations of modernism, it is a conjuncture of practices that transgress boundaries between the natural and the cultural, the constructed and the given, inherited world, and between humanistic values and the new techne, unsettling lived experience and relations. Questioning the relations between the organic and inorganic matter stirs, while capitalizing from, a generalized cultural anxiety about the nature of the human, the real and the eclipse of traditional truths. The problem or promise of unsettled boundaries is now evident across techne's spectrum, both cellular and cyborgian. They do not obliterate modernism's imprint or the traces of its epistemological and axiological centers of reflection, community and practice. I propose that what needs to be examined now are the qualitative experiential features, aspects and limits of specific practices of, in a Deleuzian sense, becoming-molecular and indeterminate, such as those starkly presented by germ line therapies and cloning technologies. These genomic practices, in their alliance with informatics, deploy emergent forms of technicity that challenge and alter reproductive choices, the normativity of bodies, health, aging and dying. They complicate modernist representations and recognition of humans, culture and futurity. As specific, recent alliances of technocultural practice, I believe generative inquiries might most usefully examine the means, methods and regulating combinations set into motion to comprise the rhetorics of the posthuman. As a contribution to a genealogy of technics, a zoography of the kind suggested here could appraise pragmatically how life is being learned and lived by other means.

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## Notes

(1) Rabinow, Paul. *Essays on the Anthropology of Reason*. Princeton: Princeton University Press, 1996). 87.

(2) Fukuyama, F.. *Our Posthuman Future*. Farrar, Straus and Giroux, 2002. 6.

(3) Gross, Neil. "Gene Therapy: The Next Generation?". *Business Week*. October 5, 1998. See Center for Responsible Genetics Action Alert, 5 Upland Road, Cambridge, MA 02140, USA.

(4) Doyle, Richard. "Emergent Power: Vitality and Theology in Artificial Life". T. Lenoir, ed., *Inscribing Science, Scientific Texts and the Materiality of Communication*. Stanford: Stanford University Press, 1998. 308.

(5) Hayles, N. Katherine. *How We Became Posthuman*. Chicago: University of Chicago Press, 1999. 243.

(6) Emmeche, C.. *The Garden in the Machine: The Emerging Science of Artificial Life*. Princeton: Princeton University Press, 1991. 165.

(7) Doyle, *ibid.*, 316.

(8) Hayles, *ibid.*, 234.

(9) Doyle, *ibid.*, 306.

(10) Turkle, S.. *Life on the Screen: Identity in the Age of the Internet*. Simon and Schuster, 1995.

(11) It is worth keeping in mind the origins of the potential, both liberating and oppressive, in the vast feminist literature on cyborgian identities. In order to maintain a focus on genomic technics I have attempted to provide a broad outline of some of the contemporary issues it raises, particularly focusing on the biopolitical negotiation of

bodies and the relations established in hybrid cellular and organic interventions. The literature on posthuman extensions, prostheses and circuits is central, however, to the directions in which questions are raised and the kinds of embodiment, form and information contemporary culture establishes. In some feminist interpretations the potential hybridity of genomic and informatic paradigms promise an escape from representation, working as active networks of transcendence from isolated modernist gender straitened individualism. Celebrating the progeny of Haraway's germinal cyborg, this literature at times assumes an uncritical feminist appropriation of the new technics. In the context of informational systems, at one and the same digital time and space, bodies are both transcended, delivered over to performative acts of gender and identity, and rematerialized in a corporeality that includes the ensembles of embodied messenger, modem and a virtual community.

(12) Quinby, Lee. "Technopression and the Intricacies of Cyborg Flesh." *Constellations* 4:2, 1997. 229.

(13) Ibid., 236.

(14) Doyle, *ibid.*, 318.

(15) Doyle, *ibid.*, 316.

(16) Kay, L.. *The Molecular Vision of Life: Caltech, The Rockefeller Foundation, and the Rise of the New Biology*, . Oxford University Press, 1993. 17.

(17) Ibid., 34.

(18) Ibid., 48.

(19) Ibid., 50.

(20) Ibid., 46.

(21) Ibid., 16.

(22) Ibid., 49.

(23) Ibid., 16.

(24) Keller, E. Fox. *Refiguring Life, Metaphors of Twentieth Century Biology* . Columbia University Press, 1995. 89.

(25) Throughout this discussion I distinguish technics, as a generalized and differentiating component of material and expressive culture, from techne. Larry Hickman 's *Dewey's Pragmatic Technology* (Indiana University Press, 1992), provides a useful definition of techne. In a Deweyan perspective, Hickman interprets the etymological origins of techne in Classical Greek thought to any productive skill or activity, differing as a human crafting of materials from activities generated by instinct or chance. Hickman writes "techne was thus used to designate a realm of activity that occupied a place between two extremes: the order of nature (or supernature) and the disorder of chance, "(17). He also shares Wolfgang Schadewald's description of techne as occupying an "intermediate place between mere experience or know-how , empeiria, and theoretical knowledge, episteme."

(26) . Mitcham, Carl. *Thinking through Technology*. Chicago: University of Chicago Press, 1994. 116.

(27) Steigler, B.. *Technics and Time: The Fault of Epimetheus* . Stanford University Press, 1998. 137.

(28) Leroi-Gourhan, A.. *Gesture and Speech* . Massachusetts Institute of Technology, 1993. 235.

(29) Ostrow, S.. *Literature, Media, Information Systems* . G+B Arts, x.

- (30) Leroi-Gourhan, *ibid.*, 173.
- (31) Beardsworth, R.. "Thinking Technicity". *Cultural Values* 2:1, 79.
- (32) *Ibid.*, 79.
- (33) Derrida, Jacques. *Of Grammatology* . Johns Hopkins Press, 1976. 84.
- (34) *Ibid.*, 292.
- (35) Steigler, *ibid.*, 49.
- (36) *Ibid.*, 158.
- (37) *Ibid.*, 15
- (38) Nietzsche, Friedrich. *The Birth of Tragedy* . Vintage, 1967. 18.
- (39) Transgenic Art exhibition, Tang Teaching Museum, Sarasota Springs, New York. See [www.geneart.org/genehome](http://www.geneart.org/genehome). All images illustrating this paper can be found at this site.
- (40) Kac, Eduardo. [www.ekac.org/transgenicindex.html](http://www.ekac.org/transgenicindex.html).
- (41) Kac, *ibid.*, 8.
- (42) Halbertram and Livingston, *Posthuman Bodies*. Bloomington:Indiana University Press, 1986. 3.
- (43) Ansell-Pearson, K.. *Viroid Life: Perspectives on Nietzsche and the Transhuman Condition*. Routledge, 1997. 31.
- (44) Halberstram and Livingston, *ibid.*, 10.
- (45) Hayles, *ibid.*, 3.
- (46) Steigler, *ibid.*, 136.
- (47) Jacob, F.. *The Logic of Life, A History of Heredity*. Princeton University Press, 1973. 124.
- (48) Kate Soper, Kate. *What is Nature?*. 1995, 126. Soper argues that in the context of contemporary ecopolitics it is critically "important that ecological argument avoids talking about the `communality' of humans and animals in ways that conflate the biological and cultural and symbolic dimensions." In