Signs of Life: Writing, Information and the Human Constitution.

By Grayson Cooke

> Modern corn infrastructure enables scalable, high volume production, unlike other plant platforms.
>
> Prodigene

In this paper, I would like to explore the biotechnological constitution of the human, and its relation to questions of value and property, through a number of different notions of *writing*; writing as information, writing as iteration and citation, writing as representation, and writing as biological and territorial capture. For many contemporary scholars, the human must always be understood, firstly, in relation to its others and to its tools – the techniques and technologies that have enabled the human to evolve as it has – and secondly, as a cultural formation that "materializes" over time, depending on the contexts it appears in and the uses it is put to. Writing, as a technique of inscription and recording, of encoding and programming, and of legitimation, is fundamental to this materialization of the human.

Writing is one of the pre-eminent techniques of *homo sapiens* – the "man of knowledge". As inscription, it is a mode of storage and retrieval, and thus of memory and temporality; but it is more than that, because, as Bernard Stiegler argues, it is via external memory supports that "we" as human beings evolve (see Stiegler). According to Stiegler, writing as technics and external memory support is therefore constitutive of the human on a fundamental level. With the development of molecular biology and biotechnology, and the associated systems of patents and intellectual property rights, writing is constitutive of the human in economic and political contexts as well. Through analysis of tropes of writing in Adrian Mackenzie's recent text *Transductions: Bodies and Machines at Speed*, and in associated texts by Judith Butler and Donna Haraway, amongst others, I wish to explore the implications of this multi-faceted writing of the human.

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In *Transductions*, Adrian Mackenzie figures the relation between humanity and technics as a "transductive" relation. Transduction is a notion Mackenzie borrows from French philosopher Gilbert Simondon; it is used to describe physical and chemical processes of development or growth in which two separate "domains" change and build through successive iterations of an interaction. When this logic is applied to to the relation between humanity and technics, for Mackenzie, it is by way of *iterability*, *citationality* and *performativity* that human beings and technics are transduced. While each of these

three terms can be understood in a number of ways, and will find definitions in a number of contexts or disciplines, what links these terms is some notion of writing.

Mackenzie explains the transductive stabilization of human bodies and technics with reference to Judith Butler's work on materiality, and Donna Haraway's understanding of corporealization. Butler's attendance to the *processes* by which matter, sex and gender come to be considered as necessary and universal, opens up a way of understanding matter, sex and gender as "singular and contingent", that is, as things that have gone through a process of materialization or corporealization. Bodies do not simply appear, whole, in the world, but are materialized over time, and the human, as both concept and biological phenomenon, goes through this same materialization (Mackenzie 29). Thinking the appearance of matter transductively suggests that "[c]orporeal materiality thus appears not as a substance, but as a pre-eminently *transductive* field in which psychical, physical, technical and affective realities precipitate" (Mackenzie 35). To be visible, to be seen and known, the human must be legible, and its legibility will be determined through this precipitation of heterogeneous domains.

Working beyond the social constructivist paradigm, Butler sees matter not merely as "surface and/or site on which social processes inscribe themselves", but as something which "stabilizes over time to produce the effect of boundary, fixity and surface we call matter" (Mackenzie 36-37; Butler 9). Matter – that is, the stuff that things are made of, and in Butler's text, the gendered, sexed body – is not so much "stuff" but the *appearance* of stuff, it is an *effect*, "the sedimenting effect of a regulated iterability", an effect of repetitions and iterations bounded or corralled by economic systems of power and discourse, culture and other forms of matter (Butler 252n12).

Significantly, Mackenzie introduces two forms of writing in his delineation of matter. He states that matter is not about social processes inscribing themselves *on* bodies, as the social constructivist idea of "writing on the body" might suggest, but rather, it is the effect of "regulated iterability" or citationality which governs what matter comes to be. While we can understand this inscription on bodies as indicative of what Niall Lucy calls the "written-down", or "writing in particular", being that Butler's terminology and logic is deconstructive we must understand iterability in Derridean terms, that is, as "writing in general" or "arche-writing", which is the very condition of the mark or trace (Lucy 25-31). Iterability is the requirement of any sign, mark or trace that it can be repeated and recontextualized, thus repeated and differentiated at the same time, *already* different from itself *within* itself. As Derrida puts it in "Signature Event Context":

> Every sign, linguistic or nonlinguistic, spoken or written (in the usual sense of this opposition), as a small or large unity, can be *cited*, put between quotation marks; thereby it can break with every given context, and engender infinitely new contexts in an absolutely nonsaturable fashion. This does not suppose that the mark is valid outside its context, but on the contrary that there are only contexts without any center of absolute anchoring. This citationality, duplication, or duplicity, this iterability of the mark is not an accident or anomaly, but is that (normal – abnormal) without which a

> mark could no longer even have a so-called normal functioning. What would a mark be that one could not cite? (97)

All marks, signs or traces can be cited, recited, and as such are *already* cited, because they are determined by citationality. There is no sign that is not already a citation, no fundamental element of meaning or particle of information which is not already enmeshed in the systematic play of writing in general. While the human may or may not not necessarily be inscribed *upon*, it is formed through a process that is the condition of all inscription.

What role does this iterative understanding of the mark or trace play in the discourses of molecular biology and biotechnology? If matter is to be understood as iterative materialization, and if life is to be understood informatically, as the interplay of elements or particles that are simultaneously imaginary and real, constructed and discovered, material and semiotic, this also implies that life, and the human therefore, can be understood as a kind of writing. If this is the case, what are the implications of understanding the human as writing, and into what contexts does this place the constitution of the human?

Mackenzie gives numerous examples of authors who rely on informatic and technical understandings of life. He quotes Evelyn Fox Keller, who notes that, since Watson and Crick's postulation of "genetical information", "some notion of information (however metaphorical) assumed a centrality to molecular biology" (Fox Keller, in Mackenzie 178). The "Central Dogma" formulated by molecular biologists in the 1950s held that the base sequence of genes, or DNA, directly and completely specified the sequence of amino-acids in a protein. From this Central Dogma stemmed the various popular genetic-determinist beliefs in genes as "programmes" for life. In this schema, life is "written" as a function of a pre-determined genetic and informational "code". These beliefs gradually filtered their way into culture to the degree that claims of "genetic discrimination" against insurance companies became commonplace in the 1990s. Genetic determinism appealed not merely to the science world but to the business world, with its emphasis on calculability and reliability. Genetic determinism - the informatic understanding of life as the writing of the genetic code - was bankable in a fundamental way, because it could be counted upon, and could thus facilitate the flow of capital in a particularly concrete manner.

The tenets of the Central Dogma have since proven to be woefully simplistic, and the idea of genes as programmes has been discredited. The emergence of traits is much more heterogeneous and interactive, indeed transductive, than originally supposed. As Ruth Hubbard writes, "the base sequence of a gene (DNA) is not translated literally into the amino-acid sequence of the protein in whose synthesis it participates …. The message encoded by DNA can be changed while it is translated into RNA and proteins (hence further genes) are involved in all these processes" (44-45). Nevertheless, despite this repudiation of the flow of "information" from DNA to proteins, contemporary biology has in no way dispensed with informatic metaphors and rhetoric. The Prodigene quote placed as the epigraph to this paper exemplifies the informatic approach to life: modern

corn *infrastructure*, plant *platforms*. The biological, here, constitutes a space in which biotechnology can do its work at the particle level, and a surface on which it can build. Like any suburb, fiefdom or colony, the body is a *built environment*, and is simultaneously biological and technological. As Mackenzie notes, "biotechnology is distinctive in the way that it configures living bodies as reservoirs of technical elements" (193).

Numerous other examples abound. Dr Ron James, former managing director of Pharmaceutical Proteins Ltd, the Scottish company that produced Dolly the cloned sheep, is on record as stating that "the mammary gland is a very good factory" (Shiva 2). This is a deceptively simple comment. Factories are where commodities are produced, places of industry and of capital; taken at face value, James' comment is easily understood. Yet factories are also complex cultural sites. The history of the factory is the history of the modern West, in terms of industrialization and narratives of technological progress, in terms of environmental pollution and the emergence of ecological movements, and the exploitation of workers and the emergence of labour movements. Factories continue to concretize key issues related to the spread of globalization, with the sweat-shops and *maquilladoras* that dot Asia and South America replicating and building upon the forces of production that characterized the Western factory. Capital moves through factories in many ways, and factories sit at the centre of complex ethical webs, double-binding workers and communities to cycles of financial gain *and* impoverishment.

In this context, James' comment takes on greater significance. The factories of the biotech century exist not in industrial parks that border the world's major cities, but in the mammary glands and bloodstreams of transgenic "pharm" animals. Human and animal bodies can now be "seeded", often on the genetic level, in order to be later "harvested" for their "crop"; this is the practice known colloquially as "pharming". The factory is no longer an industrial space peopled by machines, workers and management teams, but a biological space populated by transgenic and hybrid forms. Further, it runs on automatic, requiring nothing other than the normal conditions of life to function; no coal, no steam, no electricity. This is a significant moment in the history of the organism, when its biological systems of maintenance can be harnessed for the production of raw materials for commodities. It is also a significant moment in the diversification of capital, when elements of "value" can be grown in bloodstreams and mammary glands. The informatic approach to life signals a new moment in the history of both the organism and the factory, and to many it is clearly very promising; however, it cannot be considered apart from the constraints and inequalities which have always accompanied capital growth and industrial expansion. Within biotechnology, the biological and the technical have a complex co-implication, but this co-implication is always mediated by the economic forces that structure what science deems knowable, and worth knowing.

OncoMouse™, the eponymous protagonist of Donna Haraway's 1997 text, *Modest_Witness@Second_Millennium.FemaleMan©_Meets_OncoMouse*™, is implicated in similar fields. OncoMouse is a transgenic animal, developed in 1988 by researchers at Harvard Medical School but licensed to Du Pont, designed to aid cancer researchers in toxicology testing and in developing cancer therapies (Haraway 286n35). It

reliably develops cancer within the first few months of its life, and was the world's first patented transgenic animal (Haraway 79). Bounded by the writing-machine of patent law, defined thus as an invention and a technology, and bought and sold as a scientific instrument for use in the laboratory, OncoMouse has generated not merely a very odd market and a host of transgenic look-alikes in universities and research labs, but a discourse surrounding the production and use of transgenic animals. Haraway quotes Howard Rosen, former corporate development director at GenPharm International Inc: "We do 'custom-tailor' mice. We view them as the canvas upon which we do these genetic transplantations" (Rosen, in Haraway 98). She also quotes business writer Michael Shrage, who argues that "[t]his transition will have as big an impact on the future of biology as the shift from printing presses to video technology has had on pop culture. A mouse-based world looks and feels different from one viewed through microorganisms" (Shrage, in Haraway 98). In a recontextualized echo both of the notion of "writing on the body", and of Prodigene's "modern corn infrastructure" and Ron James' mammary factory, here, the biological is the ground or surface upon which bio-techno-logical life can be built. The biological is a canvas, a base, a blank surface, a clean, prepared slate; it is prepared for certain purposes and its value consists in its receptivity to the writing of technoscientific knowledge.

Obviously, these phrases attributed to the various stakeholders in the biotechnology industry are just that, statements, made to the press, in written texts, in interviews or wherever. They are metaphors, rhetoric, explanations for the layperson, they do not constitute science in and of themselves but rather they refer obliquely to practices which are merely explained and described with such language. However, they beg the question of the relation between biotechnological practice and the rhetoric that is used to describe this practice, and thus to represent this practice. To what degree have these metaphors of life as information, of DNA as parallel processing or computing, of biological organisms as platforms, canvasses, and infrastructure, been instrumental, or *performative*, in the constitution of life today and in the future? What are the effects of this constitution of life? And, as Haraway asks, *cui bono*? (113) Who profits from such a situation?

For Haraway, the metaphor that understands life as information is more than metaphor, it is a metaphor that has enabled certain contexts to come into play surrounding this understanding of life. Haraway states, "[n]ot only does metaphor become a research program, but also, more fundamentally, the organism for us is an information system and an economic system of a particular kind" (97). As information, the organism enters research programs and economic systems in ways that, as purely biological entity, the organism could and would not. Mackenzie concurs, noting that "the very tissue of the biotechnological hybrid is informatic. Information is not just a metaphor that reduces the complexity of life as an object of biological knowledge, it is also a set of technical-economic practices which trace certain paths and not others" (Mackenzie 181). This tracing of certain paths and not others recalls Judith Butler's account of materialization, where materialization occurs as a "*regulated* iterability" and a "normalization". The materialization of the body, and the informaticization of life, occurs in the context of decisions regarding what is scientifically and medically doable and/or useful, what is pre-scribable in terms of the strictures of intellectual property and patent law, and what is

commodifiable. There is a profoundly economic imperative governing the materialization of life, and the human, today. As Mackenzie states, "[l]ife as a diverse and intricately overlapping milieu has become an open and diverse engineering site, the subject of mapping programs, financial speculation, voracious property claims, and massive state and corporate funding" (171).

Mackenzie's discussion of bioinformatics exemplifies the role of information in the understanding of life. He examines the role of the protein and genome databases such as those used in the Human Genome Project, GeneBank, the European Molecular Biology Laboratory and the DNA Database of Japan (Mackenzie 194). These databases contain DNA sequence data fragments – the 6 billion base pairs of human DNA, in the case of GeneBank – that only become meaningful when they are compared to other fragments, using the differences between sequences to elucidate similarities and, ultimately, to draw a "map" of the genome, which is the totality of genetic "information" in a cell (Haraway 245). The sequence data of different organisms is compared, and databases are cross-referenced, comparing sequence data "to the other large-scale databases containing the details of when and where various genes are active, of protein structure and folding, and protein-protein interactions" (Mackenzie 184).

Bioinformatic databases provide a robust technical structure and architecture with which to deal with the difficulties of drawing comparisons between billions of DNA base pair sequences (Mackenzie 182). The databases, with their complex searching algorithms, allow for the performance of calculations and comparisons that could not take place without such a technical structure. This is to say more than that scientists rely on their tools to do their work. It is to say that the genomic databases provide an understanding of "life" and the human genome that is inevitably inflected by the very structure of the technical substrate. The "representation" of the "human" in genomic databases does something constitutive to how the human is, and will be, understood; and further, it provides virtualities for the human that are inevitably technically mediated.

> The human to be represented, then, has a particular kind of totality, or species being, as well as a specific kind of individuality. At whatever level of individuality or collectivity, from a single gene region extracted from one sample through the whole species genome, this human is itself an information structure whose program might be written in nucleic acids or in the artificial intelligence programming language called Lisp®. (Haraway 247).

The human is and will be not merely technically mediated, however. This mediation will take place within certain fields and contexts and not others, and according to certain economic and cultural imperatives and not others.

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Reinforcing the relation between informatics and writing, Mackenzie describes this representation of the human formed through the sorting and comparing of sequence data as the *reading* and *writing* of genomic *maps*: "Constant rereading and rewriting of

archived linear sequences also focuses on mapping the relation between DNA sequence and the topological structure of proteins" (182). Haraway, also, examines the now popular trope of the "genetic map", drawing attention to the geopolitical and biopolitical complexity of using a cartographic metaphor to describe and guide knowledge of the human genome (162-163). Maps are, obviously, a certain kind of representation, a kind of writing that is frequently used in place of its referent. Maps are tropes, an *as* or *as if* that is used to assay and extend knowledge of what supposedly *is*. This map-writing and representation, however, has a politics. Just as Ron James' relation of the body to a factory cannot be divorced from the context of industrial progress and labour movements, the mapping of the human genome cannot be understood outside the context of exploration, trade, ethnography or anthropology, botany, and territorial capture which surrounds the historical *scène* of cartography. The topologization of the biological, hinted at earlier in our discussion of plant-platforms and a mouse-based world, is here placed within the context of expanding the knowledge of a territory, and molecular biology, in taking upon itself the task of mapping the human genome, speaks volumes about the potential enclosure or capture of biopolitical territory.

The genome is a frontier, and the *thought* of frontiers brings with it a complex set of desires. To think of a frontier, with its open spaces, its limitless horizons, its seemingly unending source of the unknown but knowable, is at the same time to project the closing of this frontier, the re-formulation or reformation of what was "already there", the occupation of "space" held to be there for the taking, and the utilization of what has been "found" as a resource. The history of the American West gives us a perfect image of this tendency, with its early settlers and their farms scratched out in the wilderness, the slaughter of the native people and the claiming of their land as if it had not been inhabited, and the gradual encroachment of "civilization" through the railroad, mail, and the telegraph. Similarly, the doctrine of *terra nullius* that underpinned, consciously or unconsciously, the settlement of Australia by Europeans, held that the land was empty before colonization because there were no white inhabitants, and the land was not used in any systematic way, as in agriculture, but was used by hunter-gatherers (who were themselves invisible) (Hawthorne 176). Australia was a frontier in and of itself, but it was only able to be so through the notion of *terra nullius*, one of the powerful rhetorical technologies of colonialism. While frontiers are generally understood to involve the progress of "civilization", open space that is soon to be filled, and the promise of knowledge, they require certain kinds of blindness, and whatever violence or repression this blindness requires for its maintenance.

The notion of biopolitical territory thus raises the question of biological *property*. Once a space is mapped and a frontier closed, questions of property and property rights immediately follow. Mackenzie situates his enquiry on the back of contemporary examinations of bodies and technologies in technoscience and biotechnology, and he does this because of "the increasingly direct biotechnological manipulation of what was held to be in some sense immutable – the limits of life and death – and inalienable – the propriety or 'mineness' of living bodies" (20). He later argues that genetic information, which many would consider "the most fundamental property of the body", can only be considered thus through the technical mediation of biotechnology and bioinformatics.

That is, "DNA's status as *information*, and its status as a 'fundamental property of the body', comes to light only through the reading, copying, comparing and sorting of genetic sequences carried out by a host of technical mediations currently circulating through computer databases" (Mackenzie 187). Property is caught in a double bind; DNA information, as *a* property of the body in the way that strength is a property of steel, is surely inalienable. This is the body's make-up. Yet it comes to be so only through a system of knowledge and a technical apparatus, which in turn opens up this property of the body to become property, in the sense of something owned, something to be traded, capitalized upon, commodified. We can understand this process as a materialization or corporealization that is simultaneously a capitalization; molecular biology and genomic databases provide a structure through which certain versions of the human can be constituted and commodified *at the same time*, in the same movement.

Of note, then, is the question of "propriety"; what is proper to the body, what is the body's property, and what is the body proper? How can it be that what was thought to be inalienable, a property of the body, has been alienated and has thus become property, in the sense of the alienated commodity? Although Mackenzie does not elaborate on this question of the propriety of the body in biotechnological practices, nor does he call attention to the equivocality of propriety and property in this scenario, it is clearly at the core of any enquiry into the imbrication of bodies and technics. Biotechnology is a realm in which divisions between biological or bodily property, and intellectual or informational property, are frequently eroded, and this erosion is granted by the increasingly complex system of intellectual property rights, trademarks and patents. Donna Haraway calls the results of this erosion "the property form of existence", noting that for her two chimerical champions of the New World Order, OncoMouse™ and FemaleMan©, "to be commodity is to be" (120).

There is a well-known example that encapsulates many of these issues: In their account of the growing global trade in human body tissue, *Body Bazaar*, Lori Andrews and Dorothy Nelkin cite the case of John Moore, a Seattle businessman who, while undergoing treatment for hairy-cell leukaemia, had his spleen cell-line patented by doctors at the UCLA School of Medicine. Moore was not informed of this process until he discovered he was the "referent" of patent number 4,438,032, upon which he had this to say: "My doctors are claiming that my humanity, my genetic essence, is their invention and their property. They view me as a mine from which to extract biological material. I was harvested" (Moore, in Andrews and Nelkin 1).

Moore's case is interesting for a number of reasons, not least because of its Kafkaesque overtones. Firstly, we have one of the more contentious cases in which an element of the human body has been patented and thus considered "an invention", a technological "element" capable of entering into economic and legal exchange. Patents provide an important touchstone for the aforementioned trope of the map. The modern use of the word "patent" comes from the Latin *litterae patents*, which refers to "letters patent" or "open letters", "official documents by which certain privileges, rights, ranks or titles were conferred by sovereign rulers" (Shiva 12). *Litterae patents* were used in Europe from the sixth century, as the "charters" given by European monarchs so that explorers could

simultaneously discover *and* conquer the lands they found on behalf of the Crown (Shiva 12). Letters patent, like the doctrine of *terra nullius*, were a vital part of the colonial machinery, for their purpose was to facilitate the conquest, and ownership, of territory. Like the Word of God which brings what it speaks of into being, letters patent provide a method of capturing and owning all that can be seen by the simple writing of words. By the written word, by the presence of a certain set of words together in a document, and by the signature of the monarch as binding authority, letters patent determined what was proper and what was property, and their open status allowed this determination an open jurisdiction.

Patents are used to protect "inventions"; in order to patent something, it must be proven that this thing has come about through some technological *process* that the applicant of the patent has put in place. Donna Haraway quotes the 1952 U.S. Patent Act as allowing "any new or useful art, machine, manufacture, or composition of matter, or any new and useful improvement [thereof]" to be patented (87). Thus patent 4,438,032, as a powerful instantiation of the writing-machine of intellectual property, grants that the element of John Moore's body that has been isolated by his UCLA doctors can be considered an invention, and thus a technological element that can be owned and traded. What was proper to John Moore, his spleen cell-line, has, through a biotechnological process that *cannot be divorced* from the system of patent law that grants a certain status to the product of this process, been turned into property, and this property is not John Moore's; John Moore has been exappropriated.

Secondly, we must also understand patent 4,438,032, which grants technological status to what was hitherto considered biological, as an instance of the performative power of writing. Performativity, according to J.L. Austin's formulation, refers to utterances that put something into effect or perform a function in the very act of being uttered, thereby conferring on the speaker an absolute authority to *make it so* merely with their voice, like any god or arbiter of value. The marriage celebrant's "I hereby pronounce you…" or the judge's "I hereby sentence you…" are taken as prime examples of such utterances or "speech-acts". As Judith Butler notes, "[i]mplicated in a network of authorization and punishment, performatives tend to include legal sentences, baptisms, inaugurations, declarations of ownership, statements which not only perform an action, but confer a binding power on the action performed" (225). Although it may seem absurd to refer to the patent as an Austinian "speech-act", we must nevertheless consider patent 4,438,032 as an "utterance" that grants a certain kind of thing to *perform as* another kind of thing, to enter the market and be exchanged according to its granted status. This is another way of saying patents allow for something to *count* as something else.

Thirdly, the patenting of John Moore's spleen-cell line indicates that we have a human body being treated as a "resource", or in Heideggerian terms, as "standing reserve". Moore states that he was treated as a "mine", a naturally-occurring geological store-house from which, given the required governmental permissions, the raw materials for commodities can be extracted. He also says he was "harvested", suggesting a more agricultural use of his body as field or ground for the preparation and harvesting of, again, raw materials for the production of commodities. This second statement recalls our

earlier mention of the practice of "pharming", utilizing the biological body as a laboratory or factory in which to grow pharmaceutical or medical materials. As Heidegger points out in "The Question Concerning Technology", this process whereby human beings identify elements of the natural or biological world as standing reserve is part of the overall process of the coming into being of technology. Here, we witness a process whereby human beings, the UCLA doctors, identify elements of the *human* body as standing reserve, which instantiates the coming into being of a *biotechnological* entity. It is no longer the case that the human is considered standing reserve as a function of its potential labour-power; rather, the human body is considered standing reserve in its biological particularity, and the only labour involved is that automatic and autonomic labour of the heart, which is not necessarily a labour of love.

Finally, Moore's case is interesting because it reminds us to take note of recent developments in the trade in the human body and in biological tissue, as the title of Andrews and Nelkin's book, *Body Bazaar*, suggests. Playing on Fredric Jameson's formulation of "late modern capitalism", Nancy Scheper-Hughes has coined an interesting term for recent developments in this trade: "late modern cannibalism" (1). Scheper-Hughes' term nicely encapsulates the logic of this trade, indicating a circularity whereby human beings commodify aspects of humanity in order to transplant those aspects into other human beings as *biocapital*. Obviously, in its raw form this trade is an ancient one; "body-snatching" has being going on for centuries, and the "world's oldest profession" also has a fundamental investment in certain properties of the human body. Nevertheless, what we witness today is an increasingly particulated and informaticized approach to the commodification of the body, and we are reminded that this goes on in a number of markets and under a number of legal or illegal rubrics. The international trade in bodily organs is similarly implicated; livers, kidneys, eyes, whether given willingly by donors living or deceased, reluctantly by the poor or in-debt, or unwillingly and unwittingly by those whose organs are harvested during surgery or taken by force, now circle the globe in increasing numbers. Biotechnology and medical science play a powerful mediating role in these negotiations of bodily propriety and property, granting ever greater possibilities for the commodification of particulate biological matter.

Similarly, "biopiracy", the term given to "the use of intellectual property systems to legitimize the exclusive ownership and control over biological resources and biological products and processes that have been used over centuries in non-industrialized countries", is another important touchstone here, reimplicating the writing-machine of patent and intellectual property law in the trade, lawful or unlawful, ethical or unethical, in biological tissue (Shiva 49). Biopiracy is allied with what is known as "bioprospecting", the practice of biotechnology companies trawling the biosphere for useful biological elements which can be isolated, experimented upon and evaluated for their potential value in scientific, medical or cosmetic fields. Obviously, this can also be classed as research, just as "biopiracy" refers, albeit pejoratively, to a practice that is increasingly legitimized because it has proven profitable to the private sector. In essence, bioprospecting is a necessary part of the research process for organizations in public and private sectors, and much public good comes from such research. It is also a practice that has gone on for hundreds of years, being frequently aligned with cartographic

exploration, so is not in any way "new" or solely a function of a new technology. Nevertheless, like early cartography, the terms bio*piracy* and bio*prospecting* both indicate an economic and territorial practice of capture in the scientific and business practices lumped under such nomenclatures, and this capture is legitimized and authorized by the writing-machine of intellectual property and patent law.

In summation, Moore's case gives us insight into a framework in which the body is treated as, firstly, undifferentiated matter or information in an iterative, negotiated process of stabilization, and secondly, commodifiable *because* it is information; through biotechnology and intellectual property law, both property and propriety are up for grabs in the fecund *scène* of late modern cannibalism. What *counts* as human, and what *counts* as technological, what is proper to these things and what is their property, materializes in a space that is both public and private, open and regulated, personal and inter-personal. The process of coming to count is an iterative one, cyclical and repetitious, and it is powered by things like IP and patent laws, bioinformatic genomic databases, and rhetorical tropes. Although there are many other examples we could have chosen, Moore's case serves as a textbook illustration of the way in which various processes and types of writing – writing as representation in genomic maps, writing as genetic information, the writing of patents as territorial capture – are *performative* in the constitution of what the human is in particular, and what life is in general.

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