Chapter 6 / Life Itself
Global Nature and the Genetic Imaginary

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A defining feature of the present moment is our ambivalent encounter with biotechnology – a discomfort future analysts are likely to interpret as more than millennial nostalgia for the passing of long-established certainties. As the daily news can no longer be read without encountering some new disquieting biotechnological enablement, so also can be witnessed a process of cultural redefinition whereby foundational understandings of the human, the body, reproduction and the future are being transformed. This process of cultural redefinition accounts in no small part for the anxiety produced in relation to the technologisation of life itself.

These changes are both intimate and remote, global and personal, celebrated and feared. Public unease in relation to the reproduction of ‘unnatural kinds’ is increasingly evident in relation to the genetic alteration of animals, plants and microorganisms. Worldwide public debate surrounded the birth of Dolly the sheep, the first higher vertebrate cloned from an adult cell. The introduction of genetically modified foods has proven an equally controversial issue, bringing to public attention complex questions of risk and regulation concerning the future of world agriculture.1 While such developments have been widely debated in terms of law, ethics, public health and world trade, there remains the broad Foucauldian question of how they can be understood as part of an ongoing re-alignment of life, labour and language. We are currently witnessing the emergence of a new genomic governmentality – the regulation and surveillance of technologically assisted genealogy. This is necessitated by the removal of the genomes of plants, animals and humans from the template of natural history that once secured their borders, and their re-animation as forms of corporate capital, in the context of a legal vacuum. This dual imperative, to take evolution in one hand and to govern it with the other, is a defining paradox of global nature, global culture.

The major shifts inaugurating the genomic era can be restated schematically. Nature, in the sense of natural facts, such as ‘the facts of life’, has in the modern era been biologised, so that, for example, the beginnings of life are represented as an
evolutionary narrative of natural selection. Similarly, the origin of each individual is explained in terms of a conception narrative referring to eggs and sperm and their union leading on to subsequent embryonic and foetal development, manifesting the unique genetic blueprint that creates diverse individuals. In referring to the natural facts of human variation, the facts of life, or the evolution of Homo sapiens, the discursive frame is biology.

In turn, biology has been increasingly geneticised, and this marks the second transformation of concepts of the natural to emerge out of the latter half of the twentieth century. The geneticisation and individualisation of pathology, behaviour and identity at the turn of the millennium is exemplary of the kind of risk assessment which belongs to a nature at once globalised and personalised. It is increasingly common to make reference to the genetic parent, to genetic relatedness, genetic risk, genetic identity or to human genetic variation. The public is increasingly aware of genetically inherited diseases, genetic screening programmes, the human genome project and human gene therapy. In sum, the discourses of genetics have become an increasingly important language to describe the human condition, the effects of environmental change, and the future of reproduction (Nelkin and Lindee, 1995).

Crucially, the geneticisation of nature and the facts of life is inseparable from their instrumentalisation (Rabinow, 1996a and b), which is the third major transformation of ideas of the natural within global culture I explore here. Genes have become an increasingly prominent iconic vocabulary in turn-of-the-millennium public culture because there is a rapidly expanding range of things that can be done to them. There is increasing public awareness of genetic disease because there are more and more diseases which are seen to be genetic in origin, and a corresponding number of screening technologies to detect them. This instrumentalisation has become inseparable from the capitalisation of life itself, and the commodification of genomics is the force driving intense international scientific competition to claim biotechnological market share. The management of genetic risk, through mapping and sequencing the genomes of humans, plants, animals and micro-organisms, is similarly one of the driving forces behind twenty-first-century medicine, and has become a motor of wealth generation in the effort to secure new forms of genetic capital in the form of genetically modified and patented food and pharmaceutical products. Emergent definitions of genetic risk, and their attendant techniques of detection and intervention, are indexical of changing relationships between health and pathology, disease and cure, technoscience and the body, humans and animals, and the regulation of public health. In turn, such altered understandings contextualise the ways in which life itself can be owned, capitalised and patented.

As Edward Yozen (1981) presciently noted in the early 1980s, these shifts in the definition of life itself have both institutional and conceptual roots in the history of modern biology, and he points in particular to the emergence of a new definition of life as information. Describing the rise of molecular biology, he suggests ‘we could describe it as a kind of meta-biology, as a reductive, information-theoretical idiom’ which ‘has created a new language for analysing nature’ (1981: 70). He dates the
begins of this change back to the work of the Marxist-inspired American geneticist Herman Müller, who, in writing on gene structure as early as 1924, could already confidently claim that ‘the gene, then, arose coincidentally with growth and “life” itself’ (Müller, cited in Yoxen, 1981: 71). A consequence of this reductionism, of life to the gene, and of the gene to information, was not only the displacement of a view of natural history organised in relation to more holistic units, such as species, populations or ecosystems; the information analogy also enabled the literal and metaphorical prospect of reprogramming biology.\(^2\) Chronically the intensification of financial, institutional and International competition to stake proprietary claims in the New World of the new biology, Yoxen concludes that biotechnology is ‘not simply a way of using living things that can be traced back to the Neolithic origins of fermentation and agriculture. As a technology controlled by capital, it is a specific mode of the appropriation of living nature – literally capitalising life’ (1981: 112).

Another way to describe the consequences of molecular genomic prowess is that they entail a re-spatialisation of genealogy, so that genetic information no longer necessarily passes in a one-way, linear path of descent from one generation to the next. Rewritten as information, message, code or sequence, the gene becomes newly flexible as it also becomes differently (re)productive. The ability to recombine genes from different species has detonated the formerly rigid conduits of DNA transmission, enabling mice and goats to express human genes, plants to express genes from fish, and sheep to produce human proteins because they have been equipped with the missing parts of the human genome lacking in sufferers of rare inherited diseases, such as cystic fibrosis.\(^3\) Just as the human genome project represents a molecular globalisation of human kinship, so the transgenic industry has created postmodern genealogy, shorn of the very limits by which consanguinity was once defined – the slow, predictable and regular brachiations of the familiar family tree now superseded by more flexible dimensions of genealogical time (as speed) and space (as post-arboreal).\(^4\) The neat genealogical system that Darwin described as natural history is no longer closed, tree-like or unified. Even death no longer poses an obstacle to intergenerational transmission, as immortal cell lines can preserve DNA in perpetuity.\(^5\) There is no reason not to assume that existing collections of dead botanical and zoological materials already comprise a kind of genetic bank, or perpetual genetic capital, for which the exact means of extracting animate expression will soon be developed, if it has not been already, as the blur of genetic innovation is another of its characteristically postmodern traits.\(^6\)

In sum, we arrive at a simple sequence: nature becomes biology becomes genetics, through which life itself becomes reprogrammable information. This sequence proceeds along a path of increasing instrumentalisation, driven by commerce, legitimated in the name of public health, and regulated by the nation-state. The twentieth-century transformation of life itself has had the consequence that the grounding or foundational function of nature as a limit or force in itself has become problematic and lost its axiomatic, a priori value as a referent or authority, becoming instead a receding horizon. Nature, we might say, has been de-traditionalised. It has
been antiquated, displaced and superseded, and now it is only a trope - a mere shadow of the referent it used to signify. That does not mean it is less useful, as we have already argued, but nature is in a spin. In the place formerly occupied by 'natural facts' is a new frame of reference, an offspring of the genomic era, which is life itself - now orphaned from natural history but full of dazzling promise.

In this chapter, I examine transformations in the definition of 'life', which has literally been unzipped in the context of its highly visible instrumentalisation, to become life itself, which has both displaced traditional ideas about the domain of the natural, and become the locus, and means of expression, for new forms of cultural production (including biological ones). This chapter extends a genealogy of critical attention to changing definitions of 'life' which begins with the work of Georges Canguilhem and moves through the work of Foucault, in order to introduce more recent critical accounts of 'life itself'. I pursue these claims further in relation to the genetic imaginary, illustrated by numerous examples which take as their figurative subtext the popular Hollywood film Jurassic Park. In this film, new genetic technologies are both narrativised and animated, and I explore how these generic forms travel back into the heart of natural history, specifically into the American Natural History Museum, where sober scientific professionalism merges with spectacular cinematic promise in an exchange that exemplifies the hybridities constitutive of global culture, global nature. In other words, by using an analysis of the production and consumption of Jurassic Park, I generate a set of interpretive perspectives I then borrow to fold back on themselves. Throughout these discussions, I ask not only how particular entities are born, bred or made, but how they are imagined. As José Van Dijck argues:

> The dissemination of genetic knowledge is not uniquely contingent on the advancement of science and technology, but is equally dependent on the development of images and imaginations. 'Imaginary tools' are crucial assets in the dissemination of genetic knowledge, as they are used to shape this science's public face.

(1998: 2–3)

Both images and imaginations shape the directions of genetic science, as is made particularly evident in the case of Jurassic Park. Like Van Dijck, I am exploring the inextricability of the genome from its imagined future promises, hopes and dangers. What are the fantasies and fears catalysed within the new genetics as a domain of millennial cultural practice? What are the forms of recognition, identification and imagination brought into being in response to new genetic technology? What are the pasts, futures and presents of genomic temporality?

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**The History of Life Itself**

Many of these questions have already been the subject of considerable debate, spanning a range of disciplinary contexts from the history of the human sciences, to
the cultural analysis of science, to the analysis of kinship in the context of new reproductive and genetic technology. Feminist scholars, science studies researchers and cultural theorists from a number of different countries and backgrounds have already begun to exploit the 'de-familiarising lens' of the technological to reconsider elementary dimensions of cultural practice and social organisation informing the quest to unlock the secrets of life itself.

Notable for his early researches into this field is the French historian Georges Canguilhem, whose prescient 1966 essay ‘Le Concept et la Vie’ inaugurated the cultural analysis of ‘life as a productive force’. In his tracing of the concept of life from antiquity to the present, Canguilhem (1994) emphasised the specificity of the contemporary understanding of life itself derived from molecular biology. Like Yoxen, Canguilhem emphasises the significance of the modern biological model of life being based on an information model, and notes certain similarities to Aristotelian notions of form. As Paul Rabinow notes of Canguilhem’s contribution:

This historical reconstruction provides the groundwork for our contemporary conceptualization of life. Canguilhem frames James D. Watson’s and Francis Crick’s discovery of the structure of the double helix as an information system. . . . The new understanding of life lies not in the structuring of matter and the regulation of functions, but in a shift of scale and location — from mechanics to information and communication theory. In an important sense, the new understanding of life as information rejoins Aristotle insofar as it posits life as a logos ‘inscribed, converted and transmitted’ within living matter.

(1994: 20, emphasis added)

Canguilhem himself rejected the implied telos of life as an informational force unto itself, as well as the fetishism of ‘living codes’ as synonymous with a telos driven by the necessity of their own reproduction and survival (as is claimed by contemporary ‘selfish gene’ theorists inspired by Richard Dawkins). Canguilhem viewed the history of science not as a history of the elimination of errors in the refinement of accurate scientific knowledge, but as an epistemological project which, like the life forms described by biology, always exists in relation to a wider historical and cultural environment.

Strongly influenced by Canguilhem’s researches is the most significant contemporary historian of life itself, Michel Foucault, who first provides an exposition of this topic in The Order of Things (1970). Whereas Canguilhem is concerned with the discontinuity produced by an informational concept of life, Foucault is concerned with an earlier epistemic rupture — that of the late eighteenth century, when models of nature began to depart from their ‘non-temporal rectangle’ and move into a genealogical frame. He too is concerned with a representational shift effecting the emergence of the modern category of life itself, though in his case as an exemplary parable in his attempt to develop a method appropriate to the historiography of the human sciences — a method he describes as archaeological (Foucault, 1970).

Foucault’s attempt to understand sciences in the broadest sense through fundamental transformations of power, through fundamental transformations of power, Foucault magnifies the emphasis on a larger thesis about the delimitation and unification of the knowledges. Whereas eighteenth-century medical and natural science defined the diversity of living and non-living, and Foucault’s unifying concept of life in modern biological science did not do this explicitly.

Historians want to show that life itself has not been self-evident throughout time; that life itself did not have the same status in all periods. And that, since the eighteenth century, life itself did not exist as a concept of life that has been familiar since antiquity.

It is the study of geology, of evolution, which results in producing a new understanding of the concept of life. In modern biological science, life itself is defined as a concept of life, in turn produced out of science.

However, neither science nor life itself has ever existed as a separate and distinct concept of life. The concept of life is always in the historical epistemology, and the concept of life is always in the philosophical problem of truth. The concept of life is always in the process of truth, and the concept of life is always in the epistemological project of truth. The concept of life is always in the process of truth, and the concept of life is always in the epistemological project of truth.

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Foucault’s attention focusses on the shift from natural history to the life sciences in the broadest sense, asking how categories come to cohere within a social and historical frame, in order to document the forms of biopower brought about through fundamental transformations and re-alignments of life, labour and language. Foucault magnifies the emergence of the modern concept of life to comprise part of a larger thesis about the emergence of modernity and what he calls its power/knowledges. Whereas eighteenth-century natural history was concerned to classify the diversity of living and non-living things within a static, non-temporal frame, it had no unifying concept of life itself. Until the advent of modern biology, Foucault claims, life ‘itself’ did not exist. He writes:

Historians want to write histories of biology in the nineteenth century; but they do not realise that biology did not exist then, and that the pattern of knowledge that has been familiar to us for a hundred and fifty years is not valid for a previous period. And that, if biology was unknown, there was a very simple reason for it: that life itself did not exist. All that existed was living beings, which were viewed through a grid of knowledge constituted by natural history.

(1970: 128)

It is the study of geology and change, so central to the emergence of the concept of evolution, which results in the production of an epistemic system focussed upon the underlying connectedness of all living things. These connections, envisaged as a system of genealogy, in turn produce the conditions enabling the emergence of a concept of life itself. ⁹

However, neither Foucault nor Canguilhem was concerned merely to map the historical breakages and conjunctures out of which the modern category of life emerged as a composite of genealogy and information. Foucault’s enduring concern with knowledge as a form of power builds on Canguilhem’s insistence that all epistemological projects (projets de savoir) have consequences for the relationship of life to truth. As François Delaporte points out, Canguilhem’s definition of science as historical epistemology, and his consequent insistence that for the life sciences the philosophical problem of truth can be understood only in relation to the living of life, was described by Foucault as ‘one of the crucial events in the history of modern philosophy’ (Delaporte, 1994: 10). Foucault’s subsequent insistence that the history of the definition of life itself cannot be separated from biopolitics develops on this relation of epistemological systems to the human subjects they literally in-form and shape. The description of modern genetics as a form of biopolitics, or power/knowledge, stems from the assumption that epistemology is never disembodied, is inevitably political, and is equally manifest in the shapes of buildings and institutions as in the epistemic categories of modern knowledge practices. All of these are shaped by the same grammar or syntax. As Canguilhem himself predicted:

The science of life no longer resembles a portrait of life, as it could when it consisted in the description and classification of species; and it no longer
resembles architecture or mechanics, as it could when it was simply anatomy and macroscopic physiology. But it does resemble grammar, semantics and the theory of syntax. If we are to understand life, its message must be decoded before it can be read. This will no doubt have a number of revolutionary consequences, and it would take many chapters to explain not what they are but what they are in the process of becoming. To define life as a meaning inscribed in matter is to acknowledge the existence of an a priori objective that is inherently material and not merely formal.

Canguilhem’s prediction that ‘if we are to understand life, its message must be decoded before it can be read’ could hardly have proven a more literal description of the ‘revolutionary consequences’ of twenty-first-century genetics. The project to map the human genome, that is, to decode or ‘read’ the entire sequence of human DNA, is an exact fulfilment of the imperatives built into the concept of life first described by Canguilhem, and later elaborated by Foucault. DNA is itself a condensed signifier of ‘meaning inscribed in matter’, as is the concept of ‘genetic information’ – both of which represent life as defined by ‘an a priori objective that is inherently material’.

In the very concept of ‘genetic information’ is a collapse of matter and message at the heart of the contemporary life sciences. The Human Genome Initiative is the largest research project ever undertaken in the history of the life sciences. It is also the most global project in the history of biology, aimed at sequencing all the DNA not only in humans, but in a myriad other species, with the goal of controlling their genetic substance. Utilising a combination of state-of-the-art information and biotechnology to render binary the ‘essence of humanity’, the ‘code of codes’, the ‘secret of life’, the Human Genome Initiative is described by anthropologist Paul Rabinow as the apotheosis of the very definition of modern rationality. He writes: ‘Representing and intervening, knowledge and power, understanding and reform, are built in, from the start, as simultaneous goals and means’ (1992: 236). Yet, though he describes the Human Genome Initiative as exemplary of the modernist ethos, Rabinow also predicts it will inevitably produce a collapse of certain categories intrinsic to modernity. ‘In the future’, he writes,

the new genetics will cease to be a biological metaphor for modern society and will become instead a circulation network of identity terms and restriction loci, around and through which a truly new type of autoproduction will emerge which I call biosociality. If sociobiology is culture constructed on the basis of a metaphor of nature, then in biosociality, nature will be modelled on culture understood as practice. Nature will be known and remade through technique and will finally become artificial, just as culture becomes natural.

(1992: 241-2)

For Rabinow, then, nature and culture do not ‘implode’ or ‘collapse’ so much as their relations are inverted: culture becomes the model for nature instead of being ‘after
nature’, as if a kind of successor project or evolutionary development. This new nature that is ‘known and remade through technique’ will be modelled on the new culture, ‘known as practice’, and both are defined as ‘technique’. According to Rabinow, both culture and nature come to be defined in terms of doing rather than being, in a shift that directly parallels that described earlier by Butler in terms of gender performativity (1990). Context is also transformed in Rabinow’s account, whereby a ‘truly new form of autoproduction will emerge’ out of precisely the isomorphism between nature and culture, which are now defined much more by similarity than by antithesis. In turn, this removal of the nature–culture axis from linear time, from the chronology of natural history with its temporal insistence upon genealogical succession, means that neither nature nor culture is a successor project: both exist in the same timeframe as part of ‘a circulation network’ in which they co-produce one another.

In contrast to the postmodernist view of culture becoming ‘everything’, as Jameson (1991) and Baudrillard (1994a, 1998) suggest, Rabinow retains a concept of the natural, only in inverted relation to the cultural – a nature that is ‘after’ culture, in both senses of the term. This, like Strathern’s view, accords with what we are calling ‘global nature’, which retains an enormous power to signify in spite of the very conditions under which it might be seen to disappear or collapse. The rider to the view put forward by Rabinow, by feminists such as José Van Dijck (1998) or Valerie Hartouni (1997), is that while certain modernist definitions of nature or the natural are seemingly undone by techniques to assist them, these occasions also provide the context in which familiar modernist categories can be reinforced and restaged. As Van Dijck notes: ‘While the new genetics, and especially genomics, is motivating an implosion of categories at various levels, [and] even though new concepts of genomics orient themselves towards the constitution of a new order – a cyber culture or technoculture – they are cemented in the well-known matrices of modernity’ (1998: 194, emphasis added).

Life as a Public Sacrum

The feminist historian Barbara Duden has also explored the changing contours of the contemporary definition of life, and, like Foucault, has posed this as a question of historical epistemology. Duden’s context for examining life itself is the controversy concerning abortion in Germany in the 1990s, where, as in both Britain and the United States, the idea of ‘the protection of life’ became a powerful anti-abortion slogan. Analysing the transformation of life itself into a public sacram, or object of worship, Duden charts the emergence of the unborn foetus as a visible public entity, iconising the hitherto unknown of dark gestational space as a figure in need of protection, and thus instantiating what she describes as the sacralisation of life itself. She writes in her introduction:

Politicians and jurists, theologians and physicians, are engaged in a major enterprise of social creation whose object is ‘life’ . . . Concurrently, the term life
(and a life) has become an idol, and controversy has attached a halo to this idol that precludes its dispassionate use in ordinary discourse. . . . I want to examine the conditions under which, in the course of one generation, technology along with a new discourse has transformed pregnancy into a process to be managed, the expected child into a fetus, the mother into an ecosystem, the unborn into a life, and life into a supreme value.

(1993: 2)

Duden’s compelling account of the emergence of the foetus as a public sacrum, a worship-object for life itself, underscores the point of many cultural historians of science that in much of its imagery and narrative, science closely imitates the familiar generic devices of Christianity. Like religion, science is a system of belief, of reverence, awe, worship and faith. Especially in their contemporary magnificence and grandeur, the life sciences evoke a distinctly worshipful aura that to many resembles idolatry.

Nowhere is this more evident than in the context of the Human Genome Initiative, which is replete with metaphors of creation. Self-declaredly a search for the secrets of life, a quest to unlock the mysteries of creation, an attempt to rewrite the blueprint of humanity — Man’s Second Genesis, it is the modern Holy Grail of science. As Haraway notes, ‘the discourses of genetics and information sciences are especially replete with instances of barely secularised Christian figural realism at work’ (1997: 10). Caught up in both secular and sacred discourse, and often condensing the two, life itself is also the site of an intense commodification at the turn of the millennium. This raises questions not only about historical epistemology and capital accumulation strategies, but about forms of popular relationships to the idea of life, including the witnessing and testimonial cultures of both science and religion. Life itself, in all of these senses, emerges as a powerful conversion mechanism, employed by fundamentalist Christians, venture capitalists and molecular biologists to engender a sense of awe and to evoke resurrection and salvation.

Widening Duden’s characterisation of the exposure of the foetus to public view as a new definition of ‘life’, feminist visual historian Lisa Cartwright examines ‘the ascendency of this term “life” as a core object of epistemological contest in science, and the optical dissection and penetration of the human body that accompanied the popularization of this term throughout medical science, public health, and public culture generally’ (1995: xi). Arguing that ‘the cinema [is] an institution and an apparatus for monitoring, regulating, and ultimately building “life” in the modernist culture of Western medical science’, Cartwright documents how ‘the cinema, a technology designed to record and reproduce movement, was deeply indebted to physiology, both practically and ideologically’ (1995: xi-xii). Thus linking the animations of cinema and screening technologies, such as X-rays, to both popular spectacles and expert discourses on ‘life’ — and demonstrating the inseparability of such framings to the emergence of the category ‘life’ as the object of both popular and professional fascination — Cartwright restitutes the arguments of Foucault and Canguilhem within the theatre of contemporary spectacle, in which not only art and science signify with nature, but nature belongs to the stage here. Using this stage, life not only is questioned, but replayed and worn. Effects and consequences of enormous fascination have been enthralling to attract a fascination that power to the most advanced technologies do not possess.
and science, but *movement and epistemology* are merged. By ‘implanting cinema in
nature’, and relocating the epistemological project of discerning life itself as one that
belongs to a visual register, Cartwright articulates a crucial link for the analysis offered
here. Using film as literal ‘biography’, or inscription of life, another link connecting
life not only to labour and language, but also to spectacle and animation, allows the
question of life itself to be reframed.

In the film *Jurassic Park*, all of the features of life itself discussed above are
replayed as a major Hollywood motion picture, replete with state-of-the-art special
effects and the magical allure of cinematic spectacle. Both the film itself and the
enormous publicity surrounding its production, release and worldwide success as an
entertainment phenomenon provide means to explore the layeredness of public
fascination with new genetic technologies, the commodification of life forms, and the
power to create life through the storyline of resurrecting extinct dinosaurs using the
most advanced molecular and informatic techniques. At once a book, a film, a theme
park and a global brand, *Jurassic Park* is an ideal theatre in which to observe the new
genetics as performance.

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**Life Itself and the Genetic Imaginary**

The narratives of the world are numberless. . . . Under this almost infinite
diversity of forms, narrative is present in every age, in every place, in every
society; it begins with the very history of mankind and there nowhere is nor has
been a people without narrative. All classes, all human groups, have their
narratives, enjoyment of which is very often shared by men with different, even
opposing, cultural backgrounds. . . . Narrative is international, transhistorical,
transcultural: it is simply there, like life itself.

(Barthes, 1977: 79)

To raise the question of the nature of narrative is to invite reflection on the very
nature of culture and, possibly, even on the nature of humanity itself. . . .
Considered as panglobal facts of culture, narrative and narration are less problems
than simply data. . . . This suggests that far from being one code among many that
a culture may utilize for endowing experience with meaning, narrative is a meta-
code, a human universal on the basis of which shared messages about the nature of
reality can be transmitted.

(White, 1987: 1)

A genealogy seems unthinkable without an order of succession, as a sequence does not
signify without a syntax, and as development is meaningful only as a progression. So
too it appears life itself has always been inextricable from its invocation as a story, if
not the story, be it Genesis, *The Origin of Species*, *The Double Helix* or the ‘Book of
Man’. Like the ‘panglobal facts of narrative and narration’, the power of stories about
life itself and its Creation lies in their invocation of a global reach, a universal essence
of humanity, a shared, primordial ontology. The storiedness of life itself is thus one place to explore its syntactical power. If part of the way life itself, as a discursive condition, or as historical epistemology, calibrates its syntax is at the level of politics, truth or liberation, another level of this syntax can be defined as an imaginary. Not in the technical sense of a psychoanalytic pre-symbolic realm of undifferentiated totality, but in the more quotidian sense of a realm of imagining the future, and re-imagining the borders of the real, life itself is dense with the possibility of both salvation and catastrophe. This imaginary dimension of life itself is most evident in relation to the new genetics, and so I refer to it here as the genetic imaginary. As the genetic diversity now seen to comprise a vital source of survival-value is debated as a form of patentable, private property; as the spectacle of life as a ‘public sacrum’ mobilises campaigns to rescue frozen embryos and transgenic ‘geep’; and as the borders of the undead and the unborn recede into an indeterminate horizon of enhanced technoscientific potency, the challenges to the imagination beckon irresistibly, uncannily, hopefully, and with an enormous popular appeal.

* * * Jurassic Park: The Film*

Released in 1993 to a rapturous public and commercial welcome, *Jurassic Park* has since emerged as one of the most popular Hollywood films ever produced (Figure 6.1). The Steven Spielberg film of a Michael Crichton novel concerning the use of genetic engineering to bring dinosaurs to life for a theme park on an island off the coast of South America was rapidly promoted to become a highly successful and profitable global spectacle. The film opened as a record-breaking box-office earner in June 1993, having received lavish and adoring media attention ever since its production was first announced exactly three years previously, in June 1990. Its popularity upon release surpassed all expectations, and the film is notable not only for its unique visual effects, but for the commercial infrastructures through which it was marketed, brandnamed, packaged and consumed.

Both the original novel and the film are set just before the park is scheduled to open, during the final risk-assessment period, with the island fully populated by resurrected dinosauria, and their keepers. These are joined by a cast of characters including a lawyer, three scientists (two palaeontologists and a chaos theorist), the entrepreneur Park owner John Hammond (played by Richard Attenborough), and his two grandchildren, Alexis and Tim. Consistent with the prediction of the chaos theorist Ian Malcolm (Jeff Goldblum), the life force on the island proves uncontainable and uncontrollable, resulting in carnage and destruction, thus providing both the message of the film (that life itself is a force which will find its way out of any system designed to contain it) and its moral (that just because scientists can do something doesn’t mean they should).

Described as ‘the film that makes extinction a thing of the past’, *Jurassic Park*’s celebration (and punishment) of the power to create life is heavily overdetermined. The
Advertised as 'a film that makes extinction a thing of the past', Jurassic Park opened to a rapturous public reception in June 1993. It received extensive media publicity (such as the Newsweek feature shown here) and remains a popular point of reference in discussions of the new genetics.
narrative, concerning the successful resurrection of extinct dinosaurs by genetic engineers using fossilised DNA, is reproduced in the visual promise of the cinematic spectacle, which offers state-of-the-art special effects technology to animate the extinct dinosaurs – to make them move, breathe, eat, fight and reproduce, and to achieve this using the maximum visual enhancement attainable. As the film’s narrative content is by this means collapsed with its cinematic realisation – both highly technologised attempts to bring dinosaurs to life – the dystopic fantasy of the Crichton novel is to an extent made manifest in the Spielberg movie. Both have as their primary aim synthetic animation techniques of the highest verisimilitude. They are both concerned with producing virtual life. Like both the novel and the Park that is its subject, the film *Jurassic Park* is a form of entertainment. Film director Spielberg is consequently *doppelgänger* to the film character John Hammond, and their two respective *Jurassic Parks*, while simultaneously coincident, have opposite outcomes. Hammond’s Jurassic Park goes down in ruins, his reputation is similarly demolished, and he is impoverished – both financially and morally. Spielberg’s *Jurassic Park*, on the other hand, was both a technical and a commercial success, greatly enhancing the reputation and fortunes of its creator. This paradox is one of many contradictions the film presents to its viewers.

What is notable about the enormous efforts expended during the film’s production to make the dinosaurs as life-like as possible, including taking the production crew to the zoo to watch giraffes, hiring animal behaviour specialists as consultants, and so forth, is that *this process itself is also made very visible and explicit*. On the one hand, the images of dinosaurs must obscure the means of their own fabrication to appear life-like, which puts the invisibility of cinematic production at a premium: it is imperative to remove all the traces of human fabrication from the on-screen spectacle. On the other hand, within the film narrative itself, the means of reanimating the once extinct dinosauria are themselves part of the show at Jurassic Park, which proudly incorporates the laboratory into its display of itself. Here again the efforts of Spielberg and his fictional counterpart Hammond are the opposite of one another. There is also thus a dual spectator thrill on offer for viewers of *Jurassic Park*: you get to see the spectacle and then you get to see how it was done.¹² Both the duplicity (in the sense of duplication) of the film’s promise to offer a spectacle of the fantastic, and then to offer a realistic portrait of its creation, and the slippage between various levels of animation in the film establish a potential for a seemingly endless zigzag, or relay, between surface and depth, or figure and ground, which underscores the cyclical repeat of life, death and re-animation.¹³

The theme of the fabricated spectacle structures the narrative of the film itself. The first sighting of the dinosaurs in the Park exemplifies this process. Weakened in the knees by the sight of a living dinosaur, Grant, one of the palaeontologists (played by Sam Neill), says to Hammond: ‘You’ve created a miracle.’ Eager to demonstrate his prowess by showing how this miracle was born and made, Hammond shepherds his guests back to the park headquarters for a brief screening of a film within the film, entitled *Mr DNA*,¹⁴ featuring a cartoon account of how the dinosaurs were brought to life, using palaeo-DNA extracted from insects trapped in fossilised
amber who fed on the blood of dinosaurs. A short explanation of genetic engineering is followed by a visit to the ‘hatchery’, where the guests watch a baby dinosaur being born. It is, again, a dual and somewhat contradictory promise which is part of the signature appeal of Jurassic Park, as though one were first shown the magician’s display of conjuring, and then immediately thereafter educated in the mechanisms of its illusions.

This ‘magical’ dimension of the Jurassic Park spectacle is partly achieved through a layering of animation techniques, as mentioned above. Filmed with a combination of animatronics, morphing, texture mapping, and robotics using technology such as the Alias PowerAnimator™, Pixar’s RenderMan™ and Reality Engine™, Jurassic Park literally involved a complex sequence of ‘layering in’ several dimensions of animated material in order to enable the dinosaurs to ‘come to life’. As stated above, what is notable about this process is that the necessity that it be invisible (that is, not appear to be a set of ‘special effects’) is juxtaposed against the constant return to the primal scene of (re)production in the film itself, where we are enabled to ‘see how it was done’.

### Jurassic Park: The Theme Park, the Ride and the Toy

The means by which the animation of the film ‘brings to life’ the promise of the narrative in the form of re-animated extinct dinosaurs allows Jurassic Park to offer a complex set of juxtapositions between fantasy and reality which, like many of Spielberg’s films, play well to both very innocent and very knowing audiences. While delivering a set of reflexive, and at times moralistic, references to Hollywood cinema and the entertainment industry, Spielberg also provides a traditional context for the celebration of technoscience as both man-made and miraculous.

Recalling his original conception of Jurassic Park, author Michael Crichton notes:

> Whenever I come up with an idea like extracting dinosaur DNA and then growing a new animal from it, what naturally occurs to me is, ‘Well, okay, who’s going to pay for it?’ The cost would most certainly be phenomenal – and what is it really worth to Stanford University to have a dinosaur? So part of the theme park idea had to do with how to pay for such a project . . . I couldn’t think of any other way to pay for it. I still can’t. I think if dinosaurs ever are cloned, it will be done for entertainment.

(quoted in Shay and Duncan, 1993: 4)

In notable contrast to Crichton’s scepticism about the power of academic research scientists to mobilise sufficient funds to re-create an extinct dinosaur, he is confident the entertainment industry could do so, as, in a sense, they confirmed by investing huge sums in what many considered the improbable prospect of creating Jurassic Park. The self-ironical celebration in Crichton’s acclaim for the movie industry is in contrast
to his stated (if disingenuous) concern about the biotechnology industry: that 'the commercialization of genetic engineering [comprises] a very serious problem and one that we are still not facing' (quoted in Shay and Duncan, 1993: 4). One reading of these juxtaposed claims is that the film demonstrates the conscientiousness, and moral purpose, of the entertainment industry by offering a chilling denouncement of the biotechnology industries, and the scientific temptation to 'tinker' with the germplasm. A more cynical reading is that such claims are contradicted by the film's celebratory, 'gee whiz', depiction of biotechnology and genetic science, to which the moral reproach is mere narrative closure. Crichton has certainly benefited commercially from the hype surrounding biotechnologically assisted futures, at least through sales of his novel and the film. Like Schindler's List, with which it overlapped in post-production, Jurassic Park offers moral denunciation - an attractive certainty in an age in which solid truths are hard to come by - and, even more importantly, good box office. Arguably it is precisely the excessive layering of this film, in both moral and entertainment terms, which renders both its reception and its 'message' so appropriately flexible.

In addition to the 'theme park' setting of Jurassic Park, with its ludic, self-referential relation to Hollywood, the cinema and the entertainment industry, it is significant that much of Jurassic Park is structured as a ride. Early in the film, the visiting party is swept across the ocean and plunged into a gut-wrenching drop by helicopter on to the landing pad at the base of a waterfall. Filmed on the island of Kauai at the western edge of the Hawaiian islands, where tourists are invited to enjoy 'the most beautiful helicopter rides on earth' by at least a dozen flight-tour operators, the first 'ride' in Jurassic Park faithfully replicates an on-site tourist attraction. Subsequently, the visitors are transported by special 'tour cars' to the main headquarters. At headquarters, they take another 'ride' through the production of the dinosaurs in a series of 'behind-the-scenes' introductions to Jurassic Park, for which they are, as in the helicopter, literally strapped into their seats. And, of course, the entire rest of the film from that point onwards is about a 'ride' that goes very wrong, as the tour cars stall and the visitors' escape from the theme park begins.

Remarking on the 'theme park model of consumption' exploited by Walt Disney in his creation of Disneyland, popular culture historian Mark Langer describes an 'integrated structure, which reached an international audience, [and] formed a transnational space for selling both goods and cultural images' (1995: 75). By dovetailing the opening of the Disneyland theme park with live television broadcasting, Disney was able to invite viewers in 1955 to:

Dial 7 at 7:30 tonight for the biggest 'live' telecast in history, as Walt Disney himself guides you through the 160-acre wonderland he has created in Anaheim, California. You will steam down the rivers of America in a real old-fashioned stern-wheeler, The Mark Twain; trek to darkest Africa for a look at wild animals; ride a rocket to the moon - all in the comfort of your own living room.

(Disney advertisement, quoted in Langer, 1995: 75)
Figure 6.2
The large ‘toys’ in the theme park are, of course, the dinosaurs themselves, which are in turn animated on film by both small and large puppets, such as the Ill Triceratops shown in this scene.

Extending the Disneyland analogy of ‘a movie that could be walked into’ (Hine, 1986: 151), Jurassic Park offers a movie of a theme park which in turn becomes the main attraction of theme parks, set up by Universal Studios in 1994 in Florida and California — thus redeploying a similar series of dovetailings of rides-within-rides, theme parks-within-theme parks and movies-within-movies.¹⁸

The most important element of the theme park is, of course, its attractions: the ‘living’ dinosaurs of Jurassic Park, which are, like large puppets, its toys (Figure 6.2). As the hype factor within the film concerns the creation of animate dinosaurs, so did much of the media attention to Jurassic Park concern the state-of-the-art animation techniques necessary for its successful creation — the credibility of which was largely seen to determine the film’s success or failure. ‘Before too many months had elapsed, it became evident that Jurassic Park would need much more than the usual production in terms of preparation,’ note Don Shay and Jody Duncan, authors of The Making of Jurassic Park (1993: 22). Denis Muren, of the special effects outfit Industrial Light and Magic founded by George Lucas to create Star Wars, recalls:
At the time, Steven [Spielberg] was pretty much insistent on doing it all with full-size robotic dinosaurs that he was going to have made. He had seen the 'King Kong' ride at the Universal Studios tour in Florida and thought it was fabulous. He felt that if somebody could do that, then with some more direction they could make dinosaurs that would be able to do most of what he needed for this film.

(quoted in Shay and Duncan, 1993: 18)

Production of the dinosaurs for *Jurassic Park* was eventually based on a combination of full-scale robotic devices and smaller puppet models, combined with computer-generated imagery.¹⁹ The most daunting construction was the T-rex, which was ultimately built on a flight-simulator platform, adapted to conform in its movements to the manipulation of a fifth-scale T-rex replica. Designer Stan Winston explains:

The mechanism was based on a flight simulator, but it's not a flight simulator — it's a 'dino-simulator'. It was built specifically for us, to our dimensions for this T-rex. But the concept is the same. We took all this hydraulic technology and spread it up through the simulator, into the body, out to the tip of the tail and the tip of the head.

(quoted in Shay and Duncan, 1993: 29)

The aim was to achieve for the T-rex 'complete motion', adequate to convey the fluidity of organic musculature and bird-like rapidity. 'It was almost like sculpting motion rather than sculpting clay' noted one of the T-rex model-builders (Richard Landon, quoted in Shay and Duncan, 1993: 31). Dubbed 'go-motion animation', the techniques for animating the dinosaurs of *Jurassic Park* were successfully developed to maximise fluidity of movement and invisibility of technique. Animator Randy Dutra compiled a 'Dinosaur Bible' of movements, capable of being stored on computer and blurred into a cinema-finish through a use of motion control that eliminated the occasional 'strobing' effects of stop-motion techniques. Throughout, the primary aim in animating the dinosaurs for *Jurassic Park* was to convey a sense of warm-blooded, lithe, intelligent life forms in contrast to their lumbering, dim-witted and understandably extinct image. In addition, an emphasis on the behaviour of dinosaurs characterises both the narrative of the film and the depiction of the dinosaurs. 'What we tried to do', dinosaur creator Rick Carter claimed, 'was find the animal in the dinosaur as opposed to the monster in the dinosaur' (quoted in Shay and Duncan, 1993: 14).

Writing of the place of the toy between the animate and the inanimate, Susan Stewart describes it as 'the physical embodiment of fiction'.

The toy . . . is a device for fiction: it is a device for fantasy, a point beginning for narrative. The toy opens an interior world. . . . The inanimate toy repeats the still life's theme of arrested life, the life of the tableau. But once the toy becomes animated, it initiates another world, the world of the daydream. The beginning of narrative time here is not an extension of the time of everyday life; it is the beginning of an entirely new temporal world.

(1993: 57)
As a material-semiotic actor, the toy instantiates a fantasy temporality: that of the daydream. Its animation offers 'a point beginning for narrative' inviting 'an infinite pleasure', and it is thus directly key to the powers of imagination. Through the animation of the toy, an object 'comes to life': '[T]he world of objects is always a kind of "dead among us", the toy ensures ... the world of life "on the other side".' Stewart adds:

It must be remembered that the toy moved late to the nursery, that from the beginning it was adults who made toys, and not only with regard to their other invention, the child.

(1993: 57)

The spectre of the toy is inextricable from that of the machine, and in this sense, the toy is the ghost of industrialisation, 'the dream of the impeccable robot which has haunted the West' (Stewart, 1993: 57) as a kind of subtext to mechanisation, automation and the liveliness of machinery. How fitting Darwin should have proposed his redefinition of 'life itself' in the mid-nineteenth century, in an England seething with industrialisation, amidst the blur and hum of a mechanical liveliness all around him that was unprecedented until his era. Describing a Victorian table-top railway, Stewart suggests its amusement derives from the 'double stamp of culture brought about by introducing the mechanical to the natural and by traversing the natural with the mechanical at the same time that a reduction of scale is effected' (1993: 58). Nature is doubly transmogrified by such a display: '[T]he natural has moved from the forest to the individual trees of the park to the synthetic trees, barns, cows and farmers of the train set's landscape' (1993: 59). Toys could be said in this sense to represent an entire genre not only of second nature, but of seconded industrial culture.

This seconded, or 'toy-', nature inhabits an array of landscapes in *Jurassic Park*, in which both miniaturisation and the use of the gigantic were concealed mechanisms for the production of 'naturalistic' verisimilitude. From the mechanical hydraulics of the flight-simulator T-rex, to the delicate hand-held puppetry of the hatching Velociraptor, to the computer-generated animation of the Gallimimus herd, nature is seconded by a range of devices in pursuit not only of the amusements of a table-top reduction of scale, but of the view from the train-window which sweeps to the horizon point of landscape. The temporalities of live-action, mechanical simulation, virtual animation and their recombination post-production can be offered as a fluid cinematic spectacle, through which reorderings of scale, time and dimension are seamlessly re-unified.

Writing of the film's fluidity and movement, film theorist Peter Wollen suggests:

It's all as if *Jurassic Park*, the film, was really designed to end up as *Jurassic Park* the ride. The strip of film unspooling through the projector is like the single-rail automated people-mover designed to shuttle tourists around the park.

(1993: 8)
It is perhaps only fitting that visitors to Jurassic Park (in the film) should be transported by rail, as they are thus ‘moved’ by the ‘mechanical dinosaurs’ of the industrial age in their consumption of the great achievements of the age of genomics. Through consuming ‘wildlife’, as bio-tourists, such visitors witness the towering achievements of technoscience, indistinguishable from the ‘real thing’ save for the fact of their 65 million year disappearance.

As Stewart notes, the invention of the toy is proximate to that ‘other invention’: the child, and, consequently, the childlike. A complex positioning of the child operates within Jurassic Park, as in all Spielberg films, to which children are inevitably central. Superficially, children are important to Jurassic Park in the development of plotlines around the palaeontologist Grant, the palaeobotanist Ellie, and the Park owner, Hammond. More importantly, they are key to the establishment of point of view within the film, as well as the novel, which are notably childlike, although neither is particularly suitable for children. For both the author Crichton, and the director Spielberg, this centrality of the child and the childlike becomes closely associated with paternity, echoing the centrality of father–child bonds within the film. Michael Crichton recalls the turning point which led him to write Jurassic Park:

My wife was pregnant with my first child, and I found I couldn’t walk past a toy store without buying a stuffed toy. And what I was buying, more often than not, were stuffed dinosaurs. My wife couldn’t understand it. We knew we were having a girl. Why was I buying all these dinosaurs? And I would say, ‘Well girls like dinosaurs too.’ But it was clear I was sort of obsessed with dinosaurs; and the whole idea of children and dinosaurs, and the meaning of what that was, was just on my mind a lot during that period.

(quoted in Shay and Duncan, 1993: 3)

This extract is notable for several reasons, not least of which being the relationship between authorship and paternity signalled by the gifts purchased for his unborn daughter. In a sense, the conception of Jurassic Park, its genesis or animation, has as its starting point a toy bought for a child – but perhaps not for the child. Upon reflection, the gift reveals an ‘obsession’ not only with dinosaurs, but with children and dinosaurs, and indeed fathers giving dinosaurs as gifts to children. This fascination recapitulates the relation of author to text, long modelled on the idiom of paternity (Rose, 1993), in several senses. Certainly the character of Hammond, the entrepreneurial ‘author’ of Jurassic Park, demonstrates a pronounced paternal relation to the dinosaurs ‘born’ into his custody. ‘I always try to be present at the birth’, he explains to his visitors in the hatchery. In a sense too, the Park is conceived by Hammond as a ‘gift’ to children and it is his own grandchildren he invites to visit the Park as a treat. Similarly, Spielberg’s films centrally concern the relation of children to the miraculous, the monstrous and the father – who is often culpable, or flawed. As a celebrated cinematic auteur, Spielberg is particularly known for both appealing to children and terrifying them, much as Walt Disney did with films such as Bambi. As
film critic Henry Sheehan points out, ‘The two most terrifying scenes in the film revolve specifically around the children's near death at the hands first of the tyrannosaur rex and then of the velociraptors’, consistent with the signature Spielberg theme, present in both Jaws and Schindler's List, of 'the father or father figure trying to rescue a child just before it undergoes the death the father has unwittingly devised for it' (Sheehan, 1993: 10).

Whether or not, then, Jurassic Park, or other Spielberg films such as Jaws, are 'for' children, children are central to both his plotlines and his characterisations. Moreover, it is often noted that many of the pleasures associated with the work of Spielberg are distinctively childlike, and this is a defining feature of of Jurassic Park. As a fascination with dinosaurs may be described as childlike, so too is animation often described as a medium inextricable from the pleasures of childhood. Interviewed in Art History Journal for a special issue on 'Cartoon: Caricature: Animation', animator Irene Kotlarz describes the medium of animation as inevitably childlike because

so many of the concerns of animation have been with the unfilmable, or with aspects of the imagination which are hard to represent in other media. Movement itself can be rendered in evocative ways, objects and people can be deformed, metamorphosed and dismembered. So many of its themes have come from fables, or folklore or magic. Maybe there is something too about close attention to detail - an aspect of the process of production which promotes a kind of 'innocent' encounter with the world. . . . There is an obsessive and almost childlike interest in making things move - which often starts in early childhood.

(quoted in Curtis, 1995: 25, emphasis added)

The uses of childhood, children and the childlike within Jurassic Park complement and enhance its invocation of the 'toy', the 'theme park' and the 'ride'. The essentially ludic space created through these devices is an important means through which the many juxtapositions offered by the film are explored. Closely linked to the imagination, and to the 'unfilmable', an excess of animation offers a broad scope of possibility for re-imagining life, life's creation, and the re-creation of extinct life forms through the very medium itself.

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**The Making of Jurassic Park**

The excesses of Jurassic Park at the level of the pre-production, production and post-production of the film were accompanied by an equally staggering market-making epic. 'If it's not Jurassic Park, it's extinct,' proclaimed the slogan for a host of tie-ins for the blockbuster dino-pic. More than 500 companies were licensed to sell more than 5000 products connected to Jurassic Park worldwide. In Britain alone, sales of the Jurassic Park dinosaur toy range exceeded £10 million by the end of 1993 - just over six months from the date of the film's US release. Many of these products were
after its release on 11 June 1993, the film had grossed over a billion dollars in merchandise alone. For a film that had cost $15 to $20 million to advertise, such returns could be seen only as overwhelmingly profitable. Moreover, in March 1994 Jurassic Park was still playing in over 900 movie theatres in the US alone, with the video expected to be released in the autumn of 1994.22

The aptly named marketing executive Brad Globe of Amblin Entertainment and Elizabeth Gelfand of MCA/Universal Studios led the marketing drive for what they described as ‘the highest grossing movie of all time’.23 Two departures from traditional market and release protocol were claimed to have been instrumental to the emergence of Jurassic Park as a ‘global brand’. First, the usual timing between US and foreign release was significantly shortened, to within less than a month. This required that many of the merchandising companies were already signed on well in advance, which in turn generated approximately $60 million worth of domestic and international promotion exposure. Kenner, McDonald’s, Sega and Nintendo were all early signers to the Jurassic Park ‘Dinosaur Dream Team’, as it was dubbed. Kmart, Weetabix, Kellogg’s, PepsiCo and Coca-Cola joined later to represent different world markets. In turn, licensees of promotional products and tie-ins were invited to Amblin’s Jurassic Park-style headquarters on the Universal Pictures lot in Studio City, California, to meet Spielberg, the producer Kathleen Kennedy, and other entertainment industry executives, and to see

Key to the phenomenon of Jurassic Park as a globally successful film and its appeal to the marketing of merchandise was the way in which it was marketed, with its global brand. According to Magiera, ‘the marketing department is the brand’. The team behind Jurassic Park was successful in marketing the film in a way that established it as a global brand, which was instrumental in its success. This approach to marketing helped to create a sense of excitement and anticipation among audiences, which was crucial to the film’s success. The team behind Jurassic Park was also successful in marketing the film in a way that established it as a global brand, which was instrumental in its success. This approach to marketing helped to create a sense of excitement and anticipation among audiences, which was crucial to the film’s success.
executives, and to view 'a rare screening of behind-the-scenes footage from *Jurassic Park*' (Magiera, 1994: S1–2). Once assembled, representatives from the various licensing firms were invited to contribute their own ideas to the Amblin/MCA ‘Dream Team’, enabling them to contribute directly to the promotion and marketing strategy.

Key to the unification of 500 licensed products and more than eighty different marketing and promotional efforts was the *Jurassic Park* logo, the yellow, red and black shadow-profile of the upper part of a T-rex skeleton, standing with its jaws agape and claws raised. The logo, according to Brad Globe of Amblin, ‘identified *Jurassic Park* as very special and very unique without actually showing the dinosaurs’ (quoted in Magiera, 1994: S2). The no-show dino logo served two purposes, according to the marketing directors: it preserved the secrecy surrounding the appearance of the dinosaurs in the film, thus contributing to the suspense surrounding its release, and it clearly distinguished official *Jurassic Park* dinosaur products from their myriad saurian competitors. From early on, market managers were impressed by the worldwide appeal of the logo. According to MCA/Universal’s Elizabeth Gelfand, ‘I think that’s the phenomenon of *Jurassic Park* – that around the world there is such a strong identity for this movie and its logo’ (quoted in Magiera, 1994: S2). Market industry leaders were also impressed by the success of the *Jurassic Park* promotion, and the Amblin–MCA/Universal team was voted ‘Promotional Marketer of the Year’ by the influential trade journal *Advertising Age*.

As it not only met, but surpassed and transformed industry standards at the level of production, so too did the marketing and promotion of *Jurassic Park* exceed expectations and transform business-as-usual. It is difficult to account for the film’s enormous worldwide popularity, and the effectiveness of the *Jurassic Park* ‘global brand’, which succeeded in creating an almost instantaneous global market. Clearly many films have vast promotion engines positioning them to become summer blockbusters, and many are disastrous failures all the same. Other films, such as *Jurassic Park*, seem to attract not only the interest, attention and curiosity of the ‘general public’ but to generate momentum within the professional circles out of which they emerge – as this film seemed to do among advertisers and marketing executives, much as it had done among the cast and crew involved in its production. In more than one respect, and as a brand as much as a film, *Jurassic Park* somehow acquired a life of its own.

One way to begin to examine the bases of such fascination, curiosity and promise – the ‘hook’ of this film – is to shift attention away from its production and marketing to consider briefly at least one context of its consumption. In the following section, then, I examine the ‘consumption’ of *Jurassic Park* by the American Museum of Natural History in New York City. An unusual place for a tie-in to a major Hollywood motion picture, the American Natural History Museum was one of several prominent public institutions to ‘jump on the *Jurassic Park* bandwagon’. In an ironic sense, the film put ‘life itself’ back into natural history through its occupation of an entire wing of one of America’s most eminent scientific institutions, which is also home to one of the world’s most celebrated departments of palaeontology.
‘Press Screen to Start’: Interacting with *Jurassic Park* in the Museum

Michael Crichton’s particular brand of science fiction is said to be distinguished by the very close proximity of his storylines to actual scientific plausibility, and this is a key component in the ability of *Jurassic Park* to promise artificial life. The storyline is so close to ongoing scientific research that actual scientific discoveries over the course of the film’s production seemed as if deliberately planned to enhance its appeal.

(text from a display at the American Natural History Museum’s *Jurassic Park* exhibit)

As prominent science journals adapted their coverage of palaeontology to take advantage of the hype surrounding the production of *Jurassic Park*, so too did science museums create new displays timed to coincide with the film’s release. Seamlessly recruited to do service for the pedagogically inclined institution of the science museum, model dinosaurs have long been a popular display item offered to consumers of official natural history. Towering like imperial giants over the vast scope of life’s ancient majesty, model dinosaurs have a special place in the representation of ancient life forms.25

The successful extraction of palaeo-DNA from insects trapped in amber by scientists at the American Museum of Natural History in New York was one of several factors leading to the museum’s adoption of the film as a basis for the exhibit ‘The Dinosaurs of *Jurassic Park*’ housed in their main building beside Central Park (Figure 6.4).26 Outside the exhibit, a clip of the first-sighting scene in *Jurassic Park* repeated itself on a video monitor above the ticket office. In the first room, more clips from the film replayed themselves on a dozen monitors beside props from the film related to dinosaur re-creation and birth, including the embryo storage chamber and the hatchery. A display of storyboards from the film’s production led on to a second room, dark with jungle foliage and containing replicas of the dinosaurs featured in the film, again with video monitors beside them playing relevant scenes from the movie. As a self-congratulatory denouement, the last room contained ‘the evidence’ provided by the museum’s own collections. Insects trapped in amber, fossilised dinosaur eggs and skeletal remains were flanked by interactive computer terminals featuring the latest scientific findings about the dinosaurs: Were they related to birds? What did they eat? Did some of them have fur? How fast were they?

As a spectacle, the exhibit offered a ‘behind-the-scenes’ tour featuring a collection of authentic props (or artefacts) involved in the film’s production, and illustrating these with relevant footage from the film itself. By employing the film as a ‘lead-in’ to the final exhibit displaying the museum’s own collections, palaeontology was positioned as the ultimate ‘behind-the-scenes’ event.

The display of the museum’s own ‘contributions’ to the film thus collapsed an origin story of a particular technique (the extraction of DNA from insects fossilised

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Figure 6.4

In issuing an ‘official guide’ to the American Museum of Natural History, the museum also sought to forge a new authority as the ‘true’ source for stories of dinosaurs to be discovered (in amber) into an actuality for the museum itself, positioning palaeontologists and other inspired authors such as Spielberg, in its own media display extended the role of palaeontology, rather than trained in anthropological fields. The display thus re-framed *Jurassic Park* as derived from and giving rise to the role of discovery, and thus to the truth of nature, for the palaeontologists, themselves.

For example, it was Gheesling, president of the museum, who coined the term ‘quick seizer’, in *Jurassic Park*. The message is clear that the museum would not chose to emphasise a scientistic approach to the subject, but instead, an unintentionally ironic one.

Speculation was needed to bolster *Jurassic Park*. The museum’s own displays of dinosaurs and the role of palaeontology in evidence gathering in 3D... and actual *Jurassic Park*... the entertainment.

Displayed under the primacy of science as entertainment, and to reinforce museum authorship, the museum’s own exhibits were celebrated in *Jurassic Park*.
Figure 6.4

In issuing an 'official guide' to the dinosaurs of Jurassic Park the American Museum of Natural History sought both to attract customers by tail-backing on the film's appeal, and to reassert its authority as the 'true' source of the speculation necessary for dinosaurs to be discovered.

in amber) into an account of the origins for the film itself, positioning palaeontologists as the discoverers who inspired authors such as Crichton, and directors such as Spielberg, in the first place. In a sense, the display extended the film's credits by positioning palaeontology, rather than Michael Crichton (himself trained in anthropology), as its original inspiration. The display thus repositions the creativity behind Jurassic Park as derivative. The real author was natural history: the raison d'être for the museum itself. But the role of discoverer, of scientist, of 'modest witness' to the truth of nature's intimate genealogy, belongs to the palaeontologists, the high priests of fossilised life. For example, it was Henry Fairfield Osborn, then president of the museum, who named 'velociraptor', or 'quick seizer', in the scientific literature in 1924. The message is clear: without professional scientists, Jurassic Park would not exist. Or, as the museum itself chose to emphasise at the conclusion of its exhibit, in unintentionally ironic commercial language:

Speculation as much as special effects was needed to bring dinosaurs to life in Jurassic Park. The most accurate speculations about dinosaurs and their worlds are based on fossil evidence gathered by scientists. There would be no Jurassic Park, no recreated dinosaurs for our entertainment without science.

Displayed under the headline: 'Dinosaurs – Dead or Alive?', this text asserts the primacy of scientific research in the power to create, the capacity to transcend extinction, and to re-create the living from the dead. In strikingly similar terms to authorship, the museum too stakes a claim in the resurrection of the extinct life forms celebrated in Jurassic Park. Instead of special effects, however, it is scientific knowledge,
based on direct observation and disciplined research, which provides the animating spark or origin of life’s re-creation.

Not surprisingly, given its immensity, this claim proved controversial among members of the scientific community, such as Stephen Jay Gould, himself a palaeontologist, who was stridently critical of the exhibit. In his review of ‘Dinomania’ in the New York Review of Books shortly after the exhibit opened, Gould protested that ‘The Dinosaurs of Jurassic Park’

dramatizes a conflict between institutions with disparate purposes – museums and theme parks. Museums exist to display authentic objects of nature and culture – yes, they must teach; and yes, they may certainly include all manner of computer graphics and other virtual displays and devices from the increasingly sophisticated arsenals of virtual reality to titillate, to scare, to thrill, even to teach. . . . But theme parks are in many ways the antithesis of museums. . . . [T]heme parks belong to the world of commerce, museums to the world of education. . . . For paleontologists, Jurassic Park is both our greatest opportunity and our most oppressive incubus – a spur for unparalleled general interest in our subject, and the source of a commercial flood that may truly extinguish dinosaurs by turning them into sources of awe into clichés and commodities.

(1993: 56)

In contrast to Gould’s ‘two-cultures’ view of science and its publics, British film critic Peter Wollen questions this very divide in a review of Jurassic Park that invokes quite a different scientific tradition. Writing about the Victorian fascination with dinosaurs in England in the mid-nineteenth century, he points out that the museum and the theme park have a closely intertwined history. Here he cites the celebrated ‘dino-dinner’ at the Great Exhibition of 1851, hosted by Richard Owen, who had coined the word ‘dinosaur’ (from the Greek meaning ‘terrible lizard’) at the annual meeting of the British Association for the Advancement of Science ten years earlier. Owen had life-sized dinosaur models built for the Exhibition site of the Crystal Palace in Hyde Park, London. As Wollen notes:

To publicise the new attraction, a dinner was held on a platform inside the iguanodon, its back still open, with Owen seated at the head of the table in the dinosaur’s head. The palaeontologists and geologists who gathered in the monster’s ‘socially loaded stomach’, as the Illustrated London News reported, were there to form ‘the best guarantee for the severe truthfulness’ of [the replicas].

(1993: 9)

Given Steven Spielberg’s vigorous insistence upon the most ‘severe truthfulness’ of his dinosaurs, the discordance between the museum and the theme park cannot be said to lie in the traditions of natural history as a science. Neither was commerce absent from the earlier period of ‘dinomania’, as Wollen also points out:
For the visitor to the dinosaur's island ... there were tie-ins too: wall charts and small-scale models. Plainly the newly-minted dinosaur was in at the very birth of the theme park, mixing science with spectacle.

(1993: 9)

At the American Museum of Natural History, there was as much to see in the gift shop as in the exhibition, to be sure. Beside Jurassic Park lunch-boxes (the lower end of the 'educational' spectrum) were several shelves stacked with literary dinosauria: My Visit to the Dinosaurs; Dinosaurs of Long Ago; Dinosaur Babies; How Big is a Brachiosaurus?; The Day of the Dinosaur; Dinosaur Dreams; Fossils Tell of Long Ago, and other titles were displayed before crowds of eager consumers.

Such tie-ins were undoubtedly an important source of revenue for museums struggling to become more entrepreneurial in an era of shrinking public funds. Like the American Museum of Natural History, the Carnegie Museum of Natural History in Pittsburgh, Pennsylvania, also took advantage of 'dinomania' by launching its own collection of 'museum quality' authentic replica dinosaurs (Figure 6.5). These colourful plastic commodisauria came with official pedigrees of their sober lineage:

The original models were sculpted under the guidance of the paleontologists of the Carnegie Museum of Natural History, Pittsburgh, Pennsylvania. Each of these replicas is exactly to scale. Every detail is scientifically accurate. These replicas are a window onto a world that was. Not merely toys ... but an unusual selection of collectible replicas. They are so authentic that each one has a diploma ... a parchment tag suspended by a gold cord bearing a complete description.

The Carnegie Collection – Collect them all before they become Extinct!

(Manufactured by Safari Limited, Miami, Florida – made with 70% recycled materials.)

As the awkward disclaimer 'not merely toys' makes clear, this description once again attempts to combine the sobriety of learned scientific authority ('every detail is scientifically accurate') with both the trappings of commercialism ('a parchment tag suspended by a gold cord') and an appeal to the imagination ('a window onto a world that was'). Thus hybridising commerce, scientific authority and playfulness ('Collect them all before they become Extinct!'), these scale models perform the dense artefactualism of global nature as forms of both commodity culture and scientific realism.

Like 'dinomania' more widely, the commercialisation of dinosaurs, both by the producers of Jurassic Park, and by the directors of prominent scientific institutions, would seem to have a 'life of its own'. The consumer appeal of dinosaurs, however, cannot itself explain why commerce, like so many other media, has become so vigorous a conduit for the expression of interest and fascination with the once extinct. Long before they were the subject of a major Hollywood motion picture, dinosaurs had become something of a 'trend'. This fascination has since been tapped by a range of enterprises, from the entertainment industry to the scientific establishment.
Figure 6.5
Like the American Museum of Natural History, the Carnegie Museum emphasized ‘scientifically accurate’ dinosaurs in its marketing of scale replicas ‘sculpted under the guidance of paleontologists’, as were the dinosaurs in the film Jurassic Park.

The Mark
In its blend of spectacular cinematic effects and traditional narratives, the film performed a neat subversion of the Western’s old-fashioned methods. It thus parted company with its forebears and, in its own way, met the challenge of the age.

In its blend of spectacular cinematic effects and traditional narratives, the film performed a neat subversion of the Western’s old-fashioned methods. It thus parted company with its forebears and, in its own way, met the challenge of the age.

Life itself is an ordinary event.

This axis is not just a way of looking at life, but also at the commercial imperatives of the 21st century. It is a Foucauldian tradition, where the ‘simplification’ and ‘conjunction’ of language and discourse is a key to the wider context of the film’s appeal. It is a key to the wider context of the film’s appeal. This is a context that is global nature, which is key to the wider context of the film’s appeal. It is a key to the wider context of the film’s appeal.
Life itself is a capital accumulation strategy in the simultaneously marvelous and ordinary domains of New World Order, Inc.

(Haraway 1997: 143)

In its blend of sober scientific prediction, speculative commercial ventures, virtual cinematic effects and popular narrative forms, *Jurassic Park* is a film which collapses distinctions between fact and fiction, life and art, science and entertainment. It thus performs a neat summary of the increasing ambiguity surrounding the concept of life itself in contemporary culture, where its increasingly explicit removal from its traditionally antithetical relation to the inanimate, or to death, is the occasion of both fascination and horror. *Jurassic Park* is a parable announcing the wrongs of disturbing the realms of the undead, the once extinct. Yet it is also a celebration of precisely this newfound technological capacity. It is not properly a secular film, but an almost biblical allegory. It collapses the trajectory of evolutionary time in a fantasy of recreation, in which we stand beside our extinct genealogical brethren in awe at the miracle of (re-)creation, only to be reminded there was only one true Genesis which we mimic at our peril. But what it does best is to hold these two things together: the hubris of ‘playing God’ alongside its equally profound appeal.

This axis has many vectors of alignment with contemporary cultural practice, and the commercial success of *Jurassic Park* brings yet another set of meanings to the Foucauldian tradition of investigating ‘life itself’ as a singular indexical sign, and its conjugation as a distinctive turn-of-the-millennium grammar. In large part the production of *Jurassic Park* was commercially driven, yet its success cannot be explained by economic factors alone. It is the literally spectacular conjuncture between powerful economic forces, such as the entertainment industry, and conservative cultural institutions, such as science museums, which again demonstrates the excessiveness of the film’s appeal. This excessiveness, I argue, must be understood to work imaginatively, much as it does commercially or pedagogically. Becoming literate in *Jurassic Park*’s many idioms turns out to be another way to read across the many-layered palimpsest that is global nature. Interpreting the success of this film requires a hermeneutics keyed to the wider cultural renegotiation of life itself, to the altered artefacts of its productive and reproductive strategies, and the non-linear routes of its distribution and consumption. Viable offspring of the antiquated authority of ‘nature’ it both displaces and revivifies, life itself emerges as a contested template of cultural values and social practice. Technology figures centrally in this process of denaturalisation, as do commercial forces – both of which are, in a sense, animating entities in their own right. In addition to the expanding stakes in global contests over ownership of life forms are the intimate and subjective dimensions of such contests, throwing into question fundamental social ties based on identity categories deeply rooted in the biological. In an era in which it has become a cliché to refer to these elementary units of sociality as being ‘in crisis’, I suggest instead that what is more useful is to become
more literate in the syntax that now connects them. Whatever one thinks of *Jurassic Park* as a text, a parable, a product or a spectacle, one thing its excessiveness invites is a very broad array of reading strategies.

*Jurassic Park* is a film in which the central conceit involves not just exclusion, but exclusion of a very visible kind. The film relies fundamentally upon an axis of the visual in which everything depends on how much you don’t see behind the scenes, and everything you do see as a result of this exclusion. What is of interest is the extent to which this axis does not hold steady, but becomes the central invitation of the film: both as a cinematic or museum spectacle, and as a commercial enterprise, the invitation to go ‘behind the scenes’ is the provocatively repeated refrain. From the constitution of its half-hidden brand image, to the lure offered to commercial investors of seeing ‘behind the scenes’ clips of the makings of the film, to the museum’s reconstruction of its own ‘behind the scenes’ display, to the workings of the film itself, the invitation to *share in the secrets of its own making* is *Jurassic Park*’s predominant form of address. The film thus performs a very contemporary knowingness, speaking precisely to the knowledge of its audiences that there is more going on than meets the eye, and indeed that the invitation to call any bluff can be just another ruse. If such a form of cultural literacy is based on a certain scepticism, it is an overwhelmingly familiar one.

This repeated invitation to witness, the making of *Jurassic Park* provides a powerful analogy for the forms of public witnessing which surround the remaking of life itself. Now that biology has become increasingly technologised, gentrified and informative, its literal reconstruction in the lab has become increasingly public and visible, through episodes such as the worldwide publicity surrounding the creation of Dolly the cloned sheep. In newspaper diagrams and TV news show résumés of Dolly’s creation, her made-in-the-lab origins were repeatedly made explicit through images of denuded eggs, micro pipettes and petri dishes – an iconic biotechnological vocabulary with which the public has become increasingly familiar in the age of genomics. It is a measure of the extent to which life is no longer so much born and bred as manufactured and marketed that there is such popular interest in behind-the-scenes revelations of life’s re-engineering – a feature of life in the age of genomics which is both attractive and disturbing.

In this concluding section I turn to a set of general theoretical questions and proposals about what the genetic imaginary means for categories such as gender, sex and species which have in the past been grounded in a naturalised discourse of kinship and genealogy and remain so, while at the same time they also occupy a context of denaturalisation. More precisely, I want to ask what a refigured landscape of the genealogical augers in the way of cultural processes of signification – and, to be exact, of classification. What are the syntactics of difference through which reproductive and genetic ties are being re-circuited, re-calibrated and re-aligned as part of global nature, global culture?

Considering these questions, I also seek to return to the processes described at the outset of this volume – of naturalisation, denaturalisation and renaturalisation, building on Haraway’s claim, in exploring the promises of monsters, that:
Nature for us is made, as both fiction and fact. If organisms are natural objects, it is crucial to remember that organisms are not born; they are made in world-changing technoscientific practices by particular collective actors in particular times and places. In the belly of the local/global monster in which I am gestating, often called the postmodern world, global technology appears to denature everything, to make everything a malleable matter of strategic decisions and mobile production and reproduction processes. Technological decontextualization is ordinary experience for hundreds of millions if not billions of human beings, as well as other organisms. I suggest that this is not denaturing so much as a particular production of nature. The preoccupation with productionism that has characterized so much parochial Western discourse and practice seems to have hypertrophied into something quite marvelous: the whole world is remade in the image of commodity production.

(1992a: 297, original emphasis, citations removed)

The question I am asking here imagines a parallel process for life itself, whereby it can be investigated as a set of emergent essentialising discourses interpellating subjects into new formations – including forms of identity, embodiment, connection and disconnection. These are resonant with, but also displacing of, certain more traditional formations associated with the natural and the biological. Undeniably, new forms of knowledge, power and practice associated with contemporary technologies to ‘assist’ reproduction, heredity and genealogy both draw upon and displace pre-existing beliefs associated with nature and the natural (Strathern, 1992a and b). Writing of the new genetic cartography, visual historian Barbara Stafford comments:

The genome project is routinely and metaphorically described as a lexicological enterprise. The task is systematically to collect the protein and chemical bits and pieces constituting a human being and making up the ‘book of life’. The alphabet of DNA subunits will result, it is hoped, in the ultimate genetic compendium. Paradoxically, the trope of an inanimate catalogue or dead ‘library’ is used to talk about the original cells of existence. One of the purposes of this ars combinatoria would be to accelerate the identification of congenital defects. If the sequence of letters is out of order, the words are deranged. Consequently, reproduction has become part of the textualized and symbolized world of duplicable or disposable goods. Wanted ciphers can be kept, just as the diseased or unwanted ones can be discarded. Transposing living physiology into abstract language makes it easier, and less problematic, to justify manipulation. Like any dictionary, or digest, the consumer may refer, alter or combine decontextualized tiny elements at will.

(1991: 212)

The transposition of ‘living physiology’ into lexis, or text, comprises a shift of a particular kind: an axial transposition in the temporal and spatial orientation of life itself. If the modern definition of life itself derives, as Foucault suggests, from the
Darwinian model of life as a unified, consanguineous, interconnected system, then that system depended upon descent as its orientating axis, or even as its telos. In sum, genealogical descent is the vertical spine of the Darwinian model of life itself. When Darwin, for example, argues in *The Origin of Species* that life is indeed like a tree, the implication is that it is shared descent from a common, apical, ancestor which unifies life as a system that is not only consanguineous, but unified as a genealogy. Marilyn Strathern (1992b) amplifies this point by noting that it was the analogy of kinship which Darwin 'borrowed' to describe the significance of evolution. In this view, descent is the motor of selection - not just its axial orientation diagrammatically. Life itself derives its shape across the vertical passage of generations: it is distinctively, and necessarily, lineal. This lineal, vertical passage - seen to be unified, continuous and ubiquitous - is the source of the variation necessary for the invisible hand of evolutionary selection to operate (see note 9). Hence, variation provides the lateral axis of genealogy - the spread of the branches of the tree which denote the range of differences distinguishing distinct life forms. Importantly, for Darwin, life itself is vertically propricio-centric: its progressive orientation is always in forward gear, and its ontological constitution as a force or principle of animate vitality is always composed through descent lines criss-crossed at the point of reproduction, but pointing downwards. Like the early Ford motor car, Darwin’s genealogy didn’t go into reverse.

Once life’s variation is refrigued as a sequence of letters, a catalogue of words, or a lexicon, the axis of transformation shifts from vertical to horizontal, as in the alphabets of magnetic letters so familiar from refrigerator doors. Recombination need no longer operate intergenerationally, through the downward (as if gravitational) lineal flow of descent. Selection need no longer operate like a weir across the river of life. Indeed the river need no longer ‘flow’ at all, since its mere width becomes at any given moment a source of greater horizontal variation than it ever was constrained within narrow, lineal, canal-like passages of gene transfer, tapering to their narrowest width at the point of recombination. As sexual reproduction is above all else the mechanism for genetic recombination under Darwin’s scheme, so it is as definitively rendered insignificant by the advent of assisted heredity, cloned transgenics and the entire millennial menagerie of unfamiliar kinds.

This process can be described as the respacialisation of genealogy. Whereas, in the Darwinian model, genealogical order is the very order of life itself, in the post-Darwinian *ars recombinatoria* of the human genome project, genealogy is densely artefactual. Genealogical inevitability, once the master trope of sexual selection, becomes a thing of the past: it is a relic of an outdated recombinatory mechanism. Once upon a time, the breed was the outcome of generations of carefully selected lines, paired into haphazardly auspicious and unpredictably rewarding unions, and subsequently paired for the best of stock: the genetic capital, if there was any, OncoMouse™, the inaugural patented transgenic animal-apparatus for testing new cancer drugs, has no such pedigree. She and her sisters are a horizontal assemblage.

As it is, in a sense, flattened by the power of recombinant genetic technology to mix and match across species with the entire living lexical encyclopedia of proteins, enzymes and plasmids, after the fact of being the pure-bred among the lineage, and lineage becomes the flow of life across rather than within the profitable breeding family tree, the evolutionary story of its ancestry, and its organisation in relation to its shape, is fashioned when...

Genealogies are made available and made sense of by the form of its results: the trammels of medical history, the more or less constrained strategies, sexual strategies, sexual strategies, sexual strategies, sexual strategies, sexual strategies, sexual strategies. Biodiversity has been displaced.

If sexual expression is no longer good, if the matrix (hetero)sex - deixis, is no longer a departure from the given - is no longer the sexual desire, or Life Itself, or the traditionalism of the organic, the chemical, the laboratory? Or are we to find another form of traditions from beyond the genealogies of that high-class sexual order?

If the former foundation is life nor sex is a story to begin with. We cannot attempt to integrate or move to a different...
enzymes and plasmid vectors to choose from, so genealogy is also re-temporalised after the fact of transgenic organisms such as OncoMouse™. Once upon a time, when the pure-bred and the hybrid were the breeder’s only options, genealogy stood for lineage, and lineage stood for quality of livestock. Genealogy stood for the passage, or flow, of life across generations; good genealogy meant careful pedigrees ensuring profitable breedwealth. It referred to descent, and instrumentalised its graphology: the family tree, the lineage, the ancestral chart, the pedigree, the stud book. It was in the eighteenth century that a prized individual animal became fungible as breedwealth for its ancestry, and breeding could be said to have become modern, industrialised and organised in relation to individual genetic capital (Ritvo, 1995). All of that became old-fashioned when genealogy was replaced by the gene pool.

Genealogical time is also refuged by the newly exploitable ars recombulatoria made available through molecular biological techniques such as polymerase chain reaction (PCR). And time is passing quickly. A century ago, when biology was in its youthful period of confident expansion, genealogical time gave biology its authority in the form of its meta-trope: the mechanism of natural selection. At last freed from the trammels of merely categorical amusements, biology could offer natural laws. No longer constrained merely to describe the order of things (meticulously arrayed in their chaste museum boxes, each with a classificatory totem — like so many children’s marble collections), biology could explain origins. Now, with hybrid vigour, biology has increasingly become biogenetics crossed with biotechnology to produce a biopower unparalleled in history. And in the age of PCR, immortal cell lines, DNA libraries, and Darwin Genetics, Inc., genealogical time is as irrelevant as species borders, reproductive strategies, sexual selection or shared descent in the manufacture of life’s variation. Biodiversity has a new motor; it can be more diverse than ever before.

If sexual selection is no longer the name of the biological game, and life itself is no longer governed by sexual congress, does that mean it has been de-sexualised? Now that the organic is de-coupled from its doppelgänger — the reproductive telos of (hetero)sex — does that mean we are newly polymorphous? No longer perverse if we depart from the dutiful-but-rarely-beautiful sacred grove of nuclear familialism? What are the sexual politics proper to informational life, the virtual organic, transgenic desire, or Life Itself? If gender and kinship, like race, species, nation, ethnicity and sex, have traditionally been rooted in the given orders of the natural, the biological and the organic, then what is their function in the de-traditionalised loci of the Sequence Laboratory? Or, if class was never very far from pedigree in the Anglo-European traditions from which Darwin derived his original ‘loan’, what difference does it make that a high-class Ivy League Oncomouse has a trademark instead?

If the biological has been geneticised, and if that means that many of its former foundational fictions are now in the reliquary beside Lamarckism, then neither life nor sex is a branch on the same family tree that Darwin borrowed from the Bible to begin with. However, and as Steven Spielberg’s ever-recombinant family fictions tempt us to imagine (only to punish the thought), the transition is more one of moving to a different register than of transposing the scale altogether.
The Re-sexualisation of Life Itself

The flip side of the behind-the-scenes invitations so important to the success of *Jurassic Park*, in all its varied manifestations, is the horror the film unleashes upon its audiences. As a monster movie, the film is designed to terrify its consumers. Within the consumption of this terror-as-entertainment lie many unexplored dimensions of dis-ease and anxiety. The narrative contains this threat through the storyline architecture of successful escape from the island, effecting a closure only reopened as a prelude to the film’s sequel, *The Lost World*.

The sexual politics proper to *Jurassic Park* provide a figural standpoint from which to consider the forms of traditional narrative closure which work to contain the disturbing imagery and denigrations it releases. To begin with, sex is lexical for the dinosaurs of *Jurassic Park*, who have been genetically restricted to the female genre by means of prophylactic molecular programming. As feminised monstrous animatons, they play ‘Mother Nature’ in its many familiar guises from the bovine vegetarian brachiosaurus to the predatory and destructive T-rex. Genealogically and reproductively they are deranged, and this includes their nascent hermaphroditic tendencies, *grâce à la grenouille*. The frog DNA spliced into their genome where insect hypodermic failure left crucial gaps at the protein level yields to that familiar Darwinian life force – the imperative for reproduction where Dr Wu’s chastity helix would have there be none. The broken eggshells and little tiny baby dino footprints discovered by Grant, Alexis and Tim amidst their wanderings confirm what chaotician Ian Malcolm predicted was the only predictable thing: that ‘life will find a way’. Life, then, emerges as reproductive and familial after all in *Jurassic Park*, just as Grant is forced to rediscover the deep paternal instincts he has supressed in his ordeal with the two children he must rescue.

As noted above, the sexual politics proper to genomic kin relations are centrally founded on patriarchy. As Stafford describes a textualisation of life itself, so is the life scientist positioned as author. As the ‘romance’ of the inquiring scientific voyeur is metaphorically structured by the Baconian *ut*-text of ‘the masculine philosophy’, so too does a sexualised discourse of discovery infuse prototypic modern biological narratives such as *The Double Helix*. In genomics, the masculine associations of ‘original genus’ proper to both authorship and invention may be literalised as progeny (Franklin, 1995).

As it is always debatable how successfully forms of narrative closure restore order in the wake of their transgression, so the horror created by *Jurassic Park* may be read as exceeding its own storyline. What is notable nonetheless is the restoration of family and patriarchy, of a deeply traditional sexual politics, in the space of its own displacement. Like the disruption of genealogy and its restorations, which we have argued is a defining characteristic of the workings of global nature, global culture, this film delivers both promissing monsters and an escape route.

Critical to the establishment of the familiar identity categories based on race, gender, sex, nationality, species and family are distinctions of kind and type which make reference, if not to constitutive family structures are literally deploying.

It is thus no accident that the futuristic family is born here.

For the intersect of what it is we make reference, if not to constitutive family structures are literally deploying.

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make reference, if not to nature, then to biology and ‘the facts of life’. These, in turn, comprise a reproductive model, as Marilyn Strathern notes: ‘Kinship systems and family structures are imagined as social arrangements not just imitating, but based on and literally deploying processes of biological reproduction’ (1992b: 3). She continues:

It is no accident that thinking about intervention in this area should bring futuristic fantasies and (in some cases) doom-laden scenarios to people’s minds. For the intervention is also into ideas, including ideas about the future itself – what it is we are laying or sowing for generations to come.

(1992b: 5)

It is thus no accident that Jurassic Park attracted such enormous fascination coincident with the dramatic rise of biotechnology and genetic engineering as global economic industries. In thinking about the cultural dimensions of such developments, it is all but self-evident that a high level of social anxiety attends the renegotiation of ‘life itself’. Another way to approach this question is to ask what kinship means in the context of instrumentalised genealogies, medicalised consanguinities and reconstituted biologies (which are, of course, the themes of Jurassic Park). Traditionally, anthropologically and conventionally, kinship is held to be based on ties established through reproduction, marriage or other legal means such as adoption. For Strathern, kinship is ‘not just the ways in which relatives interact with one another, but how relationships as such are held to be constituted’ (1992a: 5). As we described in Part One, Haraway offers yet another view: "[kin] is the question of taxonomy, category, and the natural status of artifactual entities. . . Establishing identities is kinship work in action" (1997: 67). This leads her to ask: ‘How are natural kinds identified in the realms of late twentieth-century technoscience? What kinds of crosses and offspring count as legitimate and illegitimate? Who are my kin? (1997: 120). For Haraway, kinship is a taxonomic, classificatory device for the production of kind and type. She proposes that the denaturalisation of kinds brought about through the mix ‘n match trans-genetics responsible for entities such as OncoMouse has made more evident how such beings are ‘naturalised’ as brands. The brand, or trademark, which connects OncoMouse to its parent company becomes the mark not only of its proper descent (‘brought to you by Dupont, where better things for better living come to life’), but of its gender, or kind. As Haraway first claimed in 1992, the cyborg animal or corporate bioscience are ‘literacy in quite a different grammar of gender’ (1992b: 42).

Haraway thus claims that the gender of OncoMouse, and her transgenic kin, is in essence constituted by relations of propriety and paternity, rather than by nature. Darwin’s ‘small, warm pond’ matrix of life’s creation is displaced in this view by the pure culture of the petri dish where embryos are re-fertilised with foreign DNA in order to carry other species’ genetic signatures in the nuclear genome of every cell.
This corporately owned and produced corporeality is literally marked from within, and it is this altered flesh that the brand or trademark ‘protects’ as an ontological kind. Protected too by the paternal and authorial conventions of intellectual property, most notably patent, the transgenic mouse, like Dolly the cloned sheep, and like the dinosaurs in *Jurassic Park*, indeed inhabits a different grammar of genealogy, and its driving telos is unmistakably commercial.

It is in depicting precisely this sequence of events, of the creation of animals not only for profit, but to create entire new worlds of commodification of life itself, that *Jurassic Park* is, to put it literally, right on the money. Like Dolly, or OncoMouse™, or Jefferson the calf (or any other of the founder animals of new cloned transgenic lineages), the dinosaurs are not so much born as made. In a sense too, they are not so much beings as done-tos. The restrictions of a former genealogical ordering, whereby, for example, a mouse could not exchange genes with a human, have been removed, and in their place has emerged a cut-and-splice genealogy enabling almost any combination of genetic traits. The ‘viable offspring’ derived from the merger of corporate wealth generation and molecular biological techniques is driven not only by the viability of an animal in terms of being capable of life outside the womb, but by the viability of such animals as live-stock in a market organised around, as Haraway puts it, life as an accumulation strategy.

What is perhaps most notable about the genetic imaginary at work in *Jurassic Park* is the simultaneity of so many divergent and contradictory pathways offered up within its visual and narrative devices – and indeed the celebration of this excess. While it performs a denunciation of the potential abuses of new genetic technologies, it paradoxically mimics this same potency in its own visual technologies of animation. More pointedly, it is a film which punishes the fictional male, scientific inventor of these unfamiliar kinds (John Hammond), while celebrating the actual male auteur director’s ability to deliver an animated allegory of the highest verisimilitude to ‘real life’. While it is a film which achieves harmonious narrative closure through the production of a nuclear family, this itself is achieved in an oddly recombinant fashion. These contradictions are also evident in its circulation as a text endorsed by staid scientific establishments such as the American Museum of Natural History, for which actual props from the film itself are used to bolster a narrative about the power of scientific imagination and research. I have argued that the levels of creation being intertextually and artefactually annealed in this hybrid entertainment business help us to chart a distinctive genetic imaginary, made up of a multiplicity of options, much like the new genetic constructions that are its object.

It is in the archaeologiacal layering of the genetic imaginary that global nature, global culture can be explored as a recombinant context, in which both being and doing are refigured. In sum, this context is as discursively recombinant as the dinosaurs themselves, brought into being by a range of devices that are both familiar and strange, transparent and opaque, animate, non-living and undead. It turns out that life itself is not only a wealth accumulation strategy, but a cultural technology as well.

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**Conclusion**

Writing of the image, the image, something practice... fact, and is...

In sum, he writes the image of nature and global consumption in society as the role of the genetic imaginary, new calibrations of species. I am arguing... remake as technique, nature and global... argument in this sense genealogy, but with... both imagined and...

In arguing the film itself to the process of redefining the virtual natural history, he blends state-of-the-art Park anticipated signif... production of known was, as we have seen... its own speculative... Walking with Dinosaurs... envelope of this in... ontology. Self-conscious... dinosaur models we... successful series. Entertainment, but also... an abdication of science documentaries. What... publicity claimed a... Palaeontologists who... having solved certain... dinosaurs convinced... *Jurassic Park* eating...
Concluding

Writing of the imagination, Arjun Appadurai claims that

the image, the imagined, the imaginary – these are all terms that direct us to something critical and new in global cultural processes: *the imagination as social practice...* The imagination is now central to all forms of agency, is itself a social fact, and is the key component of the new global order.

(1996: 31, original emphasis)

In sum, he writes that ‘the world we live in today is characterised by a new role for the imagination in social life’ (1996: 31). In arguing that the imagery, narrative and consumption of *Jurassic Park* can alert us to new registers of social practice, such as the role of the genetic imaginary, I want not only to emphasise its importance to charting new calibrations of foundational, naturalised categories, such as gender, kinship or species. I am arguing not only that it demonstrates the means by which nature is remade as technique, but that it also offers a means of understanding how global nature and global culture emerge through specific processes of re-alignment. The argument in this sense is concerned not only with how we imagine genes, genetics or genealogy, but with a much wider set of orienting devices through which the world is both imagined and reproduced.

In arguing that *Jurassic Park* is a sign of the times, I am reaching well beyond the film itself to the many intertextualities which imbricate it within a wider social process of redefining the natural, the global, and the future. In its introduction of virtual natural history, its re-animation of extinct life forms, and its emphasis on blending state-of-the-art palaeontology with successful popular entertainment, *Jurassic Park* anticipated significant shifts not only in the perception of nature, but also in the production of knowledge. The appeal of the film’s imaginative leap back into time was, as we have seen, celebrated within the scientific establishment in confirmation of its own speculative re-creations of lost worlds. Television series such as the BBC’s *Walking with Dinosaurs*, screened to great fanfare in the autumn of 1999, push the envelope of this interchange more explicitly to create a new form of virtual palaeontology. Self-consciously building on the success of animatronics in *Jurassic Park*, dinosaur models were ‘taught’ to walk, eat, mate, run, swim and fight for the highly successful series. Here, the imagination served not only the purposes of entertainment, but also the production of fact, engendering criticism by those who feared an abdication of scientific responsibility from one of the world leaders in nature documentaries. Was the BBC’s *Walking with Dinosaurs* a ‘natural history’, as its publicity claimed and its realist narration implied? Was it a documentary at all? Palaeontologists who worked closely with the series’ producer, Tim Haines, attested to having solved certain mysteries through the experimentation required to animate the dinosaurs convincingly based on scant fossil evidence. The Diplodocus featured in *Jurassic Park* eating from treetops was corrected in the BBC series, based on careful
analysis of cervical vertebrae indicating that the animal could not raise its head above its body, and thus must have been a browser among low-lying shrubs and plants. In the virtual laboratory of computer-based animation, paleontology-as-spectacle became 'the portrait of a lost world as it really was', revealing 'the behaviour behind the bones' and 'the living animal' itself (Haines, 1999).30

In this series, as in Jurassic Park, the imagination emerges as a 'key component' in the remaking of nature, and, as Appadurai claims, 'an organized field of social practices, a form of work ... and a form of negotiation between sites of agency' (1996: 31). In such examples, and the many others we have explored throughout this book, the remaking of nature becomes apparent as cultural process in a manner which defies separation into 'real' versus 'imagined' life. That life itself has become the matrix for such a collapse between the spectacle and the actual, or the material and the virtual, only underscores its dense overdetermination as a domain of social practice, much like the domain of the natural in an earlier historical frame. Moreover, it is in tracing the work of the genetic imaginary that an essential critical dimension can be added to the analysis of global culture, global nature. Both what the imagination links together, through speculation (in both its senses), and what it keeps apart (for example, through the distancing effects of horror), are important reckoning devices for tracing the lives, worlds and selves that can be made and undone at the turn of the millennium.

Notes

1 Protesters in London in the spring of 1999 signalled their awareness of both the transnational and gender politics informing the worldwide contest to capitalise on new forms of bioengineering in their challenge to the British Prime Minister Tony Blair: 'Tony Don't Eat Bill's Seed.'

2 See also the work of Lily Kay (1993) on the rise of the 'new biology' and Evelyn Fox Keller (1995, 1996). See also further below.

3 The cultural dimensions of the introduction of transgenic animals is discussed at length by Haraway (1997). My argument here, and in this chapter generally, is that such animals represent a departure from familiar models of kinship and descent, by demonstrating that patterns of filiation and succession once considered irrevocable because they are fixed by nature can be transcended by technology (see further in Franklin 2001a and b).

4 Genealogical time in the sense of intergenerational passage can now be slowed down by cryopreservation or speeded up through mass cloning in a manner that demonstrates the increasing power of technology to transcend formerly 'natural' limits to reproduction. Similarly, the removal of the 'bar' once provided by nature against not only interspecies, but also inter-kingdom, crossings, such as the splicing together of an eel and a strawberry, refuges genealogical space as more broadly recombinant, removing the limit point or horizon of former reproductive impossibility through the informationalisation and instrumentalisation of genetic codes as programmable procreative substance.

5 It is not only in the movies that extinction has become a thing of the past; much of our current zoological and botanical diversity is already preserved as genetic information, in banks, so that when populations of plants and animals become extinct, after the last living individual has expired, the genome of the species will continue to exist, or at least to be stored.

6 Collections of frozen tissue samples give new meaning to the concept of a population, and to the Foucauldian question of how sovereignty over populations is exercised, as has become evident in debates both about controversial 'cullings'...
debates both about the repatriation of human body parts (Bowyer, 1999), and about the controversial ‘culling’ of human embryos in storage (Franklin, 1999).

7 Van Dijck’s *Imagination: popular images of genetics* (1998) offers an insightful analysis of genetics as a space of theatre or performance. Although her book does not deal with animals or plants, and thus explicitly not with *Jurassic Park* (see Van Dijck, 1998: 2–3), her analysis is highly relevant in its emphasis on narrative conventions and visual spectacle. As she notes: ‘The theatre of genetics is defined by its story-tellers’ (1998: 29).

8 As described in Chapter 2, Foucault’s concept of the ‘non-temporal rectangle’ refers to the classificatory devices of the eighteenth century, whereby things were sorted by resemblances of form, and situated not within the chronotope of natural history, but in relation to the time of God’s Creation (1709: 131).

9 The historical shift to a Darwinian paradigm of life as a unified, consanguineous system in a state of constant flux (evolution) is also noted by the authors of the US Government Report ‘Patenting Life’ in the context of debates about the ethics of commercialising life. Whereas Platonic thought pictured each species as a static, unitary and primordial unit defined by essential characteristics of form, they note, Darwin introduced a model of the species as a dynamic, polymorphous and temporal grouping (Office of Technology Assessment, 1987: 98–100). It is, thus, the Darwinian model of life which first prioritises the value of genetic diversity – as a necessary source of the advantageous mutations necessary for evolutionary survival. In turn, a concern with the value of genetic diversity for the survival of ecosystems and species both merges and is in tension with the increasing (commercial) value accorded to genetic or bio-wealth. Here, life as a ‘productive’ force interpolates with its (evolutionary) significance as a re-productive telesis: an overdetermined junction in the context of contemporary struggles over biology-as-property.

10 Throughout this chapter I use italics to denote the film *Jurassic Park*, and roman type to denote the place *Jurassic Park* in the film and in the novel.

11 Domestic box-office sales in the US and Canada stood at $344.6 million, with international box-office sales at $375.5 million, creating a total worldwide box-office sales figure of $882.1 million.

12 As I discuss below, a hint of visibility of the making of *Jurassic Park*, the film, is present in one of the scenes where a shelf full of *Jurassic Park* products is (ironically) shown, including the book *The Making of Jurassic Park*, which was one of many texts produced and sold on the promise of being able to look ‘behind the scenes’ at the making of the film.

13 In turn, these features of the film are incorporated into its sequel, *The Lost World: Jurassic Park*, which went into film production in 1996 and was released the following year.

14 In the same way that Hammond is both doppelgänger, but also inferior, to Spielberg, so too is Mr DNA a kind of amateurish cartoon film, much the counterpoint of Spielberg’s supreme cinematic *magnum opus*.

15 Scriptwriter David Koepp comments:

> Here I was writing about these greedy people who are creating a fabulous theme park just so they can exploit all these dinosaurs and make silly little films and sell stupid plastic plates and things. And I’m writing for a company that’s eventually going to put this in their theme parks and make these silly little films and sell stupid plastic plates. I was really chugging my tail there for a while trying to figure out who was virtuous in this whole scenario – and eventually gave up. (quoted in Shay and Duncan, 1993: 56)

16 Spielberg is quoted as describing the decision to film on Kauai over Costa Rica, Puerto Rico, Mexico or the Philippines: ‘I think it was my age. Had I been twenty-six instead of forty-five I might have gone to someplace really rugged. But the idea of staying in a Hawaiian hotel room with room service and a pool for the weekend was very appealing’ (quoted in Shay and Duncan, 1993: 46).

17 The use of a ‘ride’ approach to the explanation of the scientific premise of *Jurassic Park* was also seen to be useful because of its expediency for exposition. Scriptwriter David Koepp explains:

> The most difficult part of the adaptation was determining how to deal with the exposition needed to explain the extraction of dinosaur DNA and the cloning of creatures that had not
Nature Seconded

walked the earth for millions of years. [The theme park-style ride] was brilliant. We could pop
in for a few seconds here and there, put in some bits of information, and then get out. There
was no need to have beginnings and middles and ends. We could do a lot of stuff that was fun
to watch – and it would all make sense because it is part of the amusement park environment.
(quoted in Shay and Duncan, 1993: 56)

18

Significantly, the makers of Jurassic Park explicitly sought to distinguish their theme park from
theme parks such as Disneyland. As Rick Carter, dinosaur creator, comments: 'This is, after all,
not Disneyland. What people want to go see in Jurassic Park would be the dinosaurs in their
natural habitat, not a lot of man-made stuff' (Carter in Shay and Duncan, 1993: 45).

19

'Advanced morphing techniques' developed in the wake of the Oscar-winning special effects in
Terminator 2 aided in dispersing the 'lack of faith' in computer-generated animals pre-Jurassic Park
(Shay and Duncan, 1993: 49). For the Gallimimus herding scenes, the creation of threedimensional
models in digital space was refined and developed to 'make the next quantum leap in
computer graphics' (Shay and Duncan, 1993: 51). So successful were the computer graphics for
Jurassic Park, that little of the 'go-motion' technique was used in the film – and indeed was
considered all but 'extinct' due to the excitement generated by its animatronic successors.

20

In his classic account of the establishment of paternity, Totemism and Exogamy (1910), Frazer
famously argued that it was the bringing of gifts to 'his' children which first asserted early man to
the proprietary consequences of his physical paternity - until then unkownst to him, and
afterwards the basis for exogamy. As Lévi-Strauss writes: 'It was thus not by chance that Frazer
amalgamated totemism and physiological paternity: totemism assimilates men to animals, and
the alleged ignorance of the role of the father in conception results in the replacement of the human
genitor by spirits still closer to natural forces' (1962: 2).

21

Commenting on the film of Jurassic Park, palaeontologist and science writer Stephen Jay Gould
complains that: 'This dinosaurian flooding of popular consciousness guarantees that no
cartoonist can ever face a journalist and avoid what seems to be the most pressing question of
the Nineties: Why are children so fascinated by dinosaurs?' (1993: 51). Yet, as Crichton's quandary
suggests, it may not be children's fascination with dinosaurs, but adults' fascination with this
relation that is in part responsible for the flood of dinosaur replicas repopulating the domestic
space of the western world.

22

After just one day on retailers' shelves, the home video of Jurassic Park set a new sales record for its
parent company, surpassing MCA/Universal's previous record of 14 million units sold, held by
Spielberg's ET.

23

Jurassic Park is not the highest grossing film of all time in terms of sales of film and video rights,
which distinction belongs to Gone with the Wind, according to 1996 figures. However, Jurassic Park
may well be the largest grossing film of all time if total merchandising sales per annum are used to
measure its success.

24

In addition to tie-ins, 'merchandising' of Jurassic Park also extended into its packaging for retail
cinema houses through discounts on Digital Theater Systems (DTS) enhanced audio facilities.
Owned by MCA/Universal's parent company, Matsushita Electrical Industry Co., DTS utilised CD-
ROM technology to produce a 'faithful reproduction' of the original soundtrack as it was mixed
and recorded in the studio. Timed to be released to coincide with the distribution of Jurassic Park,
Universal's promotional discount to cinema houses was accompanied by a letter from Steven
Spielberg stating that Jurassic Park would be an 'experience you will never forget . . . thanks to
DTS' (undated Universal Studios promotional packet).

25

A fascinating account of the importance of dinosaurs to the American Museum of Natural History
(AMNH) is provided in the book-length account of the museum's extensive reorganisation of their
dinosaur wing published in 1996. Next of Kin, by AMNH palaeontologist Lowell Dingus, is
deserving of more commentary than I have provided in this chapter, in particular because of its
account of the way cladistic genealogy structures the 'pathways' visitors follow through the
exhibit, and because of the way in which its title denotes our 'relatedness' to dinosaurs.

26

One of several books authored by American Museum of Natural History palaeontologists in the
wake of the success of the film Jurassic Park is entitled The Science of Jurassic Park and The Lost
World: or, how to build a dinosaur (1997), by Rob DeSalle and David Lindley. Featuring on its cover

an insect trapped near a dinosaur DNA
grounding their insect DNA.
also makes reference to
Educationalists at"Jurassic Park to devise interdisciplinary study,
your students a
disciplinary activity
of a well-cooked type of food using not eat cooked

27

Have children

dessert and
raisins (repeats
outside of
finished

28

Research conducted high levels of sales
about the scientific
the trustworthy
Trust, 1998).

29

Asking whether
Marina Warner
all the constraints
nature-coded for

30

The effort to reorder
Discovery Channel
for use in an area
egg to produce
an insect trapped in amber set against a skeleton of a dinosaur, the book narrates the extraction of dinosaur DNA from amber in close proximity to an account of the film's production, foregrounding their inseparability. Though less prominently, AMNH palaeontologist Michael Novacek also makes references to the dinosaurs of Jurassic Park in his Dinosaurs of the Flaming Cliffs (1996).

27 Educationalists have not missed the unprecedented opportunity provided by the release of Jurassic Park to devise new means to 'kindle children's interest in science exploration with the interdisciplinary study of dinosaurs'. As Charlene M. Czerniak writes in Science and Children: 'Now that your students are abuzz with dinosaur fever, why not incorporate a few of the following interdisciplinary activities into your science lesson?' She suggests: 'Give each student a piece of beef jerky or a well-cooked 2.5-cm cube of beef and a piece of lettuce. Have the class try to eat each type of food using only their front teeth (incisors), cautioning that, 'of course, the dinosaurs did not eat cooked meat, but we would not want students to eat raw meat'. Alternatively:

Have children make 'insects in amber' by mixing two large boxes of orange or lemon gelatin dessert and 600 ml of hot water. Dissolve the gelatin completely and then pour it over a few raisins (representing insects) in small cups. When cool, remove it by running hot water over the outside of the cup. Students can see the 'insects embedded in amber' and have fun eating the finished product! (1993: 19–20, original emphasis)

28 Research conducted by the Wellcome Trust in London into public perceptions of cloning revealed high levels of scientific literacy concerning biotechnology, and that the more the public knew about the science of cloning the more sceptical they became, expressing grave scepticism towards the trustworthiness of either the scientific community or its regulatory mechanisms (Wellcome Trust, 1998).

29 Asking whether Jurassic Park is a work of covert misogynistic propaganda, author and art critic Marina Warner notes that 'female organisms, in the film, prove uncontrollably fertile, resistant to all the constraints of men of power. The story can be reduced to a naked confrontation between nature-coded female and culture-coded male' (1994: 5, and see also Creed, 1993).

30 The effort to re-create extinct life forms is made even more vivid in the project funded by the Discovery Channel to remove a frozen mammoth from permafrost in Siberia and extract its cells for use in an attempt either to clone a mammoth by nuclear transfer, or to fertilise an elephant’s egg to produce a hybrid pachyderm.