Mutations and Misunderstandings
Notes Towards a History of Bio-aesthetic Practice

Sven Lütticken

In a deleted section of *The German Ideology*, Marx and Engels grandly state that there is only one true science, that of history, and that this science can be subdivided into natural and human history.[1] Evolution being a process of *longue durée*, the natural world often continues to be ideologized as an essentially unchanging realm, as *the other of history*. Pollution, the destruction of habitats and global warming are seen as encroachments on this realm from the outside, especially by those who claim to be 'on the side of nature'. Purist reflexes can likewise be detected in responses to genetic engineering, which gives rise not just to specific concerns but also fundamental rejections.

Genetic engineering is the merger – or clash – of natural history and human history; the result is a new unnatural history. By the year 2002 Francis Fukuyama, who in 1989 had appropriated Alexandre Kojève's appropriation of Friedrich Hegel to proclaim the end of history, was observing that 'there can be no end of history without an end of modern natural science and technology'.[2] In other words: not any time soon, probably; and if this end comes, it will probably be the end of humanity as we know it, rather than some post-historical eternal Sunday. But 'modern natural science and technology' hardly constitute an autonomous domain. Kaushik Sunder Rajan has argued that this technology stands in an overdetermined relation with what he has termed 'biocapital', involving 'the circulation of new and particular forms of currency, such as biological material and information…'[3] The land artist Robert Smithson liked to invoke Friedrich Engels' notion of the 'dialectic of nature', but – as TJ Demos has put it – the financialization of nature shows the extent to which this dialectic has moved beyond what Smithson could imagine.[4]

Meanwhile, various strands of 'bio art' inscribe themselves in a history that is no longer the art history of old, although some conceptions of this art can be surprisingly conventional. In his book *Bio Art*, George Gessert states that 'We have come to expect books on biotech art to deal with such issues as eugenics, the commodification of life, cloning, race, gender, genetically modified foods, and surrogate motherhood'; by contrast Gessert states that he wants to focus on aesthetics.[5] By using this dichotomy of the socio-political and the aesthetic, however, Gessert buys into a rather impoverished notion of the aesthetic, which mainly boils down to a discussion of different shapes and patterns of flowers. For the more interesting cases of 'bio art', this is hardly sufficient. When the Critical Art Ensemble makes projects investigating, for instance, genetically modified foods, the aesthetic dimension does not so much lie in their exhibition design, as per Gessert's definition of aesthetics, but in the fact that they engage with the way in which our surroundings and even the materials that we ingest – their shape, colour, taste, genetic makeup – are shaped by corporate rather than individual sculptors.

Discussing the case of people who produce an excessive amount of bioelectricity, like electric eels, thus causing computers and other equipment to malfunction, Paul Chan concluded that 'This is what art is like. Art feels as if there is a profound misunderstanding at the heart of what is…'[6] A misunderstanding at the heart of what is: this striking phrase challenges any attempt to naturalize 'bio art' by limiting it to coming up with some snazzy new patterns – new fashions for nature. Of course, as 'the heart of what is' is itself undergoing change, the misunderstanding that is art can allow us to examine this relentless development, and to propose possible alternative histories. Such histories cannot be limited to any narrow conception of bio art. Using the notions of *nature*, of *ecology* and of *systems* as Leitmotiv, I want to explore some possibilities for an art history that uses what one might call an extended notion of bio-aesthetic practice. Such practices include various science fictions and oneiric scenarios that are not limited by current technological, economical or social constraints, and which may help bring the complexities and contradictions of our unnatural ecologies into focus.

BREEDING FANTASIES: CREATING NEW NATURE

The term nature comes with unwanted ideological baggage, with purist fantasies of an unspoiled opposite of culture; consequently, Bruno Latour and Timothy Morton have argued that it is imperative to think ecology without 'nature'.[7] On the other hand, one might use recent developments to re-historize the notion of nature (as well as that of ecology). There is a history of détournement when it comes to the notion of nature, which has often taken the form of the assertion that society can come to function as a second nature. In his early essay 'The Idea of Natural History' ('Die Idee der Naturgeschichte'), Theodor W Adorno relied on the young Georg Lukács' Marxian reading of the Hegelian concept of second nature. This signified an 'alienated, dead world', a reified representation of impoverished social relationships.[8] Here second nature – already a term with a significant history at that point – comes to stand for the ossified products of human labour, as a fetishistic spectacle of apparently autonomous artefacts beyond human control – while 'first nature' itself, subjected as it is by science, undergoes a similar process. Adorno states that 'the question of the relationship between nature and history only stands a chance of being answered when one succeeds in

> understanding historical being, even in its utmost historical determinacy, as a natural [naturhaftes] being, or in grasping nature as historical being, even where it is apparently most resistant and static.[9]

A polemical attack on society's stasis is thus counterbalanced with the historicization of 'first' nature.

Next to Lukács, another crucial reference in 'Die Idee der Naturgeschichte' was Walter Benjamin's book on *Trauerspiel*, which attributed to Baroque drama a conception of history as a process of ruin, subject to elementary forces of nature. It is telling that Benjamin draws a parallel between the Baroque and Romanticism as the two great anti-Classicist tendencies: in the early decades of the nineteenth century, the Baroque fixation on *Vergänglichkeit* – a notion of transience that had served as a religious memento mori – was transformed into the scientific investigation of nature as liable to dramatic change.[10] In the works of such authors as Georges Cuvier and William Buckland the emerging science of paleontology produced a radical historicization of nature. This spelled the abandonment of Biblical chronology in favour of what would later be termed 'deep time' – a long

natural history preceding the emergence of the human race, populated by long extinct creatures. Human culture itself was now a potential ruin; at the end of the nineteenth century, H G Wells would send his time traveller to the post-human future of the Morlocks and the Eloi. Past stages of life were also brought to life again, in phantasmal scenes of deep time created by artists and writers.[11]

Poster for *The Lost World* (1925), directed by Harry Hoyt

In Arthur Conan Doyle's *The Lost World* and its 1925 film adaptation, dinosaurs have survived through the ages on an isolated plateau. Willis O' Brien, who was responsible for the stop-motion dinosaurs in the 1925 Lost World film, went on to animate for *King Kong* – essentially *Lost World* with an added ape, set on a remote island. Doyle's work is deeply ingrained with imperialist progressivism; far from advocating a cyclical view of nature, he emphasizes the march of time. Although the climactic unleashing of a pterodactyl in the heart of London – in the film, a brontosaurus was given the same role – suggests that the imperial city and the primeval jungle are not that dissimilar, the iron rule of progress and of the annihilation of anachronistic survivals is re-established. The pterodactyl perishes. The survival of isolated pockets of deep time, functioning as time capsules, only underscores the relentless march of history. In this respect, the *Lost World* scenario could not be more different from the cyclical model of natural history proposed in the early editions of Charles Lyell's influential *Principles of Geology* (originally published 1830–1833).[12] Lyell claimed that creatures very similar to the ichthyosaurs and dinosaurs, whose skeletons were being discovered on the Dorset coast and in quarries, might yet live in remote parts of the world – and might show up again in England when conditions once more suited them. The non-directional vision that Lyell attempted to impose on deep time could be seen as a regressive reassertion of a cyclic worldview – a *répétition du mythe*, as Benjamin characterized the nineteenth-century theories of eternal return.

Scene from *The Lost World* (1925), directed by Harry Hoyt

Those theories included that of Louis Auguste Blanqui, the revolutionary who in prison developed a curious notion of the eternal repetition of all events on an infinite number of planets, and of course Friedrich Nietzsche's Eternal Return.[13] Nietzsche's idea was itself a return to a late Pythagorean version of the old cyclical conception of time which conceived of events as the repetition of archetypal acts from a primeval period when gods or mythic ancestors walked the earth. In Ancient Greece, pre-Socratic thinkers – the Pythagoreans foremost – radicalized this traditional conception with the notion that everything will eternally recur; every moment in effect becomes an archetype that will return countless times.[14] However, in his early text on the 'advantage and disadvantage of history for life', Nietzsche concluded that ancient Pythagorean notions of eternal repetition are hardly applicable to historical events, which are in many ways specific and unique.[15] Disgusted with the second nature of historicist culture, with the oppression of life by a mania for the historical and the copying of the forms of ancient and non-Western cultures, Nietzsche came to propose a different kind of return. If one realizes that the Renaissance was created by a mere hundred men, such a breakthrough might be repeated.

The *Übermensch* was to be a second or third coming of the Renaissance aristocrat and the antique Athenian, blissfully devoid of Christian morality. His emphasis on the 'Dionysian' element in Greek culture notwithstanding, Nietzsche remained close to J J Winckelmann in his 'Apollonian' admiration of the Greek body, as idealized by Greek sculpture – with psychosexual overtones not dissimilar to those in Winckelmann.[16]

However, the New Greek would not be some slavishly classicist copy but indeed a new Greek. Gilles Deleuze argued that Nietzsche's abysmal notion of the eternal return takes this concept to its extreme, emphasizing that eternal recurrence not based on mythic archetypes can only lead to signs without referent, and hence to true difference, difference in kind rather than in degree.[17] A history reduced to dismally scripted plots would thus be opened up to becoming once more. Nietzsche stated that the Übermensch – himself an artificial creation – would act as 'a hothouse for strange and choice plants'.[18] What would these plants be? Sculptures, operas – or a different kind of art altogether? The much-admired Jacob Burckhardt, to whom Nietzsche would write letters signed 'Dionysos' during his descent into madness, emphasized that the Italian Renaissance lords were themselves artists who shaped the state according to their desires.[19] In any case, one should emphasize that Nietzsche's Übermensch is an aesthetic and to some extent an anti-biological fantasy; certainly an anti-Darwinian one.

Nietzsche rejected Darwin's concept of natural selection, as those who survived in practice were clearly *not* the fittest, but in fact the weakest, or the most mediocre. Natural selection did not deliver. If anything, the Renaissance or its future return is an unnatural, counter-natural event, the result of an aesthetic will to power rather than all-too-random natural selection. This obviously did not prevent the Nazis from détourning the anti-Darwinian Nietzsche in favour of their biologistic breeding programme, turning his rhapsodic visions into the mission statement of a cattle farm for cannon fodder. Greek sculpture provided a visual model for their oneiric moulding of contemporary 'Aryans'. Leni Riefenstahl's film *Olympia* shows the famous Greek statue of a discus thrower, which Hitler had acquired for the Glyptothek in Munich, morph into a flesh and blood athlete. In the process, the Nazis grafted Social-Darwinist notions and eugenic practices onto a misunderstood or simply misrepresented Nietzsche, aiming to mass-produce a New Man after the model of classical art.

Meanwhile, in the Olympic year 1936, Edward Steichen briefly transformed a space at the Museum of Modern Art into a showroom for flowers – the delphiniums that he crossbred fanatically.[20] Steichen considered flower breeding to be a genuine art.[21] Famous as a photographer who effortlessly moved from the pictorialism of the early twentieth century to slick and sophisticated advertising in the 1920s and 1930s, Steichen was something of a specialist for intermedia relations. Some of his best-known pictorialist photographs depicted Auguste Rodin and his sculptures, mystifying Rodin's works as appearances of almost divine genius while ennobling photography in the process. Declaring his delphiniums to be art and shoring up his claim with his 1936 MoMA presentation, Steichen once more sought to legitimize a new 'medium' (this time composed of living matter) by comparing it to established forms of art.[22] One of Steichen's photos shows a bouquet of delphiniums in front of one of Brancusi's bird sculptures, and a picture he took of the MoMA room not only contains a female model seated decoratively and decorously among the enormous flowers, but also a small bronze sculpture.

Breeding is a time-based art, and a time-consuming art, a serial occupation without end, without finality. The products of breeding may be quasi-sculptural entities, but they constitute aberrant rhythms in time, turning history into a feverish dream. Steichen's flowers are biological sculptures, yet as such they lack the permanence of bronze. Steichen essentially conceived of breeding flowers as a form of sculpture in motion, a sculptural art of serial development. In this sense, photography itself – by now well-established as an art form, even if still a relatively minor one – has much more affinity with the floral medium. Photography is a serial art creating

meaning from ephemeral sights to a large extent by producing variations on themes or motifs, much like the cross-breeding of flowers.[23] Film might be another equivalent, but it would have to be time-lapse film which would show all phases of individual flowers' lives equally, including their decay, whereas for Steichen what mattered were shots of the different variations and generations of his flowers that show them in their prime like frozen Brancusian movements.

As Gessert has argued, Steichen's pioneering work did not lead to others taking up 'bio art', in part because of the odium with which Nazi eugenics had saddled all forms of genetic engineering.[24] In their vastly different ways, both the National Socialists' and Steichen's breeding projects are instances of the biological turn of modernity. Both Steichen and the Nazis biologize the aesthetic and aestheticize the biological, but in the case of the Nazis their bio-aesthetics was a *biopolitical* project from the beginning. By now, with genetic engineering offering a whole new spate of possibilities, it is clear that the biological turn raises questions that are aesthetic in a more fundamental sense than that of beautiful colours and patterns, though including these; those questions are aesthetic insofar as they address the sensuous fabric of existence, our bodily existence and experience in a changing ecology. Neither this ecology nor the bodies of the humans inhabiting it can be called 'natural' in any rigid and essentialist sense of the word.

Of course, humankind's gradual biological and behavioural self-transformation did not start yesterday. Marx, writing on the degradation of the soil, was well aware of such processes – as was Engels when he wrote about the evolution of the human brain.[25] These were effectively attempts to theorize aspects of what one might call third nature; third nature involves second nature materially impacting and informing first nature, but more precisely it is the appearance of this process as unavoidable fate to those implicated in it.[26] It is only with recent challenges to the global ecosystem and intrusions in the genetic makeup of organisms that third nature has become *thinkable* as the seemingly autonomous march of inalterable changes in the environment and the organism. This generates fantasies of an end to disease and even a triumph over death on the one hand, and fears of ecocide on the other. The third nature of ecological collapse is the obverse of that of genetic improvement. Nietzsche's endless production of the new has given way to an iron march of technological progress producing an ever wider social chasm, which in turn creates more biopolitical fantasies.

MUTATION SCENARIOS

In 2006, the evolutionary anthropologist Oliver Curry – affiliated both with the University of Oxford and the London School of Economics – predicted that 100,000 years into the future the human race will be divided into two separate races, termed 'gracile' and 'robust' respectively. As the BBC reported,

> the descendants of the genetic upper class would be tall, slim, healthy, attractive, intelligent, creative, and a far cry from the 'underclass' humans who would have evolved into dim-witted, ugly, squat goblin-like creatures.[27]

While this breeding fantasy in the spirit of H G Wells's Morlocks and Eloi makes no explicit reference to genetic engineering, it is clear that one of the elite's advantages is having access to advanced technology in this and other

fields. In spite – or because – of its delusional qualities, the 'two races' scenario shows the limits of well-meaning liberal narratives in which the means of containing threats to the current order are seen to lie in that very order.

Its bluntness at least has the advantage of making explicit what remains hidden in paeans to the problem-solving power of capitalism: in an age of collapse the odds are far from even, both within Western societies and on a global scale. In Germany the Social Democrat and former board member of the Bundesbank Thilo Sarrazin has carved a media career out of making blanket statements about the unintelligent underclass, especially insofar as it is constituted by Muslims, whose procreational prowess means that Germany is getting more stupid and ultimately 'abolishing itself'.[28] Such Social-Darwinist accounts of social change mythologize it in the strict Adornian sense: for Adorno, myth was the rule of *nature as fate*, and Sarrazin presents immigrants' lack of education and career prospects as a biological given and sufficient explanation of social problems.

If evolution depends on spontaneously occurring mutations, breeders – such as Steichen – have long used spontaneous mutations for breeding purposes, creating an interplay of chance and design. Meanwhile, mutation has come to function in a different register, as a pervasive fear but also as a utopia. If contemporary engineering strengthens the role of design over chance, this design itself might have unforeseen consequences: the planned release of genetically modified organisms (crops, vaccines) into the environment regularly gives rise to protests that are spawned by the fear that their designer genes may have uncontrollable effects, for instance through unforeseen mutations in the GM organisms or in others exposed to them (such as insects feeding on crops).

Critical Art Ensemble projects such as *Free Range Grain* (2003–2004, with Beatriz da Costa and Shyh-shiun Shyu) with its laboratory of testing food for genetical modifications take place in an era in which breeding fantasies have become a rather mundane reality.[29] While the project may to some extent go along with purist fears of any form of 'GM contamination', its aesthetic dimension is that it makes the protocols of the new nature visible and concrete, and thus open to intervention and contestation. The CAE received unexpectedly ferocious feedback in response to its acts when its member Steve Kurtz was arrested by US authorities on the ludicrous charge of 'bioterrorism', based on Kurtz's possession of harmless biological samples.[30] Using the unprecedented powers granted to them in the context of the 'War on Terror', the authorities clamped down on a group that dared question the dominant corporate production of third nature; branding Kurtz as a 'bioterrorist' made him the scapegoat, the spectre of bio-terror in a sense providing the monstrous counter-image of approved forms of biological research and genetic engineering.

Using Félix Guattari's terminology, one might state that this affair drives home the point that what matters is not so much ecology as such, as it is commonly understood, but the interconnections between what he calls *environmental, mental and social ecologies*.

> Now more than ever, nature cannot be separated from culture; in order to comprehend the interactions between ecosystems, the mechanosphere and the social and individual Universes of reference, we must learn to think 'transversally'. Just as monstrous and mutant algae invade the lagoon of Venice, so our television screens are populated, saturated, by 'degenerate' images and statements.[31]

Guattari thus introduces the motif of *mutation*, which occurs in and across all three ecologies, neither of which can be seen as some kind of ideal ecosystem in perfect homeostasis.

It is, of course, one of Guattari's basic tenets that in post-Fordism the production of subjectivities takes on ever greater importance:

> Post-industrial capitalism, which I prefer to describe as *Integrated World Capitalism* (IWC), tends increasingly to decentre its sites of power, moving away from structures producing goods and services to structures producing signs, syntax and – in particular, through the control which it exercises over the media, advertising, opinion polls, etc. – subjectivity.[32]

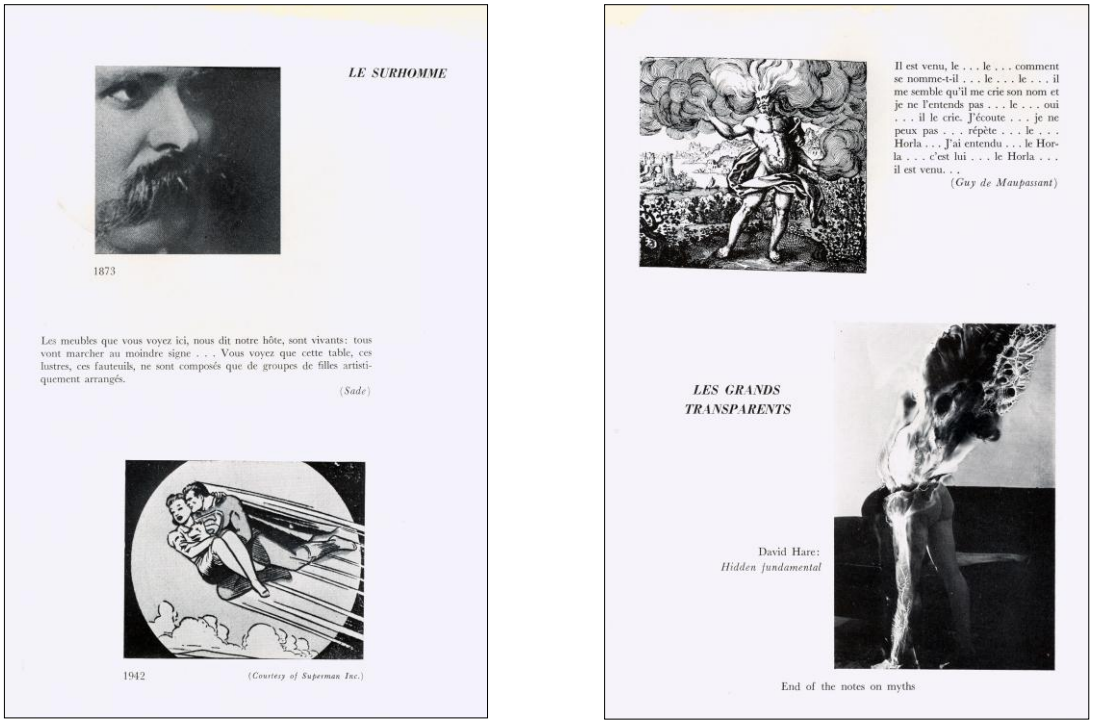
While some would no doubt disparage the making of transversal connections as mere analogy, as alarmingly unscientific, I would argue that the collapse of distinctions between previously separate fields is itself historical – dialectical – fact. Guattari himself mentions that 'In the field of social ecology, men like Donald Trump are permitted to proliferate freely, like another species of algae.'[33] This was written before Trump's self-reinvention in the TV show *The Apprentice*, and as would-be presidential candidate and prominent 'birther' – a new career in the media that spawned many jokes about his hair as a seemingly independent organism living on his head.

Donald Trump in his 2012 video addressing Barack Obama, promising to donate five million dollars to charity if the president releases his complete college and passport records

The interconnection between environmental and social ecologies had already been explored in a phantasmagorical register by Charles Fourier in the early nineteenth century. Convinced that he had found 'laws of attraction' in the psychological realm to match those of Isaac Newton in the physical world, Fourier proceeded to propose a reform of society in accordance with these laws – with human nature. The association of free human beings in the Phalanstery – a type of building designed by Fourier to house a community – would not only result in humanity attaining its true destiny but also in changes to the natural environment. Fourier's famous pronouncement that the ocean would be turned into lemonade is indicative of his extreme faith in the transformability of nature, provided human society is capable of mending its ways. Industrialization should have resulted in a warmer climate in Europe, and Fourier interpreted some unexpectedly cold winters as the planet's reaction to the sick and unnatural social order that prevailed: a social evolution in the Fourierist direction, by contrast, would effectively turn the world into a land of plenty.[34] Radical changes in the social system would induce mutations in nature itself, leading to counter-forms (*contre-moules*) that turn useless or even dangerous

animals and pests into creatures that serve humankind: the 'anti-snake', the 'anti-rat', or indeed the anti-lion or the anti-crocodile.[35] In Fourier's ecology, mutation is the positive counterpart of the 'deterioration of the planet' that he observed. Rather than opposing deterioration or entropy with a return to a homeostatic steady state, Fourier posited the possibility of the new, of a biological event that would intervene in and transform both ecological and natural systems, both social and natural ecologies. After the Second World War, in his 1947 'Ode à Charles Fourier', André Breton would poetically bemoan the delayed arrival of Fourier's counter-forms; earth was still littered with the same old 'furniture'.[36]

During much of the 1930s, the Surrealists had struggled with the place of their practice in (relation to) Communism, in particular Communism as represented by the Soviet Union and USSR-dominated parties.[37] As a practical philosophy of history, Marxian historical materialism always had an idealist component. Thought through to their limits, historical materialism and historical idealism would in fact coincide. By the end of the 1930s all hopes of any alliance between Surrealism and Moscow-approved historical materialism had been crushed.[38] It is in this context, in which any hope of finding a 'properly scientific' basis for social action was lost, that fictions of unnatural forms of nature arose. The catalogue of the 1942 'First Papers of Surrealism' exhibition. masterminded by Breton and Marcel Duchamp contains a section of pages on 'new myths' that include a page on 'Le Surhomme', a notion that is illustrated with a portrait of Nietzsche and an image from a Superman comic, alongside a quotation from Marquis de Sade on human bodies as furniture.[39]



Pages from *First Papers of Surrealism*, 1942

The next and last page of this section is dedicated to 'Les Grands Transparents', which is Breton's own 'new myth': what if we were surrounded by higher beings that our senses cannot perceive?[40] While this is indicative of Surrealism's increasing flight into the occult as an escape from the nightmare of history, Breton clearly presents it as a tantalizing fiction that might become a myth. It is not surprising that Breton's artificial myth figures prominently in the final section of *Morning of the Magicians*, the sub-Surrealist and political hodgepodge of esotericism and science-fiction published in 1960 by Louis Pauwels and Jacques Bergier. If Breton did not explicitly anchor his fiction in any concept of mutation, Bergier and Pauwels' final chapter is called 'Reverie on Mutants'.[41] *Morning of the Magicians* had significant success in the counterculture of the late sixties and early seventies, its 'fantastical realism' suggesting a mind-expanding redefinition of reality that did not require any involvement in the frustrating vagaries of political action.

A humorous variation on Breton's invisible ones was proposed by Stanley Brouwn in the mid-1960s. Breton had likened our relation to the Transparent Ones to that of lower life-forms to us. Brouwn's piece consists of an empty circle on the printed page. The caption reads 'Brouwntoys', and we are informed that this seemingly empty circle contains a thousand billion microbes and bacteria; when enlarged by a factor of five million, these make wonderful toys for children. However, 'do not use Brouwntoys before the year 4000'.[42] This is one of a number of Fluxus-inspired pieces that Brouwn later disavowed when he subjected his own work to an auto-Stalinist purge.[43] At that time, as we have seen, George Maciunas considered Fluxus a Communist movement along the lines of Productivism, though few went along with him in this respect. Maciunas' closest ally in his struggle for a socialist culture was outside of Fluxus proper: Henry Flynt. In 1966, Maciunas designed Flynt's manifesto *Communists Must Give Revolutionary Leadership in Culture*, in which Maciunas' social housing designs are mentioned as exemplary. By the end of the 1960s, however, Flynt was no longer sure of the potential for Communists to give anything resembling 'revolutionary leadership', and mutation would step into the place of revolution.

As Branden Joseph has shown, in 1968 Flynt formed an oneiric political party that called for the overthrow of the human race, which has proven to be 'biosocially irrational'. Arguing that one needs to go beyond the human species to solve social problems, Flynt proposed 'forming an alliance with a superior life-form from outer space to attack the human race', 'causing mutations in animals, producing intelligent species which will rise up against their human oppressors', and 'causing mutations in humanity that will transform it beyond all recognition'.[44] Whereas 1968 marked a moment when history once more seemed to be up for grabs, Flynt had already made experiences that others would garner in the aftermath of May 1968. In the face of blocked opportunities for political action, a fantasy of mutation provides an ambiguous release. Mutation scenarios that foresee the 'splitting' of humanity into different species were a trope in 1960s sci-fi as much as in contemporary LSE-style futurology; in a 1963 Playboy discussion between science-fiction authors, restaged by Gerard Byrne in his video installation *1984 and Beyond* (2005–2007), a biological split beyond an elite of space-travelling pioneers and those who remain on earth is foretold. Such a scenario basically sees the new space race as an improved version of the human race; Flynt's radical programme for mutating the human race through alien intervention could hardly be more opposed to it, as it presupposes that humankind needs to move not so much 'forward', into the final frontier of space, but sideways, out of any linear narrative.

Gerard Byrne, *1984 and Beyond*, 2005–2007, three-channel video installation, courtesy Lisson Gallery

The Otolith Group's films are perhaps the most cogent and compelling recent aesthetics of mutation. In *Otolith I* (2003), the 21st-century 'exo-anthropologist' Usha Adebaran-Segar recounts the effect of life on space stations on the otolith organ, which orients human beings and is dependent on gravity; as the otolith atrophies, 'a new human species' evolves in space. What was a future to be conquered for the 1963 panel (in line with US space imperialism), and an angsty-libidinal dream in the present political economy, is presented in *Otolith I* as history from the vantage point of a potential future. If a 'bifurcation in hominisation' has already occurred, the question would be if and how such a bifurcation can be conceived and lived in ways other than the Eloi-Morlock model. But what about mutation in process, in the unreal real time of the present? In *The Radiant* (2012), the Otolith Group investigates Japanese 'necro-politics' in the wake of Fukushima, creating a *sonimage* that makes visible and audible radiation and its effects through luminous images of nocturnal Tokyo and the sounds of Geiger counters and avant-garde sonic performances. Speculating on Fukushima's consequences, for instance in a shot of a lounge with monitors on which we see the mythical mutants of anime, the film also investigates the systemic incapability of Japanese society to abandon nuclear energy. Better to change biology than the economy.

SYSTEMIC PROBLEMS

In the late 1960s, after the interlude mentioned by Gessert, biological sculpture was once more on the agenda. In his book *Beyond Modern Sculpture*, Jack Burnham attempted to go beyond formalist art history and criticism by discussing sculpture in terms of the biological needs it answers. Burnham also addresses changing conceptions of life itself, both in art and the humanities and in science. The early twentieth century had seen a strong vitalist movement, of which Bergson was one of the intellectual progenitors, which revolved around the notion of a life force or *élan vital*. Burnham notes that this vitalism had been more attractive to philosophers, writers and artists than to biologists; in biology, it had played a reactionary role, whereas it had enabled some advanced art to be created. As Ludwig von Bertalanffy states in his *Problems of Life*: 'The history of biology is the refutation of

vitalism... Because vitalism centered its reasoning on noncausal and nonphysical beliefs, it has functioned as a conservative, if not reactionary, agent.'[45]

In art, by the 1960s 'an age which sought vitality in latent visual metaphor', as in the works of Hans Arp, Constantin Brancusi, and Henry Moore, was coming to an end.[46] What this means is a transition from sculpture as monolith to sculpture as *system* – a turn toward 'system aesthetics' which Gessert largely reverses with his take on the 'aesthetics' of bio art.[47]

Although Norbert Wiener presented cybernetics as the science of control and communication 'in the animal and the machine', for Ludwig von Bertalanffy cybernetics remained a rather limited discipline; it was one specific if important form of 'general systems theory'.[48] The great contribution of cybernetics, according to Bertalanffy, had been the model of feedback regulation in both technology and biology – in the latter, homeostasis can be explained by the feedback model. Like cybernetics, systems theory has an implicit ideal of homeostasis, of equilibrium. The living organism manages to overcome entropy and achieve a 'fantastically improbable state' of equilibrium because it is an open system that can regulate its relations with the environment through negative feedback.[49] The success of systems theory in the 1960s and the rise of the ecological movement towards the end of the decade also went hand in hand with the popularization of the term 'ecosystem', coined by Arthur Tansley, and the ecosystem is a concept that puts a premium on stability and equilibrium.[50]

But, as we have argued of cybernetics, systems theory in general can also be pushed from the inside to a point where it becomes dialectical. Hans Haacke's work from the 1960s and early 1970s is a case in point. Like Burnham, Haacke was interested in technological as well as natural *real-time systems*, as opposed to the idealist duration of traditional art and its appreciation.[51] Most of his 1960s works dealt with natural – physical or biological – systems. In 1969, one of Haacke's pieces involved Dan Graham chucking one hundred plastic bottles into the North Saskatchewan river. While Haacke's original idea had called for glass bottles, and these contained notes and were meant to be found, obviously not all were fished out of the water or washed ashore, and apparently the substitution of plastic for glass did not raise any concerns.[52] Other pieces, such as *Live Random Airborne Systems*, which involved seagulls retrieving bread that Haacke had thrown into the sea, were understated and lighthearted (non-)events.[53] By 1972 the work had taken on an explicitly political dimension: *Rhinewater Purification Plant*, shown in Essen, was a fishtank filled with filtered water from the heavily polluted Rhine. 'Open systems' for Bertalanffy were still conceptualized in terms of homeostasis; both 'the dynamic interplay of processes' that regulate the organism on a basic level and superimposed feedback mechanisms aim at this. The *Rhinewater Purification Plant* is in fact an open system creating homeostasis, but is itself dependent on electricity and thus implicated in a political economy that destroys not only social fabrics but also ecologies in order to stabilize itself. The term 'purification' may make some people feel uncomfortable, but the German *Aufbereitung* (the original title being the rather wonderful compound word *Rheinwasseraufbereitungsanlage*) is rather more neutral in this regard.

What is crucial is that Haacke homes in on intersections and interferences between systems – counteracting the tendency to fetishize the self-sufficient and autarkic system or structure.[54] Taking place in a public institution in Krefeld, the project spawned a press investigation into the city's part in the pollution of the river though the

dumping of untreated household and industrial sewage: social feedback with potential environmental effects.[55] In Guattari's terms, one can see in this the forging of transversal connections 'between ecosystems, the mechanosphere and the social and individual Universes of reference'. Guattari's take on the three ecologies was in fact informed by the 'systems ecology' developed around 1970 by authors such as Gregory Bateson, who in his 1972 book *Steps to an Ecology of Mind* not only used the concept of a mental ecology but also stressed the role of technology in the ecosystem.[56]

Today, strange disconnects between various ecologies or systems still persist. Recently, a professor of Sustainability and Climate Change at the Rotterdam School of Management quoted 'a well-known Dutch CEO' as saying: 'As a company we can reduce our carbon footprint radically. But the world is still driving off a cliff. *We need a system change*.'[57] The author's conclusion from this striking sentiment is, however, that management studies should pay more attention to systemic issues and 'and analyse cross-scale linkages between firm behaviour and ecosystem functioning'.[58] This is fine as far as it goes, but are we not back exactly at the level of carbon-footprint reduction? That a socio-economic system change may be necessary to save a liveable ecosystem still appears to be unthinkable today, in spite of the ongoing turbulences of an accelerating unnatural or post-natural history. The bio-aesthetic practices discussed here provide no magical solutions, but at the very least they allow us to think.

1 'We know only a single science, the science of history. One can look at history from two sides and divide it into the history of nature and the history of men. The two sides are, however, inseparable; the history of nature and the history of men are dependent on each other so long as men exist. The history of nature, called natural science, does not concern us here; but we will have to examine the history of men, since almost the whole ideology amounts either to a distorted conception of this history or to a complete abstraction from it.' Crossed-out section from the draft of Karl Marx, *The German Ideology*, Part I, section A, available online at http://www.marxists.org/archive/marx/works/1845/german-ideology/ch01a.htm

2 Francis Fukuyama, *Our Posthuman Future: Consequences of the Biotechnology Revolution*, Farrar, Straus and Giroux, New York, 2002, p 15

3 Kaushik Sunder Rajan, *Biocapital: The Constitution of Postgenomic Life*, Duke University, Durham and London, p 17

4 TJ Demos, lecture at the symposium 'Rethinking Robert Smithson', Royal Academy of Art, The Hague, 30 March 2012. See also TJ Demos, 'Art After Nature', in *Artforum*, vol 50, no 8, April 2012, pp 191–197, p 237

5 George Gessert, *Green Light: Toward an Art of Evolution*, MIT, Cambridge, Massachusetts and London, 2010, pp xix–xx

6 Paul Chan, 'A Lawless Proposition', *e-flux* 30, December 2011, http://www.e-flux.com/journal/a-lawless-proposition/

7 Bruno Latour, *Politics of Nature: How to Bring the Sciences into Democracy*, Catherine Porter, trans, Harvard University, Cambridge, Massachusetts and London, 2004, pp 1–52; Timothy Morton, *Ecology without Nature: Rethinking Environmental Aesthetics*, Harvard University, Cambridge, Massachusetts and London, 2007

8 Adorno, 'Die Idee der Naturgeschichte' (1933), in Adorno, *Gesammelte Schriften*, vol 1, Rolf Tiedemann, ed, Suhrkamp, Frankfurt am Main, 1973, pp 355–356

9 Adorno, op cit, pp 354–355; emphasis in original.

10 Adorno, op cit, pp 357–358; Walter Benjamin, 'Ursprung des deutschen Trauerspiels' (1928), in Benjamin, *Gesammelte Schriften*, vol 1, part 1, Suhrkamp, Frankfurt am Main, 1991, pp 352–353

11 On controversies surrounding deep time in the early nineteenth century, see Stephen Jay Gould, *Time's Arrow/Time's Cycle: Myth and Metaphor in the Discovery of Geological Time*, Harvard University, Cambridge, Massachusetts and London, 1987.

12 Gould, op cit, pp 89–179. Lyell refused to accept that the geological records suggest directionality – an evolution of species from the simple to the more complex, with certain species becoming extinct. He argued that while environmental shifts might cause periodic changes in the fauna of a region, none were final.

13 Walter Benjamin, *Das Passagen-Werk* (1927–1940), in *Gesammelte Schriften*, vol 5, part 1, Suhrkamp, Frankfurt am Main, 1991, pp 177–178. See also Auguste Blanqui, *L'Éternité par les astres*, with a preface by Jacques Rancière, Impressions Nouvelles, Paris, 2002. In his introduction, Rancière argues that Blanqui's theory contains a spark of hope in that it would allow for 'bifurcations' for permutations; see p 25. As elegant as Rancière's interpretation is, it does not seem to me to be borne out by Blanqui's text.

14 Mircea Eliade, *The Myth of the Eternal Return: Cosmos and History* (1954), Princeton University, Princeton, New Jersey, 2005, pp 89, 119–123

15 Friedrich Nietzsche, *Unzeitgemässe Betrachtungen ii: Vom Nutzen und Nachtheil der Historie für das Leben* (1874), in Giorgio Colli and Mazzino Montinari, eds, *Nietzsche, Werke: Kritische Gesamtausgabe*, vol 3, part 1, De Gruyter, Berlin and New York, 1972, p 237

16 See Joachim Köhler, *Zarathustra's Secret: The Interior Life of Friedrich Nietzsche*, Ronald Taylor, trans, Yale University, New Haven and London, 2002. As a philosopher of history and of the overcoming of history through cyclical breeding, Nietzsche was also a media theorist. His early Wagner-influenced writings, specifically *The Birth of Tragedy from the Spirit of Music*, took cues from Wagner's anti-Lessing aesthetic of the *Gesamtkunstwerk* integrating the various arts. According to Nietzsche, the Greek tragedy as the prototypical Gesamtkunstwerk, and Wagner's musical dramas as their modern equivalents, combined Apollonian and Dionysian arts. The visual arts are Apollonian; they are rational, orderly, Winckelmannian. By contrast, music is Dionysian, an art of intoxication, of loss of self. Language is situated between the two realms, leaning now more towards the one, now more towards the other pole.

17 Gilles Deleuze, *Différence et répétition*, PUF, Paris, 1968. Deleuze was building on the brilliant essays by Pierre Klossowski in *Nietzsche and the Vicious Circle* (1969), Continuum, London, 2005.

18 Friedrich Nietzsche, *Nachgelassene Fragmente. Herbst 1887 bis März 1888*, in *Werke*, op cit, p 90 (fragment 153). While Nietzsche frequently used the term *Kultur* in the now dominant sense, to refer to a society and its achievements (as in 'Renaissance culture'), passages such as this remind us that the Latin *cultura* referred first and foremost to agriculture and horticulture.

19 In Jakob Burckhardt's *Die Kultur der Renaissance in Italien* (1860), little is said about Renaissance painting; it is the *Staatskunst* that emerges as the true art of the times. Nonetheless, Nietzsche surely was also influenced by portraits from the Renaissance, which themselves were trying to impart their subjects with a dignity befitting Antiquity.

20 George Gessert, op cit, pp 47–48. See also Ronald J Gedrim, 'Edward Steichen's 1936 Exhibition of Delphinium Blooms: An Art of Flower Breeding', *History of Photography* 17, no 4, winter 1993, pp 354–360.

21 'This was the only time that living plant material had ever been shown at the museum. By implication, flower breeding was recognized as one of the arts.' Edward Steichen, *A Life in Photography*, Becht, Amsterdam, 1963, unpaginated, page opposite plate 225.

22 On Monday, 22 June 1936, MoMA sent out a press release that emphasized that Steichen's delphiniums were 'as creatively produced as his photographs'. See MoMA press release, http://www.moma.org/explore/inside_out/2011/03/08/edward-steichen-archive-delphiniums-blue-and-white-and-pink-too/.

23 Gessert, op cit, p 48

24 Ibid, p 49

25 See John Bellamy Foster, *Marx's Ecology: Materialism and Nature*, Monthly Review, New York, 2000, pp 141–177; and Friedrich Engels, 'The Part Played by Labour in the Transition from Ape to Man', an unfinished 1876 text that is part of the *Dialectics of Nature*, online at http://www.marxists.org/archive/marx/works/1876/part-played-labour/index.htm.

26 In a different use of the term 'third nature', McKenzie Wark in 2001 defined it as 'the transformation of both nature and second nature into an information landscape capable of controlling the process of transformation of nature into second nature'. See http://www.nettime.org/Lists-Archives/nettime-l-0102/msg00157.html.

27 'Human species "may split in two"', BBC News website, 17 October 2006, http://news.bbc.co.uk/2/hi/6057734.stm

28 *Deutschland schafft sich ab* is the title of Sarrazin's 2010 bestseller, published by Deutsche Verlags–Anstalt.

29 1 See the project website at http://www.critical-art.net/Biotech.html.

30 See Critical Art Ensemble, *Marching Plague: Germ Warfare and Global Public Health*, Autonomedia, New York, 2006, pp 117–148.

31 Félix Guattari, *The Three Ecologies* (1989), Ian Pindar and Paul Sutton, trans, Continuum, London, 2005, p 43

32 Ibid, p 47

33 Ibid, p 43

34 In a stunning text on the 'material deterioration of the planet', he averred that the noticeable cooling of the planet – there was indeed a series of extremely cold years in the early nineteenth century – was in apparent contrast with the expected warming of the climate due to industrial pollution. Charles Fourier, 'Déterioration matérielle de la planète' (circa 1820/1821), in René Schérer, ed, *L'Écosophie de Charles Fourier: Deux textes inédits*, Anthropos, Paris, 2001, pp 31–125

35 See for instance Charles Fourier, *Traité de l'association domestique-agricole I*, Bossange, Paris, p 529

36 On Breton's poem and Fourier see also Lars Bang Larsen, 'Giraffe and Anti-Giraffe: Charles Fourier's Artistic Thinking', in *e-flux* 26, June 2011, http://www.e-flux.com/journal/giraffe_and_anti_giraffe_charles_fourier's_artistic_thinking/.

37 The surrealist object of the 1930s must be seen in this light: for Breton and others, the Surrealist object exuded the promise of going beyond a static opposition between matter and thought, between object and subject; the object, as practiced by Alberto Giacometti, Man Ray, Salvador Dalí and others, showed an objectification of the psyche. It stood for an extended dialectic that was compatible with orthodox Communism even while going beyond it and complementing it. On the Surrealist object, see also Steven Harris, *Surrealist Art and Thought in the 1930s: Art, Politics, and the Psyche*, Cambridge University, Cambridge, 2004.

38 It was in this context that the Surrealist Wolfgang Paalen asked a number of authors (including Clement Greenberg, Pierre Mabille, Sidney Hook, Meyer Schapiro, Philip Rahv and Parker Tyler) three somewhat leading questions on the dialectic in 1942. The responses were published in his magazine, *Dyn*. The questions aimed at querying the status of dialectics as a scientific method and at establishing whether history or even nature have any inherent dialectical 'laws'. Paalen's second question was: 'Is the "dialectic method" a scientific method of investigation? Does science owe important discoveries to this method?' Most answers were negative. By 1942, Engels' attempts to develop a 'dialectics of nature' seemed naïf; it is all very well to argue that the change of water into steam by increasing its temperature is an instance of the 'law' of the transformation of quantity into quality, as Engels had done, but this seemed barely relevant for actual scientific research. The disastrous course taken by history in the late 1930s and early 1940s seemed to prevent Paalen and most respondents from

considering the dialectic not in terms of iron laws but as the thought and practice of contradiction. See 'Inquiry on Dialectic Materialism', in *Dyn* 2, July–August 1942, pp 49–54.

41 André Breton, 'Sur la survivance de certains mythes et de quelques autres mythes en croissance ou en formation' ('On the Survival of Certain Myths and on Some Other Myths in Growth or Formation'), in *First Papers of Surrealism*, Coordinating Council of French Relief Societies, New York, 1942, unpaginated

42 The page in *First Papers of Surrealism* does not offer any explanation of the term, being a rather cryptic montage; Breton was more explicit in the section 'Les Grands Transparents' in 'Prolégomènes à un *troisième* manifeste du surréalisme ou non' (1942); see Breton, *Manifestoes of Surrealism*, Richard Seaver and Helen R Lane, trans, University of Michigan, Ann Arbor, Michigan, 1969, pp 293–294.

43 Louis Pauwels and Jacques Bergier, *Le Matin des magiciens* (1960), Gallimard, Paris, 1972, pp 596–619. Breton is quoted on pp 603–605.

44 'Brouwnspeelgoed', in *Randstad* 11/12, 1966, p 170

45 See Ludo van Halem, 'Elementaire belevenissen. Het vroege werk van Stanley Brouwn', in *Jong Holland* 7, no 3, 1991, pp 10–25.

46 Branden W Joseph, *Beyond the Dream Syndicate: Tony Conrad and the Arts after Cage*, Zone, New York, 2008, p 212

47 Jack Burnham, *Beyond Modern Sculpture: The Effects of Science and Technology on the Sculpture of this Century*, Braziller, New York, 1968, p 56

48 Ibid, p 16

49 For Burnham's use of the term system aesthetics, see 'System Esthetics' (1968), in *Great Western Salt Works: Essays on the Meaning of Post-Formalist Art*, Braziller, New York, 1974, pp 15–25.

50 See the introduction in Ludwig von Bertalanffy, *General System Theory: Foundations, Developments, Applications*, Braziller, New York, 1968. The Wiener reference is to *Cybernetics: or Control and Communcation in the Animal and the Machine*, MIT, Cambridge, Massachusetts, 1948.

51 Bertalanffy, op cit, p 159, pp 161–163

52 A G Tansley, 'The Use and Abuse of Vegetational Concepts and Terms', *Ecology*, vol 16, no 3, July 1935, pp 284–307. A search of the *New York Times* archive shows that use of the term 'ecosystem' starts in 1967 and 1968, but the frequency rises dramatically in 1969 and 1970.

53 See Jack Burnham, 'Real Time Systems' in *Great Western Salt Works*, op cit, pp 27–38. Burnham here discusses several projects by Haacke.

54 Willoughby Sharp, 'Place and Process', *Artforum*, vol 8, no 3, November 1969, p 48. The work in question was based on a proposal for the 1965 Zero op Zee festival in Holland, which never took place. See Caroline de Westenholz, 'Zero op Zee', in *Nul = 0*, Stedelijk Museum Schiedam, Schiedam, 2011, pp 102–103.

55 See Lucy Lippard, *Six Years: The Dematerialization of the Art Object from 1966 to 1972* [etc] (1973), University of California, Berkeley and Los Angeles, California, 1997, p 62: 'November 30 [1968], Coney Island: Hans Haacke executes *Live Random Airborne Systems*, sea gulls retrieving bread thrown on the water.' This project too echoes a proposal for the aborted Zero op Zee manifestation, for which Haacke had proposed a platform with seagull food moored in front of the coast, called *Mövenschwarm* (*Flock of Seagulls*) on the drawing Haacke sent to the organizers in Holland. Apparently some of Haacke's proposals were rejected even before the final cancellation of Zero op Zee; the *Movenschwärm* sketch bears the marginal note (in Dutch) 'Deze niet' ('Not this one'). See de Westenholz, op cit, p 103.

56 Haacke explicitly stated at the time that his work is about 'interference in' systems; see Lippard, op cit, p 123.

57 Hans Haacke, 'Rheinwassseraufbereitungsanlage, 1972', in *Hans Haacke: 'Obra Social'*, exhibition catalogue, Fundació Antoni Tàpies, Barcelona, 1995, p 76. See also TJ Demos, 'The Politics of Sustainability: Art and Ecology', in Francesco Manacorda and Ariella Yedgar, eds, *Radical Nature: Art and Architecture for a Changing Planet, 1969–2009*, exhibition catalogue, Barbican Art Gallery and Koenig, London, 2009, p 22.

58 Gregory Bateson, *Steps to an Ecology of Mind: Collected Essays in Anthropology, Psychiatry, Evolution and Epistemology* (1972), University of Chicago, Chicago and London, 2000, pp 477–501; see also Demos, op cit, p 21. Guattari opens *The Three Ecologies* with an epigraph from Bateson's book: 'There is an ecology of bad ideas, just as there is an ecology of weeds.' Guattari, op cit, p 19

59 Gail Whiteman, *Making Sense of Climate Change: How to Avoid the Next Big Flood: Management Lessons for the 21st Century*, inaugural address, Rotterdam School of Management, Rotterdam University, Rotterdam, 2011, p 29

60 Ibid, p 29

Sven Lütticken teaches art history at VU University Amsterdam. He is the author of the books *Secret Publicity* (2006), *Idols of the Market* (2009) and the forthcoming *History in Motion*.