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Haraway and Kristeva: The Cyborgs and the Abject.

by

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INTRODUCTION.

Can you imagine how crude robot senses are, compared to human ones, huh? All I have are memories of the way things used to feel or taste. You know, they say amputees feel phantom pains where their limbs used to be. Well, I'm a total amputee. I'm haunted by the ghost of an entire body! I get headaches, you know, and I want to crap until I realise I don't have any bowels.

> Grant Morrison. (Sappington & Stallings, p.122)

Robotman, (a comic strip character), is a cyborg, and contrary to popular representation, is not enjoying his condition. His mind has been freed of its bodily constraints, his corporeal functions taken over by technology, but yet he complains that his mechanical body is not good enough, that it cannot accurately synthesize human senses. These complaints seem unusual in that the dream of the cyborg has been the utopian ideal of many electronic and medical technologies: the final achievement of the disembodiment and immortality that has for so long been a fantasy of Western culture.

Robotman is a cyborg of popular culture, a decidedly masculine figure possessing traits of strength, invincibility, etc. He is central to the cultural ideal of the cyborg. However, there exists a more marginal cyborg, one created by Donna Haraway in her *Manifesto for Cyborgs* This cyborg is the antithesis of popular culture's cyborg: rather than a self encased in a technologically strengthened body, living solely in some sort of future virtual world, Haraway's cyborg is a union of self and other, organic and technological, textual and mythical. Her cyborg does not claim the scientific rationalism of popular culture's cyborg, but tries to subvert this 'rational' discourse by ripping open "...the belly of the monster...", (Ross&Penley,

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p.6). Haraway's cyborg is also female, making it unquestionably antithetical to popular culture's cyborg which, with a few exceptions, have all been male figures.

I suggest that an oppositional theory to both of these cyborgs exists in Julia Kristeva's abjection, (*Powers of Horror*, 1982). Kristeva's theory deals with the boundaries of the self and their constant threat and definition by the other. Haraway is also concerned with the notion of subjectivity and objectivity, and the definition between the two, and this is why I draw a comparison between the two discourses. However, Haraway's cyborg is fundamentally different to the notion of the abject, in as much as Kristeva's psychoanalysis is distinct from Haraway's feminist scientific discourse.

The cyborg of popular culture is almost obvious in its opposition to the abject, strengthening the boundaries of its self with a fortified body. This figure does not have to contend with the constant threat by the other. As a structural model I would situate popular culture's cyborg as central to this argument, firstly because it is antithetical to both Haraway's cyborg, and Kristeva's abjection, and secondly, due to its situation as central to patriarchal culture. Kristeva's abjection and Haraway's cyborg could be considered peripheral to this culture due to their engagement with marginality.

In the coming chapters I will explore the relationship which I suggest exists between all three figures. The cyborg of popular culture, which is the most visible of the three figures, can be interpreted, and disrupted, through the discourses of Kristeva and Haraway, and read as antithetical to these discourses. The relationship between Kristeva and Haraway is more complex. Can a comparison between psychoanalysis and theories of science and biology even be valid? To the extent that science, biology and psychoanalysis have contributed to the 'construction' of bodies, such as the hysteric, and often assume an essentialist 'anatomy is destiny' argument, I would argue yes. Another comparison can be drawn due to the discourses surrounding the formation of self and other in Kristeva's and Haraway's theories.



In the first chapter of this thesis, I will attempt to foreground the complexities of the relationship between science, technology, and the body. This is necessary, not only for the discussion of the cyborg, which is firmly associated with technology and the body, but also to 'situate' Haraway and Kristeva, both of whom are working in various 'scientific', or 'authoritative' areas (biology and primatology, and psychoanalysis).



CHAPTER ONE.

TECHNOLOGY, SCIENCE, AND THE BODY.

One of the dominant ideologies of technology has been a utopian desire to escape from embodiment, and its associated problems-- mortality, vulnerability, ageing, etc. This notion could be seen as a move towards the realisation of Cartesian duality, a completion of the Enlightenment project to separate the mind from the constraints of the body. Although it may seem ridiculous to even consider this a possibility, some computer scientists working on artificial intelligence claim it to be a near reality. Some even go so far as to claim that the development of artificial intelligence is the next stage in the evolutionary model, (Hayward, p.234). Other, and perhaps less extreme methods for achieving this freedom from bodily 'constraint' exist. On a literal level pace-makers, artificial limbs, transplanted organs, even medicines, serve to help the body with its everyday functioning, whilst a bio-technology such as genetic engineering holds the possibility for the replication of body parts, even entire bodies.

The dream of disembodiment could to a certain extent have been achieved through a technology like Virtual Reality (I say to a certain extent because although in the virtual world a type of disembodiment is achieved, the user's physical body eventually 'interrupts' this state, with feelings of hunger, exhaustion, etc.). These technologies place more emphasis on the cognitive, creating for the user an 'out of body experience'.

Virtual Reality is inhabited by refigured 'persons' which are separated from the user's physical body. The actual body is in 'normal' space, but the rules of 'normal' space need not apply in virtual space; for example any persona can be assumed. Perhaps it is because of these possibilities for constantly assuming, changing and refiguring identity, that feminists such



as Allecquere Roseanne Stone, have appropriated Virtual Reality as a deconstructive and reconstructive tool. However the use of Virtual Reality necessitates the disavowel of the physical body, and surely it is the experience of living in this body that constructs, or helps to construct our identities? (This is particularly true if one subscribes to psychoanalytic models.) If this is the case then how coherent would the experience of, say a masculine identity be, if your experience until then had been of a female one? The partial assumption of a different identity cannot be the entire experience of that identity. Also if a 'masculine' identity were to be assumed, it would more than likely be an essentialism-- there is no ultimate experience of 'masculinity'.

The assumption of identity is also problematic in that the Virtual Reality system is a race and class specific technology. For example If a white middle-class American wanted to experience the identity of a Tibetan refugee living in north India, it is doubtful that there would be a Tibetan refugee experiencing the identity of an middle-class American in Virtual Reality. This example serves to highlight, not only Virtual Reality's inherent prejudice, but also its imperialistic and colonialistic tendencies-the user (usually First World) is privileged, relegating other races and cultures to the position of 'other'. Although Virtual Reality may appear classless, raceless and genderless, in reality people's access to, and experience of, Virtual Reality is greatly affected by factors of race, class, and gender, (Elwes, p.66).

The possibility of Virtual Reality for the creation of the cyborg cannot occur unless a 'solution' to corporeal needs can be found. Perhaps this solution lies in the bio-chip, a computer small enough to be incorporated within the human body. This computer will not only be able to 'help' the body with basic functions, the memory process, D.N.A. replication, amongst other things, it may also be possible to link it up with a main computer. These micro-computers are estimated to be fully developed by the year 2010, and if the theory of a linkage to a main computer can become an actual possibility, the mind really will be capable of 'downloading' into a global network, and leaving the body behind in the 3-dimensional world, finally fulfilling the dream of transcendent disembodiment, (Hayward, p.p.229-230).



The development of new sciences and technologies, and their increased integration and visibility within Western culture, has perhaps contributed to an examination of their discourses and structure, particularly by feminist theorists. The supposed rationality and objectivity of science, along with the stereotype of the scientist, is only a slight exaggeration of the stereotype of masculinity itself. These cliched suppositions are deeply interwoven, both emphasising facts, control, objectivity, rationality, etc, and it is not clear whether one is the cause, or the effect of the other, (Kirkup & Keller, p.38). Even the language of 'science', which seems to assume a monolithic discourse, is internally fractured. There is no longer one scientific 'voice', but rather there exists a heterogeneity-- 'science' has become neuronendoctrinology, biomedicine, psychoneuroimmunology, immunoendocrinology, bio-technology, etc, etc. The divide between science and technology is also no longer clearly demarcated, biotechnology or genetic engineering exemplifying this.

The construction of scientific discourse as objective, and therefore 'truth', has led to the formation of certain 'marked' bodies. Western scientific models based on the physiognomy and physiology of different races, or of specific groups of people within society, have resulted in the construction of stereotypes, which are still in effect today, the sexualised black body for example. These marked bodies have also been constructed through psychoanalytic theory, which, in its beginnings at least, had a certain agency of truth due to its association with 'scientific' discourse. Psychoanalysis constructs bodies. symbolically at least. around phallocentric culture, and bodies 'marked' by race and gender are seen as 'other' to their constructors, usually white, middle-class Euro-Americans. The critical questioning and deconstruction of traditional 'scientific' models has resulted in a subversion of scientific discourse, and an unwillingness to accept any pre-given categories as 'truth'. The division between sex and gender, for example, is one which has been highly contested. A conflation between sex and gender often leads to an essentialism, whilst their acceptance as distinct from each other denies any effect which sex may have on gender, or vice versa, (Oliver, p.186).

The question of what effect this gendered discourse and practise makes to science has only recently begun to be addressed. Assuming it was possible to ungender our discourse, could we show, or even comprehend,



what effect a non-patriarchal discourse would have on science? Evelyn Fox Keller suggests that the main task which faces feminist critics of science, is the effect that language has on science-- could the deconstruction of science, and its discourse, be possible considering that there has never been another science to compare it to, either culturally or historically? (Kirkup & Keller, p.48).

What these attempts at deconstruction have shown is how the gendering of scientific discourse, plus the fact that the 'hard' sciences of chemistry, physics, and mathematics have been considered male, has meant that scientific practice is often perceived as an exclusively masculine area. Comparatively few women are working in these areas, partly due to the cultural re-enforcement of these stereotypes, but some, such as Haraway, who often combines a feminist agenda with her work, attempt to subvert and contest its supposed inherent scientific objectivity and rationality. Haraway feels that this can best be done whilst working in the "...belly of the monster...", (Ross & Penley, p.6).

One of the technologies where 'masculine' discourse is most explicit is in computer technology. Computer technology was first developed in the military, and the language used in computer terminology still has military associations. Terms such as 'crash', 'abort', 'terminate', and 'kill', are indicative of their origin, one which has always, and still remains, almost exclusively male.

The first commercially available computer games, such as star wars or combat games, were an explicit indication of what audience they were targeting. The games appearing today mirror the developments in military technology. Developments such as Virtual Reality are presently being used in battle. Images read off a screen result in a dislocation, both physically and psychologically from what is really happening 'out there' in the 3-dimensional world. When images of 'smart' bombs destroying targets in the Gulf War were broadcast in 1991, the similarity between military electronics and computer game imagery was made clear. The fact that these were real images of war and destruction was difficult to comprehend.



Science and technology are also highly invested in politically, not least for their military association. The race to map the human genome, or the governmental interest in space programmes, satellite technology, for example, is heavily invested in, both by governments and by multinational corporations. In fact, Haraway argues that 'Star Wars' is the late 20th century equivalent of the Second World War, and that multinational corporations are the equivalent of 19th century colonialism, (Haraway, 1993, p.206). This means that scientific and technological agendas are determined by their investors, and therefore the structure of their bodily discourses is determined by a deeper political agenda.

Technology could also be interpreted as another 'masculine' area. Following this supposition it could be understood as an extension of male control over the social and physical world. By that rationale, male power over technology is indicative of their power over society, and women are users of this male-created technology; every time a woman stands by while a man repairs a broken appliance, or changes a tyre, etc, his power is further asserted. Technology can also often be seen as symbolic of man's power in society; guns are a well-known example, an extension of the phallus, and symbol of male potency. Ghetto blasters can also be seen as symbols of male power, making an intrusive, and often aggressive claim to public space. Then there is the car, a well known male status symbol, a case of the bigger and faster the car the better (criteria which apply to other aspects of masculinity too), (Kirkup & Keller, p.37).

Perhaps to strengthen the stereotype of man as the inventor of technology, and women as its users, the products of this technology have been gendered female. Machines are often referred to as 'her' or 'she', objects upon which men work, and which have a tendency to go wrong. This notion is prevalent in advertising; women are often pictured with machine-- a well-known example is the image of the female body draped over the bonnet of a car. The notion is also prevalent in popular film. One example is the film of a female cyborg (one of the few), Eve, in *Eve of Destruction*. She is developed as a military weapon, with a nuclear device in the neck of her womb, but escapes, and turns against those who created her, (Plant, p.16). Similarly in *Jurassic Park*; the all female dinosaurs (which could be interpreted as a type of prehistoric cyborg-- a combination of up-to-the-minute technology, in the form of genetic

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engineering, and extinct animal) turn against their male creators, as testament to the women/technology opposition. In *Jurassic Park* the female Raptors almost murder their victims in a scene set in a kitchen, perhaps to remind us that the aggressive, viscous animals are actually female. To top it all the creatures genetically mutate, due to their splicing with potentially sex-changing amphibian genes. This allows breeding to occur, and the dinosaurs escape from their island, promising in *Jurassic Park Part Two* to wreak havoc on mainland America. The moral of this story is females and technology do not mix, and also perhaps attempting to create organisms 'unnaturally' will result in some type of Frankensteinian horror scenario.

The relationship between the body, science, and technology is a complex one, which is further complicated by issues of race and gender. The sociological stereotyping of science and technology, and its products, as male, perhaps contributes to the lack of women working in these areas, and women's supposed technological phobism. Politics, language, and traditional scientific discourse and models, have all been central to the development of today's practice, and as critics have shown, these areas have a deeper agenda, which subverts any claims to objectivity and rationality which they might have.

The cyborg of popular culture is situated in these scientific and technological discourses, and seems to be the embodiment of a technocratic utopianism which strives to transgress the bounds of corporeality. In Donna Haraway's theories she critiques this theory, proposing instead a cyborg which is a union of technology and the organic. Haraway's cyborg can subvert the ideas inherent in the cyborg of popular culture, and work from within the technological and scientific discourse surrounding the technocultural cyborg, to deconstruct and expose supposed rationally and objectively constructed 'truths'.



CHAPTER TWO.

HARAWAY'S SCIENCE.

Before dealing with the specifics of the abject and the cyborgian bodies, I will examine Haraway's and Kristeva's theoretical backgrounds, and draw any comparisons and contrasts between their theories. Although Haraway's discourse differs from Kristeva's, a comparison can be drawn between them, on the basis of their discussions of 'self' and 'other'. Haraway is resistant to any notion of traditional psychoanalysis, yet a lot of her work focuses on the boundaries between self and other. She proposes an alternative model, which she constructs through biological discourse.

Donna Haraway is a historian of science, who is concerned more or less directly with the relationship between nature, culture, and the body. She radically critiques science, with its claims to objectivity, rationality, and the uncovering of 'truth', situating herself "...in the belly of the monster...", (Ross & Penley, p.6), a situation which, for her, holds the greatest powers of subversion. However, Haraway remains loyal to a goal of scientific rationality which she feels can be achieved by a 'split' subject, which will acknowledge the contingency, and partiality of science; if the "knowing self is partial" it is capable of joining with an-other, without claiming to be that other. To be objective is not to be self-identical, but rather to be selfdifferential, (Haraway, 1991a, p.22).

Haraway attempts to create a non-racist feminism through her cyborg, one which is not specific to Western culture. She attempts to create a new subjectivity which fully acknowledges the contingency and specificity of scientific claims, and which rejects the traditional means by which these claims were formed. Haraway claims that a historical person comes into the world already "encrusted with barnacles", and that these histories must be accounted for. Then it stands that the practitioners of biology, are



also "encrusted with barnacles", and that biology is a discourse which must assume responsibility for its own history, as well as others histories. If biology has historically constructed bodies as 'other', currently technology, for example molecular biology, is determining what counts as 'self', (Ross & Penley, p.5). The human genome project, for example, is concerned with the construction of a 'definitive' genetic map of the body, one which will translate the body (the organic), into a code (the technological). However, does the fact that the genome can rearrange, mutate, and splice mean that those whose genetic maps do not conform will be branded as 'other'.

What Haraway suggests is that women should overcome their culturally induced technophobia, "...seizing the tools...that marked them as Other", and engage in the terms of technology, (Haraway, 1991b, p.75). She claims that an alliance with nature in an attempt to remain pure must be resisted, as she feels that nature has become technologised: the coding of bodies in the human genome project could be an example of this. Her female cyborg embodies these notions, being a technologised body, and therefore a union of the technological and organic.

Haraway remains resistant to any traditional notions of psychoanalysis, particularly the Oedipal narratives, and this is the fundamental difference between her theories and Kristeva's, abjection being a theory which conforms to the conventions of psychoanalysis. Instead she develops a subjectivity which is defined through biological discourses of the constitution of self and other. For this she does not use traditional models for classification by race, gender, etc, but rather discourses of the immune system, for example, which defines and regulates what is self and other in the body. In her 1985 *Manifesto for Cyborgs* Haraway completely withstands the notion that her cyborg has any psychoanalytical beginnings. This resistance is partly due to her understanding of psychoanalysis as a construct specific only to Western culture, and partly due to its marginalisation of women, and all races which are 'other' to the white male, (Ross & Penley, p.9).

In her resistance to psychoanalysis, Haraway is particularly critical of the Oedipal narratives, believing that they are "... much too conservative, much too heterosexist, much too familial, much too exclusive...", (Ross & Penley, p.9). Her cyborg is a replicon, 'grown' in a laboratory, and therefore does



not have the familial beginnings to necessitate the Oedipal narratives. Without a father or mother there can be no identification with, or repudiation of either parent. Haraway is cynical of the desire for the phallus, and its centrality to symbolic culture, calling for a new identification with something other than the male "urinary and copulative organ", (Haraway, 1992, p.44).

In her later writings, Haraway's resistance to psychoanalysis lowers, and she attempts to develop an alternative 'unconscious' for her cyborg, which she describes as "a little flat", (Ross & Penley, p.10). This development seems contradictory, as if her cyborg has no concept of self, and no repressed pre-Oedipal memories, why does she need an unconscious? As an alternative to the Oedipal narratives she uses the Native American figure of the coyote, which is a metaphor for nature, a figure which "...is a resistance and a trickster, producing the opposite of-- or something other than-- what you thought you meant....which is what I suppose the unconscious does...", (Ross & Penley, p.11). Her resistance to the conventional psychoanalytic model is furthered by her suspicion of its inability to analyse accounts of race and sex simultaneously. The same model can be applied to both, but each account must proceed seperately. Psychoanalytically no connections can be drawn between race and sex in the same account.

Haraway draws on the writings of theorists such as Hortense Spillers, and Trinh T. Minh-ha, for alternatives to conventional psychoanalytic models. Spillers claims that the state of 'nonhuman' arises from the situation of the body in slavery, and that this condition is passed down to the next generation who are born into this slavery. If the enslaved parent holds the status of 'non-human', the infant cannot relate to the crises of the Oedipal narratives. (Even the meaning of the word 'slavish' is indicative of this situation, meaning both like slaves or non-original). If the captive body is outside the familial, then how can the Oedipal narratives apply, (Ross & Penley, p.11).

To establish the boundaries between self and other, without the psychoanalytic account, Haraway draws on biological discourse. What exactly constitutes a 'unit' in this discourse is not clear, emphasis is not



placed on boundaries, but rather "rates of flow" across these boundaries, (Haraway, 1993, p.208). Even the notion of the skin as the division between self and other is subverted- the individual body "neither stop(s) nor start(s) at the skin, which is itself something of a teaming jungle threatening illicit fusions, especially from the perspective of a scanning electron microscope", (Haraway, 1993, p.211).

Haraway's work on the immune system is particularly interesting in this context of the self and the other. The immune system controls what the body recognises as self, and what it rejects as other. Diseases, viruses, sometimes even the developing foetus, are recognised as other, and reacted to by the immune system. However in the case of disease and viral infection, the immune system will eventually replicate any 'invading' other, mirroring it, and therefore making the opposition between self and other not quite so oppositional, (Haraway, 1993, p.215). (This defense system can sometimes fail, resulting in a disease such as AIDS).

Haraway also finds the account of the opposition between subject and object problematic. She draws on Bruno Latour's sociological theory of science in which all sorts of things are 'actors', not just language speaking 'subjects'. Haraway renames the actors, language speaking, and nonlanguage speaking, agents. If Haraway's cyborg is a union of technological, organic, biotic, textual and political, then surely no traditional notion of subject or object, self or other can exist in order for it to make sense.

If Haraway's cyborg has no psychoanalytic beginnings, no pre-Oedipality, then there can be no divide between the semiotic and the symbolic. Haraway argues that the traditional psychoanalytic account of entry into the 'symbolic' is overly reliant on just one moment in the acquisition of language, that there are other moments of acquisition, that, "coming into history in different ways is not the same thing as coming into the familial", (Ross & Penley, p.9). Included in Haraway's concept of language are the coded texts of biological and computer discourses, as well as language in its more traditional sense. Here again is a difference from Kristeva's theories-Haraway's cyborg has no pre-Oedipal phase, and therefore lives in a world which is not divided into semiotic and symbolic. Therefore language, and its acquisition, is not regarded as symbolically masculine.



In her imaginings of a new subjectivity, Haraway draws on the science fiction writings of the Black American author Octavia Butler. For Haraway, "...the boundary between science fiction and social reality is an illusion", (Haraway, 1991b, p.149): the self as constructed and repressed through immunological discourse has the semi-permiable possibilities to engage with others. Similarly, science fiction is involved with the boundaries of the self, and the self's encounters with "unexpected others", which are often of an extra-terrestrial nature. This notion once again echoes the body that has arisen out of slavery. The generations of enslavement in America, experienced by peoples of different racial origin, and the incidence of rape by their white masters, has resulted in a race labelled as 'Black', but which is, in reality often a mixed race. The use of these extra-terrestrials in science fiction opens up possibilities for the exploration of new worlds, in a "context structured by transnational technoscience", (Haraway, 1991a, p.24). Science fiction could also be interpreted as:

> ...travel literature deeply implicated in the history of colonialism and imperialism, just as it is implicated in the cultural production of the literal metaphors and poetic bodies of 'high technology' social orders.

(Haraway, 1991a, p.24)

Butler's writings draw on Black and women's histories, creating displaced, non-original, and marginal characters. These characters breed not only cross-racially and culturally, but also across different species and with extra-terrestrials. The resulting subject is inherently non-original, with no kinship, and therefore there is no question of an engagement with the Oedipal narratives. Without this model for splitting self and other, subject and object, the subject becomes "hybridized, mixed, and plural", (Ross & Penley, p.10). Does the notion of the other, or the object even exist if 'they' have become unified with the subject through breeding?

Haraway's critique of the traditional concepts of self and other, and subjectivity and objectivity, and her resistance to any traditional psychoanalysis, positions her theories as oppositional to Kristeva's abjection, a theory which follows the traditional models of psychoanalysis and the self/other, subject/object divide. Haraway's cyborg emerges as a partial subject, "constructed deconstructively", its boundaries in a constant state of flux, rather than being fixed and unchanging, (Haraway, 1991a,



p.22). Her cyborg can also be situated as antithetical to the cyborg of popular culture, with its notions of strengthened subjectivity, and engagement with scientific and technological discourse. However, from a position within these discourses, perhaps Haraway can disrupt and subvert the supposed 'truths' inherent within them, and expose the technocratic utopianism behind the construction of the technocultural cyborg. The cyborg itself is a contested location, the terms of which are currently being set. What Haraway calls for is an engagement with technology, but not to the extent of technomanic utopianism, so that women may be involved in the construction of the cyborgian body.


CHAPTER THREE.

KRISTEVA'S ABJECTION.

Julia Kristeva is best known for her work as a linguist and psychoanalyst. Her work is usually concerned with the nature of the feminine, which she associates with the semiotic-- the pre-Oedipal, pre-lingual phase encountered before entering the symbolic order, which she associates with the masculine. Her distinction between the semiotic and symbolic is based on a displacement of the Lacanian Imaginary and Symbolic Orders. Like Haraway, Kristeva is interested in the theory of the subject, however she uses traditional psychoanalytical models to formulate this theory, whilst Haraway rejects these conventional models. Unlike Haraway, however, Kristeva argues against a scientific or biological account of femininity or maternity, which she claims conceal the semiotic side of these bodies. Although Kristeva maintains that the divide between the semiotic and symbolic order, and the self and the other, is often blurred, this turns out to be only a temporary disturbance, and through repression, order between these supposed dichotomies is returned.

Kristeva is particularly interested in the semiotic, which she sees as a pre-subjective realm, in which a unificatory state with the maternal body is achieved, before its repudiation and entry into the symbolic. She theorises the semiotic as a 'female' area, which is pre-lingual, but develops a theory of semanalysis, through which, she claims the semiotic can be expressed. Semiotics is not concerned with language in its conventional sense, but rather with how symbolic language can be disrupted through the 'alternative' language of contradiction, disruption, silences and absences, and meaninglessness, (Moi, 1985, p.162). Symbolic language can also be disrupted through concentrating on its materiality, such as in poetry.



Kristeva's theories of the semiotic, and the formulation of 'self', are almost completely dependant on the Oedipal narratives, which Haraway critiques for their specificity. The semiotic for Kristeva, is the pre-Oedipal phase, in which identification with the mother is central. This time of unificatory oneness with the maternal body is pleasurable, and Kristeva claims that a desire to return to this incestuous state is repressed after entry into the symbolic. The mother must be repudiated, and an identification with the father must take place, in order for separation to occur, and subjectivity be established. Once this has taken place the boundaries of the self are established, and entry into symbolic order can occur. The subject is then split, enabling signification and the attribution of difference (Moi, 1985, p.162-3). This is exactly the split subject that Haraway does not want, preferring instead a more hybridized, plural subjectivity.

Kristeva could be accused of positioning women as 'other' to the symbolic order, by their association with the semiotic. She continually reinstates the semiotic/symbolic border, and associates femininity with the semiotic, and masculinity with the symbolic. If culture is situated in the symbolic order. then the semiotic is necessarily subordinate to this. Kristeva asserts that the semiotic can be felt in the symbolic language through silences, absences, contradictions, meaninglessness, etc, and also by the study of the materiality of language. She analyses the work of certain avant-garde writers to illustrate this point, in particular poetry which, through its engagement with rhythm, alliteration, assonance, cacophony, etc, highlights this materiality of language. However if Kristeva suggests that as women we should use the semiotic as a place from which to speak, it has very few implications for practical use in symbolic culture (Moi, 1985, p.170). The semiotic can only be expressed in terms of symbolic language, and a rejection of this would, following Lacan, lead to psychosis (Moi, 1985, p.170).

The theory of abjection was first expressed in Julia Kristeva's *Powers of Horror; an Essay on Abjection* Kristeva defines abjection as that which "disturbs identity, system, order", a blurring of the bodily boundaries which define subject and object (Kristeva, p.4).



Kristeva draws strongly on the ideas of cultural anthropologist Mary Douglas to formulate her abjection. In *Purity and Danger: an Analysis of the Concepts of Pollution and Taboo* Douglas deals with the social construction of that which is clean and unclean. She proposes that a lack of distinction between subject and object leads to the formulation of dirt. In her dealings with dirt she recognises two phases;

> First they are recognisably out of place, a threat to good order, and so are regarded as objectionable and vigorously brushed away. At this stage they have some identity, ...their half-identity still clings to them and the clarity of the scene in which they obtrude is impaired by their presence. But a long process of pulverizing, dissolving, and rotting awaits any physical things that have been recognised as dirt. In the end all identity is gone....It is unpleasant to poke about in the refuse to try to recover anything, for this revives identity. So long as identity is absent, rubbish is not dangerous.

> > (Douglas, p.160)

It is this blurring of the identity of subject and object which forms the basis of abjection. The identification with the father, and repudiation of the mother during the Oedipal crisis, forms the boundaries between 'me', and 'not me'. In the pre-Oedipal stage the infant has not yet formed any identity, and so does not recognise any difference between subject and object. Identity is formed only by a repudiation of all that is 'other', and it is only by establishing these boundaries that entry into the symbolic can occur. This 'other' not only includes the maternal body, but also materials which transgress the boundaries of the body- food, faeces, urine, blood, mucus, vomit, menses, breast milk, saliva, sweat, etc. It also includes the corpse, which is a threat to subjectivity through it's half-identity, and its signifiers- disease and infection. The association of the body, particularly the maternal body, and the sexualised body, with these transgressive materials, leads these bodies to be labelled as 'abject'.



Abjection is the condition which precedes the horror of castration, and arises due to a fear of being overwhelmed by the power of the maternal body, (if one subscribes to traditional psychoanalytic notions). Freud seems to bypass the phase of infantile need for the mother, instead skipping straight to the Oedipal crisis, where paternal identification has already occurred, and the female body is regarded with horror, (Theweleit, p.253). Kristeva re-reads Freud's theory of the taboos regarding the female body, and interprets them as a result of the powers of horror which the female body generates, rather than as men's generalised dread of women. (Wright, p.439). A link can be drawn between the female body, in particular the semiotic maternal body, and the abject body; the maternal body must be made abject in order for separation to occur. Kristeva proposes that the engulfing power of the maternal body, namely the birth canal, threatens the autonomy of the individual. The child was once on the other side of that birth canal, and by the threat of reincorporation into the maternal body, the child's subjectivity, which was initially formed by a repudiation of this maternal body, is blurred. Kristeva argues that it is this confusion between the infant's view of the maternal body as birth canal, and the representation of all women reduced to birth canal, that leads to the formulation of all women as abject, rather than just the maternal body as abject, (Moi, 1986, p.55).

Kristeva situates the abject body in the semiotic; the pre-Oedipal, prelinguistic phase, which one goes through before entering the symbolic. The semiotic is firmly associated with the female, being strongly influenced by the maternal. The symbolic, on the other hand, is associated with the masculine, and includes the construct of language. By associating the female body with abjection, and thus the pre-Oedipal uncivilised body, Kristeva is implying an exclusion from patriarchal society; she states, "the body must bear no trace of its debt to nature: it must be clean and proper in order to be fully symbolic", (Kristeva, p.102). By associating women with the 'grotesque' body, Kristeva denies women the 'clean and proper' body of Oedipalization (and therefore the body of patriarchal culture).

It is partly due to this theoretical exclusion from the symbolic that the abject body cannot be a part of the technological utopianism of the future, which is embodied in popular culture's cyborg. The unconscious situation of the female body in the semiotic, and association with the abject, locates



it as 'other' to patriarchal culture. If the abject body is situated in the semiotic, how has it a role in regard to a non-corporeal future, which is grounded in the symbolic, and the linguistic, patriarchal practices of science and technology?

In *Powers of Horror*, Kristeva emphasises the maternal body and the sexualised body as expressions of the abject in symbolic society. These bodies can be interpreted as oppositional to the cyborg of popular culture, whose subjectivity is clearly defined, and is not threatened by an 'other'. The concept of the abject holds little meaning for the figure of the cyborg, which usually utilises technologies to overcome some of its 'abject' corporeal processes. If the popular cultural cyborg is to remain a male figure, and one which does not engage in 'abject' acts, then it stands that these technologies must include extrauterine conception and reproduction, and, although not absolutely necessary, alternatives to copulation.



CHAPTER FOUR.

CYBORG AND ABJECT BODIES; SEX AND REPRODUCTION.

In this chapter I will attempt to establish a relationship between Haraway's cyborg, the cyborg as represented in popular culture, and Kristeva's abject body. I will use sex- in both its biological and copulative senses- and the reproductive process as a means to illustrate this relationship. I have chosen these examples due to their increased implication in technological and biological discourses, and also due to the association which sex and reproduction has with the abject.

Ι

...the floods and stickiness of sucking kisses; the swamps of the vagina, with their slime and mire; the pap and slime of male semen; the film of sweat that settles on the stomach, thighs, and in the anal crevice, ...the slimy stream of menstruation; the damp spots wherever bodies touch; ... Also the floods of orgasm: the streams of semen, the streams of relaxation flowing through the musculature, the streams of blood from bitten lips, the sticky wetness of hair soaked with sweat...

(Theweleit, pp.410-11)

Klaus Theweleit's above description of the sexual act could be described as truly abject. Although his description is of both the male and female bodies, for Kristeva it is usually only the female body which is associated



with the abject, due to its link with pre-Oedipality, repudiation as 'other', and therefore its threat to identity. The transgression of bodily fluids is explicit in his example which, following Kristeva, threatens to destroy the integrity of the self. If sweat, blood, menses, semen, saliva, and various other secretions are a necessary part of the sexual act, then how can sex, and the sexualised body be anything other than abject? This transgression results in a blurring of the distinctions between self and other, subject and object-- the horror of abjection.

Kristeva asserts that this sexualised abject body has been unconsciously repressed by patriarchal culture through the cult of the virgin. This chaste body can be seen throughout history, particularly in religious discourse, Mary the Virgin Mother being one example. The body of this virgin is often represented as impossibly sealed, to allow no escape of 'abject' fluids, Mary being titled the Spiritual Vase, the Vase of Remarkable Devotion, etc. This idealised concept of maternity sustains the symbolic order, and with it the notion of the fixed subject.

Although Kristeva only exemplifies heterosexuality in *Powers of Horror*, some theorists have related abjection to homosexuality. If the heterosexual body is considered abject, then the homosexual body could be considered doubly abject. It is repudiated as 'other', due to its disengagement with 'normal' heterosexuality, and also due to its association with 'deviant' sexual acts and disease (Whitney Museum, p.86). The sexualised female and homosexual bodies can then be linked due to their status as 'other' to the symbolic male body, which situates them as marginal to patriarchal (male) culture.

If this abject sexualised body is bound up with notions of a self, the borders of which are continually threatened and redefined in relation to the 'other', then the cyborg of popular culture can be interpreted as the antithesis of this body. This cyborg, represented by figures such as *Terminator* and *Robocop*, almost always embodies notions of strength, rationality, invincibility, immortality, etc, resulting in a type of 'supermasculinity'. These cyborgian bodies are often armoured, which implies that the boundaries of the self are fixed and unchanging, safe from any invasion by the 'other'. The cyborgs also often use technology to overcome their more 'abject' bodily processes-- food, toilets, bleeding, or sex are



rarely a feature of their daily lives (in the Hollywood movies or in science fiction at least).

For these cyborgs of popular culture and, for that matter, ordinary people too, there exist certain 'alternatives' to the physical sexual act. For purely procreational purposes there exists insemination, test-tube fertilisation and re-implantation, or surrogacy. If pregnancy could be brought full-term in an extrauterine device, then these bio-technologies could perhaps eventually negate any need for traditional gestation.

For more recreational purposes there exists CyberSex, available on the Internet, and Telidildonics- 'virtual sex' carried out in Virtual Reality. CyberSex is extremely popular on the Internet, pornographic sites being amongst the most frequently visited. there even exists online 'brothels', 'Brandy's Babes' for example. These technologies are currently available, and could be used to prevent such an 'abject' act such as sex from occurring.

Teledildonics is virtual 'sex' which is carried out in Virtual Reality. To experience it the user wears a full body 'feely-suit', equipped with sensors which put pressure on the body wherever their virtual partner touches them (Bywater, p.14). In Teledildonics no transgression of bodily fluids occurs, which asserts the notion of virtual sex as 'non-abject'. This full body suit could also be viewed as a strengthening of bodily boundaries, similar to those of the cyborg, which reinstates the notion of a secure self, safe from the threat of the 'other'.

Similar theory can be applied to the notion of CyberSex, which is practised on the Internet. Online relationships are common, and sex is carried out like phone-sex, but the words are written rather than spoken. There are certain advantages to CyberSex, as there is with Teledildonics; there is no danger of contracting any sexually transmitted diseases, and there is also an added aspect of safety-- the plug can be pulled at any time. Some theorists also claim that it is possible to be more sexually experimental online: a different gender or persona could be assumed; electrotransvestism is a popular practise on the Internet, (Grosz & Probyn, p.117).



The various bodily orifaces through which transgression of 'abject' materials occurs, which includes faeces, mucus, urine, vomit, and blood, mark the sites of what are later to become erotogenic zones- such as the anus, genitals, and mouth. In her essay, *Reinstating Corporeality*, Janet Wolff makes the interesting observation that pornography, which includes acts such as smearing the body with faeces, or urinating on the body, often depends on the deviation of the 'clean and proper' (Oedipal) body, to the 'grotesque' (abject) body (Wolff, p.128). These practices are also prevalent in cyberpunk fiction. However, in CyberSex, pornography- which is widely available- is very much in demand. Although censorship does now exist on the Internet (new legislation was passed by Bill Clinton to censor pornography on the Internet as recently as 8 February), the enforcement of the laws is difficult.

The reason for the demand for pornography on the Internet could go deeper than merely its easy availability. Perhaps because the user is 'out of body' whilst perusing these images, no direct association with them is made- akin to the Gulf War bombers who read 'virtual' images of destruction off a screen, which psychologically dislocated them from the very real damage and death they had caused, (Baxter, p.15).

Haraway's cyborg is marginal to this popular cultural ideal of the cyborg. She envisions her cyborgs to be "...compounds of hybrid techno-organic embodiment and textuality....The cyborg is text, machine, body and metaphor...", (Haraway, 1993, p.209). Haraway asserts that bodies have become more technologised than is realised- the project of mapping the human genome, for example, constructs the body as a 'code', which can be read to produce a definitive model of the body, (Haraway, 1993, p.212).

Haraway draws strongly on the characters created by science fiction writer Octavia Butler, to formulate a 'non-original' people, not divided racially by the 'other', as has been done historically. The term 'other' is formed after the stage of primary narcissism to describe all which is 'notself'. In as much as the science which created these racial divisions was Euro-American, it is used here to describe all that is not white. These 'nonoriginal' people, which could include enslaved peoples or 'hybrid' peoples, disrupt the conventional models which mark certain bodies as 'other', usually to a white Euro-American body. These bodies exist outside the



'normal' system of kinship, which never existed for them, and so do not fit in with the familial system as theorised by Freud. The creatures created by Butler are polygendered, and disparate, which not only breed across species, but also across other worlds. These characters provide some of the inspiration for Haraway's cyborgs, (Ross & Penley, p.12).

As Haraway's cyborg does not have any familial beginnings, it cannot have the conventional psychoanalytic beginnings which form the boundaries of the 'self' through a repudiation of all that is 'other'. Then it stands that the concept of the abject would not have any affect on that self. Her cyborg is also oppositional to the cyborg of popular culture, its fluid boundaries resisting the 'popular' cyborg's fortified boundaries. If there is no subject/object, or self/other divide then Haraway's cyborg would not consider the sexual act an abject 'problem', to be avoided, unconsciously repressed, or taken control of by technology.

If technocratic utopian discourse, and the cyborg of popular culture, aim for a negation of copulative sex, it could be said that the technologies for its replacement are now in place. I will next examine reproduction and reproductive technology, which is currently a highly contested area, for both ethical and gender issues. Reproduction, and the technologies which surround it are central to my argument surrounding the abject body, popular culture's cyborg, and Donna Haraway's cyborg.

Π

Thy ruddy face shall turn lean, and grow green as grass. Thine eyes shall be dusky, and underneath grow pale; and by the giddiness of thy brain, thy head shall ache sorely. Within thy belly, the uterus shall swell and strut out like a water bag; thy bowels shall have pains and there shall be stitches in thy flank, and pain rife in thy loins, heaviness in every limb. The burden of thy breast on thy



two paps, and the streams of milk which trickle out of thee.

(Warner, p.252)

The female pregnant body can only be received with horror within the concept of abjection. The identity of the female body is not only threatened, but completely broken down by the developing 'other' inside her. When can the distinction be made between the two subjects? Is autonomous subjectivity only established when the umbilical cord is cut?

The condition of pregnancy is arguably abjection in its strongest form. Kristeva argues that because identity is not clearly defined, that self is not separated from other, it is a type of institutionalised psychosis. The inability to separate self from other is a symptom of psychosis, and Kristeva argues that pregnancy is the only instance where it is socially acceptable, (Oliver, p.4).

Kristeva does not assign a negative value to this body, in fact she invests the maternal body with a power to subvert the symbolic culture, through its unfixed, flowing boundaries. However this unificatory oneness with the maternal body must end if entry into symbolic culture is to occur. Kristeva's maternal body is situated in the semiotic, and any abject power which it might have is repressed by the symbolic. If Kristeva assigns a positive status to the maternal body, the fact that symbolic culture positions it as negative, subverts any power which Kristeva gives it, and relegates it to marginality.

In the areas of science and medicine, reproductive technologies are being developed, which may eventually negate the need for uterine reproduction. The popular culture cyborg would more than likely utilise these technologies, particularly if they are all to be male figures. Genetic engineering, *in vitro* fertilisation, and other extrauterine technologies, could perhaps negate any need for biological reproduction.

Haraway proposes that replication is the late twentieth century's version of reproduction, a process whereby cells are replicated in laboratory conditions until an organism is formed. (Although this is not yet entirely possible, rodent parts have been replicated and grafted successfully, and



the task of culturing human organs for transplant through replication is regarded as an important one.) Although, at least by the rationale of popular culture's cyborg, this could be an attempt to negate the need for the 'abject' pregnant and maternal bodies, in Haraway's theory it could be interpreted as an escape from the familial beginnings which facilitate traditional psychoanalytic theory. Without the conventional concepts of 'self' and 'other', there would be no threat from these bodies, and no need to regard them with horror, or repudiate them as disruptive to identity.

Haraway recognises the threat to individuality which pregnancy could be said to cause. In addressing what constitutes an individual she notes that Julian Huxley, in 1912, formed this definition- "literally indivisibility- the quality of being sufficiently heterogeneous in form to be rendered nonfunctional if cut in half", (Haraway, 1993, p.121). In that case, female individuality is problematic due to the capacity of women's bodies to create other individuals. Haraway also notes that, "Women can, in a sense, be cut in half and retain their maternal function- witness their bodies maintained after death to sustain the life of another individual", (Haraway, 1993, p.229). Although this description of the individual could evoke an abject response to the female body, the same response could not be made by Haraway's cyborg- if it has no concept of 'self' and 'other', it cannot feel threatened by this 'other'.

Due to the development of reproductive technologies, and other technologies, such as ultrasound, along with the increased medicalisation of childbirth, the developing foetus has been given increased visibility, and whatever subjectivity it may have has been highlighted. This has fuelled much debate over abortion rights-- if the foetus is a subject, then who has the right to end it's life? This argument has been strengthened by certain medical developments, for example foetal surgery, which further heightens the notion of foetal subjectivity. The increasing sophistication of embryonic genetic screening, also raises ethical issues-- if abnormalities are detected should abortion be recommended? And who exactly is eligible for this screening? Should it be compulsory for 'high-risk' pregnancies-women over a certain age, or for couples with genetic defects in their genetic family tree? Will it result in the abortion of foetuses who do not have, for example the hair or eye colour the parents desire? Perhaps



genetic counselling and engineering could be considered a new form of eugenics, (Kirkup&Keller, p.p.153-4).

The areas of sex and reproduction are highly contested areas, both for gender issues, and ethical issues. The abject body, Haraway's cyborg, and the cyborg of popular culture, each invest a different meaning in the theories surrounding sex and reproduction, and their associated bodies. The cyborg of popular culture could be interpreted as the embodiment of the technological utopianism which attempts to overcome the corporeal, in these instances through Teledildonics, CyberSex, and reproductive technology. Haraway's cyborg does engage with this technology, but does so to create a non-original, non-familial beginning, which cannot be subjected to traditional psychoanalysis, not to create some sort of noncorporeal being. Both of these cyborgs can be read as antithetical firstly, to each other, and secondly to Kristevian abjection; in the case of popular culture's cyborg due to its strengthened self, safe from any threat by the 'other', and in the case of Haraway's cyborg, due to its disengagement with traditional psychoanalysis, and therefore non-formation of self/other boundaries.



CONCLUSION.

In this thesis I have proposed that the Kristevian abject body, the cyborg of popular culture, and Donna Haraway's cyborg are antithetical to one another, mainly due to the definitions of 'self' and 'other' which are invested in each body. I add that Haraway's rejection of psychoanalysis makes her cyborg fundamentally different to Kristeva's abject body.

The cyborg of popular culture, found in Hollywood film and popular science fiction, is the dominant ideal of the cyborg. He embodies stereotypical 'masculine' traits- strength, aggression, rationality, etc, and the utopian ideal of bodily transgression. This cyborg has protected its 'self' by armouring its body, assuming a technological second skin. This fortified self receives no threat from the 'other', and no transgression of its bodily boundaries can occur.

The dominant ideal of the cyborg is situated in a future technological utopia, a technology which, unified with science, attempts to provide a definitive notion of the individual (mapping the genome, genetic engineering, etc). If the construction of the coded body is successful, then any body which does not conform to this model runs the risk of being branded as 'other', akin to the 19th century prostitutes which were labelled sexually 'other', due to supposed 'anomalies' in their genitalia.

Kristeva's abject body can be seen as oppositional to this notion of the cyborg, as it poses a constant threat to the boundaries of the 'self' by the 'other'. However, as Kristeva's abject body is situated in the semiotic, how can it be used to subvert the popular cultural cyborg, which is so firmly associated with symbolic culture?

Haraway's cyborg can also be seen as antithetical to the cyborg of popular culture. If her cyborg is a female figure, with undelineated



boundaries between self and other, then how can it be anything but an oppositional figure? She states:

"Cyborg writing must not be about the fall, the imagination of a once-upon-a-time wholeness before language, before writing, before Man. Cyborg writing is about the power to survive, not on the basis of original innocence, but on the basis of seizing the tools to mark the world that marked them as Other.

(Haraway, 1991b, p.75)

Perhaps it is on the basis of this imagined future that a world without 'self' and 'other', and their associated positive and negative meanings, can be realised. For me, Haraway's post-psychoanalytic world offers the best possibilities for this to become reality. In her words-- "Cyborgs for earthly survival!", (Haraway, 1991a, p.26).



BIBLIOGRAPHY.

Baxter, Ed, "Mr. Microchip on My Shoulder: Virtual Reality as Old Hat", Varient, No. 9, Autumn 1991, p.p.14-17.

Bender, Gretchen, and Druckery, Timothy, (eds.), *Culture on the Brink: Ideologies of Technology*, Seattle, Bay Press, 1994.

Bywater, Michael, "Slide into Cyberspace", *Cosmopolitan*, No. 2, February 1995, p.p.10-14.

Douglas, Mary, *Purity and Danger: an Analysis of the Concepts of Pollution and Taboo*, London, Routledge, 1966.

Elwes, Catherine, "Gender and Technology", *Varient*, No. 15, Autumn 1993, p.p.64-66.

Grosz, Elizabeth, and Probyn, Elspeth, (eds.), *Sexy Bodies: The Strange Carnalities of Feminism*, London and New York, Routledge, 1995.

Haraway, Donna, "The Actors are Cyborg, Nature is Coyote, and the Geography is Elsewhere: Postscript to "Cyborgs at Large", in Andrew Ross and Constance Penley, (eds.), *Technoculture*, Minneapolis, University of Minnesota Press, 1991(a).

Haraway, Donna, *Simians, Cyborgs, and Women: the Reinvention of Women*, London, Routledge, 1991(b).

Haraway, Donna, "When Man TM is On The Menu", in Jonathan Crary and Sanford Kwinter, (eds.), *Zone: Incorporations*, New York, New York:Zone, 1992.



Haraway, Donna, "The Biopolitics of Postmodern Bodies: Determinations of Self in Immune System Discourse", in Linda Kauffman, ed., American Feminist Thought at the Century's End: A Reader, Cambridge, MA, and Oxford, Blackwell, 1993.

Hayward, Philip, (ed.), *Culture, Technology, and Creativity in the Late 20th Century*, London, John Libbey, 1990.

Kilkurp, Gill, and Keller, Laurie, (eds.), *Inventing Women: Science, Technology, and Gender*, Cambridge, Polity, 1992.

Kristeva, Julia *Powers of Horror: an Essay on Abjection*, New York, Columbia University Press, 1982.

Lechte, John, Julia Kristeva, London, Routledge, 1990.

Moi, Toril, Sexual/Textual Politics, London, Methuen, 1985.

Moi, Toril, The Kristeva Reader, Oxford, Blackwell, 1986.

Plant, Sadie, "Beyond the Screens: Film, Cyberpunk, and Cyberfeminism", *Varient*, No. 14, Summer 1993, p.p.12-17.

Ross, Andrew, and Penley, Constance, "Cyborgs at Large: Interview With Donna Haraway", in Andrew Ross and Constance Penley, (eds.), *Technoculture*, Minneapolis, University of Minnesota Press, 1991.

Sappington, Rodney, and Stallings, Tyler, (eds.), *Uncontrollable Bodies: Testimonies of Identity and Culture*, Seattle, Bay Press, 1994.

Theweleit, Klaus, *Male Fantasies Volume One: Women, Floods, Bodies, History*, Cambridge, Polity, 1987.

Warner, Maria, *Monuments and Maidens: an Allegory of the Female Form*, London, Picador, 1987.

Whitney Museum of American Art, *Abject Art: Repulsion and Desire in American Art*, New York, Whitney Museum, 1993.



Wolff, Janet, *Feminine Sentences: Essays on Women and Culture*, Oxford, Polity, 1990.

Wright, Elizabeth, *Feminism and Psychoanalysis: a Critical Dictionary*, Oxford, Blackwell, 1992.

