

Chapter One

Gendered Technologies

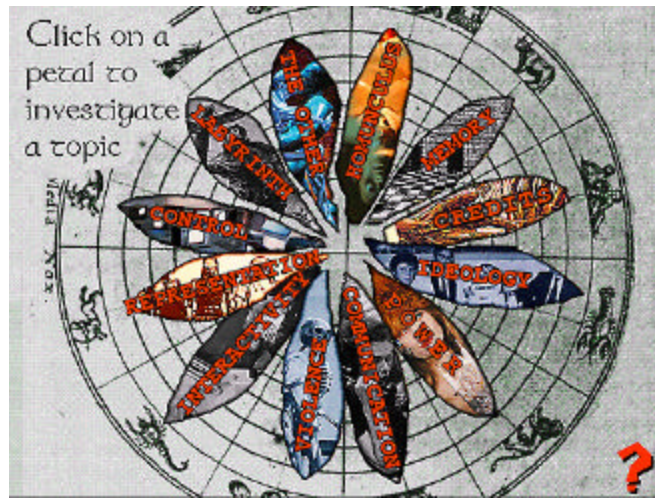


Fig. 1.1 Christine Tamblyn , *She loves it, She loves it not: Women and Technology*, 1993

The relationship between women and technology has for the most part been discursively and materially configured as an awkward and rather ambiguous one. According to predominant thought systems, women and technology are two incompatible spheres that exclude one another on account of their dissimilarities in nature. Women have been locked into the embodied feminine sphere, while technology traditionally belongs to the disembodied, “risky” and “exciting” masculine world. These two domains have been discursively constructed and materially organised to exclude one another, and therefore women’s relationship with technologies has for the greatest part been one of exclusion and separation.

This decisively problematic relation between women and technology is shrewdly illustrated in an interactive artwork entitled *She loves it, She loves it not: Women and technology* (1993) [Fig. 1.1] by conceptual artist Christine Tamblyn (1951-1998). Tamblyn presents women's relation to technology as oscillating between “love” and “hate”. The first screen of Tamblyn's project is, quite fittingly, as shown above, an image of a daisy accompanied by the text “*she loves it, she loves it not*”. Each petal is a clickable option, linking to a category considering the relationship between women and technology.¹ Tamblyn asks pertinent questions about women's relation to and alienation from technology in the past, present and future. For instance: How can women relate differently to technologies given more opportunity to do so and how can women build different relations with technologies in future? Tamblyn's questions do, therefore, pre-empt a cyberfeminist approach to the relation between women and technologies. As in Tamblyn's artwork, cyberfeminism suggests that women and technologies, although disassociated in and by patriarchal schemes, share the same intimate history and are in fact in a perverse alliance. This means that the traditional relationship between women and technologies is not only

based on false assumptions, but the possibility of forging another kind of relationship is also greatly obscured from women themselves.

But what is technology? Is technology a form of know-how, something people do or just a set of physical tools such as spanners and computers? My use of the term “technology” refers to a more encompassing human activity that is contextually bound and yet transcends an instrumentalist view of technology as providing mere tools for human use. The categories of technologies that will be included in my discussion are inclusive rather than exclusive.

Technology is, however, not restricted to machines and devices, but also includes social, economic and institutional forces. Teresa de Lauretis, in *Technologies of gender*, extends technology's meaning to include "various social technologies such as cinema, institutionalized discourses, epistemologies and critical practices, as well as practices of daily life" (1987:2).

The emphasis of the discussion is on a cyberfeminist reading of women and technologies and how women's warped relations to technologies impact on embodiment in an age during which the body is said to be disappearing into technological oblivion. If women and bodies have been perceived (and remain to be perceived) as inseparable categories, what is at stake for women specifically when bodies are dissolving into information networks?

As a consequence, it seems ludicrous to advocate, that bodies are technologically innocent and untouched by new technologies, for not only are bodies touched by new technologies, but they are also invaded, penetrated and permeated by technologies. New technologies have become all-pervasive and seductive to the point where distinguishing between the so-called “original” (technologically uninfected) organism and extreme new technologies, such as invasive neuro-transplants and infectious nano-robots, has become technically impossible. In the exchanges between bodies and new technologies, bodies cannot be viewed as static given entities (not that they ever could): instead, they are constantly changing, regenerating and in flux. As Michel Feher explains in “Of bodies and technologies”, there is a continuous process of transferral: "the body is instead a reality constantly produced, an effect of techniques promoting specific gestures and postures, sensations and feelings" (1987:159).

Clearly it is no longer a question of technologies existing solely outside bodies, but more a case of technologies – specifically nano-technologies – infiltrating and infecting bodies. As Donna Haraway states: "The machine is us, our processes, an aspect of our embodiment" (1990:222). What this means is that unexacting distinctions between the organic “self” and mechanised “other” are no longer possible, without the risk of being literally deconstructed from the inside out. We are embodying machines, just as they embody us.

On the other hand, to argue that bodies have come to their evolutionary grand finale and that humans can sustain a technologically-enhanced life without embodiment of some sort, is as ludicrous as conjuring a technologically innocent body. The dream of disembodied techno-existence ironically "embodies" a misguided trip to a paradise of self-annihilation.

Cyberfeminism's skilful and embodied espousing of new technologies, without necessarily signing up for permanent virtual existence (disembodiment), appears to steer clear of these hidden ontological and epistemological landmines on our screens. Like their hysterical sisters of the previous century, cyberfeminists know that embodiment, although changing and shifting, is a prerequisite for existence. As Katherine Hayles reiterates: "At the end of the twentieth century, it is evidently still necessary to insist on the obvious: **we are embodied creatures**" (1996:3, emphasis added). In the face of techno-determinism's severe indifference towards the body, cyberfeminism is therefore suspected of propagating body-essentialisms and nostalgia for a so-called lost "pure" and "innocent" body. The mere suggestion that we are embodied beings or, in Donna Haraway's terms, "situated knowledges" (1997:11), although continuously changing or "becoming", is treated with suspicion and discredited as being technologically inapt and techno-phobic. Those who treat embodiment with particular contempt are the Transhumanist groupings, Cybernetics, cyber-theorists such as John Barlow, Jaron Lanier, Hans Moravec, and new media artist such as Stelarc, who are all discussed later. This chapter navigates its discussion of technology and gender between the poles of technophobia and technophilia. Melvin Kranzberg aptly states: "Technology is neither good nor bad, nor is it neutral" (1985:4), and it is the non-neutral aspect of technology that is of particular interest to a cyberfeminist analysis.

1.1 Does technology have an essence?

As mentioned earlier, the term technology is used to refer to and imply the more complex compound of "technoscience" as developed by Bruno Latour (1987:174). Historically science has been described as that which **discovers**, and technology as that which **applies**. This hierarchical division of labour between discoverer and applier can playfully be compared to the relationship between "master" and "handmaiden". Accordingly, science has been construed as the more valuable partner in the relationship, but this changed during the early twentieth century, when the uneven relationship between "master" and "handmaiden" developed into what Hillary Rose describes as an "iron-bound marriage" (1994:11). In other words, the "handmaiden" has become the lawful mistress of the house of science, so to speak.

As notions about science and technology changed in and over time and within different contexts and societies, the initially strict hierarchical relation between the two dissolved. It has likewise become apparent that technology has contributed as much to

science as vice versa. The role played by computers, for instance, in the discoveries made by science is a good example of technology's immeasurable contribution to the sciences. No longer does science hold the privileged position of discoverer, while technology is denigrated as the mere applicator of its discoveries. In fact, Don Ihde is of the opinion that to speak of science today is also, *ipso facto*, to speak of technology (1993:78). Others take the argument a step further by asserting that it is no longer science that is shaping technology: technology is instead shaping itself (Winner 1977:57-73). Technology has steadily slipped through "master" science's controlling fingers and has mutated into what can more aptly be termed as technoscience, which "exceeds the distinction between science and technology" (Haraway 1997:3). Therefore, when reference is made to new technologies within this study, I imply a close conceptual link to the mutated concept of technoscience.

Continuing my exploration into the meanings of technology, particularly for a cyberfeminist reading, I nevertheless have no illusions, about the impossibility of uncovering the "true" essence of technology. Like Martin Heidegger, I affirm that, whether viewed positively or negatively, technology cannot be ignored. Heidegger poses the question concerning technology as follows:

Everywhere we remain unfree and chained to technology, whether we passionately affirm or deny it. **But we are delivered over to it in the worst possible way when we regard it as something neutral;** for this conception of it [...] makes us utterly blind to the essence of technology. (Heidegger 1977:4, emphasis added)

In accordance with Heidegger, the question concerning gendered bodies and new technologies cannot be viewed from a neutral stance and hence my choice of a cyberfeminist position. Heidegger's concept of the *Gestell* (enframing) is how reality appears or unveils itself to us in this age of modern technology.² We are born into this "mode of ordering" (1977:24) and therefore, we are always already embedded into the *Gestell* (enframing). Consequently, our thoughts on bodies and technologies are inevitably informed by a technological reality, as Heidegger explicates: "[Man] can never take up a relationship to it [technology] only subsequently" (1977:24). Any questions as to how this relationship started are, therefore, always **too late**, according to Heidegger. The only relevant questions that remain to be asked are those concerning whether we actually experience the workings of the *Gestell* and if so, how we experience them.

Heidegger's *Gestell* is not technology, but rather "what essentially comes to pass in technology" (Caputo 1993:182): in other words, it is the essence of technology. The distinction between the so-called essence of technology and technology itself is described as follows by Heidegger: "[The *Gestell*] is nothing technological, nothing of the order of a

machine. It is the way in which the real reveals itself as standing-reserve" (1977:23). In Heidegger's deployment of the *Gestell*, tools and technical instruments are mere manifestations: they are **not** the essence of technology as such. This means that Heidegger does not understand the essence of technology to be instrumental or anthropological: in other words, he does not define technology as a means to an end or a human activity. He searches beyond the instrumental definition of technology, for as he argues: "the correct instrumental definition of technology still does not show us technology's essence" (1977:6). Technology in essence is rather how "the real reveals itself as standing reserve". This means that the world comes to us in this age as a place where all things and, in particular, the material world are reduced to usable materials standing-by, waiting to be unlocked, transformed, stored up and distributed – a standing reserve (*Bestand*).

What is useful for a cyberfeminist understanding of technology is how Heidegger describes the relationship between *Gestell* and nature, or, in embodied terms, how he describes the relationship between bodies and technologies. Heidegger states that the *Gestell* challenges man to put "to nature the unreasonable demand that it supply energy that can be extracted and stored as such" (1977:14). Nature's energies and resources must be unlocked and exposed, in order to be transformed, stored up and distributed "toward [...] the maximum yield at the minimum expense" (1977:15). In other words, with the minimum input the maximum energy must be extracted. Nature is confined to a "standing reserve" (*Bestand*); a resource; a reservoir of potentiality. In fact, man³ himself in the form of "human resources" (1997:18) is part of the standing reserve, waiting to be tapped into and expedited. This inevitably means that man is not the all-controlling subject, determining technological processes, but rather man himself becomes an object of the grinding *Gestell*. Heidegger asks if the *Gestell* happens beyond all human doing and answers himself: "No. But neither does it happen exclusively *in* man, or decisively *through* man" (1997:24, original emphasis).

Although Heidegger's unpacking of the *Gestell* (enframing) is very foreboding in its outlook and implications, it does, nevertheless, provide a position on technology beyond the usual instrumentalist and anthropological versions, neither of which asks about the essence of technology. Heidegger supplies his reader with a new ontology regarding technology, in which reality is said to unfold fatally as a "standing reserve" waiting to be technologically instrumentalised. Michael Heim, an important voice in discourses on new technologies, clarifies Heidegger's use of the *Gestell* as follows:

For Heidegger, [...] the question of technology was not an ontic one, not one about the proliferation of devices or even about the possible supremacy of the machine over human beings. His ontological questions touch the world, the clearing or backdrop against which things appear. (Heim 1993:66)

Contra and yet in close accordance with Heidegger, the *Gestell* is probed in this study by asking questions about its limits, seeking out and infiltrating its fissures and lacerating its certainties from a cyberfeminist stance. As part of a cyberfeminist exploration, the position I take in relation to technologies is neither techno-phobic nor techno-phoric, or, phrased differently, it is neither anti-technological nor blindly pro-technology. In her insightful essay entitled "On bodies and technologies" (1987) Alice Jardine sets out four types of responses to technology and I would like to explore them briefly in order to position this study's response to technologies. The first is an **anti-technology** position, which manifests in left- and right-wing variations. On the left, the anti-technology position is articulated in simplistic oppositions between the earth as "good" and technology as "bad". On the right, technology is resisted on the basis of puritan ethics, such as those voiced, for instance by the anti-abortion league's opposition to meddling with "nature".

In contrast with the anti-technology variants, the other major response towards technology is to be obliviously **pro-technology** and to embrace every available technological enhancement uncritically. According to pro-technologists, it is a wonderful prospect to become a cyborg.⁴ The third approach to technology is best outlined in the philosophy of Rosi Braidotti, who, in *Between monsters, goddesses and cyborgs* (1996), sets out to show that science and technology are invented by men to liberate themselves from the so-called monstrous female. Therefore inventions, especially in reproductive technologies, are geared to take over the reproductive function from women by substituting women's bodies with technological devices. In this regard, cultural feminist Mary Daly is another good example of this type of response to technology. Daly argues (not completely without merit), that "phallotechnic progress" (1990:53) aims to substitute femininity with holograms and females with robots by techniques such as cloning and transsexuality. Daly does, nevertheless, assume that bodies are natural and technology artificial, without acknowledging the interlacing of these categories. Bodies are not exclusively natural and neither are technologies solely artificial. Phrased differently: "we are cyborgs" (Haraway 1990:191) and, therefore, the traditional distinctions between ("natural") human selves and ("artificial") machines have dissolved in the virtual age.

The fourth type of response, which Jardine identifies, ties up with Braidotti's and Daly's positions, but with an interesting twist added. According to this response, technology has always been focused on the maternal body, but moreover, it understands the machine to be a woman. Jardine explains: "technology always has been about the maternal body and it does seem to be about some kind of male phantasm, but, more, it perceives that the machine is a woman in that phantasm" (1987:156). Once again the female body, as was the case with nineteenth-century hysterics, becomes the contested site. It is with this position that I will mostly associate myself, along with other cyberfeminists such as Sadie Plant, Katherine Hayles and Donna Haraway (discussed in the next chapter).

Aligned and guided by this fourth response to technologies, an attempt is made within this study to "de-homogenize" (Sofia 1995:148) technologies, in reaction to most feminist impulses which tend to homogenise or over-generalise technology such as Mary Daly (1990) and Hilary Rose (1994). The homogenising approach to technologies entails that technology is constructed as inevitably phallic, masculine and therefore, as deadly and westernised *per se*. In such a model, one technology becomes a synecdoche of technologies in general. Accordingly, contexts and histories of technologies are over-simplified and technologies are demonised and unequivocally rejected on account of this reductionism. I rather propose a strategy of de-homogenising, wherein neither technologies nor bodies is put forward as universal subjects or categories and nor are they exclusively dichotomised. As Judith Halberstam advises: "feminists [...] must rather begin to theorize their position in relation to a plurality of technologies and from a place already within postmodernism" (1991:441).

Consequently, I propose that bodies meet technologies constantly and the result of each meeting differs. This indicates that the same technology may be used differently and even for a different purpose in different cultures, contexts and by different genders. Don Ihde affirms this when he states that technologies are "frequently variably culturally embedded" (1993:130). Therefore, universal predictions about how technologies will impact on different cultures and different genders are not feasible. The different uses of technologies by different genders are probably best illustrated in women's creative "misuses" of the telephone (Terry & Calvert 1997:5) [Fig. 1.2]. Apparently, the telephone was originally designed to assist business transactions between men, but was used more often by bored and isolated housewives as a means of making and keeping social contact with other women. The inventors of the telephone did not anticipate these subversive uses of the telephone, but neither could they control the unexpected ways in which the telephone was used.



Fig. 1.2 Christine Tamblyn , *She loves it, She loves it not: women and technology*, 1993

Technology cannot be contained in one universalising envelope, for, as Ihde shows, technologies' uses and meanings also depend on how the concept of "nature" is constructed within a specific societal context (1993:124-5). For instance, there is a significant difference in the use of technologies in a society wherein nature is constructed as a "standing reserve" (Heideggerian *Bestand*), as opposed to those wherein nature is valued in an animistic tradition as a lifelike entity. I am not hereby implying that no patterns of dominance as

constructed in a patriarchal system can be detected from the ongoing meeting between bodies and technologies, but I argue that these patterns are constantly shifting and morphing. I will, however, relentlessly critique biased patterns relating to gender and power as they manifest in the meeting between bodies and technologies.

1.2 Why gender and technology?

Before setting out to answer the questions relating to the gender of technology and to whether gender is a technology, I shall provide some reasons for choosing to use the term "gender" and not "sex" when dealing with bodies and technologies. Hilary Rose warns, in *Love, power and knowledge*, that "Arguments about whether science is gendered inexorably become entangled with the issue of which 'sex' produces sciences" (1994:98). And rightly so in my opinion, for to ask about gender is always related in a sense to questions about sex.

In my introduction dealing with the hysterical female body, I constructed the sexed body as a speaking position. The question of who is speaking is always important, not in order to capture the speaker, but rather to situate the speaker. The introduction also argues that embodiment forms an integral part of any speaking position, especially in the development of concepts such as "embodied subjects" and "psychic corporealities". So when one asks who is speaking, the question does not refer to what sex or gender is speaking, but rather enquires about both. If we ask about the gender of technology, we also inevitably ask about its sex. As established earlier, just as the mind/body split is unworkable, so is the sex/gender dichotomy.

Traditionally it was argued that sex pertains to the "natural" body and gender to the "cultural" mind. Nevertheless, this dichotomy can be disrupted in similar ways to those in which the so-called mind/body split has been disrupted by means of concepts such as Merleau-Ponty's *flesh* and Luce Irigaray's *sensible transcendent*. If it is accepted that we are always already embodied in a meshed joining of mind and body, how can sex be split from gender? Just as the body "writes" and is a text, so is sex. The sexed body writes to the gendered mind, just as the gendered mind writes to the sexed body. Evelyn Fox Keller, an important theorist on science and gender, seems to agree when she states: "gender is a fundamental relational construct which, although not determined by sex, is never entirely independent of it" (1989:38). The sexed body is, therefore, not valued as a pure given, waiting passively for the inscriptions of the ostensibly active gendered mind to produce it and vice versa. It may be argued that in some ways gender does construct bodies, but no more or less than sexed bodies construct gender.

In this view both gender and sex are texts in the widest sense of the word. Sex does not have one final essence, but rather essences sliding on a continuum between male and female, and the same applies to gender sliding between femininity and masculinity. The sex

and gender continua do, however, intersect at certain points and meet one another in the form of embodiments. In other words, I do not consider gender entirely amputated from sex, but rather propose that gender and sex are mutually, although not prescriptively, instantiated. Anne Balsamo in her inspiring text, *Technologies of the gendered body* (1996:36), similarly argues:

[...] gender, like the body, is a hybrid construction, belonging both to the order of the material body and the social discursive systems within which bodies are embedded. [...] Gender is never separate from the bodies that are taken up within it or marked by it.

This means that social change will not, in my view, be brought about only by transforming gender-roles, for that assumes (on a crude basic level) that if we change our minds the material world is accordingly changed. Subsequently, the mind-over-matter mode prevails and women, being mostly associated with matter, are once again devalued in such an assumption. Accordingly, I contest the emphasis that second-wave feminists, such as Simone de Beauvoir, place on the inter-changeability of gender-roles in order to reach equality.⁵ As will become clearer later, gender cannot be perceived as a piece of clothing or mask to put on and take off at the subject's will.⁶ Obviously, there is an element of play and masquerade attached to gender construction, and certainly gender is not fixed or cut into the flesh, but neither is it a subjective choice from a drop-down menu over which the subject has full command.

My choice of the term gender, when referring to bodies and technologies is, then, therefore, solely a pragmatic one, since the term gender is (absurdly) mostly associated with women (as if men do not have a gender), for "gender seems to 'stick' more readily to women than to men" (Adam 1998:21). It is feminist debates that have placed gender on the political agenda as Jane Flax (1990:40) affirms: "A fundamental goal of feminist theory is (and ought to be) to analyze gender relations". In a system where being white, male and masculine is taken as the default standard, one does not need to speak about gender, but once one starts speaking for and about the positions that are not "normal", namely women and homosexuals, you have to be reminded that there are (at least) two genders. It is perhaps best to refer to a sex-gender system as Donna Haraway suggests (1991:130), but seeing that gender has become shorthand for the whole complex debate, it will be used here. When gendered bodies are referred to, as in the title of the study, I am broadening its scope so as to include the always already embodied sexed and gendered state in which we find ourselves. It is argued that gender and sex (mind/body) cannot be severed into distinctive categories and subsequently, the use of gendered bodies implies the always already incorporated state of having and being both sex and gender.

1.3 Does technology have a gender?

The short answer to the question, "Does technology have a gender?" is "yes", for if we heed Heidegger's warning not to regard technology as something neutral, it should also include gender neutrality. For too long, science and technology have attempted to hide themselves behind a mask of so-called neutrality and objectivity.⁷ As Don Ihde claims, "To make a technology is not simply to make a tool or an artefact – *it is to make a world*" (Ihde 1993:103, original emphasis). It must be asked what worlds are created by technologies? Moreover, what kind of gendered worlds do technologies create?

Technologies are, therefore, not neutral: they possess gender, precisely because specific technologies favour specific genders. Sandra Harding asserts: "If science [technology] is a totally social activity – it is structured by expressions of gender" (1986:57). Although I do risk homogenising technologies at this point, nevertheless, I want to suggest that the gender that is predominantly favoured by most technologies is, indeed, masculinity. Furthermore, I want to add that most technologies also privilege a specific sex, namely the male. When Cynthia Cockburn argues convincingly that "we cannot do without a politics of physical power and that it need not immobilize us" (1985:128), she is arguing for the inclusion of sex in the debate on gender and technology. Under physical power, Cockburn includes both "corporeal effectivity (relative bodily strength and capability) and technical effectivity (relative familiarity with and control over machinery and tools)" (1985:128).

On an entry level technology requires an initial cost, namely the necessary skills, access – not only to use technologies, but also to create technologies, and in some cases technologies require above average (for a woman?) physical strength. The everyday realities of the labour market dictate that women are still paid less than men and, when it comes to "know-how", women are less skilled in technologies for a variety of reasons. In addition, traditionally the average woman has embodied herself differently from men in terms of technologies and this produces and perpetuates a system of exclusion that has been kept intact from context to context. But is the gender/sex and technology debate merely a question of access, resources, skills and strength? What transpires on the meta-discursive level that makes the bond between masculinity/maleness and technology so powerful? In *Feminism confronts technology* Judy Wajcman explains:

To emphasize [...] the ways in which the symbolic representation of technology is sharply gendered is not to deny that real differences do exist between women and men in relation to technology. Nor is it to imply that all men are technologically skilled or knowledgeable. Rather [...] it is the

ideology of masculinity that has this intimate bond with technology.
(1991:137)

Wajcman is careful not to reduce all technological relations to gender differences by keeping open the possibility that "real differences do exist between women and men in relation to technology" (1991:137). In other words, sexual differences co-exist in tandem with gender differences. Neither does Wajcman argue in a sexist reductionist manner that physical men are necessarily technologically inclined, just because they are men. On the contrary, women are definitely technologically capable, but in order "to feel technically competent is to feel manly" (Cockburn 1985:12). In other words, a woman has to traverse traditional gender roles in order to "feel" technologically adept. Obviously, it is not inherently negative to cross traditional gender-roles (in fact it is laudable), but what Cockburn is hinting at here is how technology is inscribed into masculinity and how technology is seamlessly aligned with power and masculinity.



Fig. 1.3 Ellen Eglui's clothes wringer for washing machines, 1888
(*New Scientist* 1984:10)

Cockburn and Wajcman are not arguing that technology is **inherently** masculine, but they demonstrate how technology has been socially constructed as being masculine. Obviously, the masculinity referred to here is the so-called "dominant masculinity" (Halberstam 1998:2), which has unproblematically aligned itself with patriarchy, power and maleness. Alternative masculinities do exist, such as gay masculinities, female masculinities and masculinities otherwise organised than according to the western model. However, these alternative masculinities do not necessarily have the same access to power and institutional support as the "dominant masculinity". This indicates that technology's relation to dominant masculinity has a long and dynamic history, which may (hopefully from a gender-egalitarian perspective) change again in the near future. Wajcman also stresses that there is no "coherent single form of masculinity" and that the "masculine culture of technology may take a partially different form for working class and middle-class men" (1991:39). This means that, although there are differences within the masculine culture of technology itself and it is not one

coherent system, all these differences still tap into the "ideology of masculinity", which has a close bond with technology and power. In an interview, Diane Greco, author of the interactive hypertext, *Cyborg: Engineering the body electric*, comments, as follows, on the link between technology and power:

For me, technology isn't the issue. **Power** is. When we talk about 'women and technology', **the word 'technology' stands in for power**. [...] the problem is that women (and men) are still hugely ambivalent about the issue of women's relationships to power [...] and when 'technology' comes to represent power, it acts as a kind of lightning rod. (Interview on *Riding the meridian*: 2000, emphasis added)

Given technology's unproblematic alliance with the dominance of masculinity, it is not surprising that the prototypical inventor or scientist is represented as male. Although women have also created and invented technologies, specifically in the arena of horticulture, agriculture, cooking and childcare, they are mostly disassociated from the power core of technology. The technologies invented by women have, subsequently, been discredited as second-rate and "low-tech", and not part of the so-called male "high-tech" mainstream.⁸ Furthermore, if an invention were made for instance by a black woman, such as Ellen Eglui – the inventor of the first clothes wringer for washing machines [Fig. 1.3] – race would become another inhibiting factor that prevented her from being acknowledged as a great inventor. Realising these fateful circumstances Eglui sold the patent rights to her invention for a meagre \$18.00 in 1888, because, as she rightly observed:

You know I am black and if it was known that a Negro woman patented the invention white ladies would not buy the wringer, I was afraid to be known because of my color, in having it introduced into the market, that is the only reason. (*New Scientist*, 24 May 1984:10)

Not only are female inventors under-represented and marginalised in the histories of science and technology, as in the case of Ellen Eglui, but finding references and information about female inventors is also a very difficult task. Anne Balsamo confirms this sad state of affairs: "Gathering even basic biographical material about the women who participated in traditional male-dominated technical and professional fields [...] is not an easy project" (1996:151). Even when one is fortunate enough to find references to early female inventors, their inventions are mostly not treated with the same significance as their male counterparts for "the traditional conception of technology is heavily weighted against women" (Wajcman 1991:137).



Fig. 1.4 Ada Byron King, Countess of Lovelace (1815-1852), (Photo Gallery of Women and Technology).



Fig. 1.5 Grace Murray Hopper, Portrait in uniform (1909-1992), (Photo Gallery of Women and Technology).

There is, however, a trend within recent feminist studies to search for and to recover women's contributions to the historical development of different sciences and technologies. For instance, the reclamation of the contributions that women, such as Ada Lovelace [Fig. 1.4] and Grace Hopper [Fig. 1.5] have made to computer programming are promising and encouraging to other women. However, it is debatable whether the revival and resurrection of lost female voices within the male-dominated sphere of science and technology is the only feasible way of placing women on the technology agenda. Although this is a valuable project, the discriminating premises of technology are still left unchallenged. Such a project merely reinstates women within the history or canon of men's science and technology, and places women inventors within a broader male framework. By inserting these female inventors into science and technology that have overwhelmingly been governed by male-defined notions and aspirations, these women will be valued in terms of the male standard as producing inventions which are "not-bad-for-a-woman". In Sandra Harding's terms, by keeping the masculine epistemological premises of science and technology unchallenged, both "bad science" and "science-as-usual" (1986:25) remain secure. Harding suggests that both "bad science" [science misused to prove gender-biased positions] and "science-as-usual" [science with an apparently neutral premise hiding a gendered bias] will have to be uprooted, in order for women to make inroads into the "science question".

Introducing a quota system will also not transform the so-called neutral and objective premises of science; it may merely push more women into a male-dominated system. The real challenge is rather to show that the subject of science is not neutral but in fact sexed and gendered. As Irigaray in "Is the subject of science sexed?", argues "But maybe we can ask whether there is not, underlying, underground, a *common producer* that makes science. But who? Is there someone? Does *he* show himself?" (1989:59, original emphasis). In other

words, putting women into the science and technology sphere to make up numbers (quotas) will keep the knowledge foundation of science intact. Susan Harding appropriately enquires: "Does the increased presence of women in science have any effect at all on the **nature** of scientific problematics and outcomes?" (1986:21, emphasis added) and the answer to her question appears to be in the negative at this stage.

Another way of tackling the "science question in feminism" would be to enquire how the epistemological supposition of technology as inherently aligned with masculinity, is perpetually being constructed and maintained as such. How are different social values, meanings and genders assigned to scientific and technological reason (Harding 1989)? Are scientific (masculine) claims to knowledge always better than so-called non-scientific (feminine) claims to knowledge (Fox Keller 1989)? The following sections will tackle these questions.

1.4 How technologies are gendered

Some answers to these questions can be gleaned from recent information concerning the genders' differing relations and responses to new technologies in classrooms, advertisements and on the Internet. Dale Spender's everyday accounts in *Nattering on the Net* (1995) of what actually happens in Australian classrooms between the girls and boys provide insightful information about "how" most boys tap into the power behind the masculine-technology alliance. It is amazing how "even three-year-old boys in pre-school insist that the computers are the boys' territory, and the girls are verbally and physically driven away" (1995:167), writes Spender. In the end the girls either lose interest or accept that it is not "their" territory and, in order to avoid conflict – another very feminised trait – they stop demanding access to computers. The stereotype of technology being equated with masculinity and "if you lack masculinity you don't have access" are uncritically reinforced by such daily events. It is, however, not only girls that suffer this fate, for Spender also mentions cases where specific boys are also targeted, and accordingly, ostracised from the boys' club. Perhaps these targeted boys, just like the girls, are punished for not being masculine enough and are, subsequently, excluded from the inner sanctum of technology.

The enforced exclusion of girls and certain boys does, however, not end at secondary school level, for similarly, young men in university computer laboratories ban the girls (and un-masculine men) from the "holy" male territory of technology. They make use of unsubtle methods, such as physical force and verbal abuse, and other more subtle methods, such as creating a generally women-hostile environment.⁹ If a woman wants to choose the technological route she has two choices, namely becoming "one of the boys" or taking a difficult oppositional route. Add to this the fact that role models for women in technology are

scarce and constantly under pressure and the task ahead for women interacting with technologies seems rather gruelling and torturous.

Women's failed participation in technological endeavours is, therefore, not based on an inherent technological handicap, although most women may have wrongly internalised such a supposed handicap, but rather because women are alienated from an early age from technology. Accordingly, women may find it difficult to align themselves unproblematically with technology. To reiterate the point: technology is **not** inherently masculine, but it is constructed as such and even sometimes physically claimed as male territory. Even though women create and use technology, they still do not gain effortless access to the ideology of masculinity and the power residing therein. It appears that only those men who behave in certain masculine ways are rewarded with technological power. The hacker culture, as exemplified in the image of the lonesome warrior [Fig. 1.6], is an excellent example of how "macho" myths of war, control, invasion and conquest are constantly being reinforced. Women do not, as a rule, associate themselves easily with such destructive warrior myths (this is not to say that women cannot be warriors) and are consequently mostly estranged from the hacker idiom.



Fig. 1.6 Image from "Digital underground" story, .NET magazine, June 2001

Another example of how women are alienated from the inner sanctum of technology comes from the research by Carol Cohn into the language used by "defence intellectuals" – men who do nuclear strategic planning for the US government – by unmasking the biased principles on which this highly specialised and masculinised language operates. "Technostrategic" (1987:690), as Cohn labels the initiated language of defence intellectuals, is based on "thinking [that is] more abstract, more focused on parts disembedded from their

context, more attentive to the survival of weapons than the survival of human beings" (1987:715). Subsequently, it is not possible to learn how to speak "technostrategic" without also obviously starting to think and operate in a rationalised and distant manner. Learning "technostrategic" requires one to conveniently forget "the mass incineration caused by nuclear attack" (1987:713). Therefore, "technostrategic" is a language created by men, for men, in order to control nuclear technologies and make provision for an exclusive masculine "nuclear priesthood" (1987:702) of highly informed and powerful men.¹⁰

Likewise, Ellen Ullman, software engineer and consultant, confirms: "there is a male sort of loneliness that adheres in programming" (1996:3). In her reflections on her relationship with co-programmers (mostly males) it becomes clear that communication amongst programmers complies with specific alienating rules.¹¹ Ullman discloses: "Fifteen years of programming, and I've finally learned to take my loneliness **like a man**" (1996:4, emphasis added). As a female programmer, Ullman is forced to transgress gender (assuming that there are traditional gender roles) in order to fit into the solitary male-dominated sphere of software engineering. According to Ullman, everything is "cut off from real working things" (1996:12) in software engineering, and explicitly severed from the personal and physical realms and consequently, "cut off from the real body, we construct a substitute body: ourselves online" (1996:12). Although Ullman adapted to these alienating "rules" and is probably a successful software engineer, she nevertheless draws attention to the implied and enforced "masculinity" of computer programming, which most women may initially experience as intimidating and alienating.

The same logic applies to computer games, for traditional "male" games deal with the annihilation of opponents and victory through killing. Most computer games require a specific, almost clannish attitude. In opposition most traditional "female" computer games concern problem-solving, emotional involvement, social interaction and adventures without violence. The difference between the game strategies is described as follows: "The masculinity of the machines has been largely defined by the games that have been developed and fervently taken up by boys, games which tend to leave young women cold" (Willinsky 1996). There are, naturally, many examples and individuals that do not fit these highly gendered categories, but the fact remains that about 80 percent of the computer game market is aimed at and consumed by young men between the ages of 8 and 28. Arguably, this predominantly adolescent male audience sustains the financial success of the computer game market and, therefore, computer games are mainly created with this specific target audience in mind. The success of highly sexualised female game characters, such as Lara Croft, only attests to this fact (not to imply that women do not play the game as well).

It appears, therefore, that, despite the advent of new technologies, which, with their anarchic tendencies and their decentred and multiple processes, have created expectations for differently structured gender relations and ratios, the exclusivity and hierarchical

favouritism of the masculine has resiliently prevailed. This becomes especially evident when looking at how current labour divisions are still organised in terms of gender and technology. Thus, while new technologies represent a force and opportunity for democratic change,¹² they are still constrained by pre-existing divisions of labour. As Judy Wajcman confirms: "If technology is designed with job stereotypes in mind then it is hardly surprising that sex segregation is being further incorporated into the workplace" (1991:28). In other words, the top positions in the technology sphere are still made by and secured for men.¹³

Given these gender-biased practices, it is ironic that "the electronics industry is largely a women's industry, **at least as far as production is concerned**" (Wajcman 1991:149, emphasis added). It is female workers who assemble most electronic equipment, especially in Silicon Valley, where the majority of women are Afro-American, Hispanic, or Asian. These women are cheap labour producing "boys' toys". Paradoxically, it is also women who mainly assemble the electronics of modern naval warfare vessels and other military equipment. Men get to play with technology, while women neatly assemble it for them, it seems.

It is also significant that in 8.3 million households in America it is a woman who is the primary home computer user and that two out of every three on-the-job computer users are women (Coyle 1996:42). In fact, some of the latest figures published in *USA Today* by Elizabeth Weise (2000) indicate that women are no longer a minority on the Internet. In fact, the number of women on the web has surpassed the number of men, and it is female teenagers and seniors that are specifically responsible for this dramatic growth in numbers.¹⁴ Given this increase of women's involvement on the Internet, how and why is technology still predominantly perceived as a "guy thing"?

The figures for the continent of Africa and South Africa specifically, do not, however, favour women – black women in particular – for gender-roles are far more entrenched and the residues of race discrimination linger more manifestly on this continent. In contrast to American women, who have become the primary computer users in their households, access to technology for rural women in South Africa especially, is not nearly a given.¹⁵ According to Hilary Rose, "third world feminism" is also not consumed with the problem of how women relate to technology and science, because they are dealing with issues of survival (1994:27). This could leave the impression that issues of survival are far more important for the feminist agenda than struggling against white male techno-dominance in first world systems. Indeed, at this stage survival issues, such as poverty, starvation and diseases are of life-threatening importance in the sub-Saharan region. On the other hand, given the debate on the ever-increasing digital divide between the North and South, arguably, gaining access to technology and becoming computer literate are "issues of survival" for the digital millennium as well.¹⁶



Fig. 1.7 Cover of *Wired* 10.09, September 2002

Returning again to the American statistics and figures, one may well speculate whether the perception that technology is a “guy thing”, is a question of how stereotypes outweigh reality (Coyle 1996:43). It appears that women in affluent societies are so trapped in the stereotype of technology as a masculine construct that they cannot see or dare to see themselves as also being technologically inclined. Or perhaps it is more a case of even when women finally gain access to technology (the biggest problem for women in Africa at the moment) and overcome the masculine stereotype, they are constantly re-confronted by marketing and social images, which reinforce the male stereotype again and again. This means that even though a woman may experience herself as technologically apt, she will constantly be alienated by consumer images that entrench the “technology is masculine” stereotype.

In this regard, magazines such as *Mondo 2000* (founded in the early 1990s) and its successor, *Wired* [Fig. 1.7],¹⁷ epitomise a techno-macho cult, wherein disembodied transportation to a cyber-planet is anxiously awaited.¹⁸ In the South African context as well, most computing advertisements, such as those for new service providers (*M-Web* for instance) and computer hardware and software, automatically presume masculinity as their central point of departure, especially young white masculinity. This means that black women are doubly excluded from technology, on one level by their gender and on another by their race. Technologies do not therefore, only have a predominant gender, but also prefer a specific race and class. In fact, a growing number of black feminist writers of the 1980s, such as Patricia Hill Collins, insisted that race, gender and class form a crucial “trialectic” of exclusion (Rose 1994:20). In other words, gaining access to technology does not only deal with physical access, but also gaining access by overcoming debilitating (socially constructed) gendered and racial stereotypes of technology.



Fig. 1.8 Male hacker, *Network Associates* advertisement, *.Net*, April 1999

It is also interesting to note how differently women and men are depicted in advertisements for new technologies. For instance, in the April 1999 issue of the South African *.Net* magazine, the company *Network Associates* advertises their network security services by means of a portrait of a young white **male hacker** [Fig. 1.8]. He looks utterly vicious, with a pierced tongue and an all-over face tattoo. The copy reads: "I am a simple man. {I love art, unusual jewellery and reading your confidential files}" (1999:15). In the July 1999 issue the same product is advertised, only this time by means of a very seductive **blonde woman**, sitting on a table with a laptop, exposing most of her shapely legs [Fig. 1.9]. The copy reads: "I know which buttons to push. {The ones that give me access to all your confidential files}" (1999:42). Although the humour and wit is not lost, the underlying message is clear: when men break into the system they will do so by means of technological expertise and a warrior mentality, but when women do so they will use their supposed abilities to seduce and manipulate to "push" the right "buttons" in order to get what they want. Men are once again unproblematically aligned with technology and women with appearances ("to-be-looked-at-ness", according to Mulvey (1975:63)). Women do not gain access to technology and power by means of their mental abilities and technological skills, but rather because they rely on their appearances. If these two advertisements can be considered to be a fair indication of the prevailing gendered biases regarding women and technology, then it is, indeed, "business as usual". These two advertisements show that not much has changed in how men and women are perceived in terms of their physical and social access to and abilities regarding technologies.

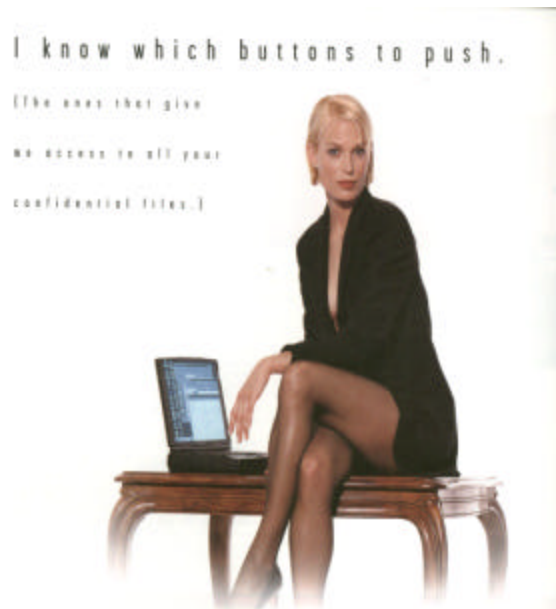


Fig. 1.9 Blonde woman, *Network Associates* advertisement, *.Net*, July 1999

This brings me to the presence of women on the Internet in the form of discussion forums, bulletin boards, MUDs (Multi-user Domains) and MOOs (Multi-user object-oriented domains). How well are women represented on these forums and how do they engage with such forums? In the USA women hold 30 percent of Internet accounts, but that does not mean women take up a third of the bandwidth (Coyle 1996:52). In fact, it seems as if women tend to "lurk" quietly on the fringes of most Internet discussions. Studies show that communication on the Internet is "more a male dialogue than a mixed-sex conversation" (Kramarae & Taylor 1993:60). The reason for the male domination is that the style of discussion that is favoured online is mostly adversarial and sometimes even blatantly hostile. In her study entitled "Gender differences in computer-mediated communication: bringing familiar baggage to the new frontier", Susan Herring (1994) claims that women and men have recognisably different communicative styles, and importantly different communicative ethics when posting on the Internet. She sets out the differences in communicative styles as follows: the female-gendered style is typified by supportiveness and attenuation, while the male-gendered style is more authoritative and portrays a self-confident stance (1994:3). Herring attributes the difference in style to the fact that women and men have different communicative ethics, because they value different kinds of online interactions as appropriate and desirable (1994:1).

Apparently, male participants also tend to send more and longer postings than women, even if the list deals with feminist issues.¹⁹ This online domination of men corresponds with research into how men and women interact in real life, for apparently in real life men also speak more and interrupt others, particularly women, 99 percent more than women do (Spender 1995:193). As Sharmila Ferris concludes in her study on the topic of women's behaviour online: "Gender differences in on-line communication mirror some [of

the] characteristics prevalent in FtF [face-to-face] communication" (1996:4). Owing to these unfavourable circumstances and the prevalence of gender hierarchies and biases on the Internet, the chances of women being "heard" online appears to be even slighter than in real life.

Despite these rather discouraging findings about the possibilities for women to communicate "freely" on the Internet, there are also signs of hope, though. Journalist Laura Miller, for instance, testifies in quite the opposite vein to the authors quoted previously when she states: "I am one of many women who don't recognize their own experience of the Net in the misogynist gauntlet described [in recent articles and stories in *Newsweek*]" (1995:54). Miller holds that although she has received messages from men online brimming with sexual innuendoes, which she has politely declined, she does not feel harassed in any way. She maintains that her reaction is not necessarily "more correct" than the women who are complaining, but that both reactions are valid responses. Miller also makes her position on virtual rape quite clear when she adds: "But on line – where I have no body and neither does anyone else – I consider rape to be impossible" (1995:54).²⁰ Miller strongly opposes any suggestion that women need some kind of protection online, for that would automatically mean that "women's minds are weak, fragile, and unsuited to the rough and tumble of public discourse" (1995:57). Here Miller, perhaps unknowingly, suggests that women's bodies are in turn weak and fragile, and therefore, susceptible to physical rape. Miller is plainly correct when she argues against a victim's logic in feminism. Obviously, there are many women like her, who swim the ether like virtual fish, but Miller's argument also assumes that the technological domain is not only equal, but also neutral. As Langdon Winner's essay, entitled "Do artefacts have politics?", suggests; artefacts themselves contain political properties and some technologies are inherently political in nature; accordingly, they require particular organisation of political relationships in order to exist (1985:26-7). The politics of new technologies, regarding adversarial rhetoric and uneven access, for instance, indicate that they are not neutral and equal, but in fact thrive on disproportionate gendered relationships and other biases.

In general, computer-mediated communications do, however, provide liberating and fascinating possibilities. The fact that, for example, a handicapped coloured woman can go online anonymously or virtually cross-dress as a straight white man provides a form of shelter, since no one can "see" her physical disabilities online. In an online classroom situation, specifically, she can post comments without being labelled or pitied. Some research has also indicated that because of the anonymity on the Internet, bashful persons feel more confident to "speak up" online. Unfortunately, one must immediately add that research has also indicated that because of the lack of physicality, a so-called "disembodied anonymity" can provide the perfect opportunity to go overboard with written responses in what are termed flames (Balsamo 1995:229). Flames or word-wars are scathing written

responses in a heated online discussion, although sometimes humorous (Riley 1996:168N), that can, erupt into occurrences of verbal harassment if they go unchecked. Flames may even turn into "virtual rape", but this is teased out in a later chapter.



Fig. 1.10 Portrait of Rosie Cross, *geekgirl*, 1999

It seems that especially those women who have dared to "speak up", instead of just quietly "lurking", have been flamed in word-wars that would annihilate even the most confident cyber-personae. Rosie Cross [Fig. 1.10], a "grrl"²¹ with technological stamina and co-editor of *geekgirl*, the "world's first cyberfeminist e-zine", confesses: "The only pre-requisite for abuse and harassment on line is to be female" (quoted in Spender 1995:203). This may account for the fact that many women when they go online prefer to gender-swap (or pose as the opposite gender).²² Obviously this cannot account for all instances of online gender-swapping, but it does provide some indication of the state of women's experiences. Going online, as "one of the boys" seems, therefore, to be a more inconspicuous option than the oppositional and confrontational route of challenging the "boys" in word-wars.²³ Although gender-swapping may prove to be a liberating experience for some, it also has its quota of problems, as explained in chapter five. As Bennett and Palmer appropriately assert:

If a woman has to pretend to be other than what she is to be heard, the medium is in fact acting as a kind of chador, stifling the individuality of the speaker [...]. I would suggest that the most effective feminist strategy for dealing with CMC is simply to be heard while maintaining one's gender identity. (Bennet & Palmer: 1997)

Creating women-only lists and forums, such as SYSTERS,²⁴ FEMCON-L and the Virtual Sisterhood, and women-only organisations such as WORD (Women's Opportunity and Resource Development), GRANITE (Gender Relations and New Technology), WON (Women's Online Network) and WITS (Women, Information, Technology, and Scholarship Colloquium) is one way of dealing with inequalities in new technologies and computer-

mediated communications. However, as previously noted, such strategies do not conclusively or convincingly resolve the issue of women's mostly ambiguous and excluded relationships with new technologies. Neither is the problematic epistemological notion that technology is aligned to masculinity necessarily challenged in women-only online groupings.

As stated earlier, the worrying state of women's access to technology, lacking technological capabilities and means, as well as the negative reinforcement of old stereotypes, are by no means the only problematic issues when fleshing out the issue of technologies and genders. In fact, as previously mentioned, the different genders are also differently situated in relation to technologies. This means that women begin their interaction with technologies from an always already differently embodied place or site than most men do and, accordingly, they establish other relations with new technologies. It may, therefore, be argued that when women establish relations with new technologies, such relationships should take into account the awkward position that women have traditionally occupied in terms of embodiment.

The fact that women have traditionally been constructed as the custodians of embodiment contributes to a suspicion (which may be subconscious) in women that new technologies have a tendency to overlook the embodied flesh and to privilege disembodied fantasies instead. In other words, hypothetically phrased, perhaps women realise that technologies, when uncritically aligned with masculinity, favour a women-unfriendly transcendence of bodily "realities". It is for this reason that women may have to make different connections and take different routes in establishing relations with new technologies. Rosi Braidotti affirms this point in the essay entitled "Cyberfeminism with a difference" (1996), where she urges women, as "over-embodied" beings, to deconstruct embodiment, whilst men, as "under-embodied" beings, should start embodying themselves in relation to new technologies.

Women's always already different situation in terms of new technologies may be interpreted to mean that women are "misbehaving" again, in the same way as their headstrong "hysterical" sisters a century ago. If women are showing "technological ineptitude" (Morse 1997:25) and are "disinclined towards technology" (Sundin 1997:249) by showing an "unwill" (Morse 1997:26) to perform technologically, does this merely indicate stupidity? Are technologically "unwilling" women not stubbornly doing what their hysterical sisters have done before, when they entertained fits, paralyses and silences? Margaret Morse explains women's occasional unwillingness to perform in relation to technologies as follows:

Unwill or the part of us that slips or forgets is also the part of us that is slothful, that loses motivation or a sense of purpose, *in nuce*, that resistance of the flesh to being harnessed or programmed by this or that ideology. Unwill is thus a hazy mixture of vegetative corporeality and an ineptitude that

amounts to culturally inscribed **hysteria**. As woman in a male-oriented technological world that devalues the flesh, my struggle is thus against myself embodied as a woman – albeit a culturally constructed one. My unwill is then to some extent or other my femininity and my female flesh itself. (Morse 1997:26, emphasis added)

Why do women experience problems in relating to (new) technologies? Does the problem lie in women's inability and unwillingness or on technology's unproblematic devaluation of the flesh? In other words, do technologies ask women to forget their bodies – which have been the site of their oppression – and yet, simultaneously, which cannot be discarded or forgotten?

If we understand technology in the broadest sense to include social discourses, such as advertisement campaigns and the division of labour, technology does indeed produce and reinforce gender, especially gender biases and discrepancies. As Jennifer Terry and Melodie Calvert explain in *Processed lives. Gender and technology in everyday life*: "technologies, as organized systems, produce a range of products, effects, representations, and artefacts, chief among them, hierarchical social relations, or what we could call technologies of gender, race, and sexuality" (1997:5). Technologies do create and sustain gendered hierarchies and "women" are mostly gendered as being excluded from technologies' powerful inner circle of know-how. In fact, Elizabeth Sundin takes the argument further when she explains, "gender constructs technology" (1997:263). In other words, one might ask not only whether technology has a gender, but also whether gender constructs technology. And if gender does indeed make technology, is gender not also a technology of some sort?

1.5 Is gender a technology?

In order to tackle the problem of whether gender is indeed a technology, certain aspects of the work of the influential English mathematician, Alan Turing (1912-1954) [Fig. 1.11], may prove fruitful. Turing's 1950 paper, entitled, "Computing machinery and intelligence", deals with the issue of whether computers can be said to be intelligent, or, as he phrases the question: "I propose to consider the question, 'Can machines think?'" (1950:433). In his attempt to answer the proposition Turing created a test known as the Turing Test²⁵ that apparently determined whether a computer could, indeed, be considered to be intelligent. In short, the Turing test demands that a human subject must decide, by posing questions to two unknown entities in other rooms, whether s/he is communicating with a human or a computer. When the human subject fails to distinguish between human and machine, the computer may be considered to be intelligent, according to the Turing Test.

Turing continued by adding a control test, which he referred to as the "imitation game" (1950: 433) or "a sexual guessing game" (1950:455), in order to elaborate on the results of the first test. He describes the "sexual guessing game" as follows:

The new form of the problem can be described in terms of a game which we call the 'imitation game'. It is played with three people, a man (A), a woman (B), and an interrogator (C) who may be of either sex. The interrogator stays in a room apart from the other two. The object of the game for the interrogator is to determine which of the other two is the man and which is the woman. He knows them by labels X and Y, and at the end of the game he says either 'X is A and Y is B' or 'X is B and Y is A'. (1950:433)

During the sexual guessing game the man attempts to deceive and the woman tries to convince the interrogator. This in itself is an interesting reversal of gender stereotypes, for traditional gender expectations would generally operate the other way around: the woman would be deceptive and the man would be credible. The main reason behind Turing's sexual guessing game was to show how even the most supposedly stable of distinctions, namely between male and female, could become unstable when imitation enters into the equation. Are those supposedly stable categories not "imitations" from the start?²⁶



Fig.1. 11 Alan M. Turing (1912-1954)

Turing did, nonetheless, strategically prefer not to emphasise the obvious comparabilities between gender and computer intelligence, as shown by his tests. It seems that Turing treated gender as "a red herring" (Hayles 1996a:xiii) and that he evaded, rather than explored, the gendered implications of the tests' results. For instance, he did not elucidate that, just as the distinction between machine and human is blurred and becomes indistinguishable during the Turing test, so are the boundaries between female and male blurred during the sexual guessing game. As Judith Halberstam explains, "Gender [...] like computer intelligence, is a learned, imitative behavior that can be processed so well that it comes to look natural. [...] In other words, gender, like intelligence, has a technology" (1991:443). As the computer learns to imitate human behaviour and even to anticipate human reactions, so gender imitates and anticipates expected reactions. Gender can, accordingly, be described as a technology, and if the computer can be said to be intelligent, it can accordingly, be reasoned that gender is similarly automated and, indeed, "intelligent".

What this brief analysis of gender as intelligent and automated (technology) has brought to the fore is that it holds exciting possibilities for women's future technological interchanges. In this regard a critical movement such as cyberfeminism has a particularly important role to play, namely by politically challenging both women's physical lack of access to technology, as well as the social constructedness of technology as being masculine, by showing the malleability of gender as a technology.

1.6 From wombs to bombs: technology and "womb-envy"

I want to conclude my exploration into the theme of gender and technology, which has focused on the problematical epistemological alignment of technologies with male/masculine, by experimenting with the idea that technology is possibly a channel for "womb-envy".²⁷ For most, the idea of "womb-envy" is probably only the converse of penis-envy and therefore, merely a substitution of one hierarchical tyranny for another. After all, both concepts are based on a seeming lack, in the one case lacking a womb and in the other instance, lacking a penis. In both accounts the apparent lack manifests itself not only on a physical level, but infiltrates and encompasses all other spheres of human existence. This means, in terms of penis-envy, that those without penises are less likely to "speak" and "write" than those who have one (sic).²⁸ On the other hand, those who lack wombs are defective in terms of procreation, and when they do create, they do so in mime of the "original" organ of procreation, namely the female womb. Neither of these positions seems a fruitful option for a cyberfeminist reading of gender and technology. I want to propose, however, that by teasing out and miming the issue of "womb-envy", one may find interesting and useful insights into how and why technology's gender is constructed as predominantly masculine. It may also take initial steps in negotiating another way of thinking and living new technologies.

In *Fathering the unthinkable* (1983), Brian Easlea appends "womb-envy" specifically to technology. According to Easlea, men suffer from "womb-envy" and as a result they compensate for this lack by giving birth, so to speak, to science and weapons. Men do not possess the "magical power" of procreative wombs and instead they give birth to bombs – men thus quite literally go from wombs to bombs. Easlea's ideas concerning "womb-envy" overlap extensively with psychoanalyst Melanie Klein's (1882–1960) controversial opposition of Freud's castration complex with what she has termed **the femininity complex**. At the heart of the femininity complex Klein identifies frustrated desires, envy and destructive tendencies towards a specific organ, namely the female womb (1988:190). Klein combines the young boy's overwhelming dread of the mother and the womb with an intense dread of castration by the father, because the boy suspects that the father's penis is supposedly

already located there (in the mother's womb). In this sense Klein does not oppose the fear of the womb and fear of castration, but combines them in the femininity complex.

The result of the femininity complex for a boy is "an attitude of rivalry towards the woman, with its blending of envy and hatred; for, on account of **his wish for a child**, he feels himself at a disadvantage and inferior to the mother" (Klein 1988:190, emphasis added). Klein holds that boys use their tendency to express excessive aggression and always "knowing better" as attempts to mask their inferiority towards women. The representation of science and technology as a masculine domain could easily fit in with this bravado of always "knowing better", whilst at the roots of this "knowing better" lies the wish to return to the womb and possibly even the wish to bear children. Also in this respect Easlea's ideas link with Klein's when he similarly states that men feel vulnerable and exposed to possible female ridicule exactly because they cannot bear children and accordingly, they have to claim the sciences, with their inherent power, for themselves. It is therefore, extremely important to bar women from this sacred territory. The ambiguous fear and longing to return to the womb that men apparently experience results in science and technology's "flight from tenderness" (Easlea 1981:242). Men try to move as far away as possible from the "mother" and expressly develop an "objective" and "scientific" discourse that makes use of vivid and aggressive imagery of invasion and distance. Science and technology become a way of transcending a passive and mysterious female nature (the womb). The more a "softer" nature can be penetrated and dissected by an unyielding and ruthless technology, the more liberated men apparently feel from the sucking force of the mother's womb.

Easlea's theory of technology as "womb-envy" obviously, has great potential to become essentialist and exclusive. If, however, the thought of technology as "womb-envy" is entertained for a moment, it puts the Hiroshima and Nagasaki bombings in quite another perspective. In fact, all technological disasters thereafter, such as Chernobyl and the Gulf War, and the horrific events of 11 September 2001 in New York and Washington, are clouded in the radioactive dust and suicidal vehemence of "womb-envy". Clearly this analogy simplifies the issue of men's relation to technology and may also trap men and technologies into a destructive relation. But it can shed some light on women's hidden reluctance or "unwillingness" (Morse 1997:26) when it comes to interacting with technologies. If technology is founded in some way, no matter how remotely, on "womb-envy", it does necessarily impact on and reflect in women's use and access to technologies.²⁹

Identifying "womb-envy" as motivational force for the development of technologies can obviously not provide final "truths" about men and technology, but it can account for some of the reasons why masculinity has appropriated technology for itself. As mentioned earlier, there are boys as young as three years old who already physically push girls away from technology. Why do (some) men push women away from technology? Could this be evidence of "womb-envy"? It seems unlikely that there is a direct causal relation, but the way

in which female wombs are portrayed in some of the latest visual technologies may provide further clues to the “pushing-away-phenomenon”. In this regard, I want to discuss a few examples from the computer game genre, film industry and human engineering, in order to elaborate on the possibility of technology being rooted in “womb-envy”.

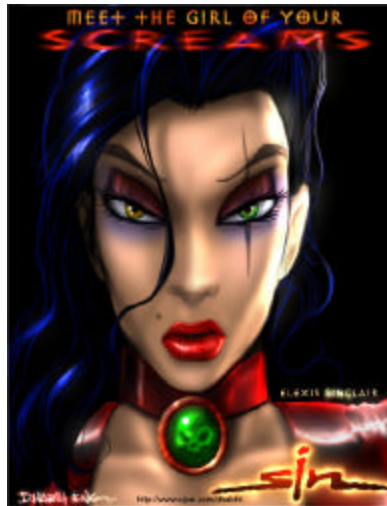


Fig. 1.12 Elexis Sinclair, *Sin*, Ritual Entertainment, Inc, 1998

In the first example under discussion, namely the computer game *Sin*, a female virtual character named Elexis Sinclair [Fig. 1.12] makes her début. The fact that her surname is (SIN)claire, with an emphasis on “sin”, is also not without significance, as will become evident shortly. *Sin* and its follow-up game, *Wages of Sin*, are first person and multi-player 3D games, developed by Ritual Entertainment in 1998. The player has a choice of playing either as Elexis Sinclair, Colonel John R. Blade or the computer hacker, J.C. The story is set in the year 2027 in crime ridden Freeport-city where Colonel Blade is the owner of a security force called HARDCORPS, which is busy investigating the source of a highly addictive drug called “U4”. The potent drug steers its users into a state of euphoria (U4 is obviously a pun on euphoria), and, more importantly, it has DNA-altering abilities. As the game unfolds all traces lead to the brilliant biochemist and elusive director of SinTEK Industries, namely Elexis Sinclair, also described as “the girl of your screams”.

Elexis challenges preconceived ideas about women and technology by showing that technology can “procreate” and that a woman (albeit a virtual woman) can “create”. By altering and tampering with these categories Elexis is typecast as an eternally sinful woman and therefore dangerously powerful. She needs to be stopped in her virtual tracks by a masculine force, virtually embodied by John R. Blade of HARDCORPS [Fig. 1.13]. It is also not without significance that the company HARDCORPS’s name resonates not only with technologies unyielding “flight from tenderness” (Easlea 1981:242), but also with hardcore pornography, which is one of the most subjugating forms of visual imagery to which women (in particular) fall victim. Colonel John R. Blade’s name is also not without meaning, for, as *Ritual*, the creators of the game, acknowledge: “It’s not just a coincidence that his name is a

deadly weapon" (*Ritual* 1998). Women who experiment with and transgress the categories of procreation versus creation will be punished, even in the virtual world.



Fig. 1.13 Colonel John R. Blade, *Sin*, Ritual Entertainment, Inc., 1998

Interestingly enough, *Sin* provides us with a twist in the tale regarding Elexis's childhood. Elexis's relation to her father, Dr. Thrall Sinclair, is exceptionally close, while her biological mother abandoned her as a little girl. Her biological mother is described as greedy and selfish, and therefore as a typical castrating mother. It was her father who nurtured her through sickness and health, appropriating the traditional nurturing and maternal role usually occupied by women. It is also her father who has taught her everything she knows about mixing chemicals and who assists her in bringing about a new world order. In short, her devoted father, who also coincidentally, but not accidentally, represents technology, substitutes Elexis's absent biological mother.

It is not surprising, then, that Elexis's ideas about motherhood are warped and misguided. At the age of five she clones a frog, which could be interpreted as an outstanding scientific achievement – except that the frog had human eyes. This miscreation suggests that Elexis cannot simultaneously be a female and a scientific genius. Instead, she is depicted as a perverted and rather sad individual who, because of her lack of a mother (her mother was not where she was supposed to be, namely at home), turns out to be a delinquent "monster". What is fascinating about the virtual character Elexis Sinclair is that she transforms technology into "Mother Nature". Technology becomes Elexis's "womb", from which many hybrid creatures spring forth.

Elexis is, however, penalised for betraying biological motherhood, since her offspring are monstrous creatures from the underworld. In other words, even though Elexis succeeds in creating a faithful subhuman army, they are mere mongrels and not "born of men". Elexis becomes a mother: not a biological one, but a technological one. She is rebuked for her daring challenge to conflate the categories of "nature" and "culture". The subtle message of

Sin is that, women should restrict themselves to biological procreation and leave the cultural products of technological creation to the men.

The same logic applies in male director, Duncan Gibbins's film *Eve of destruction* (1991), wherein a female scientist, Eve Simmons, creates a cyborg in her own image, named *Eve 8*. The act of creation that is usually reserved for male enterprise is in this instance intruded upon by a female scientist. The cyborg that she has created is modelled on her own "image" in more than one respect, for the cyborg and the scientists not only look alike: they are also telepathically linked. This telepathic link becomes an important part of the narrative as the film unfolds.

After being caged and surveyed like a laboratory animal, *Eve 8* escapes. She becomes a deadly sex vigilante and seduces many "unsuspecting" males. Her mental link to her creator is affirmed when it becomes evident that she is acting out the scientist's repressed sexual fantasies. According to Freud, hysterical women similarly repressed their sexual fantasies, which resulted in specific body parts becoming paralysed or hyper-sensitised during hysterical attacks. Accordingly, one can almost extrapolate that hysteria expressed paralysed wombs, or, at the other extreme, hyperactive wombs. In the film the cyborg becomes the (hysterical) physical extension or embodiment of repressed sexual fantasies. The theme of repression and rebellion intensifies when *Eve 8* eventually starts to direct her attacks against the scientist's father. In the end, *Eve 8* kills the scientist's father, who abused the scientist as child and caused her mother's death. Claudia Springer explains: "The film suggests that what emerges from women's deeply repressed feelings is anger" (1999:116). *Eve 8* represents the uncontrollable destructive force of women's unleashed desires, in other words, she is portrayed as the patriarchal cyborg version of the nineteenth-century hysteric.

Add to this the fact that *Eve 8* has a nuclear explosive head lodged in her womb, which transforms her literally into a ticking time b/womb, and the image of the *femme fatale* is completed. The cyborg's wayward womb has cleverly been constructed as a detonator that threatens all mankind. As Claudia Springer notes, *Eve 8* hides something far more dangerous than a *vagina dentata*, for she literally embodies a nuclear womb (1999:51). Therefore, *Eve 8* not only castrates in the figurative sense, but also in a literal sense. In the end the scientist has to choose between her technological creation (the cyborg), and "natural procreation" (her biological son). I want to suggest that it is no mere coincidence that a female scientist is placed before such a choice on screen (generally male scientists on screen are not required to make similar choices). Neither is it surprising that she makes the patriarchally "correct" choice, by choosing her biological son. The implications are clear: the female scientist realises that she has overstepped her boundaries by creating dangerous technology. In the end she resigns and reconciles herself again to her biological womb.

The alignment of the female womb with an aggressively destructive nuclear weapon may be interpreted as a symbol of technology as "womb-envy". In this version the womb,

usually understood as the giver of life, is inverted and now becomes the destroyer of life. The film can be interpreted as representing the ultimate revenge of male resentment of the female womb, within the parameters of the “womb-envy” paradigm as Brian Easlea constructs it. According to this logic, if one cannot create life, at least one has the power to destroy it. As Claudia Springer affirms: “*Eve of destruction* shows that even when a film incorporates feminine metaphors for electronic technology, it can still enunciate a misogynistic position” (1999:114).



Fig. 1.14 The main battle tank, 1997

Another interesting example of how technology appropriates feminine metaphors for its own life-denying reasons can be observed in the design and use of main battle tanks. The battle tank [Fig. 1.14] has become one of engineering's triumphs over mortality and specifically the human (female) flesh. The tank is described as truly being a vehicle of death (Brenner 1997). It gives the soldier the opportunity to live through destruction, since the tank has rid itself of the source of death, namely the frailty and mortality of human bodies.

Normally a tank is built for a crew of three or more men, because a tank can render its services (prostitute-like) to several men at once. What makes the battle tank especially fruitful for my analysis here of technology and “womb-envy” is that the tank's interior simulates a womb-like environment. As Brenner describes it: “The tank is a womb-like structure – completely enclosing her passengers. [...] The tank replaces all womanhood, becoming lover, motherland and sister” (Brenner 1997). Just as the female womb envelopes her unborn foetus in a haven of warm liquid, so the tank contains its crew in its steel belly and keeps the crew from harm. The battle tank becomes a reinvention of the fleshly womb, designed by engineers to change their mortal fate into immortality. Finally an eternal technological mother can be substituted for the flawed natural one: “The main battle tank is therefore an admirable substitute for the womb” (Brenner 1997). Man the inventor can now metaphorically give birth to himself by inventing machinery that entombs, or rather enwombs him for eternity.

Aligned with Melanie Klein's analysis of the femininity complex, which focuses its fear and envy onto the destruction of the female body, and specifically the womb, the battle tank exemplifies the extremities of such a complex. Julia Kristeva's notion of the pre-symbolic

chora can similarly be related to the fantasy and longing to return to, and simultaneously to terminate the female body (the mother's body) (1984:182). The battle tank symbolises this longing to return to and simultaneously to destroy the mother's body. The *chora* is expressed through "feelings" and articulations such as bodily drives, rhythms, pulsions, pleasures, and bliss. These longings are apparently never lost or forgotten, but the memory of them is held precariously in check by the patriarchal symbolic. Kristeva explains that all discourse, in other words, the symbolic order, "moves with and against the *chora* in the sense that it simultaneously depends upon and refuses it" (Kristeva 1984:26). In other words, the relationship of the symbolic to the pre-symbolic *chora* is ambivalent, as it is towards the female body.

Luce Irigaray similarly explains the ambiguity towards the female body and "mother-matter" (1985a:353), by means of an analogy between Plato's cave allegory and the womb, "that unrepresentable origin of all forms and all morphology" (Irigaray 1985a:253). Irigaray shows how man "cut him off from his relations with the earth, the mother" in his "ascent towards an all-powerful intelligibility" (1985a:362). In Irigaray's terms, man liberates himself from the "prison" of the "death cave" (1985a:353) on his way towards the Absolute, the Sun, the Idea, the One – and importantly, towards immortality. The invincible tank enforces and entrenches the envious and fearful male ego and the symbolic, which, in the absence of the womb (*chora*, mother-matter), try to simulate this state of "bliss" again. Soldiers do not need a "mother" once in the tank – she is now displaced by unforgiving steel and brutality. The tank becomes a bastion of masculinity and the epitome of technology's flight from tenderness.

It does, nevertheless, remain a treacherous endeavour to equate all technologies with "womb-envy", for, as established earlier, different contexts, cultures, races and genders create technologies for varying reasons and with varying results. Perhaps the digital era in which we are immersed will allow for the establishment of different technologies that somehow escape the bizarre womb-envious one just discussed. I endeavour to uncover such womb-friendly or rather body-embracing technologies in the last chapter of this thesis, where the cyberfeminist cyborg body is explored. One of cyberfeminism's key goals is to examine differing gendered relations in regard to technologies and embodiment. In the next chapter I explore the key issues that bind cyberfeminist theory together. These include tracing the roots of cyberfeminism and also establishing the theoretical premises on which cyberfeminism bases its critique of disembodied (womb-envious?) new technologies.

Endnotes:

¹ The clickable petals are: Memory, Control, Power, Communication, Violence, Homunculus, Labyrinth, Interactivity, The Other, Representation and Ideology. When the viewer clicks on a petal s/he enters a domain dealing with that topic and specifically its relevance to women's awkward relation with, and disposition in terms of technology (Tamblyn 1997:42).

² In his essay, "The question concerning technology", Heidegger explains that the *Gestell* manifests in what he terms "modern technology" (1997:14) and that modern technology does indeed, differ from older technologies. He uses the example of the old windmill to explain the difference. Whereas the windmill's movement or technology is left completely to the wind's blowing, importantly the windmill does not unlock the wind's energy in order to store it in another format or energy. In contrast modern electricity is based on the principle of unlocking nature's energy, such as the force of water and storing it in another energy form, namely electricity.

³ Despite my discomfort with Heidegger's oblivious use of "man", I have kept his use of "man" unchanged. Heidegger speaks as a man about men, although he obviously meant "man" to include women as well, without actually including women. I will keep this discrepancy intact, for it strengthens my cyberfeminist position in the sense that Heidegger's understanding of the *Gestell* is a gender-specific one. Perhaps Heidegger's pessimism about the *Gestell* is solely based on a male perspective and can only speak from a male "man" position. I want to suggest that women have a different relationship with technology and the *Gestell* and therefore, Heidegger's oversight is not an oversight at all, although an unknowing one.

⁴ Cyborg refers to the amalgamation of human and machine and is derived from the term cybernetic organism. In chapter six I deal specifically with the cyborg, its origins and critical possibilities.

⁵ See, in this regard, Tonja van den Ende's insightful reading of Irigaray's criticism of Simone de Beauvoir in *In levende lijven. Identiteit, lichamelijkheid en verschil in het werk van Luce Irigaray* (1999). Van den Ende discusses Irigaray's criticism of De Beauvoir for her advocacy of the transcendence of the immanent (sexed) body.

⁶ In chapter five, which deals with the marked body, and specifically with transsexuality and transgenderism, the impossibility of considering gender as a mere construct at the disposal of a supposedly neutrally sexed and gendered subject, is dealt with in more detail.

⁷ See, in this regard, Carolyn Merchant's (1990) *The death of nature: Women, ecology and the scientific revolution* for a discussion of how the scientific revolution has hidden itself behind a so-called mask of neutrality and objectivity and has sanctioned the exploitation of nature, commercial expansion and the subjugation of women.

⁸ Zoë Sofoulis/Sofia (2000) makes an interesting analysis in "Container technologies" of how women's technologies have been constructed as so-called container technologies and have been marginalised by mainstream technologies.

⁹ Women-hostile environments are created by means of the language that is used when men talk to one another (e.g. terms such as "fuckwit", "wanker", "dickfor"), and also in the images that are sent around and the creation of male camaraderie, which necessarily excludes anyone who does not speak and act in the same manner. Lynda Davies, a professor in computer sciences in Australia, explains why computer labs are mostly not pleasant places for women. She explains that the environment can become so abusive and threatening to female students that they prefer to take other courses instead. Davies states: "What some of these men do online – what they put on their screens and on those of the women students – has to be seen to be believed" (quoted in Spender 1995:183). But apparently the behaviour of the male students pales in comparison with the male computer service assistants: "[...] the behaviour of many of them was worse than that of the student boys [and] female students have no choice but to conduct their work in these labs [...]. To my mind it is nothing short of sexual terrorism, designed to drive women away from the centre of power" (quoted in Spender 1995:182-3).

¹⁰ Cohn gained access to the exclusive nuclear club only once she started to "speak" and behave similarly to these men and, once she started to enjoy the power that this coded language opened up to her. However, Cohn also indicates that, lurking behind the seemingly objective language are other impulses, such as "homoerotic excitement, heterosexual domination, the drive toward competency and mastery, the pleasure of membership [...] and the thrilling power of becoming Death, shatterer of worlds" (1987:717).

¹¹ Ullman explains how a strict distinction is made between the online persona and the person in real life: "the persona online must not touch the person at the table" (1996:6). The preferred method of communication is by means of e-mail and once a programmer starts insisting on more meetings (face-to-face) and makes too many telephone calls, such a person is perceived to be a "bad" programmer and, in effect, womanish. Ullman confesses to the loneliness experienced by a programmer and the lack of face-to-face contact when she states: "Early in an engineer's life, one learns to send mail" (1996:8).

¹² See, in this regard, Mark Poster's analysis of the Internet's failed attempt at democracy in "Postmodern virtualities" (1995).

¹³ The political agenda hidden behind the development of the Q-W-E-R-T-Y keyboard is one of the best examples of the gendering of technology and how technology is developed with specific gendered job incumbents in mind. Q-W-E-R-T-Y are the characters on the second row left-hand side of a conventional typewriter. The Q-W-E-R-T-Y keyboard has been incorporated into the standard keyboard of computers. It has an interesting history though, for it was chosen instead of another keyboard layout, namely the Linotype keyboard. The Linotype keyboard favoured highly-paid male operators. When management chose to dispense with the Linotype and phase in the QWERTY keyboard, it favoured traditional typists, namely females. The reason for phasing in a keyboard that favours women typists is that they are cheaper labour. As Judy Wajcman (1991:50) explains: "The QWERTY technique was designed with an eye to using the relatively cheap and abundant labour of female typists".

¹⁴ If one takes a closer look at the websites that most women frequently visit, such as sites dealing with fashion and cooking, one cannot help but experience disappointment. It is wonderful that women are using the Internet more and more, but if it is only to transfer traditional gender-roles from their kitchen to their computers, one may well speculate if new technologies do indeed provide opportunities for transgression of stereotypes. Or might this be another example, as in the case of the telephone of women subverting the intended use of technology for their own reasons?

¹⁵ For more information on accessibility and affordability of communication technologies in Africa and South Africa specifically, see the *CommUnity, Unity for communications through communication* website. The coordinator of the project, Peter Benjamin, defines the aims of the website as follows: "Closing the digital divide in South Africa: This site aims to support action, discussion and research on Universal Access to ICTs, e.g. Telecentres and other types of Community ICT projects in South Africa". Statistics derived from a 1997 survey indicating how many South Africans have a telephone in their house (universal service) and how many have access to a telephone are as follows:

32.2% of South Africans have a telephone in their home (universal service) - fixed or cellular phone (or both) in dwelling.

68.1% of South Africans have access to a telephone – self-defined access (in house, neighbour, communal phone or at shop or clinic).

When these figures are broken down into racial terms the following statistics are derived: (I have consulted with Peter Benjamin, coordinator of the project, to get the figures for a gender breakdown, but unfortunately they are not available yet.)

UNIVERSAL SERVICE

Total	32.2%
African	13.6%
Coloured	37.2%
Indian	74.2%
White	84.9%

UNIVERSAL ACCESS

Total	68.1%
African	59.4%
Coloured	72.4%
Indian	89.1%
White	91.5%

Given these numbers it should also be taken into account that: "Over 70% of people in Africa live in rural areas, and there is very limited access to telephony outside of cities. In sub-Saharan Africa, there is approximately 1 phone line per 200 people, and one Internet user per 9,000 people. Providing these technologies in every home (the goal of Universal Service) is unobtainable in the short term, and a more realistic goal that is being actively pursued is to establish public access points for Universal Access." Most women living on the continent of Africa are therefore living in rural areas and the chances of gaining access to a telephone, much less the Internet, does not seem a certainty in the near future.

¹⁶ See, in this regard, *Digital literacy* by Paul Gilster (1997), where he stresses the importance of digital literacy and other basic "core competencies" needed to survive the twenty first-century. On home ground the Alternative Information and Development Centre in Cape Town attempts to address the issue of digital literacy by offering training courses for women from rural areas focusing on the development of basic Internet skills.

¹⁷ *Mondo 2000* was founded in 1993 and the chief editor was RU Sirius. He describes the intentions of *Mondo 2000* as follows: "Mondo 2000 had been able to define a style for the emerging 'cyber' culture that was quirky, irreverent, intentionally ridiculous, surreal, anarchic, ironic, arch but not minimalist, generous, goofy and science factional rather than traditionally journalistic (operating somewhere at the interstices of information and invention). We viewed our publication as an art form, in an almost classical sense of auteurship" (21c).

¹⁸ For an insider perspective on the *Wired* experience, read Paulina Borsook's "The memoirs of a token: an aging Berkeley feminist examines *Wired*" in Lynn Cherny and Elizabeth Reba Weise (eds). 1996. *Wired_women*. In this essay Borsook explains how she was marginalised as a feminist and became the token female writer for *Wired*.

¹⁹ Margie Wylie comments in "No place for women" (1995) that even in feminist forums where women are ostensibly more interested in the subject and more likely to be experts on the subject, men also dominated the conversation. According to a 1993 study of the newsgroup alt.feminism, the results show that men contributed 74% of the postings, whereas women sent 17% and the remaining 9% were contributed by people of unknown gender.

²⁰ Online interaction seduces us into believing that we do not have bodies online, but as I will extrapolate in chapter 5 what happens to our virtual bodies online does indeed have implications for our physical bodies as well. In my opinion, Miller's dream of disembodiment, as explained here, expresses a misguided escapism of embodied situatedness and contextuality.

²¹ The online use of the term "grrl" recalls the Riot Grrl punk band movement of the early 1990s who reclaimed their girlhood, girlishness and cuteness, while hitting back at the male-dominated punk industry. The online revolution of "grrl" movements are represented especially in grrl e-zines (electronic magazines) such as *NrrdGrrl*, *geekgirl*, *Growl* and *F A T GiRL*. For an assessment of the grrl movement and e-zines, see Krista Scott's (1998) "Girl needs modems! Cyberculture and women's ezines" (Masters research paper).

²² In chapter five the phenomenon of online gender-swapping is dealt with in some detail.

²³ Some of the consequences for challenging the "boys" online can be quite horrendous, as Stephanie Brail (1996) relates in "The price of admission". She was verbally harassed with words like "cunt" flashing over her screen sent by "Mike" after they had an online disagreement (also known as flaming).

²⁴ For an interesting discussion on her experiences on the SYSTERS mailing list, see L. Jean Camp's "We are geeks, and we are not guys: the Systers mailing list" in Lynn Cherny and Elizabeth Reba Weise (eds). 1996. *Wired_women*.

²⁵ In order to play the Turing Game online, visit the Turing Game website, at <http://www.cc.gatech.edu/elc/turing/>.

²⁶ In chapter five the supposed stability in the production of the categories such as “male” and “female” is tackled, in order to show how both are constructed and indeed “imitations”.

²⁷ I have placed “womb-envy” in inverted commas, because it is a highly contested concept that needs to be applied with care. I use the concept here as a discursive miming strategy to subvert technology’s default gender as being masculine, but I am not by any means trying to lodge the physical womb as a new “place” or agency from which to “speak”.

²⁸ I do not delve into the Lacanian division between “being the phallus” versus “having the phallus” here, although it is obviously of relevance for my discussion.

²⁹ See, in this regard, Mary Daly’s (1998) *Quintessence: realizing the outrageous contagious courage of women. A radical elemental Feminist Manifesto* and Sally Gearhart’s (1982) manifesto entitled “The future – if there is one – is female”. In the manifesto Gearhart asks controversial questions such as: “Why have any men at all?” Gearhart is an advocate of ovular merging, a process that involves the mating of two eggs, which has been successfully accomplished with mice. Only female offspring are produced, which means that the role of men in reproduction is completely eliminated. Both Daly and Gearhart are, however, contentious authors and highly essentialist in their understanding of the differences between the sexes and genders in terms of technologies.