

CHAPTER 5

Looking at Science, Looking at You! The Feminist Re-visions of Nature (Brain and Genes)

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Vision has often been a central concern of feminist studies of science, medicine and technology. In cultural or social feminist analysis, the male gaze and the ways in which technoscience¹ accommodates, and in effect organizes the watching of women, has been an important part of the feminist interrogation of the gender and power relations that produce the subjects and the objects of science.² This attention is due to the intimate, and power-saturated, merge of processes of seeing and processes of knowing. Inherent in the notion of vision, there is always a politics to ways of seeing, ordering and observing, of organising the knowledge of the world. Historically, this can be exemplified by the eighteenth-century Swedish “father” of biological classification, Linnaeus. Taking a leap away from Christian assumptions, Linnaeus placed human beings in a taxonomic order of nature together with other animals.³

In his large-scale vision, he located humans together with primates in the order of *Homo sapiens*, as Donna Haraway⁴ so eloquently describes it in her ground-breaking book *Primate Visions*. And as the “father” of a specific discourse on nature, one that was not understood biologically but rather representationally, and still within a highly Christian framework, he referred to himself as the second Adam, as the “eye” of God. As the second Adam, Linnaeus could give true representations and true names to nature’s creatures and in so doing also restore the purity of name-giving lost by the first, biblical Adam’s sin. Haraway writes on how nature in this way became a theatre, a spectacular stage for the social order of the new and emerging sciences. New cartograp-

¹ Technoscience is a term for our late modern entangled relationships—or rather, the implosion—of science, technology and medicine, everyday life consumption and embodied subjecthood into each other. This is something that has been happening, or rather, been practiced, for a couple of hundred years—and on an almost global scale as a result of geopolitical, colonial and capitalist processes. See Donna Haraway, *Modest_Witness@Second_Millennium. FemaleMan@_Meets_OncoMouse™ Feminism and Technoscience* (New York and London: Routledge, 1997).

² Jordanova, Ludmilla. *Sexual Vision: Images of Gender in Science and Medicine Between the Eighteenth and Twentieth Centuries* (New York: Harvester Wheatsheaf, 1989); Donna Haraway, *Primate Visions: Gender, Race, and Nature in the World of Modern Science* (New York: Routledge, 1989); Schiebinger, Londa. *Nature’s Body: Gender in the Making of Modern Science* (Boston: Beacon Press, 1993).

³ Schiebinger, op.cit.

⁴ Haraway, *Primate Visions*, 9.

hies of “virgin land” inhabited by uncivilised “savages” and beasts, botanical and zoological excursions, in some ways mirroring the internal anatomical explorations of European medicine, followed suit to the expansive, European regimes of patriarchal colonialism, slavery and cultural imperialism.⁵ Biology, in the centuries to follow, was constructed as a discourse on nature about production and reproduction, racial and sexual difference for the efficiency of organisms. Linnaeus is a historical example of a scientific identity, the modern authoritative, and almost God-like, scientist Self with almost all-seeing capacity to inscribe nature with an order that affirms, assures and legitimizes his mastery. This is the idea of the universalist mode of seeing, and knowing it all, as from above or from no particular location at all. It is a mode Haraway in her famous epistemological text “Situated Knowledges” calls a God-trick.⁶ Linnaeus, as the almost mythical figure of heroic science he is today (celebrated as “Mr Flower Power” in Sweden in 2008 in a vain hope to attract more young students to science), came to existence inside a larger visual culture, a societal, scopic regime of ordering ways of seeing and knowing.⁷ It was a visual culture with the power to sort things out, give names and appoint identities. Such “scopic regimes” change over time, with political and economic circumstances, and are always circumvented by intersecting patterns of gender and sex, race/ethnicity, age, ability or disability, nationality and religion.⁸ This is why vision and practices of looking in science has been a feminist concern in regard to the gendered identities and historical practices of science.

⁵ Anne McClintock *Imperial Leather: Race, Gender, and Sexuality in the Colonial Contest* (London and New York: Routledge, 1995); Schiebinger, op.cit.

⁶ Donna Haraway, *Simians, Cyborgs, and Women. The Reinvention of Nature* (London: Free Association Books, 1991).

⁷ Important to keep in mind is that science is not just a set of cultural practices, but also a practical culture. The scientific subject position based on a mode of superior vision is not necessarily that which characterizes all real life scientist’s daily work today as they systematically struggle with, for instance, their particular images under the microscope. Conversely, in the laboratory practices I have started to study, amongst two young science teams consisting of predominately women Alzheimer’s researchers, *the local and the concrete* was of the uttermost importance (since it, as in the case of the protein and enzyme cascades in and between cells, was complicated enough). Further, manipulating the microscopic images of brain cells, from either mice, humans or the fruit fly (*Drosophila*), in digital imaging programs so to make clogged and entangled proteins (that disrupt the cell and are linked to a range of diseases) appear even more brightly green on the screen, something accomplished by adding a molecules that enhances fluorescence in the tissue, makes it obvious to most practitioners that what is studied is not and never was “pure nature”, but material-semiotic biocultures. Indeed, these women and young men are already self-consciously practicing situated knowledge—meanwhile they feel it part of the game of, ever more global and competitive, science to use a more grand-scale rhetoric when communicating their results to a popular audience, or even to peers in journals. And does that, the importance of image, not sound uncannily familiar to us as well? From conversations amongst “the fly women of the lab”: Ethnographic field notes from February 2009.

⁸ A “scopic regime”, a term coined by Martin Jay in “Scopic Regimes of Modernity”, in *Vision and Visuality*, ed. Hall Foster (Seattle: Bay Press, 1988) describes more or less a hegemonic mode of seeing and knowing our selves in the world that also regulates vision and visibility, that is, who gets to see and who gets to be seen, and in what way.

Scientific images and whole social imaginations of a particular field of vision, namely nature, where science holds the societal authority, work as rhetorical tools in the making of public meaning, and such images transcend the faux distinction between science and society, between lab cultures and popular cultures. And these images are highly mutable. They carry changing relations, and are perhaps even more obviously transformative in today's media-saturated world. That is why they are interesting to study and discuss, and in this chapter I will take a closer look at two ways of scientifically picturing the ever evasive nature of human identity. I will zoom in on the celebratory modes of depicting the human genome, and a commercial rendition of the human brain. Both DNA and genes, and the neurons of the brain have each been singled out and imagined as the essential bits to the human puzzle. And while I look at what might seem like mere pictures, these are imagery from the scientific domain. First, from the two most distinguished science journals, *Nature* and *Science*, when the first results of the multi-national Human Genome Project were released in February 2001, and second, I look at one pharmaceutical advertisement for a drug aimed to mitigate the symptoms of Alzheimer's disease (a disorder of the brain) found in an internationally renowned medical science journal. I argue that these pictures are indicative; they are iconic examples of a particularly scopic regime that imbue pulled out parts of our bodies with an enormous power to define the biological essence of humanness. Typically, they aim to convey something about our biology, about our bodies and our selves. And it is the way in which this is done that I find especially troublesome, but in order to do this I need to situate my concern within a larger historical context of scientific ways of looking, as well as in the historiographical context of previous feminist views on the body.

A History of Humanism and the Proliferation of Scientific Visuality

Historically, one example of how the ways things have been seen and looked at have changed is the emergence of the philosophy of humanism during the European Renaissance. Man, and not God, was put at the centre of the universe. In art and science, the invention of perspective supported this understanding of human exceptionalism and uniqueness. Perspective, as a visual technique, intended to show things the way they really were. This was done by creating an illusion of depth on a two-dimensional surface so that representations on this surface could get smaller the further away they were intended to appear.

Visual historian Martin Jay⁹ describes the emergence of the Cartesian central perspective as a scopic regime. And further, as a modern gesture of great importance as it generated a universal imaginary around the possibility for joint vision—that regardless of the observer, the view would remain the same.¹⁰ In effect, this was the claim that there is a neutral and universal mode of looking, one which can be controlled according to strict mathematical rules. This scopic regime of perspectivalism, as a “human exceptionalism”, claims in a way that the human eye may dominate the world, and that the human gaze can be scientifically structured. Such (phantasmic and hyperbolic) vision is not arbitrary but calculated and exacting, and truly objective as the observing eye is asked to disregard the body and other senses than sight. Perspectivalism is generated by objectification and disembodiment. However, this scopic regime of perspectivalism and human exceptionalism is not the only one and perhaps not even the most protruding way of seeing nature and culture, self and other, body and technology today. It is, however, one that has had a recent revival, which perhaps is evidenced in the many neo-humanist projects science has delivered publicly in recent years, from the medical imaging project of visually scrutinizing the interiority of the human body in The Visible Human Project to The Human Genome Project. Such grand-scale neo-humanist projects, of almost global reach, have made biological claims of great dignity. There are of course a lot of other scientific images that circulate in our media cultures today.

In fact, visual representations of various kinds play an important role in most scientific disciplines today. In cultural studies, art history or media studies we may use graphs and schematics when picturing a theory.¹¹ Whole disciplines, besides those of the natural sciences working with various imaging technologies, are exclusively relying on visuals (for instance meteorology, geology and geography). The display of posters and photographs are an indispensable part of medical textbooks, just as they surface in popular science media so to train laymen in scientific ways of looking and show off new spectacular sights from the interior of the body, the womb or the cell. Images are used for the encoding or analysis of raw data as well as in the communica-

⁹ Jay, op.cit.

¹⁰ Graham Dawson, *Soldier Heroes. British Adventure, Empire and the Imagining of Masculinities* (London and New York: Routledge, 1994).

¹¹ Nina Lykke, “Feminist Cultural Studies of Technoscience: Portrait of an Implosion”, in *Bits of Life: Feminist Studies Meets Cultural Studies Meets Science Studies*, ed. Nina Lykke and Anneke Smelik (Seattle: University of Washington Press, 2008).

tion of scientific concepts and information to peers, students and the general public in museum exhibitions, but do also reappear in art or in entertainment. Expanding enormously with the late modern efforts of achieving public understanding of scientific advancements, “popular science” can no longer be understood as the watered down remains of science proper.¹² The latter, “science proper”, is often imagined as practiced in seclusion, devoid of anything social or as a “culture of no culture”, as pioneering anthropologist of science, Sharon Traweek¹³ termed this pseudo-neutral self-perception among white, men physicists in the USA. Today, dinosaurs are popular and famous from movies while no human has ever actually laid her eyes on a living T-Rex. The iconography of the ascent of man from the apes is so well established it is often parodied. There are hilarious (Larsson) cartoons of microorganisms as seen from under the microscope slide. And the Bohr atom, in itself looking like a kind of solar system, has become an important icon of the modern world, of progress and rationality. It is a cultural icon that now only is eclipsed by the DNA double helix, a model of a large and dynamic molecule on the chromosomes (and mitochondria) of the cell, that has become excessively familiar to us. It is much like how we accept that rather obscure scientific methods, without knowing their names, such as gel electrophoresis patterns, provide genetic “finger prints” and certain identification, thanks to television series like *CSI*. So, on the one hand, there is a flow of science images into other cultural domains. On the other, cloning, *in vitro* fertilisation, the Internet, mobile phones, cyborgs and robots, to mention only a few phenomena, existed in 1950s literature and the popular imagination long before they became technoscientific realities and more or less mundane parts of our lives. Both popular culture and visuals in science have traditionally been understood as dimming the sharp truths of science and compromising its neutrality. Such a distinction is impossible to uphold today, both in the politicized, and highly social and rather public, media realm of science and in the local laboratory practice where images constantly are used as raw data for analysis.

Clearly, scientific imagery and scientific regimes of knowing are not contained to, for instance, the realms of the laboratory. There are many, not

¹² Cecilia Åsberg, “Genetiska föreställningar. Mellan genus och gener i popular/vetenskapens visuella kulturer” [The Genetic Imaginary: Between Gender and Genes in the Visual Cultures of Popular/Science] (PhD Dissertation. Linköping Studies in Arts and Sciences, 2005); Stuart Allen, *Media, Risk and Science. Issues in Cultural and Media Studies* (Buckingham, Philadelphia: Open University Press, 2002).

¹³ Sharon Traweek, *Beamtimes and Lifetimes The World of High Energy Physicists* (Harvard: Harvard University Press 1988, 166.

just scientific images, but whole ways of seeing, that famously have traversed the borders between the cultures of science and popular cultures. Inspired by cultural scholar Constance Penley's approach in *NASA/Trek. Popular Science and Sex in America*,¹⁴ I use the term "popular/science" to cover this wide and expansive mediascape, to underline the co-constitutive dimensions of the scientific and the popular.¹⁵ Popular/science signifies not merely an attempt to circumvent the traditional diffusion model of science communication, but—moreover—the *intra-activity* of popular visual culture and mediatized science in public.¹⁶ Simply put, I use it to rework the common idea of popularization as simple vulgarization, as the impure residues of pure science proper spread in popular science media.¹⁷ The notion of popular/science is used for the purpose of zooming in on how popular science media taps into scientific discourse just as scientific representations draw on popular imagery and contemporary media. Thus, science is not done in a social, political or historical vacuum—as the cases of Linnaeus and of the emergence of humanist perspectivalism indicate. Instead, science inhabits a larger cultural context and identity producing setting ("the cultural imaginary"), a context of technologies, economies and geopolitics ("technoscience"). And hybrids of cultural conventions, popular notions and science imagery circulate in the many overlaps of these realms. Solar system models are still today part of most classrooms, as phrenological heads once too were common teaching accessories. Still in existence, systematic practices of anthropological portraiture, once used to prove ideal types and the existence of different human races, make us remember eugenics, physiognomy and the once widely accepted ideas of racial hygiene as well as the non-innocent role of visuals in making scientific claims about human nature

¹⁴ Constance Penley, *NASA/Trek. Popular Science and Sex in America* (New York and London: Verso, 1997).

¹⁵ Åsberg, *Genetiska föreställningar*.

¹⁶ Karen Barad, "Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter", *Sings: Journal of Women in Culture and Society* 3(2003), vol. 28: 801-831.

¹⁷ As suggested by this French term, popular science is then regarded as the debasing of scientific knowledge. This is moreover based on an assumption about priority where the scientific version is the pure original others only can trail. The imaginary boundary between science and society (as if science was not part of society and the natural world it studies) is in such a way maintained. This is even done in popular culture when scientists or scholars are portrayed as incomprehensible boffins, which is, I would say, just another unfortunate way of reinforcing their separateness and elitist power. Adding to the problem with thinking about popularization as vulgarization is that all scientific activities rely today on social support, like governmental or other funding opportunities. This is an incitement to maintain public relations, ensure support and adhere to social issues and demands (see Allen, op.cit.). In fact, there are images, visuals and whole imagerial landscapes that are constitutive of both the cosmologies of science and our everyday life popular culture. Think only of the notion of "outer space" and the genre of science fiction, or of how clones, robots and the internet, long before becoming scientific fact have been staple features of the amazing wonderland of horror film and science fiction literature in the 1950s.

and human differences. In the past, the outer features of the surface—the facial features, physical frame and the colouring of the skin—were to tell about inner moral qualities, to tell the difference of the criminal from the gentleman.¹⁸ However, facial features, as I will soon show, still play an important part in signalling inner genetic qualities, but in a different way as it is circumvented by new modes of thinking ethnicity and race, sex and gender. Images have been used, and are still used, for epistemological purposes of legitimization, justification and proofing, and the difference between them is hard to tell as most images of some scientific relation are imbued with persuasive qualities (with a “rhetoric”), for instance with regard to scientific discoveries.

Recently, for the last two decades or so, it has been especially notions and imagery of genes and of the human brain that have had the rhetorical intention of telling us something essential about our bodies and our selves. In commercial vernacular this has been played out as “Genes ‘R Us”, which is the oft-used name for the flurrying direct-to-consumer online market for small bio-tech companies. For a small fee, these offer to test your DNA and sequence your genes, thereby helping you find an appropriate partner, life style, plan your recreational health care and determine your ancestry or genetic predisposition for diseases or criminal activities. These new companies experiment with ways of selling individualized genetic information to consumers. But there are also public efforts, often then making claims not on the individual level but on the level of the human race. As such, these pictures, biological figures or cultural images have the social authority and power of science. And they are obviously imagery in which feminists are stakeholders since especially women, as well as “other Others” sorted as marginal to the phantasy of “Universal Man” by the material signs of skin colour and pigmentation, reproductive capacities, physical constitution and ability, age or sexual orientation, have been defined and confined through a gendered, sexualized and racialized rhetoric of biology and nature. This power of the biological image, especially in combination with word and our ability (and respect) for scientific literacy, has also been interrogated by feminist theorists, scientists and artists, for instance by US American artist Barbara Kruger (who, herself, has appropriated this and stated “I work with pictures and words because they have the ability to determine who we are and who we aren’t”).¹⁹

¹⁸ Barbara M. Stafford, *Body Criticism: Imaging the Unseen in Enlightenment Art and Medicine* (Cambridge, MA: MIT Press, 1991); McClintock, op.cit.; Sturken and Cartwright, op.cit.

¹⁹ Barbara Kruger quoted at the official website of The Whitney Museum of American Art, New York: <http://www.tfaoi.com/aa/1aa/1aa667.htm> (accessed 2 March 2009)

Let us turn to a picture, not from science, medical commerce or popular science, but from the artistic realm that also makes a commentary on the topic of human embodiment; Barbara Kruger's visual exploration of feminist theory from the mid 1980s and US women's political demands for reproductive choice in the piece *Untitled (Your Body Is A Battleground)*, an artistic and obviously political photo montage. This picture may work as the entry point into a less obviously political terrain, namely the scientific practices of looking at the body, or rather into the ways in which feminist analysis has been useful for looking back at science as it has been looking at you.

Your Body Is A Battleground

The message stands out, white on red, from atop the black and white frontally photographed face of a woman looking straight back, unflinching, at the viewer. She is indeed looking back, returning the gaze of the observer. From books on contemporary art we may conclude that this picture in particular is representative of much of Kruger's work in how it addresses feminist issues of power and identity as they intimately relate to practices of looking at bodies in contemporary society. Kruger's art has been seen in the backdrop of the 1997 tour by the musical act *Rage Against the Machine*, and this specific image was initially used and made by the artist for a political manifestation for women's reproductive rights in the United States.

By recycling recognizable imagery of stereotypical 1950's ideal femininity, and by juxtaposing it with an arresting phrase, such as "Your body is a battleground", text and image work together to create a striking message about the contested discursive terrain that is female embodiment. In fact, the picture, as a totality of word and imagery in dialogue with its surrounding culture, declares a challenge to naturalized femininity, for instance to ideals of female beauty and proper womanhood as defined by her body rather than her mind. However, the retro-look of the woman pictured makes us acutely aware of the historically changing ideals of gender, of how they have already had their historical expiration date, and that definitions of femininity as a natural function of reproductive heterosexuality as well as a disembodied male gaze are under siege. Further in that vein, the pictured woman's own steady gaze, as she is looking right back at the onlooker, is a challenge in itself to the contested terrain that is women's bodies and the discontented theories of them (us!).

When it comes to defining women's subjectivity, our sense of selfhood, degree of agency, authority, influence and role in society—a spectacularly narrow range of theories of our bodies have been used to legitimate social power relations. And such limiting narratives of women's bodies have almost always backtracked heterosexual reproduction as the root cause and its own *sine qua non*.²⁰ The female body has been the rhetorically imagined root source for both women's existence and for why women, supposedly and collectively, are more physically limited to their reproductive bodies than men, weaker in both body and mind, more malleable, penetrable, leaky and susceptible to ailments and pathologies of various kinds.²¹ Scientific “facts” of the female body have been made a huge obstacle, incarcerating any feminist hope for societal change. However, evolutionary “facts”—of, say, the supposedly given naturalness of male heterosexual philandering and territorial expansion, of female sexual modesty and coyness, of women's natural role in the private sphere as mothers, facts on women, children and non-white people's closer proximity to underdeveloped natural stages, to pure nature rather than to civilized culture—these have also been investigated and critiqued from both outside and from within the natural sciences. In the historical retrospect, provided by feminist historians or anthropologists of science, medicine and technology, they appear more as social views than as natural facts of life. No doubt, these are, however, still contested terrains.

Indeed, it is possible to delineate four typical concerns or problems feminists have had with the biological body.²² The first is the trouble with **determinism**; that anatomy is supposed to be social destiny.²³ After having worked his way carefully through the psychological development of the boy for decades, and by 1930 approaching the female psyche, Freud famously declared, rather abruptly, that for women “anatomy is destiny” (and gave up). Biological facts about the woman body have been used for causal explanation, and at the same time also as justification, of societal power differences. In the

²⁰ Judith Butler, *Gender Trouble: Feminism and the Subversion of Identity* (New York: Routledge, 1990).

²¹ Jordanova, op.cit.; Stafford, op.cit.; Margrit Shildrick, *Leaky Bodies and Boundaries. Feminism, Postmodernism and (Bio)ethics* (London: Routledge, 1997).

²² Ruth Bleier, *Science and Gender: A Critique of Biology and Its Theories on Women* (Oxford: Pergamon Press, 1984); Annemarie Mol, “‘Sekse’ en ‘wetenschap’: een vergelijking met twee onbekenden”, in *Wetenschapstheorie: de empirische wending*, ed. Louis Boon and Gerrd deVries (Groningen: Wolters-Noordhoff, 1989); Lynda Birke, *Feminism and the Biological Body* (Edinburgh: Edinburgh University Press, 2000); Cecilia Åsberg, “The Arena of the Body: The Cyborg and Feminist Views on Biology”, in *Gender in Media, Art and Culture*, ed. Rosemarie Buikema and Iris van der Tuin (London and New York: Routledge, 2009).

²³ See Nelly Oudshoorn. *Beyond the Natural Body: An Archeology of Sex Hormones* (London: Routledge, 1994).

1980s, the feminist tactic to counter biological determinism was to make the strategic distinction between *sex* and *gender* and to point to the social construction of biology and historical wrongs regarding biological facts (especially race has been successfully problematized as a distinct biological category). Indeed, the body as code for one's naturally given social place has been contested.

A second concern of feminists has been the problem of **scientism**. The authority of science in society has been problematized, as it reigns over all other forms of non-academic knowledge production. Feminists of various parlour have also interrogated the innate masculine gendering of, for instance, medical expertise, and in historical studies scrutinized how the practices and ancient knowledge of midwives were actively subdued by the emerging profession of male doctors and gynaecologists. Historical processes of professionalization of, say, obstetricians or botanists, seem to have taken place not so much in the absence of women as in defiance of women.²⁴ The struggle has been concerning reproductive authority for women to decide vis-à-vis medical experts over their bodies. Third, feminists have been concerned with the **objectification** of the body, the perspectivalist idea that bodies are to be known from the outside—as if we, regardless of scientific status, were not actually all of us living and learning inside bodies. This is the problem of nature and bodies being treated as passive resources, awaiting exploitation and disassociated from the Self and any form of agency. Feminists have also been concerned with discourses on the human body as an objectified, unitary organism in general.²⁵ For instance, as in the idea of the immune system as a defence system against invading foreign others. The notion of a unified human organism imagines the body as bounded territory, ideally impermeable, like the borders of a nation-state protected by inviolable frontiers. Alternative feminist understandings trouble this monolithic view of the body, and see it instead as fluid and fragmented, deterritorialized and leaky²⁶ or as a biological relation of what in fact turns out to be many co-existing species.²⁷ The perspectivalist view of the objectified human body needs revision, as we have never been fully or purely human in the first place. We have rather been constantly co-evolving with other organisms, as evidenced by the viral residues in our (not quite) human genome.

²⁴ David F. Noble, *A World Without Women: The Christian Clerical Culture of Western Science* (New York: Alfred A. Knopf, 1992).

²⁵ Donna Haraway, *When Species Meet* (Minneapolis: University of Minnesota Press, 2007).

²⁶ Shildrick, op.cit.

²⁷ Haraway, *When Species Meet*.

With regard to how we share almost seventy percent of our genes with a loaf of bread (or any other organic entity), perhaps genomic percentages are not such great indicators of humanness after all? And as always co-existing with others, like the micro-organisms in our organs and intestines (helping us digest food), which are far exceeding the number of human cells in the body, we have to radically (and cold-bloodedly) rethink the assemblage of nature and culture, self and others, that is human embodiment. Incurably informed by material-semiotic feminisms (and by fields such as animal studies) as well as by the technoscience we inhabit, such alternative understandings may be thought of as **posthumanist**.²⁸ The problem of objectification (and with human/ist exceptionalism) relates to the fourth feminist body-concern, namely the trouble with **disembodiment**. This is the problematic splitting of mind and body, the priority and distinction given to the mind and to rational thought—as if the mind was not anchored, and thinking as well as looking did not always take place inside a body (within a setting of cultural affect). The problem is that disembodiment provides the scientific gaze with the power to see while not being seen, to represent while escaping representation so the conquering gaze may signify an unmarked position of (universal) Man.

The counter strategies of feminists to these problems have been to study science as culture and scientists as embodied, gendered practitioners embedded in societal norms. But also, more recently, to in fact study science as a discourse open to intervention, and not to prejudge it as bad or good but rather to paint impressions of the subjectivity producing effects of scientific ways of looking. Science is now often studied as an entangled network of agents, and humans as co-dependent on other non-human actors (or performative elements), like other organisms and animals, machines and technologies, nature and the environment. This is what we can call the posthumanist challenge to gender studies of science,²⁹ since it does not 1) take the purity of categories such as human for granted; 2) it problematizes the Renaissance-aged humanist vision of the coherent, rational and ethical human Self; and 3) since it is highly interdisciplinary it challenges and expands the disciplinary boundaries and scope of the humanities.

²⁸ Haraway, *When Species Meet*; Cecilia Åsberg and Jennifer Lum, "Mapping the Cultural Imaginary of Alzheimer's Disease: Towards New Understandings Within the Interdisciplinary Approach of Feminist Visual Culture of Technoscience", *European Journal of Women's Studies*, forthcoming in 2009.

²⁹ Åsberg and Lum, *op.cit.*

After the early pioneering book, *The Science Question in Feminism* by Sandra Harding,³⁰ the gender studies ambition was made explicit of engaging with the reality-producing potential of science. This book announced a turn *from* the problems of gender representation among scientists and women's issues and a rallying call *to* the science questions within feminist theory. Rather than asking how women can be more equally treated within and by previously bad or biased science, feminists started to engage in the project of changing science from within, as empowered patients, activist nurses, critical scientists or cultural scholars befriending lab cultures. After such thorough and far-reaching critiques of the scientific ways of looking at the body, as those four delineated above (but there are more), vision and visuality were in quite some trouble within feminist science studies. However, Donna Haraway famously suggested a new mode of seeing and knowing, an embodied form of objectivity she referred to as "situated knowledges".³¹ She wanted to reclaim vision, images and imaginings. This, in order for feminists to turn to the concrete and particular, limited and embodied and not to the scopic regime of an all-seeing God-trick, since only a "partial perspective promises objective vision", that is, any perspective that acknowledges, and stays accountable for, its own both cultural and natural locatedness and situation.³² Seeing is an activity, and it promotes social change—especially so in the powerful guise of technoscience, hence the need to reclaim it.

In a sense, such developments—together with activist work like the medical women's collective health book *Our Bodies, OurSelves*³³—trace the origins of the research field today often named **feminist technoscience studies**.³⁴ And today, as biology is dramatically increasing and producing knowledge of the body's plasticity, its molecular and multiple, cascading and co-dependent status, and as the sciences are increasingly aware of the "glocal" politics of situated knowledge, it is clear that biology and its imaging sciences are transformative practices—and, as such, potentially powerful allies to feminist, anti-racist and non-sexist claims. Such allies should not merely be

³⁰ Sandra Harding, *The Science Question in Feminism* (Ithaca, NY: Cornell University Press, 1986).

³¹ Haraway, *Simians*, 188.

³² *Ibid.*, 190.

³³ One root especially worth mentioning is the feminist medical self-help movement and the famous book *Our Bodies, Ourselves* initially published by the Boston Women's Health Book Collective (1971) and later distributed and rewritten by different women's communities on a global scale (cf. Kathy Davis, "Feminist Body/Politics as World Traveller: Translating Our Bodies, Our Selves", *European Journal of Women's Studies* 9/2 (2002): 223-247).

³⁴ Haraway, *Modest_Witness@Second*.

critiqued but creatively changed from within the academic “belly of the beast”. Today there is thus a body of feminist theories on how to scientifically know about our embodied selves in the world, and that body of work, handed-down to women’s or gender studies students, is in itself a contested field. Many feminist theories of embodiment and of science flourish and cross paths: Your discursive body of feminist theories, analytical tools and thought-models is also, *per se*, a self-reflexive battleground!

The art piece *Untitled (Your Body Is A Battleground)*, evocative as it is, may thus illustrate some of “the feminist troubles with biology”, or the ways in which women’s bodies constitute a spectacular battleground for contesting biological discourses of scientists, feminist activists and of activist feminist scientists. The stakes are high for all, but as trained biologist and feminist theorist Donna Haraway has put it: “biology is a source of intense intellectual, emotional, and physical pleasure. Nothing like that should be given up lightly—or approached only in a scolding or celebratory mode”.³⁵ In fact, following Haraway, biology is “a political discourse, which we should engage at every level”.³⁶ While it has had the tendency to mean the actual physical body itself, biology is perhaps better conceptualized as a set of social and mutually struggling discourses of both cultural meaning and fleshy matter with some unruly agency of its own. And these struggles over the politics of vision are, as I hope to show further, to a large degree, played out in the visual field.

Genomic Visions

The magnitude of the scientific endeavour of the **Human Genome Project** was in science media likened to the NASA project of putting the first man on the moon.³⁷ A media spectacle of grandiose proportions, the mapping of the human genome was not just described as a crucial event in human history but

³⁵ Donna Haraway, *The Haraway Reader* (New York: Routledge, 2004), 203.

³⁶ Haraway, *Simians*, 134.

³⁷ The United States founded part of this international research project to sequence and map out the human genome; it was directed by the National Human Genome Research Institute and led by Francis Collins, PhD, MD. The comparisons between the Apollo project and the HGP were made explicit on the American website but also commented upon in the science journals, *Nature* and *Science*, where the research results were published. “For the general public, however, the human genome sequence is of enormous symbolic significance, and its publication . . . is likely to be greeted with the same awestruck feeling that accompanied the landing of the first humans on the moon and the detonation of the first atomic bomb”. (Pääbo Svante, “The Human Genome and Our View of Ourselves”, *Science* 291/5507 (2001), 1219). The link between space science and genomics was also explored in popular culture, in for instance the Hollywood films *Mission to Mars* (Brian de Palma, 2000) and in *GATTACA* (Andrew Niccol, 1997).

also as a reversed exploration of space, a journey of discovery, not into outer space, but into the inner, genomic universe of all human kind.³⁸ Characterized by an abundance of visual imagery circulating in North European and Western media, I am to now zoom in on the covers of the two influential science journals that published the first scientific results of the tedious work of sequencing and mapping all the genes of the human genome.



Figure 1: The famous journal covers from 2001. The human genome project used an aesthetic celebrating human uniqueness while in fact very few uniquely human genes were found in comparison to other organisms. Reprinted with kind permission of *Nature* and *Science*.

After the cold war enormous resources previously used for military ends were freed, in foremost the USA, Britain and France, which together, with collective efforts of other Western scientists and politicians, aimed to amend the slightly shattered image of science after the A-bomb and, decennia earlier, racist practices of eugenics. The Human Genome Project was in that sense a gigantic effort to amend the very public image of the biological sciences themselves. The scientific journals thus put a lot of artistic effort into these covers. For instance, the *Nature* cover was produced with several advanced digital photographic technologies and used a large number of photographic pictures of famous or non-famous human faces scrambled together through the imaging program Mosaic, so to form a colourful and visually appealing DNA helix.

³⁸ In the light of the political climate in the decennia after the Cold War, and the economic, logistical and computational resources then released in Western countries, it is no surprise that this project became celebrated on a grand scale in the United States and was heralded by President Bill Clinton and British Prime Minister Tony Blair over a satellite link. It was science not for military ends, but discursively constructed as benefiting all of humanity. See José van Dijck, *Imagination. Popular Images of Genetics* (London: McMillan Press, 1998).

The artist contracted for the picture with the diffuse nuances associated to painting, on the cover of *Science*, was in fact also conveying something about visible differences of facial looks and the inner genetic nature of all of human-kind.

Sameness under the umbrella of the human genome is the political message on these covers. It becomes then also clear that politics is not something only gender studies scholars are immersed in, but that, more widely, all “science is politics by other means”—as stated by anthropologist of science Bruno Latour.³⁹ Both illustrations are supposed to visualize the otherwise *invisible* genetics, our inner genetic nature, the “discovered” molecular code to all of what is human. The colours of skin and clothing have to stand in for the evasive visual nature of genes. However, I see in fact also an idealized rendition of humanity where our ongoing worldly geopolitics, and lingering racial regimes, are transformed into a smooth aesthetics of not racial but ethnic difference. Ethnicity and gender is here the colourful and shape-giving cultural difference between humans. A computer program called Mosaic was used for the cover of *Nature*, forming a gigantic DNA molecule out of the photographs of hundreds of faces. Even the soft linear forms of the larger facial portraits on the *Science* cover seem to mimic the helical twisting of an up-right standing DNA molecule.

Exterior cultural markers of identity and difference are made to associate with an all-encompassing inner *panhuman* genetic identity. We are our human genes, the genes are us, our genes make us human (and culturally different). The scientific journals seem to in fact hold up the images for us to behold ourselves. In this gesture of mirroring, of holding up an idealized image of a collective, uniquely human, or even panhuman self, processes of identification and disidentification immediately take place. The pictures seem to tell a story of cultural differences as a function of human genes, in a form of biological determinism often named genetic determinism. Further, we see an aesthetization of lived difference that trace historical processes of colonialism and slavery. It is a refined image of human uniqueness and human unity in spite of what is conceptualized as superficial, “only” skin-deep, diversity.⁴⁰ As such, both the covers leave out the present social power relations between the depicted humans. Perhaps recalling the successful commercials of the clothing

³⁹ Bruno Latour, *Science In Action* (Cambridge, MA: Harvard University Press, 1987).

⁴⁰ Lisa Bloom, ed. *With Other Eyes: Looking at Race and Gender in Visual Culture* (Minneapolis: University of Minnesota Press, 1999).

company Benetton, biological “race” is instead turned into a matter of cultural difference and of colour, and—in turn—colour is turned into a voluntary state of mind.⁴¹ Colour becomes a choice of visual consumption. Allegorically, so has also racism today turned from being legitimated by nature to being legitimated by culture. It is almost pictures that could bear the heading “United Colours of Genomics”, so as to also remind us of not only the commercial, but the universalizing dimension of the Human Genome Project. In that vein, I would on the one hand even dare say that the neo-humanism conveyed by these images is grossly unsuccessful in creating a greater sense of inclusivity (in the invented category of “we, the genetically defined humans”), generating diversity awareness and further, a better public understanding of science in society.

On the other hand, the Human Genome Project *per se* also brought some posthuman insights to the fore. In a posthumanist feminist sense, affirmative towards the body, nature and non-human agency, the great human project in itself deconstructed our humanist understanding of the human as a unique and individual species, the Linnaean crown of creation. In fact it challenged the human exceptionalism that the project, publicly and widely, celebrated in the visual field. The human genome could not have been mapped were it not for the fly (*Drosophila*) genome, the mouse genome and other animal models, and were it not for the bovine DNA that became an essential part of the job to cover the blanks when sequencing the human genome. In this, non-humanist notions of selfhood appear, notions that pick up on dependency instead of solipsist autonomy and individuality, notions that do not shun reactions but in fact always incorporate and are co-constituted by the Other. Many of these parts of others, like fungi, bacteria or protists, within us are necessary for our survival. Most of them just ride along without doing any harm, as Donna Haraway⁴² has put it. It is in that sense we can come to realize that we have never really, anyone of us, been human in the first place. Paraphrasing Bruno Latour’s famous dictum, we have never been modern,⁴³ I think it is fair to state with Donna Haraway, that “we have never been human”—not in the prevailing traditional and purist sense. Thus, as biology itself deconstructs human exceptionalism, new differences appear on the horizon, differences that

⁴¹ Sarah Franklin, Celia Lury and Jackie Stacey, *Global Nature, Global Culture* (London, Thousand Oaks, New Delhi: Sage Publications, 2000); Evelyn M. Hammonds, “New Technologies of Race”, in *The Gendered Cyborg. A Reader*, ed. Gill Kirkup, Linda Janes, Kath Woodward and Fiona Hovenden (London and New York: Routledge and The Open University, 2000).

⁴² Haraway, *When Species Meet*.

⁴³ Bruno Latour, *We Have Never Been Modern* (Cambridge, MA: Harvard University Press, 1993).

defy humanist understandings of ourselves as coherent, purely human, selves in charge of our bodies rather than co-constituted by them and other bodies. Such a feminist vision becomes thus not just about women, neither just about men and women, but about mapping out all kinds of human and non-human relations—also in the visual field.

AD-ventures

As the neurological literature explains, Alzheimer's disease, or AD, is a progressive degeneration of nerve cells (neurons) in the brain. Neurofibrillary tangles and amyloid plaques are characteristics of this disease of the brain. These are all molecular changes of a non-human and non-voluntary nature that take their toll on the narrowly defined, and experienced, exceptionalist sense of human Self, as it supposedly is always rational and in control of one's body. When looking in medical science journals, a range of commercial advertisements for drugs appear. Some are to mitigate the symptoms of AD and they are telling of how we culturally define human subjectivity as it in fact inevitably is affected by age or disease. In one of the ads an elderly man looks sternly and straight into the camera and declares defiantly, in a cultural commentary to this disorder of the brain: "I haven't yet retired from the human race, and I don't intend to for a long time". The brain is culturally imagined as the locus of humanness.⁴⁴ Alzheimer's apparently threatens not merely our perceptions of human value and human dignity, but also human identity as a cerebral essence.

The chief biochemical feature of this disorder, we may learn from medical textbooks, is a marked reduction in the synthesizing enzyme choline acetyltransferase, therefore pharmaceutical therapy, in the shape of drugs prescribed and administered, involves correcting such acetylcholine deficits.⁴⁵ Available on the market are so called cholinesterase inhibitors. Drugs of this class have showed some results but many of them are being poorly evaluated in clinical and other medical studies. This is why public health-care systems in many European countries are ever more reluctant to sponsor these drugs for prescription. Multinational pharmaceutical companies like Pfizer, Shire, Johnson&Johnson and Novartis AG often work together to promote and

⁴⁴ Åsberg and Lum 2009, op.cit.

⁴⁵ Howard L. Field and Reid Brackin, "Neurological Disorders of Increased Prevalence in Women: Migraine, Multiple Sclerosis and Alzheimer's Disease", in *Women's Mental Health: A Comprehensive Textbook*, ed. Susan G. Kornstein and Anita H. Clayton (New York and London: The Guilford Press, 2002).

market these drugs, like Exelon™ and Reminyl™, on a global scale and, for instance, Aricept™ (the leading brand sold in 44 countries) is marketed by Pfizer Inc. and the Japanese company Eisai. The results of clinical trials range from notable improvement to no change. The drugs may thus treat some of the symptoms of the disease in its early stages, but they do not stop or target the underlying and fatal process of this disease, and not all people respond to these drugs. Alzheimer's disease is in fact considered one of the most serious health concerns in Europe and the United States and one of the top five leading causes of death in the wealthy countries of the Northern hemisphere.⁴⁶ Women are affected by the disease as caregivers of the elderly.⁴⁷ But this is also a neurological disorder of increased occurrence in women; that is, more women than men suffer from it.

The biochemical origins of Alzheimer's disease is highly complicated, multifactorial and not quite fully known. Age is most significant, but medical literature lists also possible causes in genetic predisposition, blunt trauma to the head, exposure to heavy metals and toxins along with suggestions that estrogen deficiency and menopause are related to AD. In clinical terms, progressive and irreversible dementia is the symptom that is central when diagnosing patients with AD. From the onset of clinical symptoms, which are recognized in carefully executed memory tests and brain imaging scans (but never fully secured until after a post-mortem examination), most patients gradually get worse until they die (from indirect causes such as pneumonia). Patients experience a progressive deterioration of memory and difficulties with planning, abstraction and judgement. Last to go are long-term memory, motor skills and social skills. Altered behaviour patterns, impaired activities of daily life (ADL), sleeping disorders and general expressions of purposelessness are listed in the medical literature along with emotional manifestations such as depression, agitation and anxiety, but also delusions and even hallucinations. Afternoon and evening confusion, subsumed under the term "sundowning", is common, but the patients are very sensitive in general and easily disturbed by even the slightest environmental and physical changes.⁴⁸ From this rather clinical

⁴⁶ Epidemiologists have suggested that this form of dementia exists in up to ten percent of individuals over the age of 65 while the prevalence of Alzheimer's disease increases dramatically with advanced age so that as many as 47 percent of people aged 85 and above may suffer from it. The number of patients with AD is expected to grow dramatically in the future, against the background of what has been envisioned as a dramatically greying population (Field and Brackin, op.cit; Alzheimer's Association 2008).

⁴⁷ Catherine Ward-Griffin, Abram Oudshoorn, Kristie Clark and Nancy Bol, "Mother-Adult Daughter Relationships Within Dementia Care. A Critical Analysis", *Journal of Family Nursing* 13/1 (2007):13-32.

⁴⁸ Field and Brackin, op.cit.

background of a disease of the brain, let us look at how it appears in an advertisement.

The educational significance of advertising (rather than the study of successes or failures in promotion specific goods or services) lies in the politics of representation. Advertisements are highly worthwhile to study as they may lead to clues on what the idealized images of embodied subjectivity that are being mass diffused so to have as profound an impact as possible. Consumerism is in fact intended to arise from the visually experienced glitch between the culturally valorized images of the advertisement, and one's mundane, everyday life reality; and the heavy investments in pharmaceutical advertising is telling of the apparent success in this regard. In my last examination of a picture appearing in "popular/science", that is an advertisement for a pharmaceutical drug aimed at mitigating the symptoms of "AD", I locate the objects of analysis, as popular cultural expressions of scientific knowledge, at the intersections between culturally shared fantasy imagery and various strains of biomedical and social AD discourse. Such discourse does not so much passively reflect, but actively articulates and (re)constitutes both gendered and aged identities and subjectivities, as well as the social politics occurring along such differentials.

More specifically, in addition to the problems of determinism, objectification, scientism and disembodiment, we may here identify and trace lines of *biological* and *humanist fetishism*. Such fetishist strains of reductionist logic demarcate, organize and differentiate the (female) brain as an autonomous site of disease pathology removed from and impermeable to cultural and historical forces. Furthermore, the ad allows me to map the discursive devices through which biomedical science is produced as an authoritarian agent in the illumination and rationalization of the phenomenon of the female brain, as a cultural locus of biological difference, rationality, gender, heterosexuality, social relations, normalcy and pathology. In the following, I especially interrogate how boundaries emerge between the feminine/masculine, the rational/irrational and the human/nonhuman. Even so, in many ways they seem blurred, giving rise to ambivalences and even apprehension. Perhaps we may situate such unease within a larger cultural context of underlying fear surrounding women's bodies, aging and dying, as well as within cultural uncertainty regarding the effects of new biotechnologies.

The female brain is in the centre of attention within a 2003 advertisement for Reminyl. The image consists of a side profile of an elegant looking, aging Caucasian woman. She appears to be thoughtfully gazing off into the distance, with the hint of a smile on her face. The top half of her head, however, has been covered by a broad, landscape-style shot photograph of a heterosexual couple gazing out over the ocean at sunset. Even so, her cranium is outlined by a semi-circular line of clinical and diagnostic-sounding terminology associated with AD, including the words “general function”, “cognition”, “ADLs” (Activities of Daily Living) and “behaviour”. Initially, the advertisement’s circumscription of the top half of the woman’s head with the above described terminology demarcates, individualizes and thus *fetishizes* the woman’s brain as the autonomous origin of both disease and human identity. As a biological fetish, the aging female brain is imbued with self-sufficiency and autonomy as the disarticulated and self-referential source of AD-related pathology.⁴⁹ Not only is the brain framed as the origin of the pathologies of old age, but it is assigned the powers to generate its own semiotic system, whose signifiers supposedly correspond one-to-one with its various complexities and behaviours.

The image of the brain is akin to the previously discussed popular/science conceptions of DNA, another popular/science culture fetish, in the sense that it appears as the source of its own natural, original, monolithic and unchanging meanings. As such, the brain is understood within the advertisement through “metaphors of communications and integrated systems which collapse the images of the brain as a territory, and the brain as a machine”.⁵⁰ Consequently, its apparent strengths and weaknesses, which are perceived as being located within its boundaries as a self-contained organ, are in the ad translated into rational “maps” of its functions. Thus, while the image constructs the brain as the origin of its own transparent sign systems referring to the cognitive and affective disorders ascribed to AD, the brain emerges as an unmediated, disarticulated entity whose behaviours themselves autonomously produce the mappings and meanings assigned to them. In other words, the advertisement fetishizes the brain through the imaginary act of *seeing into the head*, as if such unmediated seeing was possible. By the picture we are asked to look at the interior of the female head, on to the source, the brain-itself. And as such the ad becomes a visual gesture that echoes the various visual techno-

⁴⁹ Haraway, *Modest_Witness@Second*, 142-145.

⁵⁰ Anne Beaulieu, “The Brain at the End of the Rainbow”, in *Wild Science: Reading Feminism, Medicine, and the Media*, ed. Janine Marchessault and Kim Sawchuk (London and New York: Routledge, 2000), 41.

logies employed within the medical profession, such as CT scans or magnetic resonance imaging. The image prompts a controlling way of seeing, one we recognize as perspectivalist. It is a **medical gaze** aiming to abolish sickness and promote normalcy and health. Within such a dehumanizing visual regime, we the viewers of the ad are like the medical professionals, enabled with the capacity to separate the body from the person. The medical professionals of today, as the intended readers of this advertisement in the journal, are in this image allowed to enter visually, without technical effort or physical pain, into a generalized aging woman's brain. The chemically induced realities of her enhanced being are laid out to the spectator, as romantic memories of a heterosexual couple on the beach during "sundown" unfold as a snapshot. Thus, the fetishistic image of the supposedly drug-enhanced white woman's brain, encircled with explanatory notions such as "general function", "cognition" and "behaviour", effectuates and sustains, generally speaking, a medicalization of aging womanhood.⁵¹

This picture is a culturally encoded constellation of selected scenes that seems to signify that which transpires in the drug-enhanced brain of the woman is her inner true desires and thoughts which here are supposedly biochemically exposed.⁵² This picture links to other closely related visual genres. As a computer generated image, requiring advanced imaging programs and artistic skill, it resembles for instance widely-recognizable images found in popular science journals. In effect, an understanding and decoding of this "popular/medical" picture is produced through allusions to pre-existing reference systems of interpretation, within both medical and popular culture. It relates especially to such popular/scientific ways of imaging the mind as localized in the brain. The scientific research community, the corporate pharmaceutical world and the broader public are complicit in the production of the female brain as it is here imag(in)ed. In this sense, the picture both reflects and inflects the cultural imaginary around Alzheimer's as it is produced in the mediatized interstices of the popular and the scientific.

⁵¹ Jennifer Lum, "It's Not Her, It's the Disease': Towards a Cartography of Scientific and Popular Cultures of Alzheimer's Disease". MA Thesis defended at Utrecht University, the Netherlands, 2006.

⁵² Bettina Leysen, "Medicalization of Menopause: From 'Feminine Forever' to 'Healthy Forever'", in *Between Monsters, Goddesses, and Cyborgs: Feminist Confrontations With Science, Medicine, and Cyberspace. Feminist Confrontations with Science, Medicine and Cyberspace*, ed. Nina Lykke and Rosi Braidotti (London and New Jersey: Zed Books, 1996).

A striking montage is visible between the textual descriptions and mapping of the various functions of the female brain ostensibly affected by AD and the landscape shot of the couple taking in a view of the ocean. This seems to displace the impressions of her mind with the biochemical workings of her brain. Arguably, the juxtaposition articulates the female brain as the embodiment of an expansive, natural terrain that can be explored and rationalized by the contemporary powers of biotechnology and pharmacology. Moreover, the superimposition of the image of the beach, ocean and sunset over the top half of the woman's head produces what Kim Sawchuk may describe as a "biotouristic" fantasy, in this case, of the female brain as a corporeal frontier of scientific exploration. Biotourism is alive with the advancement and popular diffusion of medical imaging technologies, an example being the digitalized Visible Human Project available online. The body becomes a bodyscape which is "spatialized" and given definable geographic contours. "Rendering the interior of the body as a space for travel is contingent upon the representation of the body as a frontier with glorious vistas that can be visited—perhaps not by a real body, but at least by the human eye".⁵³ Importantly, this cultural fantasy renders a new kind of subject position available: the biotourist. This spectator, as Sawchuk implies, is liberated to roam about indefinitely, enjoying the sparkling "wonders" of the wet-ware of female brain in touristy fashion, without really getting close enough to feel that his/her integrity is threatened by whatever foreign and unforeseen unpleasanties and even dangers lurk within the landscape with the deep sea that threatens to engulf. In the Reminyl ad such a biotouristic window on to the fetishized female brain is opened. Mind is turned into anatomy and anatomy into landscape.

Looking at Ourselves through the Eyes of Science: Concluding Remarks

The simultaneously corporeal, media-technological and visual domain of advertisements for this particular anti-AD drug ad generated dynamic images of gender and embodiment, as well as it lent itself to ongoing feminist interventions engaging with the images and ideas circulating around aging, medicine and the body.⁵⁴ In this chapter, I explored historical regimes of vision and visibility connected to scientific ways of looking and knowing. I looked

⁵³ Kim Sawchuk, "Biotourism, Fantastic Voyage, and the Sublime Inner Space", in *Wild Science: Reading Feminism, Medicine and the Media*, ed. Janine Marchessault and Kim Sawchuk (New York and London: Routledge, 2000).

⁵⁴ Van Dijk 2006, *Imagination*.

at art, scientific journals and advertisements, targeting medical practitioners treating patients with for instance Alzheimer's disease, in order to interrogate how "technoscience" comments upon itself. Working within a methodological framework I think we should identify as "feminist visual studies of technoscience", I hope to have not merely delineated feminist concerns with the body as gazed upon by science, such as determinism, objectification, scientism and disembodiment, and that I further added another highly visual problem, that of fetishism, and more importantly propelled insights into the relations and tensions of seeing and knowing.

Clearly, publicly available science images, scientific icons (like the DNA molecule) and commercial or celebratory imagery that link to other, often different, visual genres such as romantic movies or scientific brain scan technologies, are part of our contemporary cultural fantasy landscape. These images impact upon our processes of identity formation, our practices of looking at our selves through the eyes of science, insofar as they furnish an array of cultural signposts and schematics through which we understand, imagine and even experience ourselves as gendered, racialized, sexualized, disabled subjects. Furthermore, the biological fetishism of the brain or fetishism of the genes here interrogated, seem to rely on a specific regime of human exceptionalism at the expense of the co-constituting technologies or other organisms that make us what we are. Rather than logic or argument, the appeal of the scientific rhetoric is in fact derived from the effervescent usage of images, whether in scientific or in popular or commercial settings. Prospering with images, and whole imaginary landscapes, science as well as popular culture sustain and contribute to the discursively shaped imaginary of technoscience. Feminists engage with these images due to the fact that they both give shape to identity producing fantasies, and sustain a particular organization of knowledge of the world. There is even a reality producing potential of the technoscience imaginary and this anticipatory effect is not produced in science or in fiction, but in the visual culture at large. In this chapter I have shown how feminist visual criticism can inspire us, in our further investigations of the overlapping realms of science and popular culture, to combine epistemological insights with situated knowledges and a vision of social change.

Questions for Review and Discussion

- What is the relationship between seeing and knowing? And how has feminism responded to historical ways of looking and producing science?
- Since the 1970s, the accepted interpretations of the body have been subjected to feminist critique. What views on the body did feminists critique?
- How are gender, ethnicity and sexuality visualized in contemporary science as it appears in popular media? Give examples from science-fiction films, popular science and commercial advertisements.
- What do contemporary scientific approaches to the biology of genes and the brain tell us of our contemporary understandings of human identity?
- What is to be gained from approaching biology in various interdisciplinary ways that combine visual analysis with cultural studies, feminist theory and history with postcolonial approaches to science?

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