subject—without claiming that it is a "substance." Thus he establishes a theory of the subject with fantasy as its pivotal notion. This virtual subject, the I to be found nowhere in reality, cannot avoid "actualizing" itself continuously in new formations, or in (on) new technological interfaces. This subject theory, I claim, can offer an alternative to the currents of modernism, with its claims of "identity," and postmodernism, with its condemnation of "identity." The Cartesian I that we use to refer to ourselves is fundamentally mediated, and is remediated by the extensions of ourselves in new media.

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CHAPTER 1

THE QUESTION CONCERNING TECHNOLOGY

AND DESIRE

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1.1.1 A Freudian view of cyberspace

Cyberspace is the "electronic space" that came into existence during the 1960s through a joining together of various computer networks; it became a broad social phenomenon between the 1980s and early 1990s. The interfaces that lead us into cyberspace prove that one cannot detach technology from desire. William Gibson's classical description of cyberspace as a "consensual hallucination" designates its intimate relationship with desire. Digital technologies promise to transcend familiar reality and to reconnect us to the paradise that reality has taken from us. Down with the detours and delays of reality: let us have instant gratification! With the computer we can connect to porn sites that satisfy sexual wishes, we can be the hero of our own (game) world, and so on.

In many cases the fantasies accompanying computer technologies boil down to the notion that they offer us means to surpass the limits that reality imposes upon us. The standard fantasy about the new worlds opened up by computer technologies considers them as new spaces where all the old limits might be transcended (Chesher 1997, p. 79). They offer to relieve us of the burdens of reality. From a Freudian perspective, this wish-fulfilling aspect of technology functions as the realized fantasies of a hallucination. What we cannot have in reality, we can have via the fantasy screen (of the computer). As a "consensual hallucination," cyberspace would be the utopic, new ideal world.

From a dystopic viewpoint, cyberspace is nothing more than an imaginary illusion: a world of false appearances alienating us from the real world. Nevertheless, a Freudian perspective must question such a sharp distinction between reality and illusion. And this is what Sherry Turkle does. In her 2002 Freud Lecture at the Sigmund Freud Society in Vienna, this prominent Internet (psycho)analyst describes cyberspace as what some have called—following the terminology of Erik Erikson—a "psychosocial moratorium." Cyberspace offers a "time out" from reality, during which people can experiment with their identity. Just as Freud describes fantasizing as a "time out" during reality testing, Turkle interprets cyberspace as such an always-available playground: "Time in cyberspace reworks the notion of moratorium because it may now exist on an always-available 'window'" (Turkle 2002, §4). Yet the idea of a sharp distinction between reality and the fantasy space of cyberspace does not necessarily follow, for she appeals to Erikson in order to suggest that this withdrawal from reality is necessary for personal identity itself: experimentation facilitates the development of a "core self" (Turkle 2002, §4).

Translated into Freudo-Lacanian terminology, Turkle's remarks signify that cyberspace is not merely a fantasy reserve for the pure functioning of the

pleasure principle. It is also a *window* for gaining insight into what actually is the object of desire. As a staging of the drives, it may offer a blindly desiring subject a view of what it wants and what kind of objects respond to that desire. As such, it is the *condition for fantasizing*: only after having a notion of what one wants can one stage the objects in imaginary scenes (Bernet 1996, p. 175). Although the Internet is of course an enormous playground for gaining pleasure from imaginary scenes, Turkle also shifts the attention to a deeper aspect. For a desiring being, fantasy is a vital window for being in the world. In Freudian theory, these two aspects of fantasy as an imaginary screen and a conditional window are closely connected, as I will briefly show by means of Freud's central notion of the lost object.

For Freud the hallucinative experience is a revival of earlier, real experiences. In the case of imbibing food by means of the mother's breast, the real or actual object of the drive (the breast) is lost. Fantasy tries to recover this object, but all it can do is to generate a *substitutive* experience of satisfaction. Although Freud uses fantasy as an "illusory" function that does not take reality into account, we can already discern a constitutive function in fantasy, because it is the recovery of the lost, real object that motivates us to confront external reality. Then fantasy is not solely the opposite of reality but also the (libidinal) motivation of our odyssey through reality.

In her essay on the role of foundational psychical fantasies in our current technological world, Teresa Brennan also touches on the Freudian theme of the subject of desire positing its own unconscious fantasies in the production of objects, as well as in their consumption. She stresses that consumer goods encapsulate foundational fantasies—that is, psychical fantasies operating throughout human history—which we now find expressed in commodities. The desire for instant gratification, the desire to imitate the original, and the desire for the mother are part of an original human condition (Brennan 1993, p. 94). This would imply that we constantly buy the same consumer goods (or are attracted to them) because they express transhistorical fantasies.

In her *Electronic Eros* (1996), Claudia Springer shows that a similar desire, the desire to merge (with technology), permeates many expressions of popular culture. And the work of psychologist, systems analyst, and philosopher Raymond Barglow may support the idea that "constitutive myths" pervade information technologies, as he maintains that they assume many maternal characteristics. As providers of information, they are bounteous mothers of a kind: all-knowing, all-powerful, limitlessly nourishing (Barglow 1994, p. 132). This "mythology" is actually built into technology. For instance, the voice control system in the cockpit of the Eurofighter jet enables the (usually male) pilot to perform tasks using his voice; in return, a computer voice gives him the information he asks for. It is intriguing that this computer voice is female, because the pilots react best to a female voice. Or, as one of the pilots

put it, "Mama knows best." The affective relationship with the computer voice leads to better performances. Another example comes from Clifford Nass, a leading theorist who focuses on the relationship between technology and psychology. In his study of voice user interface design, he discovered, first of all, that people react the same to a synthesized voice as to a natural one. Secondly, he found that fantasy plays an important role in the perception of a computer voice: a "male" computer voice is often perceived as competent and concise, whereas "female" computer voices are believed to be better in communicating on topics such as relationships and love (Nass et al. 2003).

Freudian theory depicting fantasy as what "rules" the formation of the desirable object gives us an awareness of a deep psychological structuration of the world. Much more than we are aware of, fantasy organizes our perception of the world. And technologies actually seem to embody this psychological level. Lacanian theory depicts fantasy as a medium that supports our reality by making it an attractive or engaging process (beyond our "instrumental" involvement): in a crucial passage from *The Four Fundamental Concepts of Psycho-analysis*, Lacan makes a very instructive distinction for understanding our interfacing with technological media. He distinguishes between the English terms "aim" and "goal" in order to "clear up the mystery of the *Zielgehemmt*," the drive that attains satisfaction without attaining its goal (Lacan 1998b, p. 179). A partial drive can reach its aim, which is to attain satisfaction by circling around the object, without achieving its goal, the realization of its biological function or the consumption of the object. Rendering Lacan's description of the fantasy object in the case of the oral drive is illustrative: "It is not introduced as the original food, it is introduced from the fact that no food will ever satisfy the oral drive, except by circumventing the eternally lacking object" (ibid., p. 180). Fantasy as a medium that constructs the drive's object can provide satisfaction—and actually does so in most cases—without fulfilling ("natural") needs. According to Lacan, this duplicity is a human characteristic: the drive aims at a *continuation of satisfaction* and not merely at a fulfillment of a need. It is this excess of pleasure that accounts for much of our construction of reality.

In our electronic realities we can find the same functioning of fantasy objects as media that support the reality we live in and provide pleasure. The cell phone, for instance, sustains the construction of a reality of mobile communication. And it is obvious that it does so by providing pleasure (of chatting) and enjoyment (of contemplating the beauty of the latest gadgets). Cyberspace itself would not be worth bothering about without the functioning of fantasy. Online psychotherapy, and online relationships in general, would be uninteresting—and hence would stop—without our (unconsciously) positing "something" in the impressions that we get from the other on the screen (Lacan converts this "thing" into theory as the *object a*: the object that causes

desire and sets desire in motion; fantasy decorates, and designs, this object). The other is more than his screen image. The whole sexual thing on the Internet would stop without its fantasmatic support. For if we simply measured it against "true, face-to-face reality," we would immediately realize that it is not real, and would quit surfing.

Online virtual worlds are also an expression of fantasy, but, as many users attest, they are far from being merely an imaginary illusion: users love them and "live in them"—with all the ambiguities attached to that phrase. Deborah Lupton's description of the inherent antagonism in this love affair of human and computer anticipates the issue of the (human-computer interface as a) fantasy screen that is both opening up and fending off the unrepresentable real dimension of reality:

> The relationship between users and PCs is similar to that between lovers or close friends. An intimate relationship with others involves ambivalence: fear as well as pleasure. As we do with people we feel are close to us, we invest part of ourselves in PCs. We struggle with the pleasures and fears of dependency: to trust is to reap the rewards of security, but it is also to render ourselves vulnerable to risk. Blurring the boundaries between self and other calls up abjection, the fear and horror of the unknown, the indefinable. . . . Computer users, therefore, are both attracted towards the promises of cyberspace, in the utopian freedom from the flesh, its denial of the body, the opportunity to achieve a cyborgian seamlessness and to "connect" with others, but are also threatened by its potential to engulf the self and expose one's vulnerability to the penetration of enemy others. (Lupton 2000, p. 487)

1.1.2 Fantasy as design

As a central theme in the philosophy of technology, design is generally considered to be a process, pattern, or scheme that describes how to realize a practical aim, function, or artifact. It has to take account of two different sorts of constraints (Mitcham 1980, p. 308; Brey 1997). The first is the scientific or technological constraint: it is only possible to create what is technically possible. The second is the "social constraint": the design process has to take account of the social, economic, and cultural demands that are imposed on it (safety regulations, standards, norms, prices, dominant aesthetics, and so on). Design involves both engineers and artists. Whereas efficiency is the ideal of engineering design, beauty is the ideal of artistic design—and beauty is not so much a question of materials and energy as of form (Mitcham 1994, p. 229). Interface theorist Steven Johnson expresses the idea that the interface is not so much a matter of engineering and programming tricks as it is about the design of desire. This technological enterprise is basically an artistic matter: interface design might be the art form of the twenty-first century (Johnson 1997, p. 213).

The perspective of the technological Eros stresses this role of "ideals" (fantasies) in the process of design. Designing relates directly to the human subject because "designing (from the Latin word *designare*, 'to mark out') . . . is, as it were, reified intention" (Mitcham 1994, p. 200). Design is to a large extent a matter of desire, both on an individual and a collective scale. Hence the manifestation of the technological Eros in design can help to clarify, for example, why people in a specific culture or subculture all try to look the same and love the same gadgets. For example, why did Michael Jackson suffer all his plastic surgery operations, and why does a computer addict sacrifice his relationship by being online all the time? (These examples indicate the difficulty of clearly separating the individual and the transindividual level, for doesn't the cultural context also determine Jackson's fantasy of his "perfect" face?) Technological Eros therefore stresses an element in the list of "social constraints" in the design process that is beyond pragmatic, instrumental, and teleological reason.

In his investigation of electronic technologies, Derrick de Kerckhove gives an equally broad scope to the intermediate status of design. He considers technology, as an extension of our mental and bodily functions, to be an externalization of our inner selves. Design gives a form to these technological extensions of ourselves, and is therefore at the interface of the body and the mind, the material and the cultural, our "inside" and "outside": "Design, as I understand it, is a modulation of the relationship between the human body and the environment as it is modified by technology. Technology comes out of the human body and design makes sense of it . . . mind and body are so intermingled that it is pointless to separate them" (De Kerckhove 1995, p. 156). Therefore a clear distinction between the material and the formal is, in his opinion, impossible. The place where we exist is in *the between* (in the middle, in media), where the content is intermixed with the form (or, in Lacan's theory, truth with fantasy). As a creation of the surface of things, design is "the skin of culture," De Kerckhove says; this description makes clear the immense importance of technological design (or technology as design) for the understanding of our culture and ourselves. As such a "skin of culture," design functions, I claim, as a technological externalization of the function of fantasy that Lacanian theory describes.

When one moves from technology in general via electronic technologies to "immersive technologies" like virtual reality, one can make even stronger claims about the role of design. As virtual reality is entirely based on software activities, it is the closest one can get to "pure" design (De Kerckhove 1995, p. 89). The goal of designing interfaces has always been to immerse the user in the virtual environment of the screen: think for example of the movie theater, with the surrounding screen of the IMAX theater as its apogee. Virtual reality is currently as close as one can get to the design of a "fully realized world" on the screen. It is the most intense experience of designer presence,

the best illusion of an experience of "being there" without mediation: "pure" technological enjoyment—or perhaps in actuality a manufactured enjoyment (see chapter 6).

1.1.3 Designing presence with metaphors

Metaphors play a crucial role in designing the form that digital information takes (Johnson 1997, p. 45). They help us to imagine and represent the information (a visual metaphor like a folder on a desktop) and to make sense of it (a discursive metaphor like "the information superhighway" as a representation of the Internet). Metaphors are means to give form to what does not (yet) have a place in reality "as we know it." They even link the nonrepresentable as such to familiar representations; all speaking about God can thus be said to be metaphorical. The notion of metaphors, for instance in the influential theory of linguist George Lakoff and philosopher Mark Johnson (Lakoff and Johnson 1980), is therefore crucial for the understanding of virtual reality, for virtual environments can be considered objectified metaphors delivered as sensory patterns (Biocca 1997, §1.2). According to Sandy Stone, cyberspace is nothing but a space in which everything, including bodies, exists as something close to a metaphor (Stone 2001, p. 190). And Marshall McLuhan calls the spoken word the first technology by which humans grasped their environment in a new way (an opinion shared by Lacan). The metaphors that intersperse speech hence have a constitutive function. But besides the spoken and the written word, McLuhan argues, optical, mechanical, and electronic technologies have throughout history been "active metaphors" and "translators" between human and world:

> All media are active metaphors in their power to translate experiences into new forms. (McLuhan 1994, p. 57)

> Just as a metaphor transforms and transmits experience, so do the media. (Ibid., p. 59)

Interface metaphors represent data objects that do not have a phenomenal existence. They are, to speak in Kantian terms, of the noumenal dimension. Information design transforms the data objects into something visible or understandable, something meaningful: objects of representation. And this transformation is not completely "objective," because the digitized real world does not possess in itself a structure or form according to which it should appear. For what is the true form of a data object? Is it the way it appears on your computer display, or on mine? And what is the true representation of cyberspace? Is it a huge brain (Pierre Lévy's "Collective Intelligence"), a database, or a medium? And if we digitize a dog into a data object, what would

subsequently be the "essential form" of a dog? A Tamagochi, the meaning of a dog reduced to the exact codes by which it is communicated? And even if objects did have a true form, this form might be impossible to retrieve. For example: whatever amount of information on the Big Bang we may have, it will still be impossible to visualize it in a virtual reality environment in its true form, because the event withdraws itself from its (technological) imaging. Platonism, the doctrine of the true form, is hard to maintain in the digital age.

So we should avoid considering cyberspace as an objective fact or objective information. It is a product of human imagination, in which we use known metaphors for a new domain of information and communication. These metaphors inevitably go along with a distortion, misrepresentation, or bias of the domain that they structure, since they describe it as something other than what it is. Lacanian theory incorporates this notion of metaphors by considering distortion as an aspect of human reality itself. Metaphors link the subject to the "original" event. Freud describes this metaphorical structure as one of the two basic mechanisms of the unconscious and calls it "condensation." A representation represents ("condenses") several associative chains and is therefore overdetermined. Several associative elements compose a dream image and other "formations of the unconscious" that therefore do not have a single referent. A character in a dream, for instance, is an "assembly" of traits of different persons. Those "metaphorical formations" do, however, form a link between a person's conscious life and the reality of his unconscious. They represent something of the inaccessible real—just as a dream character may represent, partially, a repressed truth.

Lacan therefore describes the Freudian process of condensation as a metaphorical process (Lacan 1998b, p. 247). By means (or media) of association and composition, there arises a representation of something that does not exist as such. The metaphor is therefore always a substitution: it substitutes a "real presence" that is impossible. And the computer deals with this impossible real, as a machine that can present photorealistic representations of impossible, nonexisting worlds and phenomena (Darley 2000). For Lacan, it is exactly the metaphorical dimension of language that precludes the truth of being (in the metaphysics of presence: the Idea, God, Logos) from being represented in exact language. All of our reality can therefore be said to be metaphorical. We never see "reality as it really is," but always via (conceptual) frameworks. The displays of the computerized world that surround us are new frameworks, in which we design our reality via the metaphorization of data. This metaphorization proceeds along the two basic principles that characterize most computer applications: *selection* and *compositing*.

As they compose the "real thing," we must be careful not to take metaphors literally, though this can be very tempting in case of the (metaphorical) worlds that computers create. George Lakoff explains: "This kind of mistake

happens because, first, people use metaphors unconsciously, and, secondly, because you must use metaphor to understand most of what happens in a computer" (Lakoff 1995, p. 128). This is the conundrum we are in: we inevitably "live in metaphors" and at the same time we must avoid the seduction of taking them literally.

1.1.4 Channels of perception: The imagination and the understanding

Data objects do not exist "in the real." The "real" of such an object is, rather, its code, assembled from zeros and ones (see also section 2.3.1). Cyberspace in general is therefore conceivable in this dimension of a reality without "real" objects, by proceeding from Kantian philosophy in which it is the human subject that also constructs the object with his or her imagination and understanding.

Here I want to raise the matter from a Kantian perspective, and start with Frank Biocca's clarification of the functioning of virtual reality: "In immersive VR the whole interface defines the boundaries and shape of the body by defining the boundary between inside and outside, between the part of the VR world that is 'me' and the part that is 'the world.' . . . From coherent patterns of energy impinging on the senses (i.e., the proximal stimulus) the virtual world is divided into 'self' and 'environment'" (Biocca 1997). Computer interfaces, in this case those of immersive virtual reality, stimulate different sensory channels: visual (via head-mounted display), aural (spatial audio), tactile (tactile feedback), and proprioceptive (force feedback and motion display). On the basis of ("real") data, the computer transforms sensations of a virtual world into a mental representation of a reality. The virtual reality interface synthesizes the (chaotic) stimuli, simultaneously causing a coherent perception of a (virtual) reality.

This transformation of (the real of) the computer code into the physical sensations of the computer output is already a "synthesizing" activity that the computer appropriates from the human subject, for whom it is—according to Kant—the most elementary activity in relation to the "object." For Kant, the human subject positions the (sensible) impressions of objects in the dimensions of space and time by means of the (transcendental) *imagination*, just as a television screen synthesizes electronic pulses and displays them as a coherent picture in time and space. As channels of imagination, the interfaces also function in this manner, similar to Lacan's understanding of fantasy—an issue I will address extensively further on in this book (particularly chapter 4). For Lacan, fantasy, or the imaginary order, both *synthesizes* the manifold stimuli originating in internal and external reality "into a number of preformed frameworks," and *anticipates* an ideal unity.

Not just the (transcendental) imagination determines perception. From the perspective of Kantian theory, the interesting point to be made is that we should not think of perception as preceding the arrangement made by the *understanding*. The conceptual apparatus determines the senses, even before perception occurs. This much, as Horkheimer and Adorno already showed in 1947, both Kant and Hollywood film production know: "Intuitively, Kant foretold what Hollywood consciously put into practice: in the very process of production, images are precensored according to the norm of the understanding which will later govern their apprehension" (Simmons 1995, p. 147).

For Kant, it is what he calls the "anticipation of perception" that must ensure we are dealing with a real object of experience. Now, for the subject of the human-computer interface—for whom the computer is the framework that establishes the appearances—the question is whether a "real" object at the level of experience corresponds to the "codified object." Is the experience that a virtual reality installation provides also good enough to confine reality to it? Or does it fool us (turn us into hallucinating fools) by making us illegitimately apply the category of reality to its simulated experiences? That is, does it lead us into the illusion of presence, by exceeding the limits of (real) experience?

In her "Reflections on Real Presence by a Virtual Person," Carrie Heeter concludes that it is not technology alone that engages the subjective experience of presence. Real presence (here: the experience of "being there") is not only a matter of sensory realism and "real" sensory stimuli. She illustrates this by her visit to the space shuttle *Enterprise*. Despite the total physical realism, she did not particularly feel as if she was there, because her sense of presence was dampened by expectations, lack of familiarity, limited prior experience, and limited cognitive schemas (Heeter 2003, p. 336). Giving a survey of the literature on presence, she suggests that presence is not a static internal state but varies from moment to moment. And in daily life different individuals experience different amounts of presence. Furthermore, there is a difference between numerous moments of moderate presence and peak moments of extreme presence: "Some individuals are probably presence junkies, seeking intensity all the time. Others are the opposite, avoiding being present as much as possible" (Heeter 2003, p. 339). She rejects the dichotomy of perception ("perceptual processing") as presence and conception ("conceptual processing") as absence. Both can evoke presence, as long as they are tied to current sensory stimuli. Cognitive processes such as perception, attention, learning, thought, and affect must be closely tied to current perceptual stimuli in order to generate experiences of presence. So, as Heeter's Space Camp mission illustrates, presence may be lower during a real visit with inadequate conceptual processing (high expectations of what it would be like to be on a space shuttle, no sense of danger, little knowledge of or experience with the shuttle) than during a virtual, simulated visit with better conceptual processing.

The "Kantian" conclusion is that for "real presence" the objects must (also) conform, or pattern themselves, to the human subject. It is not simply sensory realism that takes the measure of presence; presence is the result of the interfacing of the real (stimuli) and the virtual (mind). It is *presence for a subject*.

1.1.5   Mind the gap!

The human subject also determines the appearance of the real object. This is the Kantian revolution that is so important for an understanding of the digital age: the insight that, in psychoanalytic terms, the needs, interests, and desires of the user also determine the way the data object appears on the computer display. Both Kantian philosophy and Freudian psychoanalysis subscribe to the idea that truth cannot be equated—in the modern scientific sense of Descartes—with the exactitude of the representation. Thus, it may already become a little clearer that for Lacan fantasy is the dimension that we must not exclude when we consider the Cartesian ideal of exact representation (see section 3.3.4). Even more, fantasy is actually the "content" of this format of representation. There is a gap between the object and its "exact" representation, and in this gap the (unconscious) functioning of fantasy takes place, as imaginary and metaphorical (trans)formations of data into new forms of reality.

In an uncritical approach, the notion that technologies—from photography to virtual reality—can achieve an unmediated presentation of what they represent, or an "undistorted" relation between subject and object, is still very compelling (Bolter and Grusin 2000, p. 30). For users hardly notice that the "images" they deal with are built up of discontinuous elements. But when one takes a closer look, one must admit that the digital world is discontinuous; it represents by means of discrete units (like the digital clock with its "jumps"). So, as Steven Holzman concludes, there will always be a gap of some sort in any digital representation (Holzman 1998, p. 164).

This discontinuity, however, does not characterize digital representations only. All sign systems have such a gap: they never represent the object as a perfect copy, but always by means of something (words, images, and so on) different from what it represents. Furthermore, in sign systems there are always processes of selection and composition of elements. (For instance in a sentence: which words do I choose, and how do I combine them? Lacan elaborated these processes into the metaphorical and metonymic axes of language.) The two basic principles that guide most computer applications also are selection and composition, as mentioned earlier. In many cases the materials of new media objects are selected from a database of documents. In his analysis of hypertexts, the "texts" that construct the World Wide Web, Espen Aarseth puts this problematic of the part and the whole in a central position. In hypertexts we never reach completion because there are always links that

we haven't investigated yet. Because of this "constitutive leftover," hypertexts are structurally constructed around aporias: "the hypertext aporia prevents us from making sense of the whole because we may not have access to a particular part. Aporia here becomes a trope, an absent pièce de résistance rather than the usual transcendental resistance of the (absent) meaning of a difficult passage" (Aarseth 1997, p. 91).

In the context of a theory of new media, Lacan's basic notion of mediation through the *Other* (alienation) is crucial: the Other is the *reservoir* of signifying elements we use to construct linguistic representations, and the *locus* where speaking takes place (see section 2.2.3). It teaches us that all representations are already discontinuous with "real reality," since they consist of discrete units (the binary oppositions of structural anthropology—high/low, in/out, etc.—or those of digitality—zeros and ones). And with this awareness of the constitutive role of the big Other, one could doubt whether it is the introduction of digital images as such—embroidering on the prior introduction of photographic, film, or television images—that leads to a bigger distrust of their veracity (Simons 2002, pp. 165 and 322). Representation always was to a large extent a matter of selection and composition. Although new media may supply us representations with a strong sense of photorealism, these representations still are a "language" in that they compose an "image" of the object by means of discrete and discontinuous units. This composition gives room to the fantasmatic formation of the object.

It is not without reason that some critics describe reality in the digital era as resembling the psychic reality that psychoanalysis analyzes: they both consist of the compositing of different elements or fragments. An essay called "Digital Desire" stresses this correspondence between digital media and Freud's theory: digital media represent history through fragments, in the form of images, sound bites, and video clips, without revealing the whole in detail (Savage 2000). In this gap Freud posits the functioning of the unconscious, with the psychic reality of fantasy as its core: fantasy "fills in" the gap. Therefore, Freudian theory is an instrument well suited to the analysis of the digital era. One consequence is that one cannot easily use Freudo-Lacanian theory for a romantic criticism of technology, as witnessed especially the 1960s (Mitcham 1994, p. 243). Technology is not alienation from a pretechnological real world.

1.2   TECHNOLOGICAL EROS

1.2.1   Philosophy of technology: Substantialism and constructivism

Now that I have introduced (digital) technologies from a Freudian point of view, it is useful to discuss the broader scope of philosophies of technology so that the Freudian position becomes more articulate. First of all I will try

to define what technology is. Not a simple task, for there is hardly any consensus on the meaning of the term "technology." However, there is a generally accepted—although not completely homogeneous—understanding of what technology refers to (Mitcham 1980 and 1994). First of all there is the "commonsense" view that identifies technology with particular *artifacts*, such as tools, machines, and computers. The second conception stresses the idea that the fundamental issue of technology is not the objects that are made but the *process* of making and using those objects. It focuses on the invention, design, and public use of technology. A third conception views technology as a kind of *knowledge*, consisting of skills, rules, laws, and theories that teach us how to achieve the technological artifact we desire. The fourth conception of technology relates it to the aims, intentions, desires, and choices of humans as the "users" of technology: technology as *volition*. It is on this most difficult and "hidden" aspect of technology, which considers it as grounded in some human act of the will (Mitcham 1980, p. 316), that I will focus.[1]

Philosophies of technology revolve to a considerable extent around the question of whether humans are autonomous in their use of technology or whether technology is, instead, an autonomous mover in the human world. The substantialist view of technology propagated by its first generation of twentieth-century philosophers—Martin Heidegger, Lewis Mumford, and Jacques Ellul—and later by such thinkers as Neil Postman and Don Ihde holds that technology has a transformative effect on our perception and awareness, on politics and society, and on our culture as a whole. Technology hence profoundly interferes with subjectivity: it is a strong "mediator" that transforms our perception of being. This vision strongly opposes the commonsense view—which is not very common among theoreticians—that technology is a neutral instrument that we can use for all sorts of different goals. This does not mean that the major current in the philosophy of technology is the substantialist one, quite the opposite. New, mostly American philosophers of technology support the view that technology is a (social) construction.

The British thinkers Thomas Hughes and Trevor Pinch, working with their Dutch colleague Wiebe Bijker, laid the foundations of social constructivist theories in *The Social Construction of Technological Systems* (1987). Social constructivism strongly opposes the substantialist view of technology as determining history and society. Such a technological determinism presents technology as a system with inevitable and irresistible social (or other) effects. In "hard determinism" (Levinson 1997, pp. 3–4), technology is an autonomous force that shapes humans and the world and eliminates human autonomy. The "soft" version of technological determinism also holds that technology has a determining influence, but it is not the only determining factor. The shape of society, culture, and subjectivity is the result of several forces (economic, military, social), of which technology is only one. Whereas this emphasis on

multicausality involves an overdetermination of an effect by multiple causes, the "soft" version of technological determinism still thinks in a scheme of cause and effect. Social constructivism tries to break out of this scheme.

Although there are different approaches in social constructivism, a common feature is the view of technological development as a contingent process that involves heterogeneous factors. Different actors or relevant social groups play a decisive role in technological change. They are engaged in all sorts of strategies in order to shape technology to their own plans. The directions and goals of technologies therefore depend on the choices and influences of the different social groups that carry out their design and implementation. By stressing the importance of the choices of actors and groups, and by its empirical approach, social constructivism tries to distance itself from the "monolithic" approach of technological determinism, and hence is much more in accord with the current distaste for "grand narratives."

1.2.2 Technology beyond conscious intentions

Social constructivism received important criticism in an influential article by Langdon Winner (1991), who used it as an umbrella term for the body of ideas of a variety of thinkers such as Steve Woolgar, Trevor Pinch, Wiebe Bijker, and Bruno Latour. Winner's critique concerns social constructivism's lack of consideration for the deeper structures that govern technology: it does not pay attention to the power struggles and the political dimensions that underlie the so-called construction of technology by social groups. It also ignores the influence of the broader cultural context on the shaping of technology. Philosophers of technology such as Marx, Mumford, Heidegger, and Ellul, who reflected on the broader patterns of technology, can thus too easily be pushed out as old-fashioned. Social constructivism seems to reduce the reason that permeates technology to its instrumental version. It cannot, I would say, understand technology as a construct of the "diseased animal" (as Nietzsche put it). Furthermore, when it makes the role of social actors in the construction of technology absolute, it seems to tumble into the same trap that it wanted to avoid in the first place: this is the trap of determinism, for it considers everything to be the result of social interaction. It therefore neglects typically human factors, like the meaning that people give to things and the (sometimes strange) reasons and motives they have for performing certain actions—not to speak of the ambivalence toward the openness of the future: the desire for certainty and for the impossible (Nusselder 2008).

According to Winner, social constructivism also disregards the social consequences of technical choice, the social groups that are not included in the construction and the evaluation of technology. I would add to this list the element of nonreflexive intentions: desire. For social constructivism considers the social construction of technology as the outcome of rational choices

and strategies. A simple example might show the limitations of this approach. Was the development of the flying machine solely the result of the rational intentions of the actors and groups that were involved in its production? What about the pioneers of aviation who willingly took the risk of flying the first flying machines, with the chance of crashing right away—was that simply a calculated risk? Probably not. It was also an (unreflected) act, for they did not know what the outcome was going to be.

The question of whether the human "will" is primarily a conscious affair returns in the discussion of technology. This fourth conception of technology, as a kind of willing or volition, is subject to different interpretations. An encyclopedia entry on the philosophy of technology—which commends the value of a social constructivist conception of it—replaces the volitional conception of technology, for instance, with the idea of technology as a social process (Kroes 1998). In this case the conscious intentions of social groups that produce technological artifacts determine the outcome of the process. Unconscious aspects of the human "will" are left out of consideration. This interpretation of technology as a social process thus emphasizes the determination of technology by the rational aims, choices, and preferences of social groups.

Considering technology from the perspective of desire—the term that I will use from now on to specify one domain of volition, namely the Lacanian Eros—apparently entails from the beginning a noninstrumental consideration of technology. Instrumentality strives for an exact knowledge of our intentions during the technological process, while the approach from desire points to the deficient transparency of those intentions. Human intentions are partly unconscious, which is what psychoanalysis takes a close look at. This limitation of self-consciousness is probably not absent with regard to human "use" of technology. The philosopher of technology Ivan Ilich speaks paradoxically of "unintended intentions" (Mitcham 1994, p. 183). And William Mitchell of MIT's Media Lab adds: "Tools are made to accomplish our purposes, and in this sense they represent desires and intentions. We make our tools and our tools make us: by taking up particular tools we accede to desires and we manifest intentions" (Mitchell 1992, p. 59). From the perspective of the technological Eros, technology involves more than the rational use of means. And technology as volition is more than the "conscious" intentions of individuals and social groups.

1.2.3 Technology: From means to media of desire

In philosophical anthropological studies, one considers technology in relation to the human position in and toward nature. The "classical" position holds that humans are defective animals that need technology in order to survive. As deficiencies and shortcomings characterize humans on the biological plane, technology is a means to substitute for these shortcomings. The essence of technology is then its ability to compensate or substitute for biological or natural needs (Gehlen 1980). This dominant conception of technology defines its meaning completely in terms of our needs: technology is a *means* to transform or manipulate nature in order to fulfill human *needs*. It is a form of teleological or purposeful action that satisfies utilitarian or practical functions and goals. Or, to quote a training institute, technology "begins with a need and ends with a solution."

We must nevertheless ask the question whether technology is something that (instrumentally) helps us to exist in this world, or whether it (substantially) creates a world: is it merely a means or is it a *medium*? Do we use technology only in order to safeguard our biological survival, or do we also apply it in order to transform our environment—and ourselves—according to our *desires*? In order to stress my volitional approach to technology, I mention here that several philosophers of technology make note of this idea of technology as led by a will to transformation. The existentialist analysis of Ortega y Gasset grounds technology in a willed self-realization. Hannah Arendt considers modern technology as an answer to old cultural dreams, as a realization of the desire to leave the earth and its conditions (Mitcham 1980, pp. 243–249). For the French philosopher Jean Brun, "technology grows out of Western ontological aspiration to merge subject and object" (Mitcham 1994, p. 249). Heidegger—both in *Being and Time* (1927) and in his later important discussion of this subject in "The Question Concerning Technology" (1949–1950)—also rejects the common idea of technology as pure means: technology is, instead, a revealing or disclosing of what is. As Carl Mitcham points out: "Although Heidegger does not use the term 'volition' and 'will' frequently, *Being and Time* presents technology as object, knowledge, and activity as fundamentally related to volition" (Mitcham 1994, p. 256).

In the conceptualization of the computer as an instrument, "usability" is the central term: the question is which interface design is most effective in helping the user to perform her job. However, the computer has functioned increasingly as a medium since the design of the graphical user interface (GUI), designed in the 1960s at Xerox PARC. Together with Douglas Engelbart's invention of the mouse, the GUI was successfully introduced by Apple in the 1980s on the Macintosh computer. The graphical user interface gave, for the first time, a spatial dimension to data objects, so that the computer could appear as an *environment* that the user could travel through. With the boom of the Internet in the 1990s, this notion of the computer as a medium became very influential. The crucial difference between the computer as an instrument and as a medium holds for information technologies in general. Technologies often start as instruments, and later on they frequently become media as well. Computer technologies often reach the general public when they are

applicable to communication, marking the transition from information technologies (IT) to information and communication technologies (ICT).

Because the conceptualization of the computer as a medium closely connects to the representation of data objects on all sorts of displays, it may be a useful metaphor for my approach to cyberspace. Although we must not overlook the fact that cyberspace probably is a combination of several different metaphors—both on the level of the producer and that of the user; in design and in reception—the metaphor of the medium has a particular interest when one focuses on the "volitional" aspect in which the computer—unconsciously—creates a world.

1.2.4 Technological Eros and the seduction of the essential copy

In line with many present-day thinkers on information and communication technologies who consider cyberspace as a new medium for the fulfillment of our wildest fantasies, Michael Heim posits the old Platonic Eros, the desire for real presence, as the foundation of our actions in cyberspace (Heim 1993, p. 88). It is the desire to (re)find our Other Half—that which we are missing, what lies beyond the limit of our possibilities—that motivates our use of technology. Thus we can speak of a technological Eros, a term first used by Jakob Hommes in his Der technische Eros (1955). Carl Mitcham uses Paul Ricoeur's delineation of three levels of the human will to explain the technological Eros as technological desire, technical motivation or movement, and consent to technology (Mitcham 1994, p. 255). The relationship between technology and Eros is only one of the four "classical" ways to understand what technology is. Therefore, my investigation of the "technological Eros" does not cover the "whole" domain of technology, but is restricted to this aspect that is most intimate to us and therefore the hardest to grasp.

Incorporated in technologies is the age-old desire for presence, of which virtual reality technologies are the latest "material" manifestations. "The goal of virtual reality, presence, is part of an ancient desire to use media for transportation and experience 'physical transcendence' over the space we live in and to experience an 'essential copy' of some distant place, a past experience, or the experience of another person" (Biocca 1997, §5.1.2; also Biocca, Kim, and Levy 1995). Information technologies thus seem to design or create a second, parallel world. Philosophically speaking, this is the technological design of being, of presence. The issue is, however, that many (utopian or idealistic) perspectives consider this parallel world from a Platonic perspective: as a *substantial* world that exists independently of the human subject. Cyberspace, then, is an informational space in which the data are *already present*, and just wait for us to reveal them. This makes cyberspace a realm of immaterial data that exists independently of the computers and networks, of the hardware, the software, and the human wetware. Similarly, Plato thought that the content

of concepts is neutral with regard to the form in which they are represented: concepts (Ideas) exist independently of the knowledge, experience, or imagination of the human user. And in these uncritical perspectives, cyberspace also reproduces the Platonic dualism of body and mind, for they conceive the cybernaut as an immaterial mind that dwells unhindered by its bodily limitations through the data flows of cyberspace. Information and communication technologies seduce the user into thinking that there is a steady contact point between the representation and the things they represent. They make us believe that they represent the real "as it really is."

In semiotic terms, this "metaphysical" paradigm implies that there is something like an immediate relationship between the user and an abstract or medium-independent sign system that puts the user in a direct relationship with the content or concepts that the sign system expresses (Simons 2002, p. 148). From a Lacanian perspective, one could call this the dual, deceptive relationship between user and content. One must note that psychoanalysis recognizes the seduction of such a belief in transparency. And one must also recognize that digital media especially have the power and the aim of achieving such an immediacy (Bolter and Grusin 2000, p. 22). Nevertheless, what is at stake in the era of digital media is the exact analysis of the role of the medium, of the form, in the relationship between user and content—and thus to replace the dual paradigm with a triadic relation between user, sign, and medium.

1.2.5 A desire for simulation?

Simulation is the ecstasy of the real. (Baudrillard 1988, p. 187)

As technologies are often considered ways to cancel the (sense of) loss, media theorist Peter Weibel therefore describes all technology as psycho-technology:

Technology helps to fill, to bridge, to overcome the insufficiency emerging from absence. Every form of technology is teletechnology and serves to overcome spatial and temporal distance. However, this victory over distance and time is only a phenomenological aspect of the (tele-) media. The real effect of the media lies in overcoming the mental disturbances (fears, control mechanisms, castration complexes, etc.) caused by distance and time, by all forms of absence, leave, separation, disappearance, interruption, withdrawal or loss. By overcoming or shutting off the negative horizon of absence, the technical media become technologies of care and presence. By visualizing the absent, making it symbolically present, the media also transform the damaging consequences of absence into pleasant ones. (Weibel 1992, p. 75)

With (psycho-)technologies we try to transgress, confront, shift, or reposition our limit(ation)s. Within a Lacanian context, where the real is exactly what withdraws itself from our grasp and therefore poses a limit to ourselves, we cannot confront or reach the real except through a medium. As Weibel states, technologies are indeed media to bridge the gap that separates us from the real: teletechnologies that seek to overcome distances, immersive technologies that seek to close the distinction between the virtual and the real environment. The purpose of a technological medium is hence to obfuscate itself as a medium and to claim a real presence—and to provide enjoyment through this presentation of things on opaque screens. According to Bolter and Grusin this is what contemporary media are preoccupied with: the transparent presentation of the real and the enjoyment of the opacity of media themselves (Bolter and Grusin 2000, p. 21). Hence we may consider the notion of a *desire for simulation*: "Simulation is no longer that of a territory, a referential being or a substance. It is the generation by models of a real without an origin or reality: a hyperreal" (Baudrillard 1988, p. 166).

Two examples, one concerning mechanical technology and one concerning digital technologies, illustrate this thesis that technology seeks—in the end—to replace the real by its "simulated version." The first example is the experience of speed. The car, a technological vehicle that can provide us with this experience, is a frame that allows our experience of reality to change. Thus it allows for a hyperrealistic perspective upon the world, not only in the experience of speed, or in the feeling of autonomy, but also in the new world order that accompanied car use: the car became a new vehicle for the distantiation of the here and now. And as Kaufmann and Smarr show in their *Supercomputing and the Transformation of Science* (1993), supercomputers radicalize this drive in the digital domain: they can simulate things that no human has ever seen yet—molecules or the origin of the universe—or visualize places that are impossible for humans to reach, and hence almost fully detach our outlook from our physical position.

Within a Lacanian context, this dynamic can be translated as the erotic desire that has as its goal a realization of fantasy. Then fantasy, which normally is a vital support of desire, becomes an opaque screen turning the reality of the desiring subject into a lure. For these are the two basic forms of the object of desire:

> But the object of desire, in the usual sense, is either a fantasy that is in reality the support of desire, or a lure (Lacan 1998b, p. 186).

We can start to analyze this lure by referring to Freud's analysis of love, and find out that it has a fundamentally narcissistic structure. Fantasy can become so pressing that we take its images—which we love so much as the perfect reflection of ourselves—for real. In media studies one tends to call this striving a desire for a "fully realized world" on the screen. Baudrillard elaborates on this theme in his theory of postmodern hyperreality in which entertainment, media, information, and communication technologies provide experiences more involving than the scenes of everyday life:

> Information devours its own content. It devours communication and the social. . . . Rather than creating communication, *it exhausts itself in the act of staging communication.* Rather than producing meaning, it exhausts itself in the act of staging meaning. . . . It is useless to ask if it is the loss of communication that produces this escalation in the simulacrum, or whether it is the simulacrum that is there first for dissuasive ends, to short-circuit in advance any possibility of communication (precession of the model that calls an end to the real). Useless to ask which is the first term, there is none, it is a circular process— that of simulation, that of the hyperreal. The hyperreality of communication and of meaning. More real than the real, that is how the real is abolished. Thus not only communication but the social functions in a closed circuit, as a lure. (Baudrillard 1994, pp. 80–81)

Considering Baudrillard's work as a description of a realized fantasy in this manner, I agree with Scott Durham's remark that it "may be most usefully read as one articulation of a certain *phantasy* of postmodernity as a totalitarian operational system" (Durham 1993, p. 161).

Media technologies have a peculiar relation to the real as the impossible. On the one hand they virtualize—via the screen (of fantasy)—our subordination to our immediate, real environment. On the other hand they try to restore—on the screen—a sort of virtual immediacy: think, for example, of real-time telecommunications. These technologies seem to be guided by the ideal of eliminating our immersion in the "natural" environment ("natural presence") and restoring an immersion in a virtual environment ("virtual presence"). As human beings we seem to be condemned (or blessed) to exceed the limits of our "natural" position in the world, and hence we try to rediscover the paradisiac enjoyment of immediacy (which was never a reality) "stolen" from us.

So, to formulate a Lacanian perspective in Baudrillardian words, we say that there is a desire for an ecstasy of the real.

CHAPTER 2
THE TECHNOLOGIZATION OF HUMAN VIRTUALITY

2.1.1 Virtuality: A historical overview

A widely accepted conception of virtuality juxtaposes it with reality. This opposition leads us to the first meaning of the word "virtual," in which it is something that *only seemingly exists*. It is an image or space that is not real but appears to be, such as the space of the telephone or electronic money (Mirzoeff 1999, p. 91). Besides this everyday meaning, the virtual also has an important philosophical meaning, which I will discuss here. Its technological meaning will be considered in the next section.

To illuminate the philosophical meaning of the word "virtual," we note that it derives from the Latin *virtus*, which means "power, efficiency." One can trace the word *virtus* back to *vir*—"a man" or "manliness"—as in "virility" (Porter 1996, pp. 9–10). Thus, one arrives at the notion of *virtus* in its more physical meaning, where it equates with health and sexual purity. In its moral meaning, *virtus* is related to "virtue" and indicates courage, excellence, and virtuousness. Latin philosophical terminology includes the virtual in this sense of power, whereas Greek philosophy did not know the notion of virtuality.

The philosophical application of "virtual" connects it to the relationship of cause and effect. Thomas Aquinas introduced the notion of the virtual, or "virtual implication or containment" (*virtualis continentia*), as a synonym of Aristotelian potentiality, indicating that the effect is already contained ("present") in the cause—as the tree is already virtually present in the seed. In this classical notion, founded in the Aristotelian theory of potential and actual existence, the virtual stands for the potentiality of an essence. Duns Scotus extended this theory of virtual content, capacity, or substance ("essence") from the metaphysical to the epistemological domain by claiming that the conclusion is already present in the premises. So, if it is true that "machines have no feelings" and "I am a machine," then the conclusion "I have no feelings" is already virtually present. In spite of the many controversies over this theory of virtual content, it persevered into the modern age, when Leibniz brought a new edge to the position of Scotus with his theory that in all true sentences the subject contains the predicate either explicitly or virtually.

In the fourteenth century, Scholastic terminology introduced the noun *virtualitas*, "effectiveness, efficiency." In its Scholastic definition, "virtuality" acquired the meaning of a "virtual distinction," a distinction as-if: what we cannot distinguish in reality should be seen *as* if it were distinguished (*virtualiter*: in Thomistic philosophy the Divine attributes are distinguished from the Divine nature and from each other by a virtual distinction). The classical notion of "virtuality" equates it with potentiality. Virtuality subsequently came to characterize humans as beings still able, within certain boundaries, to realize their potencies. Charles Sanders Peirce strongly criticized this confusion of

the virtual and the potential. He associated the virtual with a *difference of orders*: it is not something of the same order as the potential, which has—being the potential—merely not realized itself yet. When all being is like the potential being of the tree in the seed, everything has the same nature. He defines the virtual as follows: "A virtual X (where X is a common noun) is something, not an X, which has the efficiency (*virtus*) of an X. . . . This is the proper meaning of the word; but it has been seriously confounded with 'potential,' which is almost its contrary. For the potential X is of the nature of X, but is without actual efficiency" (Peirce 1902, p. 763). Alterity hence seems to characterize the virtual, which henceforth cannot be reduced to a natural essence.

This bears a resemblance to the thinking of Gilles Deleuze, as formulated in *Difference and Repetition*. There Deleuze introduces a capital distinction between the possible and the virtual. The possible being is already constituted and static; it only lacks existence and must to that end realize itself. This realization, Deleuze says, is quite different from the actualization of the virtual, which is a creation, a "becoming-other" (Lévy 1998, p. 14; Deleuze 1994). And, as Deleuze states in his book *Bergsonism*, "The possible is a false notion, the source of false problems. The real is supposed to resemble it. That is to say, we give ourselves a real that is ready-made, preformed, pre-existent to itself, and that will pass into existence according to an order of successive limitations. Everything is already *completely given*: all of the real in the image, the pseudo-actuality of the possible" (Deleuze 1988, p. 98). Peirce and Deleuze teach us that the multiple ways in which the virtual can actualize itself ("what man is depends on what becomes of him") differ profoundly from the teleological striving of the possible that wants to realize itself in a certain predetermined manner ("the seed and the tree"). This notion of "heterogenesis" is also at the basis of Pierre Lévy's philosophy of virtualization, which I discuss in part 2 of this chapter.[1]

It is noteworthy that both the common and the philosophical meanings of "virtual" are also present in the terminology of modern physics. After the decline of Aristotelian philosophy, modern physics included the aforementioned notions of the virtual in its new theories. In optics, the theory of the "virtual image" appeared around 1700. This is the (virtual) point where the beam of rays that an object radiates and which are refracted by an optical instrument seem to converge. It is the point in a Newton (mirror) telescope where one must position one's eye in order to see the object. And it is the virtual image in the mirror. The optical theory of refraction also accounts for the fact that when one puts a stick halfway in the water, what one sees is the virtual image of the part of the stick in the water, and not its actual position. In mechanics, the notions of virtual powers and virtual velocity appeared around 1800. These powers or velocities are not actually present but have the potency of becoming real: they can be actualized (or realized). Because the

emphasis is on the possibility or potency of these powers to become active, this mechanical notion of the "virtual" is still very much in the Aristotelian scheme. One can only call them virtual in the sense of Peirce when they are already efficient although not actually present.[2]

2.1.2 Computer virtual reality: Interactivity and immersion

Nowadays we associate the notion of virtuality mostly with the virtual reality that computers generate. By calling this reality virtual, one usually refers to just one of the two basic meanings of "virtual," namely that something only seemingly exists, that it is not "real." The term was also introduced in this way in the descriptions of interactive computer systems. Theodore Nelson, inventor of the term "hypertext" and one of the first to apply the term "virtuality" to computers, defined virtuality in 1980:

> By the virtuality of a thing I mean the seeming of it, as distinct from its more concrete "reality," which may not be important. . . . I use the term "virtual" in its traditional sense, an opposite of "real." The reality of a movie includes how the scenery was painted and where the actors were repositioned between shots, but who cares? The virtuality of a movie is what seems to be in it. (Rheingold 1991, p. 177)

A movie is not just virtual because it is not real, but because of the "reality effect" it creates that makes us believe the illusion is real. The more important meaning of "virtuality" is this *capacity to cause effects*. The virtual is not imaginary; it produces effects (Lévy 1998, p. 30).

The example of the movie also indicates that virtuality in "imaging technologies" does not exclusively belong to the virtual reality of computers. As early as the classical era, spectators of art felt themselves "transported out of reality" and visitors to a virtual reality. The development of the panorama in 1792 marked the next step, in which virtuality moved from the mental space into virtual architecture (Mirzoeff 1999, p. 93). With the stereoscope, a device containing two photographs that must be held up to the eyes to produce an effect of three-dimensionality, the possibility of such virtual visits to other places became available to a broader public. This stereoscopic virtual reality aroused comments that show a remarkable similarity to the way we speak nowadays about the virtual reality of computers: the American physician and writer Oliver Wendell Holmes, for example, described his experience as "a dream-like exaltation in which we seem to leave the body behind us and sail away into one strange scene after another, like disembodied spirits" (in Mirzoeff 1999, p. 94). Through its introduction of the moving interface, the cinema marks another important stage in the human desire and ability to interface with virtual reality.

Yet interfacing with virtual reality by means of the computer distinguishes itself in two important ways from previous notions of virtuality. This goes especially for immersive virtual reality: sensorimotor interaction with a computer model via a head-tracked and head-mounted display that gives the user a compelling sensation of actually "being there" (presence) in the virtual world. The computer introduced for the first time an interactive version of virtuality. One generally distinguishes between two forms of interactivity: interactivity in a human-human relationship, and that in a human-data relationship. Interaction can thus consist of *communication* with other users, *manipulation* of digital objects, and *navigation* through a digital space of information (Simons 2002, p. 79). Because the interface is interactive, the human user is not solely a passive spectator but can actively intervene in, or navigate, the representations that the computer generates. For instance, the user can change the point of view from which the information becomes visible, or alter the conditions of the virtual world he or she is in. In virtual reality, this interactivity resulting from sensorimotor feedback creates a sensation not found in media like film or television and gives users a specific awareness of their bodies, for their head movements alter what they see (Biocca 1997, §5.3). Sandy Stone considers interaction the modality that distinguishes the computer from the cinematic mode of engagement (film, theater). It is the physical concretization of a desire to escape flatness and merge into the created system, and the "spectator" becomes both participant in and creator of the simulation (Stone 2001, p. 192).

The second feature of computer-generated virtual reality is its already-mentioned *immersive* character. The use of stereo glasses and data gloves in virtual reality provides the user with the physical sensation of being immersed in a computer-generated reality. A direct projection of the images on the retina is currently the most advanced version. There are also technologies that use helmets (head-mounted display) or that project the images on screens that surround the user (CAVE). In any case, the goal of the interface design is the experience of three-dimensionality, of being in another world that completely surrounds us. Of course it achieves those effects to different degrees, depending on the technology and how this makes the materiality of the interface disappear. Although immersive virtual reality achieves the strongest degree of virtuality, its effect can also be created on the two-dimensional screen of the personal computer. In virtual worlds on the Internet such as World3D and Second Life, the user's avatar enters a virtual world inhabited by others, and hence experiences a sense of entrance or insertion into another world. A general characteristic of virtual worlds is that the tools for communication, search, and retrieval are present in a continuous space. So "computer virtual reality" (virtual reality in the weakest sense) refers to all software objects, such as computer programs and databases, and their contents. The virtual reality experience then results from the ongoing interaction with a program or a model that results in the automatic generating of "texts," messages, and all sorts of images (Lévy 2001, pp. 54–55).

2.1.3 The real and the virtual in digital technologies: Four models

In their article on virtuality, Marcus Doel and David Clarke (1999) describe the four major conceptions of virtuality in its contemporary, technology-driven version. Their first version of virtual reality, *simulation*, considers the virtual as a copy, as nothing more than a pale imitation of the real. The correspondence theory of representation that guides this discourse (a representation is only true when it corresponds to extramental facts) posits the real as something original that is self-identical. Here the virtual is a dangerous supplement, as the image is in Plato's philosophy.

The second version of virtual reality, *suppletion*, falls victim to the same discourse of approximation, although it is an inversion of it. Here it is the real that is impartial, lacking, and imperfect. The virtual can *supplete* this real. The virtual relates to the real as the perfect does to the imperfect. It can correct the defects in the real.

Doel and Clarke name the third version seduction, or *s(ed)uction*, in which the (fetishized) ideal of the virtual would amounts to living in the (tele)presence of a full realization of the world's possibilities (Doel and Clarke 1999, p. 274). It leads to a total annihilation of semblances. Doel and Clarke introduce this idea with a quotation from Baudrillard in which technicians from IBM take over the task of transcribing the nine billion names of God from a community of Tibetan monks. Their computer can do in a few months the job that, according to the monks' belief, will achieve the purpose of the world and will end it. In this version of the relation between the real and the virtual, the real is "a real drag" that should be left behind.

The fourth version of virtual reality, which the authors adhere to themselves, revolves around the notion of the *simulacrum* as elaborated by Gilles Deleuze (1983, 1994). The authors' main thrust is to show that this notion evades the mistake of *confusing the virtual with the possible* made in the discourses of hyperrealization (the first two versions) and ex-termination (the third). The question of virtuality, they hold—and this is the same argument discussed in the treatment of Peirce and Deleuze—is about actualization and not about realization (of possibilities). The simulacrum expresses exactly this idea of a creation of new events out of the heterogeneous play of forces composing the virtual.

Doel and Clarke thus sketch the field within which a philosopher must find a position.

2.2.1   Pierre Lévy: Characteristics of virtualization

Pierre Lévy concludes his analysis of virtuality by putting it on a par with desubstantialization:

> Virtualization, or the transition to a problematic, in no way implies a disappearance in illusion or dematerialization. Rather, it should be understood as a form of "desubstantialization." . . . This desubstantialization is broken into a related series of changes: deterritorialization, the Moebius effect—which organizes the endless loop of interior and exterior—the sharing of private elements, and the subjective integration of public items. . . . Subjectivation is the implication of technological, semiotic, and social means in the individual's psychic and somatic functions. Objectivation will be defined as the mutual implication of subjective acts in the process of constructing a shared world. Subjectivation and Objectivation are therefore two complementary aspects of virtualization. In fact, in terms of what they do, neither subject nor object are substances but fluctuating nodes of events that mutually interface with and envelop one another. (Lévy 1998, p. 169)

This very brief description needs some explanation. To begin, we note Lévy's implicit proposal to go against the tide of philosophical tradition, which has always focused on the passage from the possible to the real or from the virtual to the actual (Lévy 1998, pp. 16–17), the model of "realizing our possibilities" and of (the humanistic ideal of) self-actualization, and so on. Lévy tries to analyze the inverse transformation, that is to say, the "becoming virtual." This is not something that, as common understanding would have it, occurs only by way of digital technologies. As will be shown further on, it belongs to the process of "becoming human" itself.

Lévy understands this virtualization as a "transition to a problematic." By this means, an object—or the human self—loses its fixed identity and is transposed to a virtual field of (opposing) tendencies and forces within which it can manifest itself in several different actualizations (as a human being can actualize itself differently in different circumstances). Similarly, a virtualized text, a constructive hypertext, loses its fixed character and steady authorship and may therefore appear in several new forms. Hypertext writer Michael Joyce distinguishes the *constructive* hypertext that allows the "reader" to become a "writer" from the *explorative* hypertext that merely enlarges the user's navigational space (cf. De Mul 2002, p. 119). Lévy's Deleuzian inspiration resides in this focus on the creative process of "becoming other," or heterogenesis, which is enabled by virtualization.

Lévy's study stresses, in its philosophical-anthropological dimension, that virtualization and humanization are concurrent processes. His reflections teach us that a dimension of virtuality always permeates human reality. This is nothing other than saying that "desubstantialization" characterizes human reality. Lévy divides this desubstantialization into several categories. First there is the process of deterritorialization as a detachment of the here and now, a process he delineates by referring to the work of one of his predecessors in the description of the virtual, Michel Serres, who in his book *Atlas* pictures the virtual as a process of leaving the "there." "Imagination, memory, knowledge, and religion are the vectors of virtualization that have enabled us to leave this 'there' long before the appearance of computerization and digital networks" (Lévy 1998, p. 28).

With his reference to the Moebius effect, Lévy emphasizes that a category such as virtualization impedes our thinking in schemes of simple oppositions. For the Moebius strip, which can be formed by twisting a long rectangle of paper and joining its ends together, is a figure in which one cannot distinguish between the inside and the outside: they are continuous. Considering virtualization as a constitutive function of human reality, there is no clear division between inside and outside, between self and other (and no clear distinction of body and mind). For instance, we incorporate texts written by others (we subjectify them), we externalize our inner body by medical imaging technologies (we objectify our body), and so on. Similarly, virtualization rejects the idea that there is a chasm between an event and the dissemination of information about it. For example, one cannot separate an election from the information that press agencies distribute about it: messages that virtualize an event also prolong it, and become a part of it (Lévy 1998, p. 74). Reality inevitably contains a fictional element.

Lévy's notion of virtualization as the foundational process of community (communality, communion, collectivity) is in accord with the Moebius effect as a process that entwines the interior and the exterior (an effect already extensively analyzed by Hegel). Virtualization connects ("interfaces") the private and the public, and is to a great extent a matter of our use of signs. Virtualization is a process through which we come to *share a reality*—a reality that is constituted in its basic structure, as Lévy also indicates, by an externalization of the personal and an internalization of the social. By verbalizing an emotion, we "bring it out" and share it with others, and merely by listening to music, looking at a painting, or reading a poem we personalize a public item. In this sense the construction of a society takes place through a process of virtualization (Lévy 1998, p. 98).[3]

Most interesting is what Lévy discerns as the ultimate goal of virtualization, its "engine," namely, the effort to escape death and decay: "In general, virtualization is a war against fragility, pain, wear. In search of safety and control, we pursue the virtual because it leads us towards ontological regions that ordinary dangers never reach" (Lévy 1998, p. 99). This resembles Gilbert Durand's

conclusion in his grand work on the role of the imaginary in human existence: "It is obvious that the inventory of the imaginary, from the great sacred myths to the purely aesthetic emotions, is completely oriented by its fundamental inspiration: to escape death and the vicissitudes of time. . . . The struggle against decay, the exorcism of death and temporal decomposition: such is, in our view, the euphemising function of the imagination as a whole" (Durand 1999, p. 391). Although we do not necessarily always win this "war against fragility," distancing oneself from the anxiety-provoking real seems to be the fundamental inspiration of the imagination that underlies virtualization.

2.2.2 Forces of virtualization: Language, law, and technology

The pursuit of the virtual, which at the same time constitutes humanity itself, takes place in three ways. It is no surprise that Lévy associates the first mode with the human use of signs: human language virtualizes events, material objects, and time. In language we *exist*: we are detached from the real "here" and the real "now." Language opens up an ecstatic time, a past and a future in which we live: "Through their vital connection, the inherited, remembered, and reinterpreted past, the active present, and the hoped-for, feared, or simply imagined future are psychic, existential. Time, as a complete dimension, exists only virtually" (Lévy 1998, p. 92). The virtualization of real time is the condition for remembering, telling stories, imagining, simulating: ways by which we can travel to other worlds. [4]

Lévy typifies the second form of virtualization as a "virtualization of violence": "Ritual, religion, morality, law, economic and political regulations are social mechanisms for virtualizing relations of force, immediate impulses, instincts, desires" (Lévy 1998, p. 97). All these "rules" are about the detachment from a direct relationship or a particular situation. The law holds for anyone, independent of their personal situation, just as marriage regulates the relationship between man and woman in general. The virtualization of immediate (im)pulses stabilizes behavior and identity, and determines "frameworks" for the transformation of our relationships and personal status. Virtualization functions as a mediation that transforms human identity. The following example anticipates the Lacanian version of virtualization by means of language and the law. When someone receives (Holy) Communion, her identity is transformed into a communal form. This form does not reflect the "real form" of her identity (as imagined in a dual relation: the "realization of the true self"), but *constructs* it symbolically.

The third process of virtualization is that of technology. In the general understanding of technology—reduced here by Lévy to the production of tools—tools are considered as an extension of the body: the hammer is seen as an extension of the arm, for example. Lévy does not follow Marshall McLuhan's understanding of technology as an extension of the body, for he consid-

ers the wheel, for instance, not an extension of our leg but a virtualization of walking (Lévy 1998, p. 95). He emphasizes the moment of the virtualization of *action* in technology. A hammer is a virtualization of the action of striking and, following Lévy's Deleuzian inspiration, this virtualization is actualized every time a hammer is used. The tool memorizes the original moment of virtualization of the body (Lévy 1998, p. 96). This actualization of the virtual can take place in different forms: I can use a hammer to demolish, to build, or to kill. By conceiving technology as a process that virtualizes the original object or action in a materialized way (writing virtualizes remembering, the wing of an airplane virtualizes flying) and that can be actualized in new forms, Lévy places technology in the philosophy of heterogenesis that in his opinion characterizes humanity itself.

2.2.3 Language as virtualization: Other scenes

After Lévy's sharp insights into understanding the virtual, I will now switch over to a Lacanian understanding of virtualization. In Lacanian terms, the mediation of language is what opens us to the "space and time of the Other." The notion of language as the symbolic Other originates in Lacan's simple premise that humans, as a subject of language, constitute themselves in an intersubjective relationship: the word addresses itself always to the other. "The Other is, therefore, the locus in which is constituted the I who speaks to him who hears, that which is said by the one being already the reply, the other deciding to hear it whether the one has or has not spoken" (Lacan 1977, p. 141). In a more general sense, the Other is not merely the other person to whom one speaks but the order of symbols in which speech literally *takes place*: the Other is the *locus of speech*. This Other place is also the foundation of (fictional) truth. Lacan considers "what I call the capital Other (*le grand Autre*), the locus of speech and, actually, the locus of truth" (Lacan 1998b, p. 129; translation modified). [5] In his Écrits (1966, p. 454), Lacan says that the big Other is nothing but the guarantor of Good Faith. Even though we lie, the Other may assume our words to be true. This is exemplary of the way that the Other twists our "inwardness" (in this case, our real intention) and constitutes truth. To put it in Žižek's words (who, for his part, quotes the X Files motto): "The truth is out there."

The symbolic Other—for instance, in the realm of language—is a domain in which a symbol functions within a network of interconnected signifiers (material, "acoustic images" that we use to signify things). A symbol, unlike an image, does not represent an established meaning, but gets its meaning from the relations to other signifiers in the symbolic order. For the meaning of a symbol, the presence or absence of elements is of decisive importance: two additional smaller bars on the Latin version of the Christian cross produce a symbol (an Orthodox cross) distinct from the cross with only one bar

(Catholic or Protestant). Similarly, scientific symbolizations also work with this system of presence and absence: for example, the codes of DNA, or A+, B−, for the representation of blood types (Zwart 1998, pp. 110–111). The symbolic "dissects" objects by reducing them to all sorts of basic elements (signifiers) that function as a language of their own (for instance, the mathematical language of nature, the language of DNA, the language of the unconscious). Through such "languages," symbolic systems *structure* the real rather than *reflecting* the real, as images pretend to do with their mimetic forms of representation.

The dimension of the Other is the scene in which real events inscribe themselves, thus virtualizing the real. This allows, for instance, for the possibility of lying (pretending) and of (unintended) "subversion." When I write an email to a friend that includes both the words "Bush" and "dead" in no direct relation to each other (for example, I said that I do not agree with the policies of President Bush, and later on mention that my cat is dead), those two words might be connected by the computers of the National Security Agency checking my emails, and interpreted as a hint that I might be planning a terrorist attack. The words are inscribed in "another scene" of a big Other, in this case one very much focused on everything with the connotation of terrorism. (The paranoid reaction of the U.S. government to work by Steve Kurtz of the Critical Art Ensemble which it considered to be a terrorist activity is a perfect illustration of this: in May 2004 the U.S. Joint Terrorism Task Force seized some of his artistic and scientific material.) In general, the significance of the "original material" must be sought in its relationship to the Other.

To return to the example of deterritorialization that Lévy uses to illustrate virtualization as desubstantialization: one cannot conceive the meaning of an election by referring to the event that took place at a particular place and time, for its meaning constitutes itself in the information about it that influences all sorts of systems outside of its actual location: stock markets, diplomacy, and so on. Events and information about events exchange their identities and form a dialectical signifying process (Lévy 1998, pp. 74–75). It is this structure that Lacan has in mind with his theory that the "original event" is already "decentered," as it is inseparable from the information about it. The "information" about the event necessarily takes the event into another place—the place of the "signifying process" that Lacan calls the (unconscious) locus of the Other.

The present-day "paranoid" Other that is anxious of terrorism shows that the structure of the Other can manifest itself in different symbolic systems (of law, language, culture . . .). The analyses in my "ontology of virtualization" do not primarily concern all the differences between various symbolic systems. They explore the insight that there is always a mediation of the real; we always

live in a reality that is structured as a fiction. The current narrative of terrorism (and of course all the other grand narratives: communism, liberalism, capitalism) illustrates this. Thus,

> it is clear that Speech begins only with the passage from "pretense" to the order of the signifier, and that the signifier requires another locus—the locus of the Other, the Other witness, the witness Other than any of the partners—for the Speech that it supports to be capable of lying, that is to say, of presenting itself as Truth. Thus it is from somewhere other than the Reality that it concerns that Truth derives its guarantee: it is from Speech. Just as it is from Speech that Truth receives the mark that establishes it in a fictional structure. (Lacan 1977, p. 306)[6]

When Lacan speaks of truth, he always refers to the truth of desire. Contrary to the notion of truth as exactitude that the exact sciences aim at, this truth is related to metaphorical language: "it is with the appearance of language that the dimension of truth emerges" (Lacan 1977, p. 172). Because an original substitution by the signifier characterizes humanity, the "paradox of the truth" is that there is only metaphorical truth. Signification is essentially metaphorical (Lacan 1966–1967, 7 and 14 December 1966). Metaphorical truth is what "makes a hole" in knowledge; and because truth is essentially metaphorical, we must also validate discourses other than those of exactitude, for instance artistic ones (Bergoffen 1995). As long as we are in the order of meaningful language, we are in the order of substitution and the metaphor. The subject is therefore always already in the order of substitution that language introduces. This is Lacan's theory of primal repression. The subject of the signifier is virtual.[7]

2.2.4 The retroaction of "real time"

Through the inscription of events in the locus of the Other, they acquire a significance that the subject does not know and cannot foresee. An artist being seen as a terrorist (as in the example above) shows once more that the unconscious as a symbolic structure is "out there." It "ex-sists"—as Lacan says in his *Télévision* (Lacan 1973, p. 26)—only in a discourse. It is for that reason that the locus of the Other is Lacan's translation of the Freudian notion of the unconscious as "another scene." The Other is also the place that installs the ecstatic dimensions of time: past, present, and future. Tying in with Lévy's description of the virtualization of "real time," language thus opens up a field of future possibilities. By linguistic articulation it functions as a medium that can make events from the past reappear. It is a sort of virtual memory of the past.

Lacan, however, develops a notion of time that tries to do away with the view of it as a linear development. Like the future, the past also is characterized

by openness. It is the virtual subject of language (the subject of the signifier) that "determines" how the past reappears. The subject of the signifier (re) structures the real (of the past). Lacan's exposition of the notion of temporality comes down to the idea that the person one was in the past depends on how one thinks of oneself in the light of present experiences and future possibilities (there is no final representation of "the real past"). A separation from a lover may thus change from painful loss into liberation. It is for the greater part about the way that someone currently assumes, or structures by means of speech, his or her anterior states from the perspective of the future: "History is not the past. History is the past insofar as it is historicized in the present" (Lacan 1988a, p. 12; for more on this topic, see his pivotal "Discours de Rome," Lacan 1977, pp. 30–113; also in Lacan 1968).

This notion of "historicization," or restructuring, makes the psychological symptom a "trace" which acquires its content or its meaning only in the future: in the "second time," the time of its articulation. With this notion of retroaction ("après coup"), Lacan translates Freud's notion of the *Nachträglichkeit* of the symptom. For Freud it is not the event itself that is traumatic, but its conscious reception, or recording, in the psychic system. Also in his theory of dreams he stresses the importance of this "secondary time." The secondary elaboration restructures the "original" and heterogeneous dream elements (preconscious remnants of occurrences during the day, unconscious material). Laplanche and Pontalis explain: "The secondary elaboration is an a posteriori reworking which takes place in the successive transformations which we impose on the story of the dream once we are awake. This consists essentially in restoring a minimum of order and coherence to the raw material handed over by the unconscious mechanism of displacement, condensation, and symbolism, and in imposing on this heterogeneous assortment a façade, a scenario, which gives it relative coherence and continuity" (Laplanche and Pontalis 1986, p. 21).

There is an intellectual system in us that demands unity, coherence, and clarity, and thus restructures incomprehensible material into a new "meaning." It is only to the (fictive) truth of this restructured material that we have access. Or, as Derrida (1987) points out in his reading of Freud, when there is no origin (of meaning, memory, subjectivity), the repetition of the "origin" itself is original. In this Freudian theory of the "deferred effect," each repetition is original in that it differs from what it repeats. And this logic is used to understand the current breakdown of traditional oppositions (subjective/objective; interiority of living memory/exteriority of artificial memory) in technological forms of registration and memory (the "camera model"): memory names the enigmatic event of originary repetition (McQuire 1998, p. 172).

2.2.5 Law as the virtualization of "natural forces"

Representing the world in all sorts of discursive structures, we are necessarily "subjected" to the laws that govern these discourses. Games may illustrate this. When I play a game, that is to say, when I represent myself as a player of a certain game, I am inescapably submitted to the rules that determine how the game should be played: how one should interact, and so forth. Lacan considers human reality, in its most fundamental form, to be a "game" also—as shown by his saying that the principle of reality is the principle of collective fantasy. Language composes the fabric of its general discourse. Therefore for Lacan, the law—which is both the set of universal principles that make social existence possible and the structures that govern all forms of social exchange (Evans 1996, p. 98)—is basically the law of the signifier. The principles that organize the human world precede the individual and determine the relationships between people; they make the relationships independent of the fluctuation in the relations of force. Therefore the law corresponds to Lévy's (1998) notion of the contract as a virtualization of violence: it virtualizes "brute reality." As the field of the Other, the unconscious "reshapes" nature by means of structures that Lacan cannot help formulating in terms of the laws of the signifier:

> Before any experience, before any individual deduction . . . something organizes this field, inscribes its initial lines of force. . . . Before strictly human relations are established, certain relations have already been determined. They are taken from whatever nature may offer as supports, supports that are arranged in themes of opposition. Nature provides—I must use the word—signifiers, and these signifiers organize human relations in a creative way, providing them with structures and shaping them. (Lacan 1998b, p. 20)

The relation to the Other, or the symbolic order, causes an entwining of Inside and Outside. As a person interiorizes the law as his or her ego ideal (the ideals and values of the environment, of significant others, that the individual identifies with), the social Outside inevitably becomes part of the subject's Inside world. The outside world limits the instincts, thereby shaping the drives and thus also conditioning transgression (creating Nietzsche's "diseased animal").

2.2.6 "The unconscious is outside"

The constitutive role of the relation to the Other preempts all conceptions of the unconscious as merely a "dark inside" of the subject: "The Unconscious is outside, not hidden in any unfathomable depths" (Žižek 1997, p. 3). Therefore its representation as a cellar, or even as a cave by way of allusion to Plato, is not a good comparison (Lacan 1998b, p. 187). The unconscious straddles the

interface of the Inside and the Outside, where the particular and the general or the individual and the social meet: "the unconscious, which I represent to you as that which is inside the subject, . . . can be realized only outside, that is to say, in that locus of the Other in which alone it may assume its status" (Lacan 1998b, p. 147). For Lacan, the unconscious is nothing without the word: it must come into existence by means of its articulation. The subject must come into existence at the locus of the Other: a possible Lacanian translation of Freud's adage that "where the unconscious Id was, the I must become" ("Wo Es war, soll Ich werden").

With regard to the question of fantasy, this means that the Inside (the fantasmatic images supposedly belonging to our most intimate self) inevitably consists of elements that come from the Outside. Furthermore, when we want to express our deepest fantasies, we necessarily place them in a signifying chain that "annihilates" their "original meaning." When we want to access our fantasies, we cannot avoid deconstructing them: the law (of the signifier) is an inevitable moderator. Lacan's analyses of the unconscious fantasy contain the crucial notion that fantasy is unconscious because it concerns "an image set to work in the signifying structure" (for a more extensive description, see section 5.2.2). When we understand that the articulation of the unconscious, virtual subject thus depends on the signifying structures that humans inhabit, we have an opening for finding its new shapes in the outside world.

I already introduced the virtualizing functioning of technological interfaces in the first part of chapter 1, which I will now extend in order to posit technology as a third force of virtualization.

2.3 VIRTUALIZATION (II): TECHNOLOGY

2.3.1 The digital revolution: From object to interface

Since this study is focused on information technologies, the question arises whether the description of technology that I have given up to now, especially in part 2 of chapter 1, also suits the situation in which technologies operate on information. For there is the pitfall that we might still consider technology to be a sort of tool transforming *nature*. Information technologies, however, do not operate on (material) nature but on ("immaterial") information, and might show that the usual conception of technology is too restrictive. At the very least, this replacement of nature by information, typical of the postmodern world, questions the modernist thinking (specifically, about technology) in terms of a univocal opposition of nature and culture. The confusion of the natural and the artificial places us in "the postmodern condition." We might even be said to be living in a "technological universe" (Ellul 1967) because of a thoroughgoing replacement of the natural by the technological. Technol-

ogy is "progressively effacing the two previous environments," nature and society; "human beings have to adapt to it and accept total change" (Ellul 1989, 134, 136).

So, what is the importance of the fact that we are dealing with information technologies? This brings us to the (philosophical) question of the difference between analogue and digital representation. Shouldn't this be a question for engineers? That is to say, can't this difference be accounted for in a technical way? Not really. The distinction between digital and analogue representation is philosophical before it is technical (Chesher 1997, p. 86). The difference is not fully explicable in a *quantitative* manner (e.g., I see things better with my virtual reality goggles on), because it has a *qualitative* aspect (I see a different reality)—the Kantian critique of naive realism remains crucial today. Digitization highlights the fact that the reality we live in is not an objective given, and thus our investigation analyzes how it consists of a framing of things and how technologies organize such windows on the world.

I will give a simple example to illustrate the question of analogy. When I see a large mushroom cloud above a city (on television, in a drawing, through the screen of my cockpit, or on a computer display: in all cases, it appears on a "screen"), not only do I know that there was an explosion (there is a causal relation; it is an index, as Peirce would say) but I also know that there has been a huge explosion. Analogue representations encode or represent their message in a proportional or *continuous* degree (Lévy 2001, p. 33). They have a proportionality between object and representation, matter and form, sender and receiver. In its technical manifestations the analogue representation implies that the object that emanates the signal has the same, or similar, form as itself: "An analogue code represents what it signifies by establishing a relationship of parallel degree. . . . The signal is analogous to what it is representing. . . . Where analogue involves a conversion of form, digital always involves encoding and decoding" (Chesher 1997, p. 86).

An example of an analogue "conversion of form" is the vinyl record. Its structure is similar to the structure of the sound volume it generates: the deeper the groove, the higher the volume. Proportionality between the representation and that which it represents characterizes the analogue representation. And the analogue sign system uses continuous, and not separated, units (the analogue clock illustrates this: it represents time without intervals, unlike the digital clock). But this does not imply per se that they have a figurative resemblance to what they represent. For what would time look like? And a curve that represents someone's heartbeat naturally does not look like the beating of a heart.

The first crucial characteristic of the digital revolution is the conversion of analogue information to digital information, called "digitization." Digitiza-

tion is a conversion of continuous data into a numerical representation. That is to say, all sorts of objects are encoded into the "language" of zeros and ones that composes digital information. This "language" has different units for different sorts of media: images are encoded as pixels, sounds as voxels, texts as numbers and letters, graphical representations as polygons, and scripts or sets of algorithms are units of movements. As objects transform into the digital language of the computer, they become easily manipulable, transportable with the speed of light, and can be copied endlessly.

The supposed substantial object behind the different actualizations on the computer screen then becomes a purely virtual object. Although the actualizations do approach the encoded object to a certain extent, they are never identical to it. The encoded object loses its true form in representation. For what is supposed to be the right form for a "package" of zeros and ones? The perceptible, or phenomenal, properties and characteristics as such are not present in the encoded object. The appearance of the object depends on the software of the user, its configurations, and its manipulation by the user.

Digital representation breaks with the principles of continuity, proportionality, and similarity that characterize analogy. The similarity of form between object and representation is no longer the basis of its encoding, but a translation of the object into numbers of a binary language. The computer represents the objects as data that can appear in various forms; it *substitutes every constant with a variable* (Manovich 2001, p. 43). Manovich designates variability as the crucial aspect of the new media object. Because the digital revolution recasts all kinds of representational systems as digital information, there is a similarity at the level of binary coding. And since different media all have the same basic structure, one can also speak of a "multimedia revolution" (Lunenberg 1999, p. xvi).

One must not forget that the digital object does have a previous history. Earlier, the electronic object in media such as radio and television caused an important shift from the material object to an electronic signal, which is only radicalized with the digital object. The present state of the new media object is "liquid": it does not have a fixed form or identity. Data can appear in different forms: just imagine what digital photography can do with the "real" image. Digitization confronts us with the notion of a radical break with the principle of analogy as a "conversion of form," for the very reason that it breaks loose from the *identity of form*. The images that I see on my computer screen, for instance, are not necessarily similar to the "real object," because for the computer the "real" consists of digital information that the user can store, mutate, control, and access at his will. Crucial here is the notion that the *object consists of data*. And these data can appear in different *forms*, that is, they can appear via a number of different *interfaces*. Therefore Manovich states: "A new media object can be defined as one or more interfaces to a multimedia database" (Manovich 2001, p. 37).

To explain the influence of digital technologies on our conception of reality, I bring together two revolutions in the relation of the human subject toward the object of his representations: the Kantian (see section 1.1.4) and the digital one. Both involve a radical questioning of the natural world of references. The Kantian revolution questions it mainly because of the constitutive quality of the subject, the digital revolution mainly because of the assembled quality of the (digitized) object. In order to understand "real" objects, we cannot simply address "things as they are," because we ourselves also constitute them, mentally and cybernetically. Therefore a philosophical analysis of the digitized object consists in an analysis of the *conditions of possibility* of the appearance of the object! The so-called Toronto school in media studies (McLuhan, Havelock, Ong, De Kerckhove) analyzes the mode in which media determine our experience of reality in such a Kantian way. I will also use this transcendental approach, which focuses less on concrete descriptions of specific cases than on the way we conceive of an object by means of the conditions of the techno-fantasmatic screen. Such a "philosophical" analysis is concerned less with the content than with the structure of appearance.

2.3.2 Digitization and the mind's schemes of representation

The process of digitization modifies the two basic coordinates of representation: time and space. As Jeremy Rifkin states in his book *Time Wars*, the way in which we imagine, explain, and use time mediates all our perceptions of ourselves and the world and is hence constitutive of our identity and the culture we live in (Rifkin 1987, p. 1)—a conclusion consistent with Kant. Digitization of time can change the way we experience time, the way we relate to the past and to the future. Thus programming can determine in advance the sequence, duration, and tempo of an event: automated machinery automatically instructs how to make a product or when to deliver a service. Because human mediation (which is also modification, error, caprice) dissolves, there is a basically different design of time than in the schedule, the plan, or the project, which are our "traditional" schemes for our relation to the future. Programs also eliminate the user from her subjective experience of the past—which she usually takes as a source and guide (a "scheme") for future actions—and make her rely more on data than on personal recollections (ibid., p. 100).

Digitization of time therefore means a (further) removal from the object of our "natural" or "immediate" experience. This digitization of the time scale is typical of the changed relation toward the surrounding world that the computer causes. Whereas the clock, as an analogue representation of time, refers to the circular time defined by the earth's orbit, the digital time scale is

no longer bound to such a circular reference. With the computer we are less bound to the space-time of our direct environment, as we can be virtually present in different time zones. Time is experienced less as temporality with its (analogue) representations than as speed ("virtual immediacy").

With respect to space, cyberspace can actually bring a physical elsewhere into the physical presence of the user, and offer the possibility of actually moving and acting in that virtual elsewhere. We call this "telepresence" (such as seeing through the eyes of a robot), and it highlights the question of what is real and what is virtual: am I here—at the place where I sit (body), or am I there—at the place from which I see (mind)? The example of telepresence, in which cyberspace functions as a medium to let the user perceive in a different space, shows that digitization can radically cause a (further) discontinuity between humans and our surrounding world, as well as between our body and our mind.

What we call cyberspace is a "realization" of this experience in a parallel space in which the continuity with natural space has almost dissolved (we are not subjected to the laws of gravity, to our physical position, to physical distances, and so on). In the case of webcams, for instance, digital technologies work to annul, to undo, or philosophically to negate the distances that separate the user from the place (resort, or home) where he wants to be. They virtualize those places, and transform them into "non-places" extracted from their geographical, historical, cultural, and linguistic contexts (Simons 2002, p. 302). Therefore a standard fantasy imagines cyberspace as a space of surpassing (transcending) all the old limits.

Cyberspace as a medium of "immediacy" seems to transport us immediately to different times and spaces. And it may give us the impression that all information is present in it, and can—or must be—withdrawable on demand, without notice. It seems that cyberspace leads to a "time-space compression," where the schemes with which we organize our reality (the physical space-time that we exist in) loosen their firm grip on our experience of reality. Time and space seem to be dimensions of the world that we can compress by means of the computer: they lose their significance. Nevertheless, this may be only one side of the story, for the "immediacy" also causes time and space to become more important; indeed, they become increasingly critical dimensions. We don't want to wait for a file to be downloaded; transportation must be done in real time, without delay.

In his "Speculations on Freud," from his book *The Post Card*, Derrida advances the fundamental thesis that, in Freudian psychoanalysis, a detour (*Umweg*) is the efficacy of the psychic apparatus, necessary in order to avoid the destructive and deadly limits of pure enjoyment and pure reality (Derrida 1987). The duplicity of real-time interaction shows that it is the quest for *immediacy* that challenges the "traditional" experience of reality based on *delay*.

2.3.3 Technological fiction: Invocational media

Several authors stress the intricacy of the mediation by language and technological mediatization. De Kerckhove (1995), for example, formulates it succinctly in his chapter called "The Origins of Technology in Language." His predecessor in Toronto, Marshall McLuhan, refers to such a philosophy of technology in the work of Henri Bergson:

> It is the extension of man in speech that enables intellect to detach itself from the vastly wider reality. Without language, Bergson suggests, human intelligence would have remained totally involved in the objects of its attention. . . . Bergson argues in *Creative Evolution* that even consciousness is an extension of man that dims the bliss of union in the collective unconscious. (McLuhan 1994, p. 79)

As an extension of humans, language is the first technology (of virtualization) in that it enables us to consciously grasp the world beyond the objects of our attention: language implies a *mediation* of the world. All sorts of technologies bring this expansion of human possibilities in space and time even further (*mediatization*). Technology, just like language, brings about "space-time distantiation": it detaches us from the here and now.

In his theory of mediatization, John Thompson stresses this intricacy, because both kinds of media are about the transmission of symbolic forms, which are detached and distantiated from the original context of their production, both spatially and temporally, and inserted into new contexts that are located at different times and places (Thompson 1990, p. 13). This is what Lévy (1998) considers to be virtualization. Even more than the previous media, like photography or film, that they "remediate," virtual technologies are in an especially close connection to (spoken) language, for they open up not only a world that we look at but a world in which we can do something. They contain performative environments.[8]

Whereas Lacan states that there is no subject outside language, new media theorist Michelle Kendrick states that there is no subject outside technology. Applying the notion of technology in a broad sense, she holds that technologies—*material and semiotic*—always reconstruct subjectivity, so that any subjectivity or identity, any sense of a pretechnological reality or a reality distinct from or prior to technological interventions, can only be imaginary (Kendrick 1996, p. 144). Because of the constitutive function of both linguistic mediation and technological mediatization (language as a technology, technology as a language), the notion of a self-evident real outside those media, and separate from them, is a purely imaginary illusion. I will give a few examples to illustrate this virtualization by means of information technologies.[9]

"No one has ever seen atoms." This quotation heads an article about one of the Netherlands' top scientists in molecular dynamics, Wilfred van Gunsteren, who is working on the simulation of atomic reality, because "everyone nowadays wants to know what is happening at the atomic level" (NRC Handelsblad 2001). Heinz Pagels in his book *The Dreams of Reason* expands this topic to all of the computational sciences. Why is it, he asks, that we make a model of the world and represent it as a myth, a metaphor, or a scientific theory? Why does the mind reform its experiences in terms of symbols? According to Pagels, a good simulation (such as a religious myth or a scientific theory) gives us the feeling of control over our experiences. With the appropriation (symbolic representation) comes the realization that we have denied the immediacy of reality (Pagels 1988, p. 88). This "immediacy of reality" ("the real") is what we cannot grasp or see (we cannot see atoms). It is, so to speak, what "we have lost." The example of the atoms clarifies that—applied to the scientific enterprise—we have never possessed this "immediate sight." Van Gunsteren argues, "The biologist and the chemist are blind to their experiments. They measure all sorts of values . . . but they cannot see what really happens at the atomic level" (in NRC Handelsblad 2001). Nevertheless, we try to *simulate the immediacy of sight*. We do this by privileging the discourses of the sciences, which, according to Debra Bergoffen, is how the West expresses its grief over the lost object of its passion for knowledge: the Thing, the void around which all the symbolizations circle (Bergoffen 1995, p. 576).

Computers objectify into a material form the representations, metaphors, or symbolizations that have always mediated human perceptions. In a comment on the Rhizome blog on January 19, 2000, critic and Lacan specialist Alexandre Leupin considers the Internet as confirming Ferdinand de Saussure's discovery that language, taken on the level of signifiers, is only a series of relative and negative differentials, which can be written minimally as $[0,1]$. From the outset language was already digital. The computerized virtual world that those two basic elements can create prolongs what we have always termed cosmos, i.e., the linguistic fiction of our perceptions. In this way, the Internet does not constitute an epistemological break (Leupin 2000). It is, for instance, well known that online communication (especially in Internet Relay Chat and Usenet newsgroups) has its own rules and signifiers: (_)] ☺. And one can find, in a more visual form, the narrative structures that virtualize our reality in computer games and virtual worlds. This justifies the consideration of cyberspace as a realm of interconnected signifiers, as a reality made out of fiction.

Sherry Turkle draws a parallel between online personae and the self that emerges in a psychoanalytic encounter. Both are significantly virtual, constructed either within the space of analysis or in the virtual space of online role-playing communities (Turkle 1995, p. 256). This parallel confirms the

Lacanian perspective on cyberspace as a realm whose "truth" finds its foundation not in reality but in the signifier. Truth has the structure of a fiction, and cyberspace is an extension of our age-old capacity and need to dwell in fiction (Benedikt 1991, p. 6). Considering the fictitious structure of reality, cyberspace seems to be nothing else than a realm of technologically produced fictions. In that sense it does not differ fundamentally from "reality as we know it."

Since we are always already also in a fictitious perspective toward the real, computers do not just "lead us into fictionality." They may actually create *new and different (virtual) perspectives*. Some examples can illustrate this. Pagels (1988, p. 45) emphasizes that the computational point of view of physical processes (the material world and the dynamic processes in it are considered to be computers) creates a new perspective that unifies science in a different way. Furthermore, in a virtual reality environment, we can stand inside a molecule and observe it from the inside. With computers we can also extend the calculability of natural laws that define the development of systems (the brain, the solar system, quantum particles). And telepresence systems allow us to look through "distant eyes."

Since computers also present the real (the "real me," the atoms) by means of signifiers, one may hold that, at a mental level, computers contain an aspect of invocation or incantation. By their very technical structure, computers create a world on the screen that mediates a "pre-technological reality" (Kendrick 1996), or the real. Because this world on the screen can be highly enchanting, many researchers point to the resemblance between computers and magic (Davis 1998), or technical images and magic (Flusser 1983). Computers allow us to handle or manage a real world behind the screen that we otherwise could not deal with (because of its complexity, its nonexistence, because it is heavily emotionally charged). Because of this basic technical feature, Chesher calls computers "invocational media": we invoke data by a command, a call, or a click on an icon. Although invocation traditionally involves magic or a deity, it is a useful metaphor for how computers allow people to "call up" data (Chesher 1997, pp. 83–84).

it finds a form of enjoyment precisely in this circling around the "real thing," or constantly and repeatedly doing the same thing over and over again. The voyeur is its perfect illustration, or the Net surfer who enjoys his continuous surfing, without finding closure.

Barber's analysis of the computer as a medium for sadomasochistic play shows that enjoyment is to a large extent a matter of representation, as is watching the television news (as Postman argues), or playing sexual or identity games on the Internet, or seeing sex instead of having sex. It is all about (visually) enjoying one's position. Therefore enjoyment itself serves to generate reality experiences: representations themselves cause forms of arousal and enjoyment. This is what Lacanian theory names the *enjoyment in the signifier*. The subject of cyberspace is sustained by libido invested in the (fantasmatic) scenes of these virtual worlds.

Scott Bukatman's *Terminal Identity* (1993) makes this fantasmatic interface between body and environment the principal form of a subjectivation that lies at the border of more traditional forms of subjectivity such as the (autonomous) individual. "Terminal identity" is at the interface of body and computer terminal, and inscribes itself in the surfaces of old selfhood. Although one need not agree with Bukatman's vision of hyperindividuality merging with the new socialization of the Internet, his analysis does emphasize that we must look for new forms of subjectivation in our interfacing with new technologies. One such form may be a theory of the interface as mediating the "real subject" of bodily identification with the virtual subject of sociosymbolic contexts. It implies a critique of utopian celebrations of cyberliberation and the pretense of unrestrained access to the real, as well as the dystopian gloom and doom that consider subjectivity to be fully virtualized.

Contrary to these models, I consider the computer screen to be the realm of the scene, a "staging." I recognize the screen's capacities to lure and indulge us in a "fully realized world" in so-called moments of closure. But when we avoid fixating this closure as being "real reality" itself (which is the proper "task" of the "unsettled" subject), then the screen allows us to play, to indulge or enjoy our fantasies and create a certain distance from and insight into them. Such (reflexive) insight is also emphasized by Terence Harpold in his essay on hypertextual environments: he argues that closure is always fixated *afterward* (*nachträglich*) (Harpold 1994, p. 198). In other words, there is a *secondary* construction or fixation of an original event. This awareness guards us from taking the construction for real. "Wo Es war, soll Ich werden." The scheme of deferred action that is crucial to French psychoanalysis is therefore still decisive for comprehending reality in the digital age.

NOTES

CHAPTER 1   THE QUESTION CONCERNING TECHNOLOGY AND DESIRE

1. As Carl Mitcham is one of the most important historians of the philosophy of technology, I will frequently refer to his work.

CHAPTER 2   THE TECHNOLOGIZATION OF HUMAN VIRTUALITY

1. The "Deleuzian" critique of the notion of the possible bears upon its "classical," Aristotelian interpretation. However, one cannot equate the possible to this interpretation, as, for instance, the philosophy of Heidegger makes clear when it characterizes being-in-the-world by a possibility that cannot be reduced to some sort of unrealized essence.

2. Jeremy Bentham's design of the Panopticon (1791) as a model prison, in which all prisoners in a ring of cells could be supervised from a central control tower, would be the dark manifestation of Peirce's notion of virtuality (that is, it makes the virtual perspective into an element of social control). Although the guard is not (necessarily) present in his observation post, the *possibility* that he can observe the prisoners already causes an *effect* on their behavior. This once again illustrates the crucial importance of the notions of cause and effect in the investigation of virtual reality.

3. With this aspect of virtualization, we are at the level of the *conditions of possibility* of cyberspace as a sphere of community. It is this—Kantian—level of fantasy as a condition of experience that I want to describe. How, for instance, is it possible that the ("illusory") world of online communication can create the real effect of communality?

4. The prime moderator of virtualization is language itself. Lévy (1998) develops this notion toward his theory of collective intelligence, a fully distributed intelligence that is continuously enhanced and synergized in real time by the

networks in which it operates. I will not discuss this theory of the congruence of thought and psychic life with society, but will merely use his basic ideas about the subjectivation of the social and the objectivation of the individual, as I do not consider Lévy's thoughts on collective intelligence his most interesting work. Lévy is at his best, I think, in the solid philosophical work on virtualization, as presented in his *Becoming Virtual*.

5. In French it says: "le grand Autre, le lieu de la parole, virtuellement le lieu de la vérité." In the English version, *virtuellement* is translated as "potentially," i.e., in its second meaning of "virtuality." The French adverb *virtuellement* does, however, have a meaning that differs from the two meanings of the virtual, namely, "actually," or "practically spoken." So the big Other is not an order that has the potential to ground truth, but can actually be considered to do so; it is "as good as" a foundation of truth.

6. In his "Le facteur de la vérité" (1980), Derrida concludes that Lacan uses a very orthodox distinction between reality and truth. And in his *Positions* (1972, pp. 115–117), Derrida states that the crucial aspect of Lacanian thought in the *Écrits* is the identification of truth (as disclosure of being) and the word (of the Logos). The word reveals the truth of being. It would—as "full speech"—lead to a true, authentic presence, and result in the exclusion of all sorts of simulations as unreal alienations. By contrast, I sketch a story of Lacanian thought wherein the focal point is the constitutive function of alienation. Nevertheless, I must stress that the later development of Lacanian thought (with the centrality of the notion of *jouissance*) moves further away from a notion of "full speech" as an "authentic" disclosure of being. With this development toward the unrepresentable (real) core of reality, Lacan's thought gets closer to that of Derrida than one might first assume (Nusselder 2003). Simulation is then certainly not an unambiguously negative notion.

7. It is interesting to relate this idea of virtuality to Peirce's philosophy, in which cognition consists in the manipulation of signs that may be externally embodied: "I do not say that we are ignorant of our states of mind. What I say is that the mind is virtual, not in a series of moments, not capable of existing except in a space of time—nothing insofar as it is at any one moment" (Peirce 1958, §248).

8. Harold Innis (1951) was the first to systematically address the issue of how electronic media affect our perception of place and time, and with that, consciousness. His critical approach to the technological conquering of space and time, the way technology effects social control and causes economic and democratic inequalities, was succeeded by the work of his fellow Canadian Marshall McLuhan. The latter's far less critical analysis claimed that electronic media can "abolish space and time" and make of the world a "global village." The British sociologists Anthony Giddens (1991) and John Thompson put more emphasis on social structures in their analyses of the intricacy of media and the perception of space and time.

9. Žižek also discusses this issue in his significant text "Of Cells and Selves" (1999d). With technoscientific systems we make all sorts of things into objects of technoscientific knowledge and control (as, in case of the body, with the medical imaging technique of the CT scan). However, we cannot objectify the horizon of signifying systems whereby we determine the object. Before we determine the object, we ourselves are in systems of (re)presentation.

CHAPTER 3 FANTASY AND THE VIRTUAL MIND

1. What Turkle calls "simulation" corresponds more to Doel and Clarke's (1999) fourth model of the relationship between the real and the virtual of the simulacrum, i.e., of continuously new formations of reality that are not modeled according to some "true" form of the real, than to their model of the simulation, which stands for nothing but a false copy of the real. Thus, we can see that different interpretations of the notion of simulation are in use: simulation as a productive re-creation of reality (Turkle), and as a diversion (as in Doel and Clarke's categorization).

2. In order to track the (semiotic) origins of the rift between the notions of *Vorstellung* and *Darstellung*, it is interesting to refer to the work *Sprachtheorie* of the German linguist Karl Bühler (1934), who uses the notion of *Darstellung* to indicate the disembodied (incorporeal) relationship of sign and referent.
   In *The Rules Are No Game: The Strategy of Communication*, Lacan commentator Anthony Wilden states that the confusion of the representation with the thing represented is a feature of schizophrenia and psychosis (Wilden 1987, p. 201). Such formulations introduce the idea that there may be psychopathological implications of the digital mediation of the world.

3. Heidi Tikka (1995) uses this translation of *Darstellung* as opposed to *Vorstellung* to account for the visual space of the binocular technology of stereographic images. She cites Monique David-Menard's use of these words in her work *Hysteria from Freud to Lacan: Body and Language in Psychoanalysis* (New York: Continuum Publishing, 1989), in which David-Menard argues that the (hysterical) symptom is a *Darstellung* instead of a *Vorstellung*. Tikka writes: "*Darstellung* is the realm of heightened presence. This presence is sometimes achieved in dream images which may become so intense, that they seem to pass into the body as if in a hallucination. . . . The hysterical state of *Darstellung* and the stereographic view both *challenge our sense of distance*" (my emphasis).

4. And isn't the same problem involved in psychopathology: are the symptoms of a hysteric real, or is he simulating? Or, and this is the most intriguing option, does simulation make it real (Jean Baudrillard's simulation model)? To pursue the ideas of David-Menard cited in the previous footnote, we see that there actually is a line—via hysteria—from Freud to Baudrillard: "To simulate is to feign to have what one hasn't" (Baudrillard 1988, p. 167). But Baudrillard continues his thought by questioning whether the work of the unconscious must then be considered as the real cause of simulation: "Why should