9

Conclusions: Including a Proposal for the Cartography of Media Anarchaeology

The things are here—why invent them?
—JEAN-LUC GODARD, *ÉLOGE DE L'AMOUR*

Developed media worlds need artistic, scientific, technical, and magical challenges.

For the generation that began to work imaginatively in and with media worlds at the turn of the twenty-first century, it is of vital importance to know that a magical approach toward technology continues to be possible and to be reassured that investment in it is meaningful. Photographic and cinematographic apparatus, highly differentiated and automatized forms of imaging, electronic tools, local and networked computing machines—these devices are not simply awaiting discovery by today's media activists, as was the case in the avant-garde movements of the 1920s, the postwar pioneers of fluxus, action and concept art, video, or the early NetWorkers. On the contrary, they are hemmed in on all sides by standardized technical devices and systems, yet access to the functional bases has become enormously complicated and expensive and is only available to a privileged minority. To find one's own way through all this and arrive at original creative expression is not easy, assuming that merely reprocessing what already exists for the new channels of communication is not an option. Many art and design activists choose to create something original by establishing unusual connections between existing means of expression and/or material; such work stands out significantly from the media products we encounter every day. For example, they may cooperate on a casual and temporary basis with the club or

dance scene. Combinations of DJing and VJing create amalgamations of sound and image processing in real time—a contemporary equivalent of *expanded cinema.*[1] Hooked up directly to music machines, the body's sensory functions, or even brain waves, generate self-constructed or annexed worlds of images that are projected to the rhythm of technomusic in dilapidated buildings abandoned due to industrial affluence. The event locations in Germany, for example, are old factories, called *E-Werk* in Berlin and Cologne and *Stahlwerk* in Düsseldorf. Few activists, however, take the more daring path of exploring certain points of the media system in such a way that throws established syntax into a state of agitation. This is poetic praxis in the strict sense that the magical realist Bruno Schulz of Poland understood it: "If art is only supposed to confirm what has been determined for as long as anyone can remember, then one doesn't need it. Its role is to be a probe that is let down into the unknown. The artist is a device that registers processes taking place in the depths where values are created."[2]

In the 1930s, the Polish writer and artist Bruno Schulz corresponded briefly with his more famous colleague Witold Gombrovicz. Gombrovicz wrote to Schulz that he had met a lady on a tram, the wife of a doctor, who said that in her opinion Schulz was either mad or a poseur. This provocation, which Gombrovicz published in the avant-garde journal *Studio,* was intended to challenge his younger colleague to an intellectual duel. But Schulz refused: "Actually, I don't believe in the sacred codex of arenas and forums at all; I despise it." At the end of his written reply to Gombrovicz, however, Schulz is driven into giving an opinion, one that strikes straight to the European heart: "You have the makings of a great humanist; for what else is your pathological sensitivity to antinomies if not a yearning for the universal, a yearning for the humanization of *non-humanized* spheres, a yearning for the dispossession of minority ideologies and their conquest for the sake of the grand unity."[3]

Schulz came from Drohobycz, a small town in Galicia that is now in the Ukraine. In his collection of short stories, *The Cinnamon Shops,* he charges the now forgotten things and figures of his hometown with the new energy of magical fantasy. Schulz, who also created one of the most fascinating and bewildering books of the twentieth century, the *Book of Idols,* taught art at the local grammar school. On November 19, 1942, he was shot dead in the street. Schulz had attempted to survive the ghetto by painting and drawing for an officer in Hitler's Gestapo. This officer had killed the protégé of another German officer, and the murder of Schulz was retaliation for this killing. In 1936, three years before the Nazis marched into Poland, Schulz had written a text while in War-

saw that, like so many of his works, remained unfinished: *The Republic of Dreams.* In dreams, Schulz writes, "Hunger for reality" is summed up, "a demand that commits reality to mature imperceptibly into credibility and into a decree, a bill of exchange that falls due and must be paid." Schulz proclaimed the republic of dreams to be "the sovereign territory of poetry," where one could live "a life of adventure, of perpetual dazzlement and amazement." His personal paradise is not so different from the realm of flowing honey that Queen Kyris protected for Empedocles. Schulz conceives it as a haven and, especially, as a place of boundless hospitality. Anyone "pursued by wolves or robbers" who manages to get there is in safety: "His reception is triumphal, his dusty garments are removed. Festive, blissful, and happy, he steps out into the wafting Elysian winds, the sweet rose-scented air" that pervades the garden and its "cells, refectories, dormitories, libraries, pavilions, balconies, and belvedere."[4]

Bills of exchange that fall due and must be paid, defense of antinomies versus universalization of the remaining heterologous remnants, and politics permeated by the poetry of hospitality: these are ways of describing the subterranean currents of energy that course through the deep time of the media. Schulz, a poet from a tiny village at the back of beyond, whose texts and drawings have been catalysts for the work of many artists and scholars in the latter half of the twentieth century in their labors to remodel reality in their favor,[5] was also an inspiration for this study. Throughout this expedition through the deep time of media worlds that my protagonists thought up or actually constructed, I have made no attempt to conceal my partiality for a magical relationship to things and the relationships between them.

In a superb essay titled "Form and Technology" (1930), the philosopher Ernst Cassirer, who came originally from Wrocław, examines the historical relationship between the methods employed by magical natural philosophy and by experimental physics—from the viewpoint of committed and enlightened inquiry. He concludes that, in principle, the partitions dividing the two are as permeable as Empedocles envisioned the interfaces of his active organs to be. At the same time, Cassirer challenges the notion that the magical arts should be regarded as the direct precursors of scientific experiment,[6] with reference to a decisive question for the modern inquirer: "[This idea] ascribes a significance to the magical approach and lays claim to achievements, which belong by rights to the later technical approach. Yet magic does differ from religion in that with magic, man emerges from a wholly passive relationship to nature: the world is no longer received as the mere gift of a superior divine power but man

seeks to take possession of it and impose a particular form upon it."[7] The magical arts also contrast with the systematic investigation of things and their interrelationships by experimental science, implemented by technology, in that their dreams reveal enhanced wishful thinking: the "Allmacht des Ich" [all-powerfulness of the self].

From the standpoint of an archaeology that assigns special importance to the poetic permeation of media worlds, one can take Cassirer's idea a step further: the operations of the magic arts cannot be tied absolutely to a particular purpose, and their prerequisite is a specific mental attitude. This way of looking at things should not be understood as an underdeveloped precursor of the experimental approach to the world of things and their relationships that flourished and died out in premodern times. Historians of science like to classify the magical way of thinking as "primitive," when judged on the criteria of the extent and degree of certainty of its knowledge: "The field of observation is too limited, the methods of observing fluctuate and are too unreliable for the outcome to be any statement of tenable empirical laws."[8] This is precisely why the magical approach to technical media worlds holds such potential for new impulses and inspiration. Science, which seeks to establish general laws, cannot afford to concentrate obsessively and passionately on one area of observation any more than it can allow fluctuations and uncertainty in experimental proof. Such obsessive focus is essential, however, for the kind of experimental thought and practice that can afford to fail and is not afraid of including the possibility of failure in its calculations. The determined pursuit of a single idea and its investigation until all possibilities are exhausted will likely stir up unrest among firmly established structures and procedures. In most cases, established firms and institutions react to this method of study with discrimination. Yet such discrimination may be of only short duration—one task for anarchaeology of media. Magical, scientific, and technical praxis do not follow in chronological sequence for anarchaeology; on the contrary, they combine at particular moments in time, collide with each other, provoke one another, and, in this way, maintain tension and movement within developing processes. When heterogeneous approaches meet, openings appear that, in the long term, may even result in relatively stable technical innovations. Porta's experiments to sound out the media possibilities of the camera obscura in staging his theatrical performances of moving images with sound or his rotating cryptographic devices are examples of this as well as Kircher's combinatorial boxes for mathematical calculations

and musical compositions or Ritter's discoveries about electricity and chemical processes.

Cultivating dramaturgies of difference is an effective remedy against the increasing ergonomization of the technical media worlds that is taking place under the banner of ostensible linear progress.

The collision of diametrically opposing concepts of creative work with and in the computer-centered media has come to focus on the operation and design of the interface. This boundary between media users and media devices simultaneously divides and connects two different spheres: that of the active users of the machines and that of the active machines and programs. In the 1990s, both technological developments and dominant media concepts were oriented toward making the boundary between the two imperceptible. The vision was to use a computer and be unaware that it is a machine based on algorithms for calculating and simulating. The user would be immersed in a so-called virtual reality of images and sounds without noticing the transition and, what is more, without knowing that one was dealing with a precisely prestructured, calculated construction of visual surfaces and temporal sequences. Computers were, and still are, designed for their users like a camera obscura; one works with them, enjoys the effects they produce, and has no access to their mode of functioning. A number of artists, together with programmers, conducted experiments to challenge this smoothly functioning technological and semiological ergonomy with the aim of facilitating and sustaining possible dramaturgies of difference, including with the most advanced technology. As heirs of classic film and of the video avant-garde, they insisted that access to computer worlds must remain as access to artificial contructs. Interfaces to these worlds must be designed to maintain an inherent tension with the worlds outside the machine; this would enhance, rather than diminish, enjoyment of both of them.

Brecht's concept of "thinking as intervention" was envisaged as an alternative to thinking as an option, which the real world—as the world of commodities—supports and engenders. His *Short Organum for the Theatre* (1948) is a theoretical and practical plea for operational dramaturgy—that is, for a dramatic art, that does not invite its audience to illusion and catharsis but that encourages thinking to continue during pleasure. The senses and reason are not construed as being in opposition; rather, they are forces engaged with each other in an exciting social game that we may call art. A comparable *Organum* for the

interface does not yet exist.[9] However, powerful artistic work is being done on the dramaturgy of difference, both in and outside the Net. Interestingly, particular groups are engaged in this project, like the Critical Art Ensemble (CAE) from North America or the German-Austrian trio Knowbotic Research, who have been working in this area for the last ten years. Logically, their projects are located between the disciplines of art theory and practice; the critique of technology policy aimed at standardization is an important element.

Perry Hoberman from Brooklyn, New York, is one of the few individual artists currently working in the production of art with and through media outside the Net who brings off the balancing act between fascination with technology and thinking as intervention. At one level, his installation *Cathartic User Interface* (1995) makes use of the need to vent the frustration and aggression that arise from dealing with the external interfaces of personal computers and their manufacturers. As in earlier works,[10] Hoberman uses a simple experience from everyday culture, in this case, throwing soft balls at stacks of tin cans, familiar from the fairground sideshow where direct hits win prizes, such as small toys or gadgets. In the *Cathartic User Interface,* computer keyboards replace the cans. If a ball hits one of the active keys, the reward is not an artifact from the world outside the game; the prizes here are technical images projected onto the screen showing the keyboards, and they all derive from the world of machines and programs: ironic user instructions or error messages, satirical shifts in the user interface graphics, or faces of computer-industry agents. The physical act of throwing things at these objects of anxiety and aversion has a short-term liberating effect. However, hoped-for catharsis does not take place. The prizes on offer are merely from the world of machines and programs, and physical action attacks only their visual images. A short in the cybernetic system—one cannot get the better of this programmed and standardized world by machine wrecking; that course of action was already doomed to failure in the century before last. The only effective form of intervention in this world is to learn its laws of operation and try to undermine or overrun them. One has to give up being a player at a fairground sideshow and become an operator within the technical world where one can work on developing alternatives. For artistic praxis with computers in particular, this means learning the codes they function with. In the 1920s, Gastev demonstrated to the techno-avant-garde that taking up this position does not necessarily have to be identical with that of the programmers. An important part of *Cathartic User Interface*'s concept is that several users take part at the same time, a common feature in many Hoberman works. The presence of several people performing actions together within a twilit space invariably leads to interaction between the visitors, something that is not possible in this way in the dark cube of the cinema. This aspect makes it expanded cinema of a special kind.

Establishing effective connections with the peripheries, without attempting to integrate these into the centers, can help to maintain the worlds of the media in a state that is open and transformable.

Modern audiovisual mass media first became established in industrial centers: cinema and television were introduced as innovations in Berlin, London, New York, and Paris. Although we are accustomed to think of, write, and see media history from the perspective of these metropolises, this way of looking at the subject leads to a dead end, not least because decentralized and networked media systems no longer need the industrial and financial capitals in the way that mass media did. The entrance of Japan into Western markets has already brought about considerable shifts. With their focus on mobile and electronic media artifacts, Japanese manufacturers after World War II began to change the geographical conditions of the media economy. And this trend continues. The People's Republic of China with its hundreds of millions of potential media users is entering the world market, at great speed and with enormous power—and will change established hierarchies in the foreseeable future. Seoul and Singapore have only just begun to impact hegemonial conditions from the Far Eastern periphery. Although many current software solutions are still marketed lucratively by American corporations, they are no longer primarily developed in the United States. Automobile production, energy, and heavy industry, the pillars upon which Western Europe's and the United States's economic strength developed and grew, are not suitable models for producing the highly ephemeral products of the service industries. The media worlds of telematics have become as ubiquitous as their designers are mobile and nomadic.

One conclusion of this quest through the deep time of seeing and hearing using technical devices, with its additional focus on combining (*ars combinatoria*), is to advocate a two-fold shift of geographic attention: from the North to the South and from the West to the East. This shift has nothing to do with commercial markets. Stated oversimplistically: both the philosophical and the practical foundations for the construction of modern media worlds stem originally from the Far East, particularly ancient Chinese culture, and from regions adjacent to the Mediterranean, such as Asia Minor, Greece, and Arab countries,

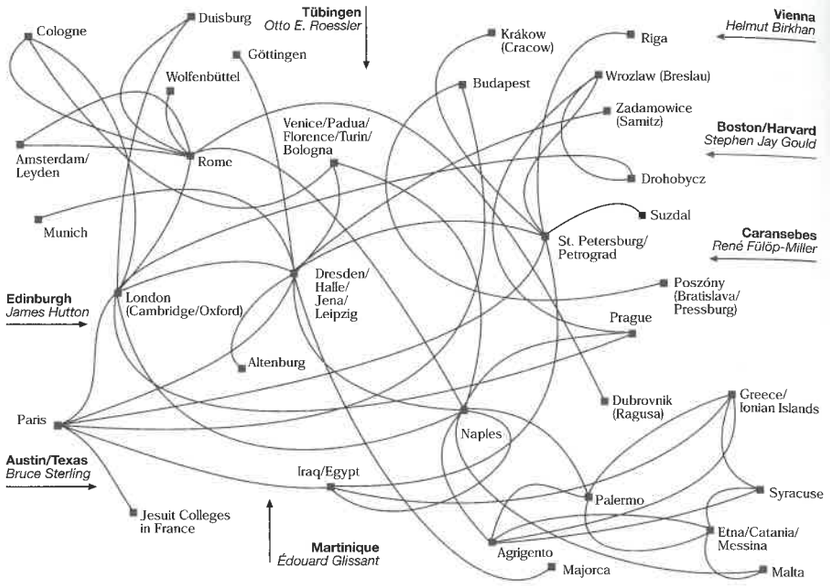

Figure 9.1 A suggested cartography for an anarchaeology of the media.

including their outposts in southern and southwestern Europe. We have followed and traced this movement broadly, for example, in the development of optical concepts and artifacts. From roughly parallel beginnings in China, the Greek islands, and Sicily via the reactivation and expansion of this branch of knowledge by Arab researchers around the turn of the first millennium, these activities intensified and gradually moved northwards. In early modern times, the southern Italian city of Naples was an incubator for various attempts to investigate phenomena and acquire knowledge about them magically. Further north, and to the northeast, Tuscan cities appeared on the scene and, before the turn of the seventeenth century, the Prague of Rudolf II, as hubs of astronomical, mathematical, and technical knowledge, with links to London, Oxford, Cambridge in England, Paris, as well as Krakow in Poland. With the Jesuit order's network as intellectual avant-garde and the Vatican as supreme authority, in the seventeenth century, Rome became the center where knowledge acceptable to the Catholic Church about the new media worlds was collected, analyzed, evaluated, and redisseminated worldwide. Rome and the

Vatican reduced the South more and more to the level of the periphery. Championing a different worldview and in competition with Rome, there emerged Paris, with its Catholic minimalists and early rationalists of the Enlightenment; the classical university towns Oxford and Cambridge; London; and the strongholds of liberal thinking in the Netherlands. Heretics fled from the persecution of the Inquisition and left their mark on the places that gave them temporary shelter. From this perspective, *Electricorum* by the Roman professor of rhetoric Mazzolari, represents a brilliant highlight, but also the turning point that heralds the end of this geographic order. In his Latin hymn of 1767 to all things electrical, Mazzolari recapitulates all that is known about this new realm, which will be so fundamentally important to media, culminating in its reification in his proposal for an electrical teletypewriter. However, the new protagonists in the poem now hail from other places: Dubrovnik, Philadelphia, Leyden.

At the turn of the eighteenth century, with Ritter, Chudy, and Purkyně, a region comes increasingly to the fore, which until then had only attracted notice when its outstanding teachers and scientists (who could afford it) moved to the north Italian universities, Rome, or Paris to study and to teach: present-day Poland, Hungary, and the Czech Republic, with their extremely checkered history of conquest and foreign domination. Scientists and engineers of this region

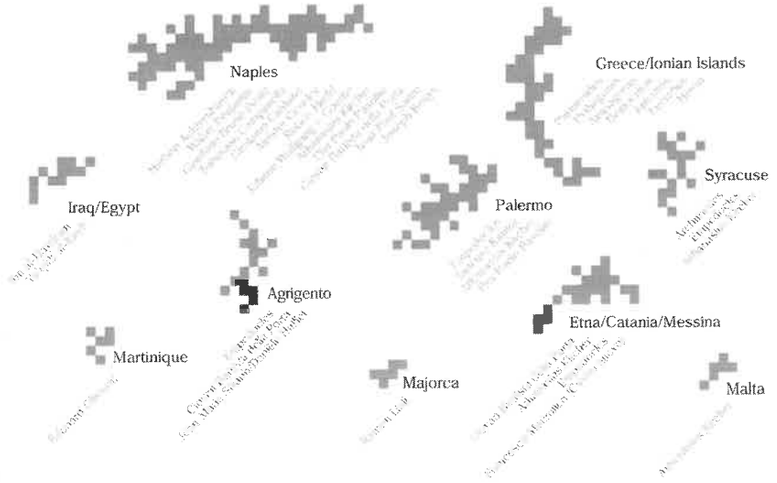

Figure 9.2 Cartography detail 1.

still went to study and teach in the academic centers of Austria, but also increasingly to eastern German universities in Thuringia and Saxony: Dresden, Halle, Jena, Leipzig. World War II and its aftermath resulted in a brutal caesura whereby the links and lines to these places and archives in the East were interrupted for decades. As though in defiance of this history, since the mid 1990s, the media faculty at the Bauhaus University in Weimar, situated at the border between eastern and western Germany, has developed into one of the country's most advanced institutes for teaching and research.

The breaks were even more profound for St. Petersburg, Russia's former center of science, technology, and art. They lasted for over eighty years and were of a twofold nature: first, there was the rigorous political and ideological turn away from everything that had to do with the West, and second, the geopolitical reorientation within Russia. Moscow became the center of political power and thus also the focus of national and international attention. With the founding of the Theremin Center more than ten years ago at the Moscow State Conservatory, there is again a laboratory for experimenting and testing new forms of art and media. It is named after the inventor of one of the first electronic musical instruments, which is played without touching anything: moving the hand or fingers between two electrodes influences electromagnetic waves. First demonstrated in 1922 to Lenin at the Kremlin, the melodic instrument was invented by the physicist and musician Lev Sergeivich Termen in 1920 in St. Petersburg, while he was director of the Physics and Technical Institute there. Through Brian Wilson's legendary composition "Good Vibrations" for the Beach Boys, the theremin's strange wailing sounds have found a place in the history of pop music. With his project *Forgotten Future,* the Theremin Center's director Andrei Smirnov has started to bring the power of these older inventions to the contemporary artistic game of creating technical illusions. Outstanding young artists, such as Anna Kuleichov, combine in their work the aesthetic ideas of the Russian kineticists, cubo-futurists, and suprematists with modern electronic concept and performance art.

Familiar geography is gradually changing again, but not only as a result of the new Moscow laboratory. In the years of perestroika, the nascent art scene in St. Petersburg began to reforge intellectual links with the legacy of their city's techno-avant-garde of the 1920s. Housed in a vast building in a courtyard off Pushkinskaya Street are the provocative "neoacademic" school, founded by the eccentric artist Timur Novikov, and the Techno-Art Center. Directed by Alla Mitrofanova and Irena Aktuganova, the Techno-Art Center realized media art

projects in the 1990s in its Gallerie 21 under the most difficult infrastructural conditions and cultivated debate. At the Budapest Academy of Arts, the Intermedia section commenced work in the autumn of 1990, before the majority of such academic initiatives in the West. In cooperation with the associated Center for Communication and Culture, this institute has since achieved an international reputation for exceptional media projects. Miklos Peternàk, director of both institutions, is untiring in his efforts to reestablish connections between the new media worlds and technological and cultural gems from Hungarian and Eastern European history. *Excavating the Future* was the title of a symposium organized in 2001 by various institutions in Prague, which focused on Jan Evangelista Purkyně and his discoveries connected with technical envisioning. For decades now, Jan Švankmajer's brilliant animated films have ensured that advanced media worlds remain connected with the deep time of the Prague alchemists, magicians, and mannerists. *Alice* (1987), *Faust* (1994), and *The Conspirators of Pleasure* (1996) are but three masterpieces from the *mundus animatus* of this Prague surrealist to whom, lamentably, German cinemas remain closed.[11] In the 1970s, Poland already had its own school of video artists centered on the film school in Lódz.[12] Under the dictatorship of Jaruzelski, several of these artists—like Zbigniew Rybczynski—emigrated to the West, where they enriched the experimental film scene as well as the commercial world of music video. Others, like Josef Robakowski, elected to stay on and work in Poland under politically and technically difficult conditions. In the 1990s, the Biennale in Wrocław established itself as an important nexus of East–West relations in the art world of electronic media. WRO2000 took place in a building belonging to the old university whose tower once housed one of the first astronomical observatories in Europe. The media activists of the Russian, Polish, Czech, Slovenian, and Hungarian scenes are beginning to link up the most valuable elements of their archives and museums with advanced technical and media know-how of the West or to develop them further independently.

At the end of the 1960s, two exhibitions took place almost simultaneously with the objective, each in its own way, of investigating the interdependent relations between science, technology, art, and media. At the New York Museum of Modern Art, the Swedish curator Pontus Hultén organized *The Machine,* a retrospective devoted to various avant-garde movements in the past age of mechanization. In a brief appendix, artists and engineers were invited to present contemporary collaborations and experiments with electronic instruments and computers. In the exhibition catalogue, which has a metal cover and weighs

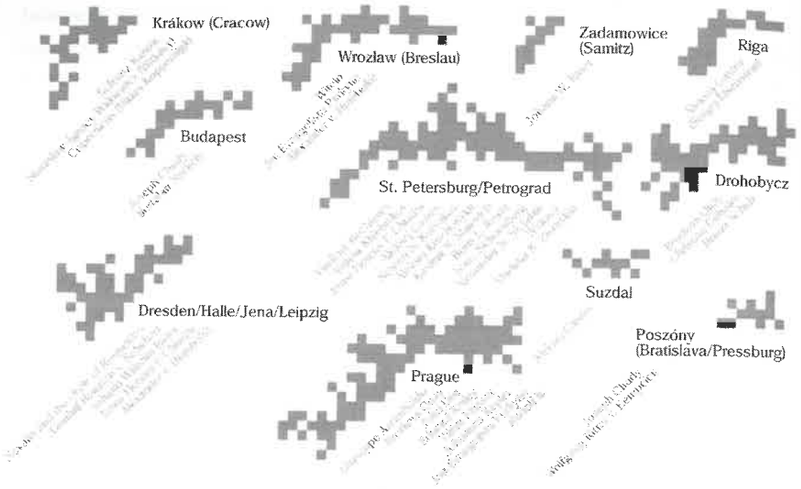

Figure 9.3 Cartography detail 2.

kilos, these electronic projects, described in blue print on white at the end, are in danger of being overlooked.[13] However, together with Jasia Reichardt's less spectacular exhibition at the London ICA (Institute of Contemporary Arts) in 1968, it was a beginning.[14] Solving the title of Reichardt's exhibition is a welcome gift for anarchaeology: *Cybernetic Serendipity.* Serendip is an old name for Sri Lanka (Ceylon), and *serendipity* was coined by the English author Horace Walpole after the title of a Venetian fairy tale, *The Three Princes of Serendip,* the heroes of which "were always making discoveries, by accident and sagacity, of things they were not in quest of."[15]

These two exhibitions and their publications are now legendary, but most of the pioneers of rudimentary digital graphics and computer-generated installations are nearly forgotten. The most ambitious project of this early period took place three years later, in the Galerie Grada in Zagreb, Yugoslavia. Under the title *Dijalog sa strojem* [Dialogue with the Machine], for the first time artists and scientists from eastern and western Europe, the United States, and Japan met to discuss their approaches to computer-programmed art. Among others, Marc Adrian from Vienna presented a program that he had developed in collaboration with Gottfried Schlemmer and Horst Wegschneider, a computer programmer. A 162-II IBM computer was used to rearrange syntactically text fragments taken at random from popular magazines. The texts, which were put together according to the rules of the program, were performed by three actors, a, b, and c:

c: shouldn't intersections fall in love? body-fresh telephone lines chat about heaven. you must get this! but who really tells their child what this is: heaven? embarassments liquidate tired stomachs or perhaps not?

a: drink embarassments! women discover independent tastes. martinis know no boredom.

b: shouldn't women fall in love? tongues cut budding intersections. what happened to the prettiest cover girl in the Soviet zone?[16]

In Tuscany, northern Italy, the media theorist and activist Tommaso Tozzi and the network-duo 0100101110101101.ORG are fighting a rather solitary battle for greater integration of advanced technology into political and academic culture. In Venice, for decades Fabrizio Plessi has been building his lovely baroque video sculptures. It is difficult to imagine that southern Italy will have a renewed shift in that direction. The immediate reasons are severe economic problems and poor infrastructure, but also that the most recent innovatory thrusts in the area of media technology are the result of social and cultural processes that are relatively alien to southern European societies. Work and play on PC workstations hooked up to the Net are solitary pursuits and still dependent to a large extent on enclosed architecture equipped with ports connecting it to global data networks. Imaginary excursions in the World Wide Web still do not hold a great attraction for members of societies whose culture is traditionally oriented on the public sphere of streets and piazzas and oral communication. The exception is the cell phone, which enables southern Europeans to practice their favored form of exchange with others in a technically expanded form. In South America, the situation is very different. Particularly in those countries where the users of telecommunicative systems were subject to control under dictatorships, such as Argentina or Brazil, the Internet has made considerable inroads into urban everyday life. In the more affluent districts of Buenos Aires or São Paulo there are veritable supermarkets for accessing the World Wide Web. These retailers of time provide the infrastructure and terminals, which the customer uses to connect to the Internet. The customer pays for admittance just

as for the fantasy-machine, cinema. Naples, one-time center of the magical researchers of nature and inventors of fantastic media worlds, plays no role in contemporary media geography. That which the Internet strives to deliver as a simulation—multifarious identities, ordered and restricted as little as possible, side by side and overlapping—is everyday reality in Naples, with all its incompatibilities, disasters, and surprise promises of pleasure. In this way, the city of Porta retains the same status that it has had for many generations of intellectuals: it is a place of desire and longing, particularly for those who hail from the sleek and well-organized North. In Herbert Achternbusch's film *Das Andechser Gefühl* [The Andechs Feeling] (1974), the grammar school teacher (played by the director) has just received the security of tenure from the Free State of Bavaria. This achievement plunges him into depression and desperation. Instead of the usual family lunch, the kitchen is the scene of a violent quarrel between him and his wife, in which his mistress is also involved. Attacked by his wife with a huge carving knife, he sinks to the tiled floor at the feet of his mistress and breathes his last with the words, "See Naples and die." A priest, who is also present (played by the film director and later director of the Berlin Film and Television Academy, Reinhard Hauff), is sent off shortly before this into the garden.

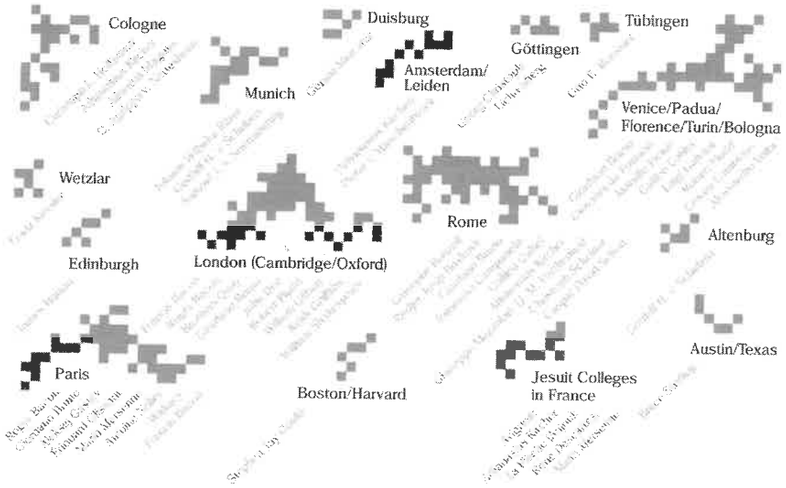

Figure 9.4 Cartography detail 3.

The most important precondition for guaranteeing the continued existence of relatively power-free spaces in media worlds is to refrain from all claims to occupying the center.

In the deep time of media, two models can be distinguished that correspond to the tensions, that Georges Bataille began describing in the 1930s in his proposals for a general economy, written under the deep impression made by fascism and Stalinism. An economy of adjusting and shaping that is committed to the paradigm of productivity, which first culminated in the project of industrial cinema and television and then, for the time being, in the postindustrial[17] phenomenon of the Internet, confronts an economy of friendship. The first model serves to effectivize systems, to protect them, and to ward off attack by rival, competing systems. The second has a subversive relationship to the first and is a luxury. It requires no legitimation, just as pleasure and art require none. It either develops and expands or it is nonexistent. It exists in and alongside the hegemonial economy. Even in the media worlds that developed critically close to the spheres of power—telecommunications and cryptography being cases in point—this other economy was also present: inventive, ingenious, and imaginative. From Trithemius's *Polygraphia* and Porta's proposals for communicating over distances to Kessler's place-finder and Bozoli's electrical teletypewriter, the ideas were, down to the last detail, motivated by concern for the friend who was obliged to remain in an inacessible place.

In the first half of the 1990s, the Internet enjoyed a short phase of euphoria. Anyone with access to a computer and a telephone line could send and receive messages that were largely uncensored. Political and artistic utopias of free exchange and freedom from the straitjackets of markets and power structures were projected onto the new networks. From the outset, this young scene of international NetWorkers did not accept the old boundaries of competing ideological and political systems. Quite the contrary: a high priority of their activities was to establish connections with the relatively few machines in eastern Europe via the few lines that could be freely accessed. This effort was both an affirmation and a test of the democratic potential that they presumed to be inherent in the data networks, which in the meantime were being expanded and made accessible to a mass public of users. The denizens of big cities in the countries where political and economic change took place relatively peacefully, under the banner of the global marketplace, connected up most quickly with the marketplaces in the West. For others—for example, in Albania or Kosovo—who were suffering wars and persecution, these lines of communication were the only ones

which censorship could not reach for the time being. In 1996, the Syndicate Network came into being as "a translocal network that is based upon personal relationships and a healthy mixture of disagreement, respect, and solidarity, which characterizes all good friendships. . . . The Syndicate has its roots in the tactical media associations linking individuals and groups on either side of the Iron Curtain, through it and under it, far away from the eye of the mass media."[18] These relations also became established ones. A highlight of the Syndicate's activities to date was the *Deep Europe Workshop,* which took place in 1997 in the Internet platform of the Documenta X exhibition in Kassel. In a forum open to world opinion, fifteen syndicalists from various countries in eastern and western Europe discussed their ideas for a central Europe linked through networks of mutual respect.

At the beginning of the 1990s, the subscene of media worlds connected through networks, of which the Syndicate is but one example among many, underwent a transformation process.[19] The establishment of the World Wide Web as a global provider of audiovisual services, which knows very well how to commercialize anything that meets with massive interest among its users—including services that are barely legal or blatantly illegal—led to justifiable doubts about the existence of a highly intelligent lumpenproletariat. At the same time, the activities of committed interest groups made an important contribution to keeping open the option of a nonhierarchical public sphere of heterogeneous relations, also with regard to technologically advanced media worlds. They have not failed because theirs did not become the central model for the so-called information society. The economy of friendship is not amenable to generalization; it develops in and laterally to established relations and, as a rule, it is of short duration. It has to be set up time and again anew.

The problem with imagining media worlds that intervene, of analyzing and developing them creatively, is not so much finding an appropriate framework but rather allowing them to develop with and within time.

Photographs are flat surfaces showing a detail that contains visual information. The monitor of a television, video, or computer has a standardized frame with a ratio of 4:3 or 16:9; the cinema screen and electronic projection screen merely expand the same ratios. When watching media constructs, we have become used to viewing them as larger or smaller framed images. Particularly when the frame is filled with something that claims artistic merit, the misconception has arisen that all media productions that we can perceive audiovisually are primarily concerned with the production of images. Monitors embedded in sculptures or piled up to form monuments in museums, with or without loudspeakers, only deepen this misapprehension under which art critics and art historians continue to labor. It was always difficult for them to get a handle on forms of processual art praxis, such as the happening, performance, or action; these forms of art eke out a very meager existence at the outer limits of their attention.

Literary studies, on the other hand, opened up to the aesthetic disciplines at a much earlier date. Dramatic texts, phonetic poems, and oral lyric poetry are all media forms that operate within time. At the former Institute for Language in the Age of Technology in Berlin, as beginners we learned our theory from Friedrich Knilli in his seminars on Gotthold Ephraim Lessing's *Laokoon.* Among other things, Knilli also introduced us to film and radio text analysis. Political science, sociology, and psychology were other disciplines that were quick to include individual media phenomena and structures as subjects of study, as were physiology, physics, chemistry, and medicine. Media apparatus has accompanied the experiments and studies of the latter since the founding of these disciplines.[20] Mixing, linking, rhythm, frequency, assembly, processes, impacts, and collisions are some of the basic modes that the sciences, which deal with bodies of all kinds, operate with on a large and small scale.

For this reason music and sound plays a significant role in media archaeology. Arts that operate with and through advanced technical media are arts of time. This applies equally to producing the illusion of moving pictures with a succession of still photographs or dynamic graphic structures. This story is told, day in, day out, by established channels of distribution for industrial media products. Yet images that appear to move are but one phenomenon among many that the arts create in time. Robert Fludd studied the construction of harmonious structures as well as arithmetic and meteorological processes. For Athanasius Kircher, composing and combining were artistic praxes that were just as important as creating sensational visual effects. However, it was the physicist and galvanist Ritter who really ushered in a paradigm shift, also for art theory, when he crouched down to get a horizontal view of Chladni's sound figures vibrating. Electricity breathed a new soul into the media worlds. From that point onward, they could no longer be thought of exclusively in static terms; they began to dance, to oscillate, to vibrate, to come alive. At the same time, they entered precarious territory, now operating in close proximity to the phenomena from the "museum of sleep" (Robert Walser) that people call life. With his projections of the real outside world inside the artificial space of the camera obscura,

Porta had already drawn attention to this dilemma. Henceforth, observers of and participants in media events found themselves in a permanent reality test. As various realities began to compete with each other for attention, the possibilities of deriving enjoyment were enhanced, but insecurity also increased. Which worlds should be considered true and which false? Perhaps Ritter sensed the turbulence into which this question plunged thought and perception when he defined the new praxis of art that was needed as physics. It is still not too late to listen carefully to the oscillations emanating from his lecture, given over two hundred years ago, which would help to prevent misunderstandings arising in the academic disciplines concerned with aesthetic phenomena.

Media worlds that need electricity as energy are synonymous with artificially created, processed, and rhythmic time. The nomadic existence of contemporary alchemists working in the electronic arts has both logistical and economic grounds: they go to the places that offer well-equipped laboratories for their experiments and spaces of freedom where, for a time, they can install and present their unstable or ephemeral works. A considerable number of the excellent first-generation artists to engage with these rather unreliable techniques do not come from a fine arts background. Nam June Paik began his career as a musician and fluxus artist. Steina Vasulka is a fine violinist and gave many excellent concerts before she turned to film, video, and combining violin-playing with electronic image worlds. Among the many identities he has assumed, Peter Weibel performed as a rock musician and continued to live out his identity as an action artist at the same time he was director of leading media art institutions. Among other activities, Alluquére Roseanne Stone worked on Jimi Hendrix's stage shows before she began performing media studies discourses. Perry Hoberman constructed projections for Laurie Anderson's multimedia shows before he began to build his own complex installations. Such artists have problems with the traditional venues for exhibiting artworks—and galleries and museums have difficulty with them—because their background is one of concert venues, clubs, tours, and the street: not primarily the places where art is quietly comtemplated and collected.

Kairos poetry in media worlds is potentially an efficacious tool against expropriation of the moment.

Under the pseudonym Heinrich Regius, Max Horkheimer published his *Dämmerung: Notizen zu Deutschland* [Twilight: Notes on Germany] in 1934. The notes contain a short passage entitled "Time is Money." Horkheimer remarks

that this phrase raises the question of establishing a criterion for how much money a certain amount of time is worth. He continues:

> A worker who rents a car to get to work on time is stupid (viz. the cost of this means of transport compared to his daily wage); an unemployed person with only five marks in his pocket, who uses a car to save time is crazy; but someone from middle managment will start to show lack of talent if he does not make his calls with a car. A minute in the life of an unemployed person has a different value than a minute in the life of a manager. Time is money—but what is the life-time of most people worth? If one is not bothered by speaking in such platitudes, then time is not money—money is time, in the same way as it is health, happiness, love, intelligence, honor, tranquillity. For it is a lie that whoever has time also has money—just having time won't get you any money; however, the reverse is true.[21]

Against the background of an experience of time that flowed at a leisurely pace, following the seasonal cycle of agricultural production, Aleksei Gastev made the audacious suggestion more than eighty years ago that temporal perception and praxis should be connected with the tempo of what he referred to as "machinism." Gastev's aim was not so much absolute acceleration but rather an alternative structuring of time, which would make labor time more effective, and thus save time. Linking this new time structure to mechanical apparatus on the basis of a binary code of motions in the labor process was intended to eliminate, or at least reduce to a minimum, frictions between biological and technical bodies. Gastev hoped that machinism would result in a new and sovereign individual, that the conscious act of union with a completely different other would lead to a new unity: the proletarian human machine or, what was the same from Gastev's perspective, the mechanical human. For the poet–industrial organizer, this construction possessed both a utopian and an elitist nature. He knew that it was impossible to achieve such a symbiosis as a permanent state and was reconciled to the fact that only a few, highly qualified and flexible combinations of manual and "mental" workers would actually get anywhere near this goal.

On the basis of the digital computer's binary code, at the beginning of the twenty-first century, information can now be billed to users per bit; it is immaterial whether the information comes in the form of numbers, images, texts, or sounds. The basic digital unit is becoming a new abstract currency. As the smallest techno-instant, it is the basis for calculating in an economy of providing services—services that take the form of producing symbols and programs,

which prospectively include art that is realized exclusively within the framework of media networks. The development of such modalities of invoicing pleasure/leisure and work-related services is concurrent with the peaking of a trend in the mass media that Jean-François Lyotard described most aptly in one of his early texts: "Our culture valorizes and stages the only performance that, in its eyes, constitutes an event: the moment of exchange, the immediate and direct, the block-buster, real time—this is the only kind of time that is alive and vivid for our culture. One can name this instant, in which accumulated dead time is realized, obscene."[22] Thus, the power of disposal over time, as the ability to make decisions instantaneously, is under threat from two sides: from the obscene, culture-industrial compression of life-time into a staged and acclaimed "blockbuster hit," and from the installation of a universal measure of time and economy, which is indiscernible to human perception.

The temporal behavior of technical processes may be described as follows: even the qualities that affect such processes from the outset, such as monitoring, checking, and control, are time-dependent. They are re-formed by the technical process. On the output side of any machine-machine or human-machine system, we find time-dependent qualities of experience. These may also be called dynamic processes. The least that artists and engineers who engage with such processes can do is to ensure that the re-formation, which takes place in the course of the process, sets marked differences between the qualities operating on the input and the qualities of experience operating on the output. This would indeed be efficacious work on the interface; that is, its dramatization. Designed or formed time must give back to people something of the time that life has stolen from them. This is one of Jean-Luc Godard's finest thoughts on cinema, and it can also be expanded to include technical media worlds. If media activists fail to effect this transformation, then processed time is wasted time. We should not always be lagging behind the capabilities of machines.

"We wander around in circles and are consumed by fire": this is how the situationist Guy Debord described the activity of "wandering about," which he considered the only dignified course to take, confronted by a society of the spectacle.[23] The first known devices for measuring time from ancient China were square, oblong, or round metal reliefs with labyrinthine structures. In the depressions, a powder was scattered that burned slowly. The burning powder in the labyrinth marked the passing of time. Debord offered his body and imagination as material for measuring the passage of time during the period in which he lived. What alternatives for time-conscious praxes are there to this situationist, self-consuming identity? Theoretically, one possibility is to be fire, and not burning powder. However, this position can be assumed only by those who want to play God, for we are of a substance that time wears out. A course of action that is open to us is to intervene in the rhythm of the fire's burning and help to organize its intervals. From this perspective, pro-active media policy would mean committed action to preserve independent use of time and how it is organized. To be prepared and aware of the risk of loss and failure, in the sense of Debord's "consuming" and Bataille's "expenditure," are necessary caveats. Yet in this case loss would not be a category of a fatalistic economy if one succeeds in turning it into an enrichment for others. Otherwise, the act of consuming would be religious, and expenditure ideological. Both positions have had horrendous consequences in the recent past.

This expedition through the deep time of media-technological thinking and operating has focused on protagonists from very different historical epochs and configurations. They all contributed to the transformation process, whether by condensing existing knowledge, adding to it, tweaking it in a different direction, or courageously opening up other, riskier pathways than those offered by the established wisdom of the day. In an approximation of Hölderlin's epithet for Empedocles, they can be called Kairos-pilots. Each in his unique way has demonstrated that the fortuitous moment does not exist to accomplish something for us, but that we must grasp the moment.

The Quay Brothers, who are originally from Philadelphia but live in London, are directors of film and theater. Their special passion is giving a soul to lifeless objects through cinematography's tricks—that is, creating animation films. With a unique poetic power, their films wander through forgotten and banished places, often from eastern Europe. They collect and assemble old signs, discarded objects, things that exhibit a resistance to the commonplace, rhythms and melodies that seem to come from time dimensions to which we no longer have access or on which we have closed the door. With consummate precision and sensitivity, they animate their found material, combining it with the power of imagination to create minimalistic orgies of momentary sensations. One of their quests led them to Drohobycz. An early masterpiece is their *Street of Crocodiles* (1985), a willful filmic interpretation of Bruno Schulz's short story of the same name. The film is Kairos poetry par excellence. In the back rooms of the shops in the Street of Crocodiles, where mannequins play out secret obsessions and frenetic bustle reigns, a small boy searches for manufactured objects that will satisfy his curiosity and desire to play. Rusty screws twist elegantly out of

dusty floorboards of their own volition, scatter across the floor, and wind back down again in different places. The boy halts one of the screws, twists it counterclockwise out of the floor, and carefully adds it to a little pile of collected things. A figure made of various metal parts with a dim light bulb for a head rubs an iron plate, the bulb's filament shines briefly, and the boy catches the light in a pocket mirror and deflects the beam onto a mechanical monkey, who rewards the boy with a furious, but very brief, roll on his drum. Later, the boy is seen with the metal figure by his side. He takes it in his arms and pulls his own little hat over its glass head.

Artistic praxis in media worlds is a matter of extravagant expenditure. Its privileged locations are not palaces but open laboratories.

Media art is a strange *mixtum compositum.* On the one side, the compound noun denotes two things that are very close, rather obviously so. All art requires media for it to be perceived by others. On the other hand, media art has been developed over recent decades to describe a specific concept of cultural praxis. From this perspective, the *mixtum compositum* contains two elements that are far apart and strives to fuse two different worlds into one. The origin of the compound was strategic—not so much for media, but certainly for art. Similar to the terms "film art" and "video art," which preceded it, the prefix *media* was designed to facilitate its delineation of new artistic praxes as opposed to traditional "old" ones; its association with "art" staked its claim for tapping into historically developed markets, distribution channels, and discourses. The strategic concept of "media art," however, went even further. Since the mid 1980s at latest, the prefix *media* could count on a high rate of acceptance, both politically and economically. The designability of what would come in the future was securely tied to the media. At the same time, this acceptance was one reason media art was rejected more vehemently in the traditional institutions of art than previous concepts involving other media.

In this compound, *media* stand for several paradigms where the connection with art is not at all self-evident, including their remit of boundless popularity. The technical media of the late nineteenth and twentieth centuries no longer addressed the closed circles of social elites, but rather reached out to possible audiences that were nonspecific and unlimited socially, regionally, and nationally. Telephone, telegraph, cinema, radio, television, videorecorder, CDs, and DVDs developed as cultural technologies that could function worldwide. Their tendency to cross all borders is inherent, a trend that telematic media enhanced still

further. Their users no longer saw themselves primarily as spectators and listeners but as participants in a global event, players in an interactive context, which we have learned to call "communication." In this, our world, we are confronted not with individual technical artifacts, but with technical systems built of multiple elements and, in the exact sense of the term, with technology. Telematic communication is no longer a question of individual objects and forms in which technology is articulated but a complex structure that includes technical capabilities, the training of engineers and computer scientists, technology policy and economy, its social and cultural meanings, and, naturally, the arts and sciences and their institutions. Technology is connected in a specific way with what is called progress and, thus, also with power. At present, computers and their worldwide networks are the focus of attention. Both the individual machine for processing, storing, and sending data and its transnational connections are systems for calculating. They are still systems in the mechanical tradition although they operate with sophisticated electronics and programs. For a hallmark of mechanical systems is that the processes they run must be capable of formalization—it is immaterial whether these are digital or analogue.[24] Art, too, has various dimensions that can be formalized. These can be taught and learned; they can be expressed in language or in other systems of ordered symbols; and they can be developed strategically and tested. In this sense, one can speak of artistic experiment. Thus, one can also refer to a studio with mainly technical equipment and focus as a laboratory. In a laboratory, research, development, and tests are undertaken; results are discarded or gained. Such work is connected with a peculiarity of artistic praxis, which it shares with science and industry. The difference is that it possesses far greater significance for art; indeed, for some it is the very essence of art: intuition, the specific way of looking. It is inextricably linked with the most important source of energy for artistic praxis, namely, the imagination.

Formalizability and computation on the one side, and intuition and imagination on the other, are the two poles of the *mixtum compositum* media art with regard to the actions of the subject. To understand these poles as two ends of a scale that can be played in both directions is an alternative to a dualistic view, which is an easy option but also fatal, if one remains trapped within this kind of thinking.

The spectrum of what is currently still referred to as media art is a training ground for mixtures of the heterogeneous. It is, therefore, a chaotic space, if one understands chaos to mean that dynamic linkage of multifarious[25] elements,

of chance and necessity, which is by nature opaque and out of which arise phenomena and processes that we can understand. At least this is how the chaos heuristicians from the fifth to the third century B.C.—Anaxagoras, Empedocles, Democritus, and Epicurus—understood chaos. Why should we lag behind them?

Artistic occupation of media worlds requires locations where chaos is understood in this way. In these places the work of mixing and separation, dissecting and combining, is viewed as work that is valuable and worthy of support. In premodern Europe, such places were called alchemists' laboratories. The only people who could afford them were the rich nobility, queens and emperors, in Prague or London, or under the control of the Vatican, in Rome. Irrespective of their backgrounds, such patrons invited the most original minds so that they might experience at close hand their work with the impossible. In the long way from the division of the *prima materia* via various processes of mixing to the final projection, the last step in the alchemical process where the base is transformed into the noble was no less than the attempt to make the impossible more possible. These places were not permanent or enduring; they were not installed for posterity like the halls of the academies or universities. They were localities of passage, of surprises, of new departures, of abrupt cessation, but they were also havens. Yet, if the patron's money ran out, or the sorcerers' apprentices proved to be mere charlatans or mountebanks, an ear might be cut off, or the alchemists might be thrown into a dungeon. If they were more fortunate, they would be sent back onto the precarious highways where they would journey to the next promising destination that might take them in.

The situation has changed for contemporary laboratories of experimental research on media worlds in Cambridge, Berlin, Karlsruhe, or Cologne, in Japan's Ogaki-shi, Barcelona, Budapest, or Moscow, but the reasons they were set up and expanded have not changed. Behind the modern, well-equipped research-and-development facilities of today lies the hope of those who set them up that the contemporary sorcerers' apprentices, engineers, programmers, and artists will succeed in turning the digital into gold. Once established, the institutions developed their own dynamic. The people who worked there were not on the whole amenable to merely providing ergonomic designs for what the politicians were fond of referring to as "the future of the information society." When the room for maneuvering is curtailed for everything that is unusual or foreign, that is unwieldy and does not quite fit, then the attempt must be made to confront what is possible with its own dimensions of impossibility to render

the possible (or reality) more vital and worthy of investment. With the advent of Web projects, exploration of new forms of cinematographic and video narratives, the opening of experimental acoustic spaces, the shifted space of artistic praxis and experience into the machines themselves—to the limits of physical endurance—or the development of new apparatus for which there was no demand and combinations of different performative forms for which there are no stages as yet, the activists from the institutions entered into a relation of friction and tension with their intended assignment. Because an explicitly formulated "mission statement" does not exist in most cases, they have freedom of action. The experiment cannot really fail. The alchemists were well acquainted with failure—not because they sought such experience for its own sake, but because, time and again, they embarked on projects that were of such significance that there was honor in failure.

In the 1970s, a bizarre economy was described by the French painter Pierre Klossowski, whose trilogy on the laws of hospitality also make him well known as a philosophical author. The text, with a letter by Michel Foucault as an introduction, was not published until 1994. In it, Klossowski proposes a possible solution to the conflict inherent in the *mixtum compositum* media art. He turns around the cultural pessimists' lament about commercialization and the resulting mechanization of the body, and declares the human body an object of exchange, "live currency." Liberated from the constraints of unwanted reproduction and the pressure to produce offspring, the body conceived of in this way is free to become a supremely confident actor. Klossowski assigns a special role to experiment in his economy. The manufacture of appliances is confronted regularly with its own "periodic infertility," which "becomes more apparent because the accelerated tempo of manufacture perpetually forces prevention of inefficiency (in the products) and this inevitably drives it in the direction of wastage. The experiment, the precondition of which is efficiency, presupposes the wasteful mistake. To explore in experiments what may result in profitable production is geared to the elimination of infertility in the product but at the price of wasting material and human labor (production costs)."[26]

This anarchaeological quest should also be understood as a plea for maintaining and continuing the right of access to those places which offer hospitality to experimenters and experiments, and for setting up more of them. Such places are able to function not only because they have a generous host or patron, for whom artistic waste is not synonymous with failure but a sign of independence and strength. My plea also includes the type of guest: guests for whom

artistic praxis with and in media worlds is more than a cleverly packaged affirmation of what we know already, what fills us with ennui, and what merely serves indolence and to harmonize what is not yet harmonious. It is a plea for guests who understand the invitation to experiment as a call to continue working on the impossibility of the perfect interface of Empedocles of Acragas. In this sense, it is even meaningful to speak of the virtual world. The willingness to engage in wasteful activity oneself is the least that this economy should demand of its guests; such willingness is also the trick that makes it work.

Artistic praxis on the Internet is superfluous. Those who can afford this superfluity earn their living offline or through a second nonartistic identity in the form of productive work in the Net. The establishment of Linux, the freeware operating system that was conceived as an alternative to industrial Microsoft, originally followed the logic of such an economy. The people who worked on improving and updating the software for all Net users did this in their spare time, parallel to their secure jobs as academics or well-paid programmers. For the generations of artists who exclusively realize their works as processual, ephemeral media worlds, the situation has become increasingly narrower toward the end of the last millennium. Olia Lialina from Moscow has a background in journalism and experimental film. She could not make a living from her sophisticated and committed work on the Net, although her art has achieved recognition worldwide. The same applied to a host of other artists, including her fellow-Russian Alexei Shulgin; Vuk Cosic from Belgrade; Knowbotic Research from Zürich; David Link from Cologne, inventor of the *Poetry Machine;* or Texan science-fiction author Bruce Sterling, just to name a few examples. They all live at least double existences now, alternating between work to earn their daily bread and artistic work on inventions to invigorate the international data networks of information and communication or for presentations at art forums. Bruce Sterling summed up the situation at the beginning of the new decade admirably during a discussion in Cologne in 2001: he would not be able to invest the requisite time and energy in his Internet projects if his internationally successful sci-fi books had not provided him with the financial basis. As a further seriously wasteful activity, artistic praxis on the Net may have a brilliant future.

Notes

Chapter 1

1. See Sterling 2000; the project can be visited at: www.deadmedia.org (last accessed 29 August 2004).

2. In discussions, this was one of Dietmar Kamper's favorite rejoinders to metaphysicists of media technology.

3. See also Thompson 2002.

4. Fülöp-Miller 1934, p. 330 and 275.

5. On Hutton's discoveries, see Trümpy 1996 (in German); citation p. 79f., and Repchek's wonderful new monograph *The Man who Found Time* (2003).

6. See Gould's chapter on Hutton, pp. 61–98 (1987, reprint 1991).

7. Ibid., p. 3.

8. Ibid., p. 63f.

9. See Gould 1991.

10. Gould 1997.

my behalf on Rosing in the St. Petersburg archives. The information I cite here is taken from her unpublished report, which is based on a number of original Russian sources. A particularly rich source of information for her is an essay by A. P. Kupaygorodskaya, "Boris L. Rosing (1869–1933): The Final Years," published in the anthology *Outstanding Figures of Russian Science in the Nineteenth and Twentieth Centuries: Historic Essays,* vol. 3, St. Petersburg 1996, pp. 73–95 (in Russian).

22. Cf. Abramson 1981, p. 579f.

23. See the introduction to the German edition of Taylor 1913, by Rudolf Roesler, p. xii.

24. Citation from the 1911 original, available on the Web courtesy of Eric Eldred (<http://melbecon.unimelb.edu.au/het/taylor/sciman.htm> [September 14, 2004]).

25. Taylor 1913, p. 5f.

26. Fülöp-Miller 1926, p. 283.

27. Gastev 1923/1978, p. 237.

28. Lenin 1961, p. 145.

29. Baumgarten 1924, p. 3.

30. Ibid., pp. 112, 115.

31. Gastev cited in Fülöp-Miller 1926, p. 287.

32. Fülöp-Miller 1934, p. 343.

33. Ibid., p. 276.

34. Cited in Baumgarten 1924, p. 111f.

35. Meyerhold, cited in Bochow 1997, p. 65.

36. See the excellent essay by Chadarevian (1993) on this concept and field of research.

37. Braune and Fischer 1892, p. 409.

38. The text was completed in October 1894 and published by Hirzel in Leipzig in early 1895.

39. Braune and Fischer (1895) describe the practical difficulties they encountered in the course of these experiments, but also how much they enjoyed themselves. For example, lacking a room at their disposal that could be darkened sufficiently during the daytime, they did all their experiments at night. Because they were interested in taking shots of locomotion that was as relaxed and "natural" as possible, the test persons had to make trial "walks" to get accustomed to the electrical-mechanical corset: "We had the additional pleasure of following all phases of the entire movement process directly with the naked eye" (1895, p. 183).

40. Tramm 1921, p. 86f.

41. Bücher 1899, p. 358.

42. This is the title of a paper by Konstantin Sotonin from the University of Kazan, a collaborator of the scientists in St. Petersburg. See also Mitrofanova 2000, p. 180, whom I asked to research the early neurophysiological scene in St. Petersburg; this publication is a summary of her results.

43. *Music for the Mozart Effect* is the title of a series of CDs that some seventy-five years later, utilizes the findings of such research commercially on a large scale. Fragments of musical compositions, particularly early Mozart pieces, are arranged in therapeutic sound packages, such as "Strengthen the Mind" or "Unlock the Creative Spirit," and marketed worldwide.

44. Mitrofanova 2000, p. 175.

45. Etkind 1996, p. 143.

Conclusions

1. This is the title of a legendary book by Gene Youngblood (1970) from the early years of using computers artistically in cinema.

2. Schulz in a letter to Stanislav Ignacy Witkiewicz, in Schulz 1992, vol. 2, p. 92.

3. The correspondence is published in Schulz 1967.

4. All quotations in Schulz 1967, pp. 17–24.

5. In 2001, the writer Christian Geissler discovered in Drohobycz the remains of the murals that Schulz had painted in the nursery of the Gestapo officer's son. Through this spectacular find's being made public, something again became topical and relevant that had remained buried under decades of suppression and oblivion. Through the Drohobycz of Bruno Schulz run lines connecting it with the wide world of art, science, and the media. The poet Geissler from the far north of Germany is one among many: the filmmaker Peter Lilienthal also drew inspiration from Schulz, as did the art theorist John Berger and the film directors The Quay Brothers. In 2002, Christian Geissler's son Benjamin brought out an exciting documentary film, *Bilder finden* [Finding Pictures], which also provides a profound portrait of Schulz. The film's premiere was at the Center for Jewish History in New York.

6. This is also the position of Lynn Thorndike. Cassirer refers here to the work of James George Frazer in the early twentieth century, first published as *The Golden Bough* in 1922.

7. In Cassirer 1985, p. 31.

8. Ibid.

9. The first essay on this subject is Röller and Zielinski 2001, pp. 282–286.

10. For further details, see Zielinski 2001a, pp. 8–27.

11. On the art of Jan and Eva Švankmajer, see the excellent Švankmajer Catalogue 1998.

12. See Milev 1993 on the development of video in eastern Europe.

13. Hultén 1968.

14. The publication that treats some of the works from the exhibition appeared three years later: Reichardt 1971.

15. See the Oxford English Dictionary for the British origin of the word. The tale *Peregrinaggio di tre giovani, figliuoli del re di Serendippo* originated in sixteenth-century Venice but clearly is strongly influenced by Arab and Persian sources.

16. Marc Adrian, "syspot," in Kelemen and Putar 1971, p. 167.

17. *Postindustrial* is not intended here to mean "the time after," because, obviously, industry is still central. I use the term in the sense that Jean-Luc Godard employs it, referring to the hegemony of the post offices and telecommunications over the distribution of images and sound in Europe after World War II.

18. See the essay by Andreas Broeckmann, "Gesichtswechsel oder: Protobalkanische Entidentifizierungen," in Kovats 2000, pp. 364–372, citation p. 368.

19. nettime 1997 provides a useful overview.

20. A striking aspect about the deep time of media is the high number of professional physicians. To my knowledge, no one has yet written a history of the reciprocal relationships beween media and medicine.

21. Horkheimer 1934, p. 28.

22. Lyotard 1987, p. 40.

23. Debord 1978. The citation is also the title of Debord's last film before his cinematographic last will, which was completed after his death (see Debord 1985).

24. For an excellent overview, see Taube 1966.

25. In German, *Manchfaltigem.* Lorenz Oken (1843) used this delightful word to refer to things of different kinds.

26. Klossowski 1998, p. 10f.