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The Electronic as Post-optimal Object

As new technical developments alter the object and make it "intelligent," they also set the object on a plane with no prior cultural references . . . although the physical aspects of these objects are still within the world of materials, their operation and their very state of being is well beyond the manipulation of matter and has more to do with information exchange than with form.

—E. Manzini, *The Material of Invention*

Most designers of electronic objects have responded to this challenge by accepting a role as a semiotician, a companion of packaging designers and marketers, creating semiotic skins for incomprehensible technologies.

From Banham writing about portable radios in the 1970s, through the plethora of essays on "product semantics" in the 1980s, to Norman Bolz's 1992 essay "The Meaning of Surface," the treatment of the electronic object as a package for technology, designed to communicate use, cultural meaning, and corporate identity through its surface, has been thoroughly explored. The electronic object accordingly occupies a strange place in the world of material culture, closer to washing powder and cough mixture than to furniture and architecture, and is subject to the same linguistic discipline as all package design, that of the sign. It is lost somewhere between image and object, and its cultural identity is defined in relation to technological functionalism and semiotics.

This chapter considers three perspectives on the electronic object: "The Electronic as Lost Object" briefly discusses theoretical perspectives, "The Electronic as Object" focuses on design approaches, and "The Electronic as Post-optimal Object" introduces the idea of the "post-optimal" object.[1]

A Technological Perspective

From a technological perspective the theories of Jean Baudrillard and Paul Virilio are a stimulating source of ideas about the effects of electronic technology on the way we experience and think about ourselves, objects, and environments. Their provocative fusions of analysis and imagery offer a rich inspiration while remaining grounded in reality. But there is a danger that if designers are seduced by this, their designs will become mere illustrations of descriptions of electronic objects. Designers of electronic objects are already familiar with the kinds of technologies analyzed by these writers. It is more important to extend the range of cultural values, building on what is already understood, rather than illustrating it.

Some writers on the social history of technology present the ideological dimension of everyday technologies, even if these are often pre-electronic. This is useful to critique the human factors "community," who have developed a view of the electronic object, derived from computer science and cognitive psychology, that is extremely influential in the computer industry; see, for example, Don Norman's (1988) *The Psychology of Everyday Things.*

A serious problem with the human factors approach though, in relation to this project, is its uncritical acceptance of what has been called by Bernard Waites (1989) the "American Ideology," or the ideological legitimation of technology:

> All problems whether of nature, human nature, or culture, are seen as "technical" problems capable of rational solution through the accumulation of objective knowledge, in the form of neutral or value-free observations and correlations, and the application of that knowledge in procedures arrived at by trial and error, the value of which is to be judged by how well they fulfil their appointed ends. These ends are ultimately linked with the maximisation of society's productivity and the most economic use of its resources, so that technology, in the American Ideology, becomes "instrumental rationality" incarnate, the tools of technocracy. (31)

The result, as the computer industry merges with other industries, is that the optimization of the psychological fit between people and electronic technology, for which the industry strives, is spreading beyond the work environment to areas such as the home that have so far acted as a counterpoint to the harsh functionality of the workplace. When used in the home to mediate social relations, the conceptual models of efficient communication embodied in office equipment leave little room for the nuances and quirks on which communication outside the workplace relies so heavily.

Writing on electronic art might seem a good source of ideas on the electronic object, but, surprisingly, electronic art has become so technology-driven that it seems concerned only with the aesthetic expression of technology for its own sake. Rather than relating the impact of technology to everyday life, art criticism in this area glamorizes technology as a source of aesthetic effect to be experienced in galleries. The exceptions tend to be based on electronic systems rather than objects (e.g., in the work of Roy Ascott).

A Semiotic Perspective

A semiotic approach has been taken by design writers, both at the linguistic level, looking at the way objects can be "written" and "read" as visual signs, and at the more general level of the study of consumerism, where semiological analysis of objects as commodities has revealed their part in maintaining what Roland Barthes (1989) has called "mythologies." An impressive semiotic analysis of the object is Baudrillard's (1981) *For a Critique of the Political Economy of the Sign,* which shifts the emphasis on the analysis of commodities away from the production of objects to the consumption of signs.[2] But, as Daniel Miller (1987) writes: "While the rise of semiotics in the 1960s was advantages [sic] in that it provided for the extension of linguistic research into other domains, any of which could be treated as a semiotic system, this extension took place at the expense of subordinating the object qualities of things to their word-like properties" (95–96).

A Material Culture Perspective

Although there is very little available on the electronic object, the study of material culture is still of interest because it situates the object firmly within everyday life. Academically, it is somewhere between anthropology, sociology, and ethnology.

Miller (1987) claims there is a an "extraordinary lack of academic discussion pertaining to artifacts as objects, despite their pervasive presence as the context for modern life" (85), and provides an alternative to the semiological analysis of mass consumption by distinguishing material culture from language and the study of meaning in order to focus on the physical nature of artifacts.

In contrast to analyses of the object in relation to consumerism, Mihaly Csikszentmihalyi and Eugene Roshberg-Halton's (1981) *The Meaning of Things* analyzes the meaning of objects in domestic settings, emphasizing their symbolic role. And in "The Metafunctional and Dysfunctional System: Gadgets and Robots," Baudrillard (1996) writes about the electronic gadget as the subject of a science of imaginary technical solutions. Although originally written nearly thirty years earlier, Baudrillard's analysis of electronic gadgets is far more stimulating than a more recent analysis, *Consuming Technologies,* by Roger Silverstone and Eric Hirsch (1992), which is more concerned with descriptive models than with Baudrillard's challenges to the imagination. *Hertzian Tales* is more concerned with "critical" theories,[3] and thus in assessing the development of objects not against whether they fit into how things are now, but the desirability of the changes they encourage.

The value of material culture for this study is that it draws attention to the complex nature of our relationship to ordinary objects and provides standards against which new electronic objects can be compared.

A Design Perspective

Since the early 1960s a very narrow form of semiotic analysis has dominated design thinking about the electronic object. Of books written about design from a theoretical point of view, only John Thackara's (1988) *Design after Modernism* contains new perspectives on the electronic object.

Books and articles by designers, based on particular projects prove more interesting. Manzini and Susani (1995) present a collection of design projects that explore a place for solidity within the fluid world created by electronic technology: "In the fluid world the permanent features we need are no longer there as a matter of course, but are the result of our desire; the 'solid side' in a fluid world, if and when it exists, will be the result of a design" (16).

Their strong emphasis on aesthetics and ecological concerns is a powerful example of design research carried out by practicing designers within an intellectual context. Susani has developed a design perspective that locates the electronic object within material culture rather than semiology or electronic media. He writes: "We are lacking a discipline, perhaps an 'objectology,' or an 'object ethology,' which allows us to analyse and systematise objects and to formulate the rules and codes of their behaviour . . . a discipline which recovers and updates the interrupted discourse of material culture, in crisis since the world of objects was taken over by the world of products and the world of consumption" (Susani 1992, 42). He also recommends a sensual approach to introducing technology into the home, building on what is already there, and exploring the overlap between the material and immaterial world from an aesthetic and anthropological point of view. He suggests that material culture could offer useful insights to this problem.

A Literary Perspective

However, the most fruitful reflection on material culture is to be found, not in anthropology or sociology, but in literature concerned with the poetry of everyday objects. In *The Poetics of Space,* Gaston Bachelard (1969) offers an analysis, influenced by psychoanalysis, that emphasises the poetic dimension of humble furniture such as wardrobes and chests of drawers; Jun'ichiro Tanizaki's (1991) *In Praise of Shadows* considers the Japanese object in relation to shadows and darkness, and the effects of electricity on their appreciation; and Nicholson Baker's novels (such as *The Mezzanine* (1986) and *Room Temperature* (1990)) give everyday industrial products significant roles.

The view of objects suggested by literary writers reveals a poetry of material culture that offers a fresh alternative to the formal aesthetic criticism of the art object and to the academic analysis of their meaning as signs. Their objects are firmly grounded in everyday life.

The best writing in this area blends anthropology, sociology, and semiology to explore the irrational dimensions of the material culture of everyday life. As the electronic object rarely features in this literature, the discussion in the rest of this book is based mainly on design proposals.

The Electronic as Object

This section discusses four design approaches to the electronic object: packages, fusions, dematerialization, and juxtaposition. They differ in how each addresses the conflict between the solidity of the object and the fluidity of electronic media. Design is viewed here as a strategy for linking the immaterial and the material.

Packages

Commercial design's approach to the electronic object has been to treat it as a package for electronic technology. An example of this, where the aesthetic and conceptual possibilities of the package are thoroughly exploited, is Daniel Weil's *Radio in a Bag* (figure 1.1), which takes the idea of the designer's role as a packager of technology to the extreme. On one level the electronics provide decoration, while on another, their exposure signals a nonchalance toward technology. The radio's literal flexibility expresses the flexible structural relationship between electronic components, and its transparency attempts to demystify the electronic

Figure 1.1 Daniel Weil's *Radio in a Bag* (1983) takes the idea of the designer's role as a packager of technology to the extreme.

object. It shows that by taking a playful approach to package design and liberating it from product semantics, even the packaging of electronics can yield interesting results. Ironically, part of the critical success of this design, despite being a package, is its treatment as a thing rather than an image.

Fusion

The logic of computers is expressed in forces that are averages of the behaviour of many electrons. No machine has ever been so far removed from the world of human experience: the largest aircraft carriers are still infinitely closer to the human scale than the simplest, slowest microcomputers.
—D. J. BOLTER, *TURING'S MAN*

The electronic object is a confusion of conceptual models, symbolic logic, algorithms, software, electrons, and matter. The gap between the scales of electrons and objects is most difficult to grasp.

The architect Neil Denari has spoken of the need for the "overcoming of the symbolic," and his view is that architecture must make a connection between the worlds of electromagnetism and spatial inhabitation. But there is greater chance of bridging the gap between electromagnetism and inhabitable space if one where to explore this route through the design of objects rather than buildings.

The first transistor (figure 1.2) is a test-rig for a key electronic component created by inventors who work at the level of both electrons and matter. They organize matter as interacting volumes of electrons,[4] and they offer a possibility for reconciling the scales that separate the worlds of electrons and space. But once these prototype elements have been subjected to the extreme rationalization required by mass production, they become reduced to abstract ultraminiaturized electronic components. Their modernist poetry, based on truth to materials, is lost.

Closing the gap between the scales of electronics and objects by directly manipulating materials as volumes of electrons is a difficult route for designers. This task is essentially limited to scientists, and even their test-rigs will eventually become miniaturized components. *Clock* by Daniel Weil (figure 1.3) captures some of this quality—partly a reaction against miniaturization, its size is based on the largest circuit boards available in the early 1980s. The circuit is composed visually and the wires linking the two main components are made from dining forks. Familiar objects are put into new but natural relationships based on electrical properties.

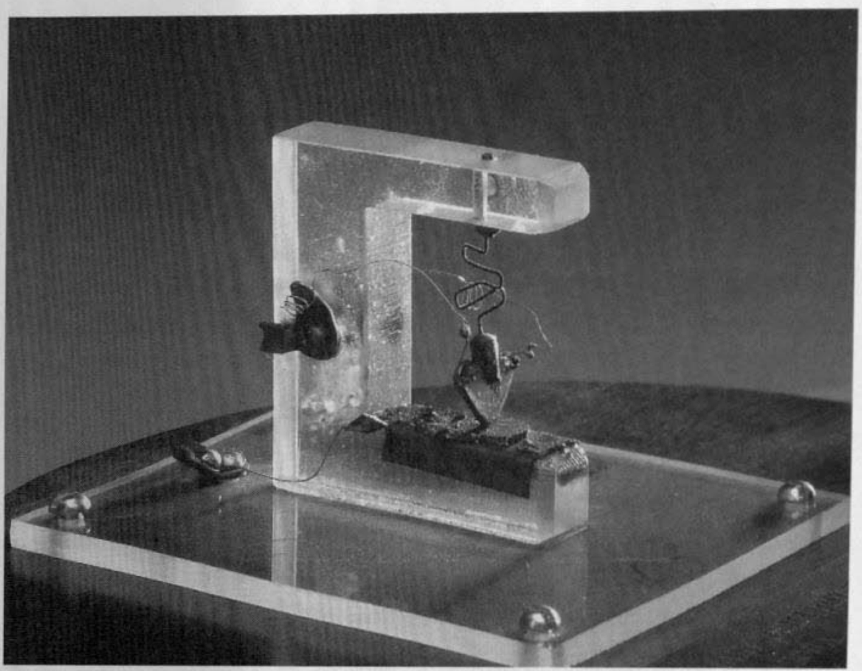


Figure 1.2 The first transistor: a test-rig for a key electronic component created by inventors working at the level of both electrons and matter.

This approach resembles the way electricity was dealt with in early natural philosophy books that explained electricity in delightfully poetic ways, drawing attention to unusual but real phenomena: "The simultaneous development of both kinds of electricity is illustrated by the following experiment:—Two persons stand on stools with glass legs, and one of them strikes the other with a catskin. Both of them are now found to be electrified, the striker positively, and the person struck negatively, and from both of them sparks may be drawn by presenting the knuckle" (Everett, *Deschanel's Natural Philosophy,* Part 3, 4).

The development of "smart materials" is another area where the gap between the electronic and material is being closed, although primarily for technical reasons. Scientists and engineers are developing new materials, designed at a molecular level, that are responsive, dynamic, and almost biological. Although most of these materials are still experimental some, such as electroluminescent laminates[5] and piezoelectric films[6] have been around for several decades.

Manzini (1986) explores the implications of designing with these new smart materials: "The design of this skin, and therefore of the objects that are made with it, is chiefly the design of interactivity with the environment—a scenario for which we must prepare the stage, the sets, and the actors. Imagining the nature of these 'individual objects' is another new chapter in the history of design" (204). Most of Manzini's specially commissioned examples illustrate the miniaturization arising from integrating previously separate mechanisms and their novel decorative possibilities. However, they do not demonstrate the radical aesthetic potential of these materials to open new channels of communication with the environment of electronic objects.

Only Alberto Meda and Denis Santachiara's *Stroke Lamp* (see Manzini 1986) hints at the new relationships between people and machines made possible through new reactive materials. It is controlled by stroking the surface, which is made from an insulating plastic with a copper circuit deposited on it by a photochemical process similar to that used for printed circuits. Although low-tech, it suggests a sensual and playful interaction with everyday objects that might be extended to more complex interactions as more sophisticated materials become available. Andrea Branzi's *Leaf Electroluminescent Lamp* (1988) for Memphis is another application of advanced electrochemical materials for cultural rather than functional innovation (figure 1.4).

But generally, designers have not exploited the aesthetic dimension of new materials with the same energy that engineers have exploited their functional possibilities (to backlight LCD screens in laptop computers reducing their bulk and weight, e.g., or to illuminate escape routes in aircraft so they can be seen through smoke).

Most work in this area does not encourage poetic and cultural possibilities to converge with practical and technical ones. The outcome is a stream of unimaginative proposals. For example, AT&T has applied for a patent for a coating of colored polymer sandwiched between two thin layers of indium tin oxide that changes color when a low voltage is fed through it; the company plans to use it to enable phones to change color instead of ringing.

Although combinations of matter and information might eventually lead to interactive surfaces, giving rise to new channels of communication between people and an increasingly intelligent artificial environment of objects, most smart materials are still under development, are expensive, and use large amounts of energy to operate. The most interesting materials are not available for design

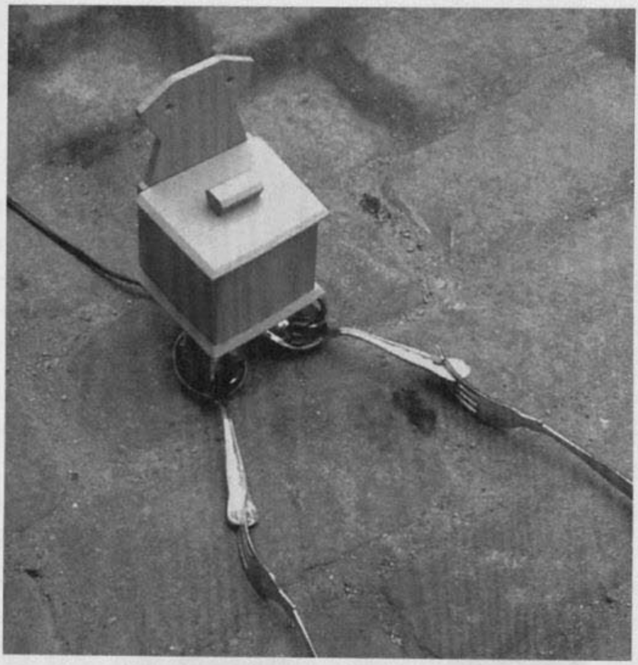


Figure 1.3 Daniel Weil's *Clock* (1983), based on the largest circuit boards available in the early 1980s, is a reaction against miniaturization.

experiments, and one must either use simulations or work with widely available but less sophisticated materials to create emblems of what might be.

Dematerialization

The electronic object is an object on the threshold of materiality. Although "dematerialization" has become a common expression in relation to electronic technology, it is difficult to define in relation to the tangle of logic, matter, and electrons that is the electronic object.

The CPU of an electronic object is, essentially, physically embodied symbolic logic or mathematics. Its "material" representation is the circuit and the components it connects. Symbolic logic describes the workings of the "machine" the object becomes when the program runs. The algorithm is the logical idea behind the program, a strategy that allows symbolic logic to be translated into a programming language (such as C++) and run through the machine, controlling the flows of electrons through its circuitry.

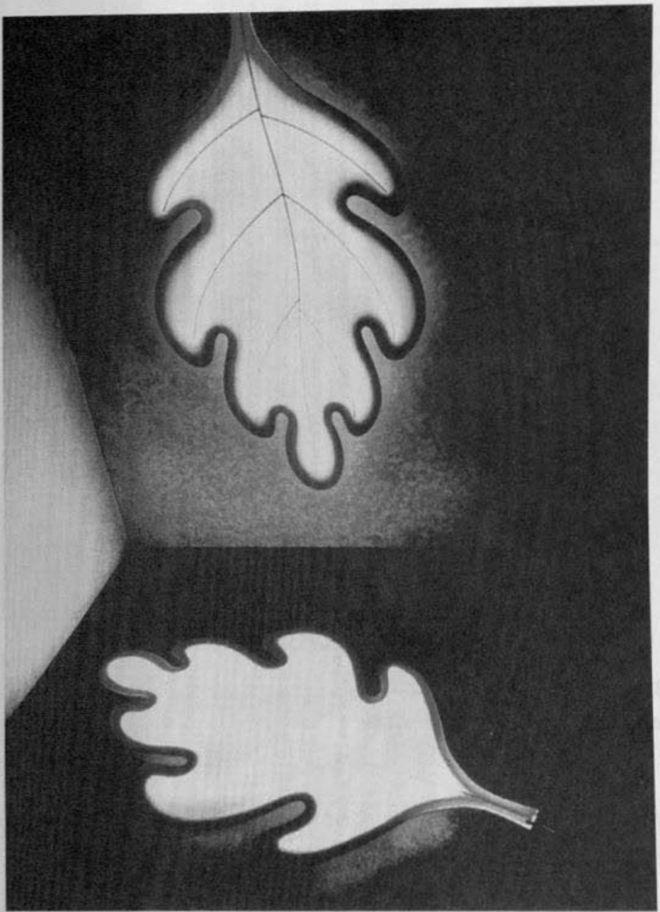


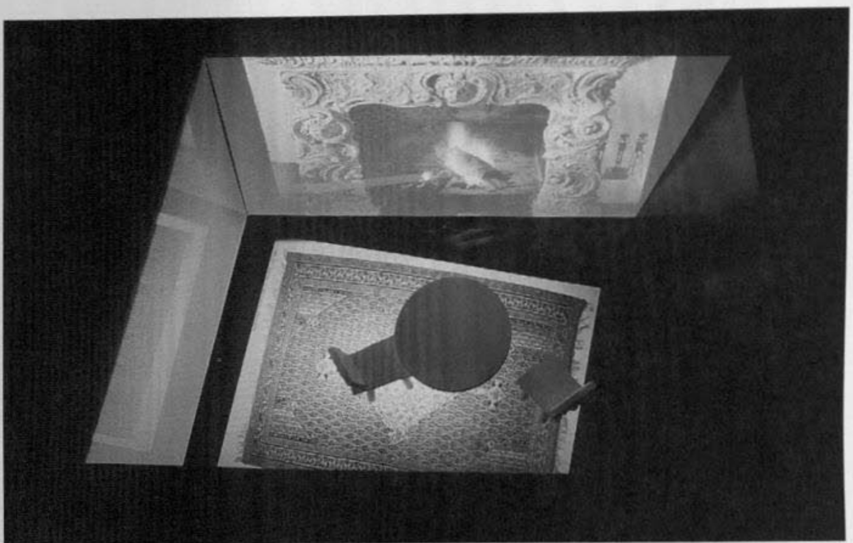
Figure 1.4 Andrea Branzi's *Leaf Electroluminescent Lamp* (1988) for Memphis is a rare example of an application of advanced electrochemical materials for cultural rather than functional innovation.

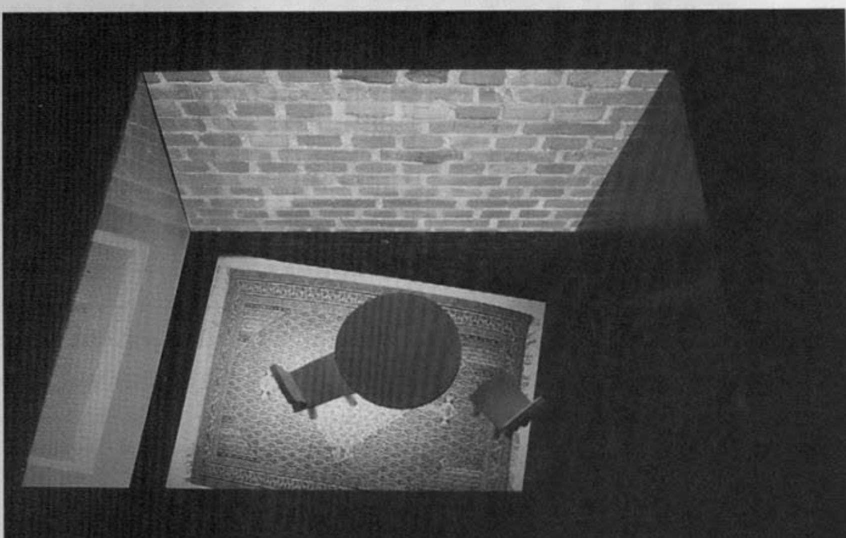
Dematerialization, therefore, means different things depending on what it is defined in relation to: immaterial/material, invisible/visible, energy/matter, software/hardware, virtual/real. But the physical can never be completely dismissed: "Every symphony has its compact disc; every audio experience its loudspeaker; every visual image its camera and video disc. Behind every outward image or symbol lies mechanical support, and if the immateriality of these images and symbols gives rise to a new approach to the relationship between human being and object, the analysis will be one of the individual's connection with the material support underlying the new culture of immateriality" (Moles 1995, 274).

One argument, put forward in the 1980s by the design group Kunstflug, is that values and functions can completely shift from hardware to software, from three to two dimensions, and ultimately to "design without an object." It sounds like an untenable and an oversimple critique of materialism, but during the mid-1980s it drew attention to their ideas. They argued for a change in the attitude to the consumption of objects, calling on industry to produce solutions, not commodities. "Design without an object" could, as part of a cultural movement, offer an alternative to abstinence from consumption while encouraging "the forsaking of things as objects of desire and covetousness."

In the exhibition Design Today, held at the German Museum of Architecture in 1988, Kunstflug offered two examples of this approach: design proposals for *The Electronic Room: Programmable Appearances—Surfaces, Appliances, Comfort* (figure 1.5) and *Electronic Hand Calculator* (figure 1.6). While the room seems only to reinforce stereotypical approaches to the impact of electronics on architectural spaces, the electronic hand calculator became an icon for "design without an object," defining one extreme position in the debate about the impact of electronic technology on objects.

This interest in dematerializing the object for social and political reasons is echoed by the "info-eco" ideas of Manzini, Susani, and Thackara who argue that, by focusing on experiences rather than objects, electronic technology can provide services currently offered through discrete products. In the Info-eco Workshops held at the Netherlands Design Institute in 1995, participants developed scenarios on themes such as "Beyond Being There." Dematerialization was used to investigate hypothetical situations in limited scenarios and discover how information technology might satisfy needs normally fulfilled materially. For instance, telematic tools were proposed where the quality of experience they offered would reduce the desire to travel—digital information being easier to





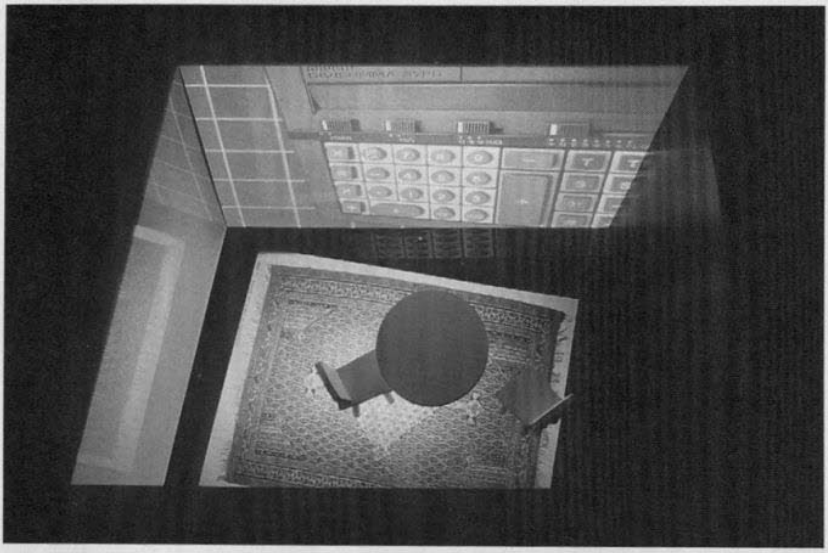


Figure 1.5 The design group Kunstflug's *The Electronic Room: Programmable Appearances—Surfaces, Appliances, Comfort* for the Design Today exhibition held at the German Museum of Architecture (1988).

move than matter. (Reports detailing the results of the workshops are available at www.design-inst.nl/.)

In the introduction to the 1994 Ars Electronica festival in Linz, Peter Weibel describes a another form of dematerialization, "intelligent ambience." It arises from shifting emphasis from the "machine" to its "intelligence," and distributing that intelligence throughout an environment:

> Machine intelligence will serve to make the environment more efficient and more intelligent so that it will be able to respond more dynamically and interactively to human beings. The realisation of the concepts of computer aided design and virtual reality will thus be followed by the realisation of computer aided environment and intelligent, interactive, real surroundings. The latter will be referred to as intelligent ambience—an environment based on machine intelligence. One could say: from Tron house to the Tron ambience. (Weibel 1994, n.p.)

Weibel's observations fall between two other views of dematerialization. The first, which belongs to the human factors world, has been referred to as "ubiquitous computing" and is the subject of much research. Dematerialization is

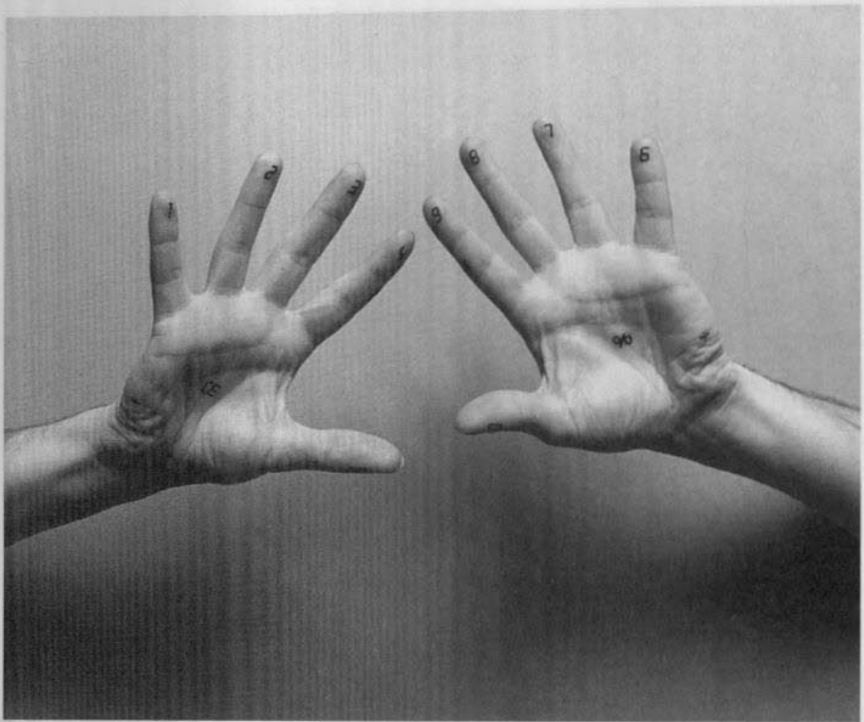


Figure 1.6 Kunstflug's *Electronic Hand Calculator* for the Design Today exhibition held at the German Museum of Architecture (1988): an icon for "design without an object."

seen as a way of providing "transparent" interfaces for computers by embedding the technology in familiar objects and environments and introducing a high degree of automation. At the other extreme is Design Primario,[7] where design effort shifts from hardware to software, and controls levels of light, sound, and temperature to provide sensual environmental qualities. But the aesthetic possibilities of this form of dematerialization have been best exploited by architects: Toyo Ito's design for his *Dreams Room* at the Victoria and Albert Museum in London, was partly motivated by a desire to extend this approach to include information (which he referred to as "active air").

Another form of dematerialization is defined by electronic objects' role as interfaces. With these objects the interface is everything. The behavior of video recorders, televisions, telephones, and faxes is more important than their appearance and physical form. Here design centers on the dialogue between people and machines. The object is experienced as an interface, a zone of transaction.

Although most work in this area tends to reduce the object to a "graphical user interface," a screen, designers are beginning to explore the full potential of the "thingness" of the object. The product becomes virtualized and is represented by a set of physical icons and their various permutations. This could lead to more sensual interfaces than screens and offer new aesthetic qualities.

The work of Durrell Bishop offers a vision of what this might mean: existing objects are used as physical icons, material representations of data that refer to both the pragmatic and poetic dimensions of the data being manipulated. The objects and the electronic structure need have nothing in common. For example, in his design for a telephone answering machine, small balls are released each time a message is left. These balls are representations of the pieces of information left in the machine, allowing direct interaction between the owner and the many possibilities an answerphone offers for connecting to telephone and computer systems. If the caller leaves a number, the ball can automatically dial it; if the message is for somebody else, the ball can be placed in his or her personal tray. Although applied very practically, Bishop's thinking engages with the cultural context in which the technology is used. An "aesthetics of use" emerges.

The material culture of non-electronic objects is a useful measure of what the electronic object must achieve to be worthwhile but it is important to avoid merely superimposing the familiar physical world onto a new electronic situation, delaying the possibility of new culture through a desperate desire to make it comprehensible.

Juxtaposition

How can we discover analogue complexity in digital phenomena without abandoning the rich culture of the physical, or superimposing the known and comfortable onto the new and alien? Whereas dematerialization sees the electronic integrated into existing objects, bodies, and buildings, the juxtaposition of material and electronic culture makes no attempt to reconcile the two: it accepts that the relationship is arbitrary, and that each element is developed in relation to its own potential. The physical is as it always has been. The electronic, on the other hand, is regarded only in terms of its new functional and aesthetic possibilities; its supporting hardware plays no significant part.

Fiona Raby's telematic *Balcony* (figure 1.7) demonstrates how the contradictory natures of electronic and material cultures can coexist. The balcony provides access to an open telephone line linking two or three places. Its physical form provides a focal point and support for leaning on, while an ultrasonic

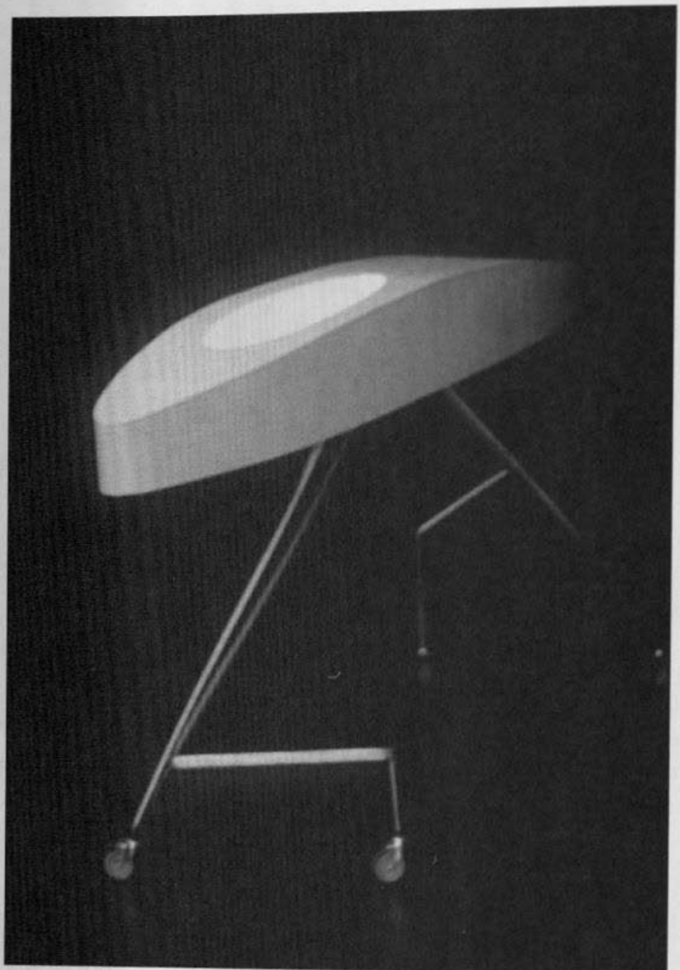


Figure 1.7 Fiona Raby's telematic *Balcony* (1995) is an example of an approach to electronic objects where no effort is made to reconcile the different scales of the electronic and the material.

Figure. 1.8 Robert Rauschenberg's *Oracle* (1965) has had its technology updated three times over thirty years, but its materiality and cultural meaning remain unchanged. Cultural obsolescence need not occur at the same rate as technological obsolescence. Robert Rauschenberg, *Oracle* (1965). Copyright Robert Rauschenberg/VAGA, New York/DACS, London 1999.

sensor detects the approach of users and slowly clears the line. There is no point trying to integrate the physical support and the ultrasonic field, to collapse one into the other, forcing the physical to represent the electronic or to disappear completely so that only electronic effects remain. Juxtaposition allows the best qualities of both to coexist, each with its own aesthetic and functional potential. Technology can be mass-produced whereas the object can be batch-produced. No effort need be made to reconcile the different scales of the electronic and the material. They can simply coexist in one object. They can grow obsolete at different rates as well. Robert Rauschenberg's *Oracle* (figure 1.8) has had its technology updated three times over thirty years, but its materiality and cultural meaning remain unchanged. Cultural obsolescence need not occur at the same rate as technological obsolescence.

Perhaps the "object" can locate the electronic in the social and cultural context of everyday life. It could link the richness of material culture with the new functional and expressive qualities of electronic technology.

In Philips's 1996 *Vision of the Future* project (Philips Corporate Design 1996), a more subtle awareness of the value of material culture has entered the mainstream of design thinking and may well soon enter the marketplace and everyday life. The project consists of over one hundred design proposals for products for five to ten years in the future. But this awareness is primarily expressed in this project by references to existing object typologies—for example, hi-tech medical kits in the form of medicine cabinets—rather than by radically new hybrids. The designers focus more on practical needs, the electronic qualities are not fully exploited, and the types of objects proposed are already familiar from student degree shows. But the designs do achieve a new visual language, sensual, warm, and friendly. They are well-mannered and socially competent. In these projects the electronic object has reached an optimal level of semiotic and functional performance.

The Electronic as Post-optimal Object

The most difficult challenges for designers of electronic objects now lie not in technical and semiotic functionality, where optimal levels of performance are already attainable, but in the realms of metaphysics, poetry, and aesthetics, where little research has been carried out:

> This is what differentiates the 1980s from 1890, 1909, and even 1949—the ability of industrial design and manufacturers to deliver goods that cannot be bettered, however much money you possess. The rich find their exclusivity continuously under threat. . . .
>
> Beyond a certain, relatively low price (low compared with other times in history) the rich cannot buy a better camera, home computer, tea kettle, television or video recorder than you or I. What they can do, and what sophisticated retailers do, is add unnecessary "stuff" to the object. You can have your camera gold plated. (Dormer 1990, 124)

The position of this book is that design research should explore a new role for the electronic object, one that facilitates more poetic modes of habitation: a form of social research to integrate aesthetic experience with everyday life through "conceptual products."

In a world where practicality and functionality can be taken for granted, the aesthetics of the post-optimal object could provide new experiences of everyday life, new poetic dimensions.