HOT-WATER BOTTLE, 1999

Prototype for radiator, painted wood

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PHOTOGRAPHY
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This prototype is for a rubber radiator that would encase metal plumbing pipes inside a resilient skin, exchanging a harsh industrial vernacular for softer forms. The circular grooves in the surface resemble stylized, standardized fingerprints. The object—modeled after a hot-water bottle—evokes the antiseptic comforts of nursing care as well as tactility and warmth, reflecting the overtly technological, clinically erotic attitude of the new design organics.
SKIN is a multilayered, multipurpose organ that shifts from thick to thin, tight to loose, lubricated to dry, across the landscape of the body. Skin, a knowledge-gathering device, responds to heat and cold, pleasure and pain. It lacks definitive boundaries, flowing continuously from the exposed surfaces of the body to its internal cavities. It is both living and dead, a self-repairing, self-replacing material whose exterior is senseless and inert while its inner layers are flush with nerves, glands, and capillaries. Contemporary designers approach the surfaces of products and buildings as similarly complex, ambiguous forms. Manufactured skins are richly responsive substances that modulate the meaning, function, and dimension of things.

In the 1940s and 1950s, organic forms and materials provided designers with a humanist vocabulary that affirmed society’s place within the natural world. By the end of the century, a new organicism had emerged, as nature itself was transformed by a host of technologies. In the 1990s, plants and animals with altered DNA were dispersed through the global food market. The successful cloning of a sheep in Scotland in 1997 plunged a science-fiction fantasy into practice. In the summer of 2000, the human genome was mapped—a competitive venture between government and private enterprise—laying bare new terrains for medical science and economic conquest. In the mid-1990s, the new field of tissue engineering emerged, charged with the manufacture of human organs. While complete hearts, lungs, and kidneys cannot yet be generated from living cells, skin is already a viable medical product, grown in laboratories.
During the 1990s, cosmetic surgeries and products were marketed to an expanding and unembarrassed public, as many people came to see surgical alteration as no more objectionable than diet and exercise.\(^1\) Consumption of breast implants and liposuction doubled between 1997 and 2000. The demand for nonsurgical dermatological procedures soared during the late 1990s as well. Injections of fat or collagen are used to temporarily fill shallow lines and acne scars. Chemical peels remove the outermost layer of the epidermis, erasing sun damage and other blemishes by exposing a fresh layer of cells. Cosmeceuticals, a rapidly growing over-the-counter product category, deliver low concentrations of acids and other chemicals, and claim to repair skin at the biological level.\(^2\) Botox injections allow a small dose of the toxin that causes botulism to paralyze selected facial muscles, easing wrinkles caused by habitual frowning and eyebrow-raising—the number of Botox procedures performed in the United States doubled between 1999 and 2000, having risen sixteenfold since 1997.\(^3\)

A sense of horror as well as enthusiasm accompanies these developments. Environmentalists warn against an ecosystem unhinged by genetically altered species, while bioethicists condemn human cloning and envision a society dominated by a self-replicating elite.\(^4\) At the same time that humanity risks reduction to a genetic code, concerns are arising about the potential humanity of machines, as seen in films such as Steven Spielberg’s A.I. (2001). Scientific research is increasingly motivated by profit and loss—life-saving drugs and newly identified DNA sequences are patented and sold for financial gain, while unchecked diseases devastate local and international economies. Cosmetic surgeries are consumed by the privileged few—anxious to prolong the attributes of youth into lives ever-lengthened by medical services—even as the lack of basic health care and sanitation shortens the life spans of millions around the world.

Designed objects and spaces inhabit this rapidly transforming arena, where surging fears and ambitions fuel scientific discovery and stimulate the creation and consumption of new technologies. Design reflects and shapes our understanding of the world; it is both symptom and cure. As a practice embedded in the fabric of technology and commerce, design responds critically to the very culture it serves to replicate and extend.
The rise of digital media over the past decade has changed the practice of design, providing tools for making objects and buildings that resemble living creatures—modeled with complex curves and forms—while remaining distinctly artificial. This new organicism has taken shape most aggressively across the surface of things. The primacy of the skeleton has given way to the primacy of skin. Surfaces have acquired depth, becoming dense, complex substances equipped with their own identities and behaviors. New materials react to light, heat, touch, and mechanical stress. Translucency and mutability have replaced transparency and permanence. The outer envelope has detached from the interior volume. Flexible membranes are embedded with digital and mechanical networks. Thin planes of material are folded, warped, or pumped with air to become load-bearing structures. Industrial skins have assumed a life of their own. It is a life whose pedigree, however, is more alien than human.

**Skin is both dead and alive.** The thin outer layer, the epidermis, consists of strata of cells that migrate toward the surface, where they compact into a layer of dead material. Skin’s protective function relies on the inertness of this outer surface. Mark C. Taylor, whose 1997 book *Hiding* is a commentary on the culture of skin, writes, “Death, like life, is not a momentary event but is an ongoing process whose traces line the body. At the point where I make contact with the world, I am always already dead.”

This convergence of life and death also structures our relationship to the object world. Skin, hair, and nails are products of the body, continuously sloughed off and renewed. Hair is part of the skin, its cells generated deep within the living dermis and pushed upward into shafts of protein, emerging across the body’s landscape as a thicket of dead blades. Skin is connected to our bodies yet also alien, marking the exterior, the end of our selves. It is a screen on which we can watch the body’s amazing ability to heal itself while also witnessing its inevitable collapse.

Many of the earliest technologies were created to supplement the inadequacies of this natural envelope. The first shelters and the first garments, made from animal skins, protected humans against hostile climates. Today, military and aerospace technologies are being used to extend the
body's tolerance of extreme temperatures. In Italy, Corpo Nove has created the hyperinsulated Absolute Zero jacket, lined with the cloudlike substance Aerogel, one of the lightest materials on Earth. The Cooling System jacket, also by Corpo Nove, is plumbed with plastic tubes that carry water across the body, as used in space suits. CP Company has produced a series of raincoats that inflate to become chairs, tents, or mattresses, while the Tokyo partnership ixilab has created prototypes for garments that are also stools, floor mats, or storage units. By providing survival gear for the urban nomad or the eco-tourist, these products suggest a culture where danger and disaster coexist with leisure and entertainment, animating the surface of experience.

Such projects recall the Pop movement of the 1960s, with its embrace of portable structures and synthetic materials. Pierre Cardin introduced his vinyl minidress in 1968, using a sculptural, preformed fabric made by American Cyanamid—an artificial skin with its own dimensional markings. In contrast with the implied optimism of Cardin's Pop couture, the vinyl and PVC fashions of Walter van Beirendonck are apocalyptic party clothes. The shiny surface of a 1998 red synthetic suit bubbles with protrusions, like scales on a futuristic dragon. On the runway, models danced in gas masks, implying the presence of a toxic process.
Like skin, design performs at the intersection of life and death, body and product. Human beings, using objects to survive and conquer, rely on the world of things, merging their own identities with the objects they use. Photographer Elinor Carucci, whose pictures appear throughout this book, has used her camera to reveal intimate relations between skin and everyday industrial products, from lipstick and pantyhose to zippers, bras, and buttons. Industrial designers Carla Murray and Peter Allen propose more grotesque conjoinings of bodies and consumer goods in their project Skinthetic (2001), which predicts the grafting of brand identities into living tissue. Skin is the surface where bodies and products merge.

In modern civilization, dependence on technologies has become absolute. From birth, the human organism is enmeshed in an infrastructure that controls and delivers food, water, light, climate, health care, and entertainment. This modern creature of comfort has become a cyborg, a living thing whose functions are enhanced by technology. Monstrous beings come to mind, along with everyday pacemakers, hearing aids, prosthetic limbs, and even pagers, cell phones, and wristwatches.

Our increasing dependence on the artificial is not without anxiety, a phenomenon most vividly expressed in science fiction. In Star Trek: First Encounter (1996), the leader of the villainous army of Borg consists of a disembodied mechanical nervous system covered with glossy, translucent skin—she is a head and shoulders with no body. She descends into a metal gown whose connective fasteners bite down into her soft, lubricated flesh. The hero of the same film has a nightmare recalling his seduction by the Borg; in his dream, a spiderlike mechanical probe pushes out through the
elastic skin of his cheek, searching bluntly from behind the soft layers before cutting through with its sharp prongs.

The fear of invasion from within the body drives many depictions of beings from outer space. In the Alien films, the enemy is most frightening when it occupies a human host, incubating inside the body before erupting through the abdomen or chest. A dream sequence in Aliens (1986) shows Sigourney Weaver—prone on a hospital bed—watching with horror as a mechanical-looking object probes upward through her belly, threatening a hideous birth. The clinical setting heightens the shock of the scene, with its threat of physical helplessness and humiliation.

David Cronenberg’s Videodrome (1983) conjoins the body and machinery in reverse: here, inanimate objects pulse with life. First a videocassette, then a television and VCR, swell, buckle, and moan, their plastic surfaces heaving with morbid sexuality. The screen of the TV bulges outward, filled with a video image of Deborah Harry’s half-open, lipsticked mouth, which threatens to engulf the shocked but willing hero, played by James Woods. Later, a hand and gun press through the elastic surface of the screen, turning into a slippery, engorged hybrid of flesh and machine.

Like cinema, design offers imaginative responses to the convergence of life and technology, sometimes celebrating the relationship and other times recoiling from it. Contemporary objects and spaces are cloaked in surfaces that have been enhanced, simulated, or engineered, surfaces that masquerade as other materials, surfaces where the physical and the virtual, the real and the imagined, collide. Hard surfaces look soft, and soft surfaces
look hard. Wood is sealed inside of resin; smooth planes are rippled, bobbled, or scarred with digital imagery; luminescent fabrics, gels, and plywood glow with preternatural life.

Jurgen Bey's Kokon series, initiated in 1997, encloses traditional wooden furnishings inside a tight wrapping of PVC. The familiar, humanly scaled limbs of the found objects press through a grossly artificial skin. In Kokon Double Chair, two chairs are bound, back to back, like lovers held hostage in a dysfunktional embrace. Moorhead & Moorhead's Rubber Lamp No. 5 has a flexible shade of translucent rubber that peels open to direct the flow of light, evoking the alien pods from the films Invasion of the Body Snatchers (1956, 1978).

Organic design vocabularies—from the ecstasies of baroque ornament to mid-twentieth-century biomorphism—have always gestured toward the erotic, suggesting the curves and movements of the human body. In contemporary design, eroticism is present yet kept at a distance, handled with rubber gloves. The fulfillment of desire and the satisfaction of touch are blunted by protective layers of material. Clothed in latex, vinyl, rubber, or resin, sensual forms are rendered clinical. When love and fear are necessary bedfellows, the plush, dimly lit boudoir gives way to the bright, wipeable surfaces of the laboratory and lavatory.
TechnoGel, developed for the health-care industry in the 1970s, typically is used in wheelchairs or hospital beds, supporting the body with minimal friction. Designers have adopted this soft polyurethane material for its cool yet fleshy texture—it is said to have the consistency of human fat. The Tino stool (1999), designed by Alessandro Scarpellini Piva, is padded with TechnoGel; the armrests rise up like bathroom grips or the side rails of a walker. Werner Aisslinger's Soft chaise is an indoor/outdoor lounge chair. A web of nylon straps is padded with a seamless slab of TechnoGel, protecting its user's skin from unsightly impressions while providing an ideal resting place for invalids and sunbathers.

Latex is another material whose clinical functionality cloaks the eroticism of contemporary design. Matthieu Manche has created latex garments that propose links among multiple wearers and the proliferation of body parts. He uses the material of self-protection to suggest the merging and elaboration, rather than the separation and containment, of bodies. Tonita Abeyta's Sensate is a line of latex undergarments—some equipped with built-in male and female condoms—that aim to transform the tools of sexual hygiene into alluring fashion objects.
In furniture designed by Elizabeth Paige Smith, the outer layer becomes a viscous medium. Her Cube table (1998) is a built-up block of balsa wood interred in a deep coat of resin. While conventional finishes heighten the visual texture of wood, Smith’s milky skin provides a palpable layer of protection. Timothy McLoughlin’s 2001 Ottoman (Customized for K. Fischer) is a pristine white volume that has been physically violated. Upholstered in fragile white fabric, the surface of the stool appears gouged with a path of footprints. McLoughlin has inserted rubber castings of footprints into the stool’s foam padding, suturing them into place with the care of a surgeon and covering the scars with flocking. McLoughlin’s Ottoman uses modernism’s white cube—archetype of the silent, static object—as the stage for a temporal narrative.

Smith’s thick coat of resin brings an element of time to her Cube table as well, slowing down our view of the natural surface. Terrence Riley describes how materials serve to delay and materialize the passage of light in his 1995 book Light Construction. Contemporary architects have exchanged the transparent skins of early modernism for physically present, semi-opaque surfaces. Buildings are clothed in multiple skins that trap and reflect light, from translucent marble to double layers of glass.

Temporal change animates the skin of Gluckman Mayner’s Helmut Lang Tokyo showroom (2001), which pulses with shifting light effects. Composed of translucent glass and LCD panels, the store’s gridded facade is 60 centimeters deep, functioning as a vast showcase and a field of dynamic light patterns, transforming from opaque to transparent to translucent over
S-1 LOCOMOTIVE, 1936
Photograph, clay scale model
DESIGNER
Raymond Loewy, 1893–1986
COLLECTION OF Cooper-Hewitt,
National Design Museum,
Smithsonian Institution,
1937-58-6
Raymond Loewy’s streamlined locomotives were icons of aero-
dynamic styling.

PORTABLE HAND MIXER
c. 1955
Plastic, metal
MANUFACTURER
General Electric, U.S.A.
COLLECTION OF Cooper-Hewitt,
National Design Museum,
Smithsonian Institution
In the 1950s, everything from a kitchen implement to a Cadillac
was enclosed in a hard, horizontally elongated skin.

EYEBEAM COMPETITION:
DETAIL OF BUILDING
SKIN
Digital rendering, 2001
DESIGNER Greg Lynn, b. 1964
Greg Lynn FORM, Santa Monica
Architect Greg Lynn uses 3D-
modeling software to create
forms shaped by dynamic
forces.
the course of a day. The glass facade can either reveal or conceal the contents of the building; it functions like a multilayered, three-dimensional cinema screen, whose narrative is populated by the merchandise, the customer, the concrete shell within, or the skin of the glowing white box itself.

Greg Lynn confronts temporality by stretching the skin of architecture into the dimension of time. According to his concept “animate form,” digital design tools plunge three-dimensional structures into a space that ripples with currents of force. Lynn writes that in place of a neutral abstract space, “the context of design becomes an active abstract space that directs form within a current of forces that can be stored as information in the shape of the form.” The undulating skins of Lynn’s “blobs” record the object’s passage through fields of pressure.

The idea that the shape of an object can refer to its own motion through a fluid medium is linked to the origins of the industrial design profession. In the 1920s and 1930s, Raymond Loewy, Norman Bel Geddes, and other pioneering industrial designers drew upon engineering principles that had been employed in naval and aeronautical design since the nineteenth century, when the curved shells of ships and zeppelins were designed to minimize drag as vessels push through air or water. In the 1930s designers employed aerodynamic forms to impress the image of speed and modernity on the bodies of cars, trains, and planes as well as on such stationary objects as toasters, staplers, and pencil sharpeners. The teardrop became an icon of 1930s modernism.

The early industrial designers created skins for mechanical devices that enclosed their working innards inside smooth, streamlined shells. These gleaming surfaces became the interface between body and product, protecting the mechanisms from water, dirt, and interference from the user. Documenting his work in the manner of a cosmetic surgeon, Raymond Loewy promoted his achievement through Before and After photographs.

While Loewy’s skins aimed to conceal, product skins today are often transparent or translucent. The iMac (1997) revealed the electronic components of the computer through a candy-colored shell, providing visibility while maintaining the fundamental structure of the protective casing. Other industrial surfaces have become softer, more giving to the touch,
enhancing the object’s creaturelike presence. Mario Bellini designed an adding machine for Olivetti in 1972, covering the keyboard in flesh-toned rubber. In 2001 the design firm IDEO published prototypes using ElekTex, a conductive fabric whose entire surface can sense the location and pressure of human touch: “It allows a product to have a skin that is flexible, that is itself a functioning, intelligent organ.”

Skins also mediate between users and products in the digital realm. The customized buttons and controls used in computer interfaces are known as skins. Thousands of skins can be downloaded from the Web, allowing users to create and exchange interfaces that are colored, coded, themed, and branded to suit individual whims. Avatars, the graphical personalities used to represent players in computer games, are also known as skins—they are the digital surfaces of invented personae. In 2001, the first feature film cast entirely with digital, photoreal human characters—Final Fantasy—was released. Such characters are created by imposing digital surfaces over wireframe structures.
In an editorial in the New York Times (11 April 2001), Maureen Dowd commented on the use of bovine collagen as a “line filler” in dermatological procedures as well as an ingredient in numerous cosmetic potions and creams. As communicative diseases devastated livestock across Europe at the turn of the twenty-first century, cattle-based products could have fallen into disfavor. Yet the alien had already been invited in, and it is hard to banish such a charming guest. Dowd quotes dermatologist Patricia Wexler: “I’ve never had a patient ask about a kosher cow. I’ve never had a vegetarian model object to bovine collagen. I’ve never had an animal rights activist object to cows getting killed for collagen. When it comes to cosmetic matters, women have a ‘Don’t ask, don’t tell me, please!’ policy.”

The substance of the body is under renovation. The arsenal of drugs, vaccines, and mechanical replacement parts developed during the twentieth century is now joined by the engineering of flesh itself. While living skin has become a commercially manufactured product, objects and buildings have come to resemble natural organisms. The barriers between body and product, self and other, nature and technology, are folding inward. The dense, luminous surfaces of contemporary objects—pulsing with hidden intelligence or taut with potential life—can be beautiful and disturbing, divine and grotesque. These industrial skins may be incubating something alien. They could be shielding us from invisible dangers or harboring the nascent growth of a predatory being. Everywhere, prophylactic skins slip into the space between people and things, forming seductive planes of contact as well as protective barriers, screens where image replaces tactility or where touch triggers a visual response—points of no entry or no return.

INTERFACE
SKIN, 2001