are we human?

notes on an archaeology
of design

by

Beatriz Colomina
& Mark Wigley

Lars Müller Publishers

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The question *are we human?* is both urgent and ancient. It might even be the oldest question of all – reverberating through the ages from the smallest gestures of daily life to the largest transformations of technology, biology, and geology. Perhaps the human is simply the species that asks this of itself. But other animals might have doubts about their identity too. Our species might not be as unique as it thinks or hopes. Even a machine might ask itself if it is human and some machines may well be more human than people. The question *are we human?* is from the beginning a hesitation about the relationship between ourselves and everything around or inside us. These notes dive into that hesitation to explore the intimate relationship between design and human. They are field notes from a continuous stream of conversations, classes, symposia, readings, interviews, site visits, meetings, walks, and meals during the last year and a half as we prepared the 3rd Istanbul Design Biennial. The evolving overlapping thoughts don't provide answers to the question that defines our species. This is not a design guide or a do-it-yourself humanity manual. No reason to think it will change you. The notes just try to consider the role of design in defining the human animal. If the human is a question mark, design is the way that question is engaged. An archaeology of design is an archaeology of curiosity.

1
The Mirror of Design

spiderwebs – sediments
radiation – extinction
self-surveillance
[9]

2
The Plastic Human

plasticity – strange artifacts
interface
[23]

3
Blows of Design

technofossils – prehistory
genetic continuum
hands – ornament
sexual selection
[31]

4
The Invention of the Human

tools – brain – curiosity
[51]

5
The Ornamental Species

domestication – beads
networks – thinking strings
useless things
[63]

6
News from Nowhere

mechanical life – good
design – morality – failure
toys – functionalism
[75]

7
Good Design Is an Anesthetic

smoothness – shock – smile
shock absorber – nerves
[89]

8
The Design of Health

dissection – X-ray
tuberculosis – fatigue
allergies – autoimmune
burnout
[107]

9
Human-Centered Design

camping – artificial limbs
biology – survival – self-
destruction – primal scene
[127]

10
The Frictionless Silhouette

normal – human
engineering – automaton
biotechnique – discipline
[147]

11
Designing the Body

bodybuilding – hedonism
nudism – libido – stomach
psyche
[167]

12
Design as Perversion

fetishism – bondage
voyeurism – erotica
scatology – pedophilia
[183]

13
Designing a Ghost

scale figure – protohumans
clothing – lurking
shadows
[203]

14
The Unstable Body

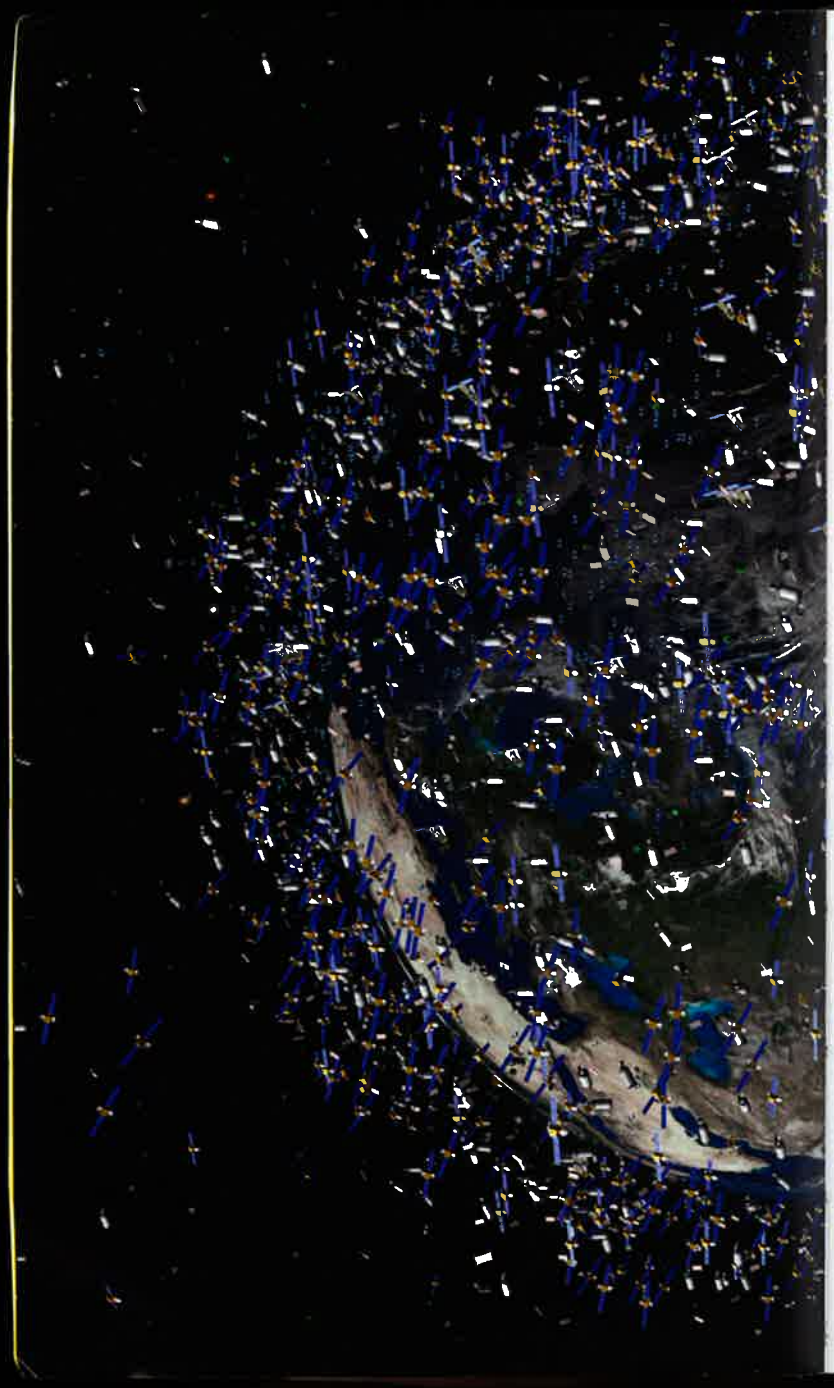
microbiome – prosthetics
plastic surgery – drugs
biodesign – chimera
[219]

15
Homo Cellular

intimacy – connectivity
shelter – computation
selfie – surveillance
[239]

16
Design in 2 Seconds

social media – avatar
hybrid space – the bed
postlabor – self-design
[257]



1

THE MIRROR OF DESIGN

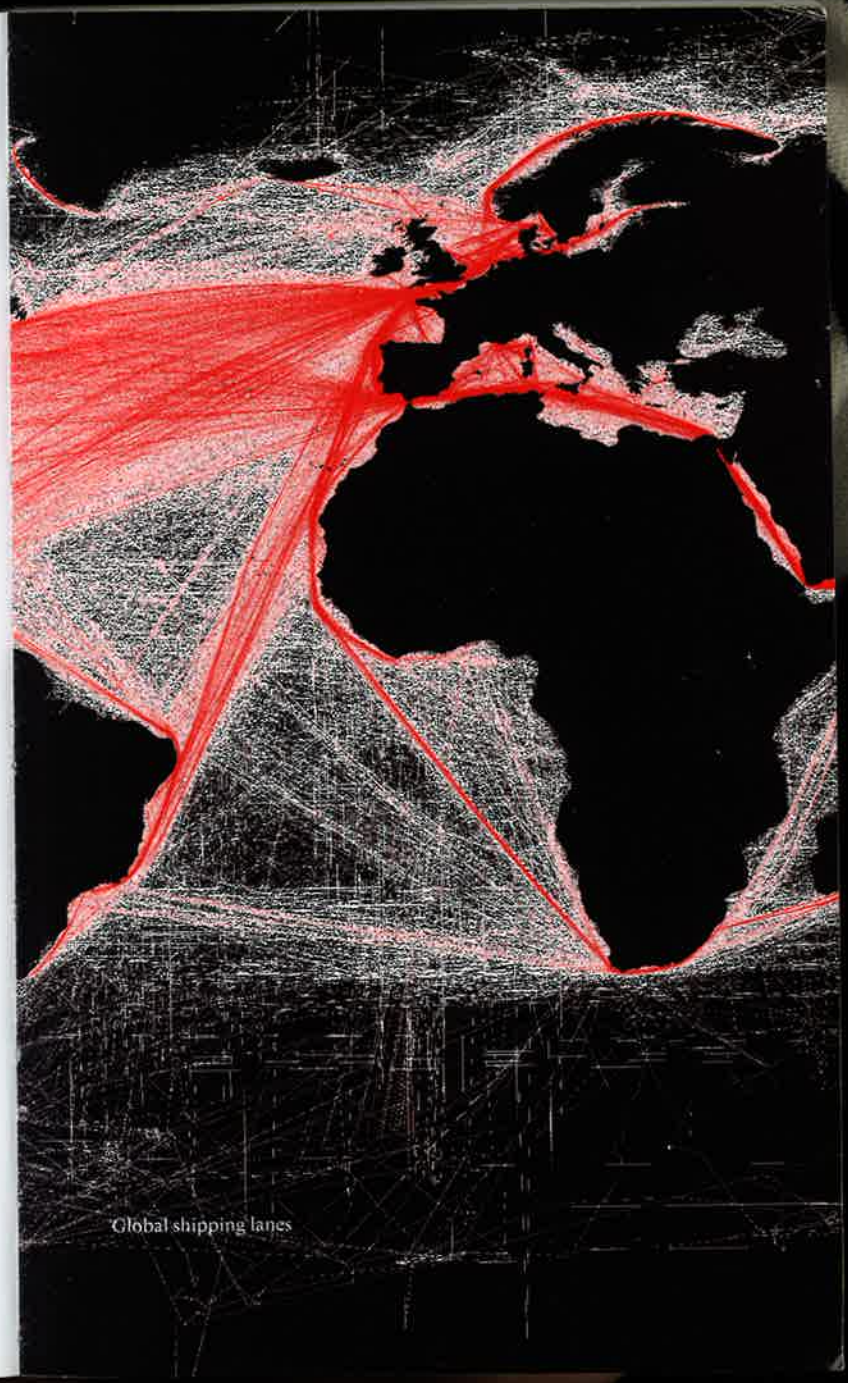
Design always presents itself as serving the human but its real ambition is to redesign the human.

The history of design is therefore a history of evolving conceptions of the human. To talk about design is to talk about the state of our species.

Humans have always been radically reshaped by the designs they produce and the world of design keeps expanding. We live in a time when everything is designed, from our carefully crafted individual looks and online identities to the surrounding galaxies of personal devices, new materials, interfaces, networks, systems, infrastructures, data, chemicals, organisms, and genetic codes. The average day involves the experience of thousands of layers of design that reach deep into the ground and outer space but also deep into our bodies and brains. We literally live inside design, like the spider lives inside the web constructed from inside its own body. But unlike the spider, we have spawned countless overlapping and interacting webs. Even the planet itself has been completely encrusted by design as a geological layer. There is no longer an outside to the world of design. Design has become the world.

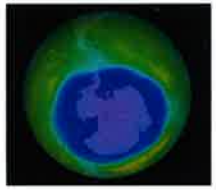
Design is what you are standing on. It is what holds you up. And every layer of design rests on another and another and another. To think about design demands an archaeological approach. You have to dig. Dig into the ground, underground, beneath the seabed, and deep into the Earth. Dig into the things sitting on the ground – buildings, cities, treetops, and antennae. Dig over the ground – into the air, clouds, and outer space. Dig even into the invisible layers – data storage, formulas, protocols, circuits, spectra, chemical reactions, chemical reactions, gene sequences, and social media posts. Digging, documenting, dissecting, discussing – digging, that is, into ourselves.

If design needs archaeology, archaeology has always been about design. It reconstructs human activity by analyzing the material traces of technofossils. It treats every artifact and pattern it uncovers with a delicate brush or a penetrating X-ray as evidence of human life and intentions. Sedimented layers are painstakingly exposed to replay sequences of human sociality, mobility, diet, metabolism, symbolism, and mental capacity. This obsessive forensic analysis deploys the most precise measurements and carbon dating techniques. Yet the evidence is always partial and the analytical framework is never innocent. Archaeology is an amalgam of polemical speculative debate and the latest understanding of scientific rigor. It is a kind of reverse engineering of design. It tries to recover possible pasts while design looks forward to possible futures. Design is a form of projection, to shape something rather than find it, to invent something and think about the possible outcomes of that invention. This endless reshaping and speculation about possible outcomes is uniquely human. The archaeology of design is not simply about the history of the human animal as revealed in all the layers of artifacts. It uncovers the sedimented ways of reinventing the human.



Global shipping lanes

Design is the most human thing about us. Design is what makes the human. It is the basis of social life, from the earliest artifacts to today's ongoing exponential expansion of human capability. The human radiates design in all directions. The imprint of the human is in the land, the oceans, the atmosphere, the plants, animals, organisms of every kind, chemicals, genetic makeup, and all frequencies of the mainly invisible electromagnetic spectrum. There is no water whose temperature, movement, and chemistry has not been affected. No air is unmarked. There is hardly any dimension of the natural world that has not been affected by human activity. Most of the Earth's surface has been massively transformed through urbanization and agriculture. There is an ever-accelerating reduction of biodiversity through the devastation of countless species through loss of habitat, overfishing and overhunting, industrial chemicals, pollution, and the invention of new species of plants and animals through selective breeding and genetic editing along with the acceleration of climate change driven by burning fossil fuels. The designs that mark human life are not just the cultural and technical artifacts that eventually



make their way into museums. They are the precarious movements of refugees, the collapse of biodiversity, the global flows of information and resources, the holes in the *ozone layer*←, the microplastic diffused throughout the oceans, the radioactive isotypes from atomic testing in the atmosphere and the black carbon everywhere in the air and soil.

Humans no longer move across a small part of a very thin layer on the skin of the Earth, nomadically foraging for resources as if acting lightly on a vast stage. They now encircle the planet with layer upon layer of technocultural nets, posing an ever-greater threat to their own survival.

Midway Atoll, North Pacific
photo by Chris Jordan

The human might be the only species to have systematically designed its own extinction, and seems to be getting close to accomplishing the goal. Yet it largely acts as if it cannot do anything about it, staring at the prospect of its own demise as if transfixed, even with a lingering sense of pride in this massive self-destructive accomplishment. It is as if the image of a vast sublime natural world overwhelming the human attempt to comprehend it has been reversed. The human itself is now the overwhelming spectacle.

Enveloped in all the nets of its own making, the species constantly watches itself, as if fascinated by what it has become, increasingly aware that it is the very force that is making its own occupation of the planet, and that of most other species, ever more fragile. The human animal spends a remarkable amount of time looking at itself and its artifacts from an ever-increasing number of angles at every scale from the whole planet to atomic and now subatomic details. Conventional media channels provide continuous self-surveillance by bringing real-time images from every corner of the globe. The Internet offers multiple interfaces tracking the global movements of satellites, space junk, aircraft, ships, tweets, viruses, migration, and remittances. Millions of fixed webcams enable specific locations to be monitored from isolated stations in the Antarctic, desert highways, building sites, laboratories and apartments, to orbiting space stations. Instantly uploaded video from cellphones means the eyes with which we watch and are watched have multiplied exponentially. Live video feeds from cellphones in bedrooms, bathrooms, and battlefields have become the front lines of contemporary life. Once deeply private spaces are now accessible online. Personal actions and thoughts are experienced by global audiences. Individual movements, purchases, and communications are continuously detected, recorded, and analyzed throughout the day and night, as if constituting a massive collective selfie.

The transformative "blue marble" photograph of "our" planet taken on December 7, 1972, through the window of the Apollo 17 spacecraft as it headed toward the Moon – a singular, seemingly all-encompassing view of the "whole earth" from the outside with no visible human trace – has been displaced by live feeds from the International Space Station orbiting the planet at 17,000 miles an hour and countless views from the inside the Earth, as exemplified by the real-time images made, distributed, and watched on billions of cellphones. The technology to simultaneously visualize the Earth from outside and from inside is now in everybody's hands. Images and sounds from inside every dimension of human activity from the minutest scales of personal and chemical life to the widest expanses of interstellar space are gathered together in ever-shifting combinations on our small portable screens. Yet this real-time juxtaposition of multiple scales and angles does not form a seamless unity that either frightens or reassures. On the contrary, the image of our self-made habitat is a permanently changing mosaic. The new "whole earth" image is a real-time heterogeneous collage of collages that are riddled with questions. The unprecedented ability to collectively construct and share images does not mean that we all see the same thing. Our self-image is multiple and ever-shifting, as if we look into a vast multifaceted mirror in which the surfaces keep moving. We are fixated on a reflection that is as strange as hearing a recording of one's own voice, continually wondering what we are becoming. "Are we human?" is the most everyday question.

This huge and detailed self-portrait is full of gaps, technical limits, and multiple forms of censorship. It is paralleled by massive secretive surveillance systems with government, military, and corporations carrying out relentless visual and electronic tracking. The ability to see so much more is equally the ability to be seen much more. The human looks at itself looking at itself. Self-monitoring is a huge part of human activity – and is inseparable from design. The world of design is not the world of isolated artifacts seen in the spaces of design schools, exhibitions, museums, magazines, and stores or even in the wider spaces of the city or landscape. It is more in the planetary domain of overlapping geological and biological layers of artifacts at different scales and time frames and especially includes the ways that those layers are looked at, touched, and explored. Looking and grasping and reflecting is after all a key part of design. If design is basically a way of looking forward, this is not simply in the sense of inventing new artifacts. Artifacts become truly transformative by exceeding what was expected of them, exceeding our grasp. It is precisely in challenging us – triggering the potential of new ways of seeing, thinking, grasping, and acting – that design plays its role in redefining the human.

If you were coming to Earth from Mars it would be easy to observe that one species is entirely dominating the planet. But where would you meet this species? What would the first encounter be? Coming across a piece of space junk on the way in? Would you say, "Well, that's just a designed object and let me wait till I find out who made that." Or would your first thought be "Okay, contact with another creature"? After passing through clouds of satellites chirping to one another you would see airplanes and cities and sense the Internet buzzing with countless thoughts. Would you stop when you see organisms walking around on two legs and say "I found the humans"? Would you even see the fleshly bags of organs on your way into the crucial microbes, the proteins, or the genome of the creature? Or would you just pass the body by on the way into the electrical signals, the reshaped Earth, or the weather? You might conclude that this species dominating the planet emerged only 200,000 years ago, which is a pathetically short time, but this species is already like a kind of cloud of design, countless overlapping webs at the scale of the planet that are part of its body and brain. The human is occupying itself in a strange kind of way. It's fascinating but not clear if this species can survive itself, or even wants to. Better make some notes.

"It is time that that we become human again."
–Sigfried Giedion

2

THE PLASTIC HUMAN

Human is an unstable category, even an unstable being. It is not a clearly defined biological organism with a particular form and set of capacities that collaborates in social networks to change things around it.

On the contrary, it is defined by its diversity and plasticity – its ability to modify its own abilities. It is this very plasticity, the radical instability of the human, that is the basis of its massive impact. The more malleable and indeterminate the species, the more extreme the impact. In redesigning itself, it redesigns the planet. But equally and simultaneously, the redesigned world redesigns the designing animal. This is the real plasticity that is human. The objects, networks, and systems are never simply produced by a knowing subject dominating the material world. Rather, a new kind of knowing and acting is made possible by that adjusted world and is embedded in the world itself. What makes the human human is not inside the body or brain, or even inside the collective social body, but in our interdependency with artifacts. The human is suspended in a complex and continuous back and forth between itself and artifacts, a flickering that ultimately dissolves the distinction between them. Designed artifacts have as much agency as the animal that seemingly

produced them. They transform the animal just as much as they are transformed by the animal. Or, to say it the other way around, the body and brain become artifacts. What is human is the radicality of this mutual exchange. The human is inseparable from the artifacts that it produces, with the human body having the extended shape of all the artifacts it has made and each artifact being an intimate part of its biology and brain. But also, and more important, the human emerges in the redefinition of capacity provided by the artifacts. In a sense, the artifacts are more human than the human.

Artifacts are therefore never simply the representatives of human intentions and abilities. They are also openings, possibilities of something new in the human, even a new human. There is always a gap between intentions and what is produced. The artifact offers something unexpected, some additional quality or resistance. This excess opens up new ways of thinking, new modes of design. It is not simply feedback to the makers. The network of people responsible for a particular artifact may not pick up on the potential opening. It might be taken advantage of by another group. The artifact may not have been intended in the first place or becomes transformative when used in ways that were not intended, when it breaks, or even when lost. It can do almost everything that was intended yet interact with other artifacts in unexpected ways to produce new potentials. Artifacts are always strange. They are never quite what we expect yet never simply outside us – even when they are appropriations from the outside world, like a rock or even a particular view, or the thought that something we come across is the artifact of another being. Artifacts are part of the body and brain. They are thoughts. But equally they are the potential of new ways of thinking.

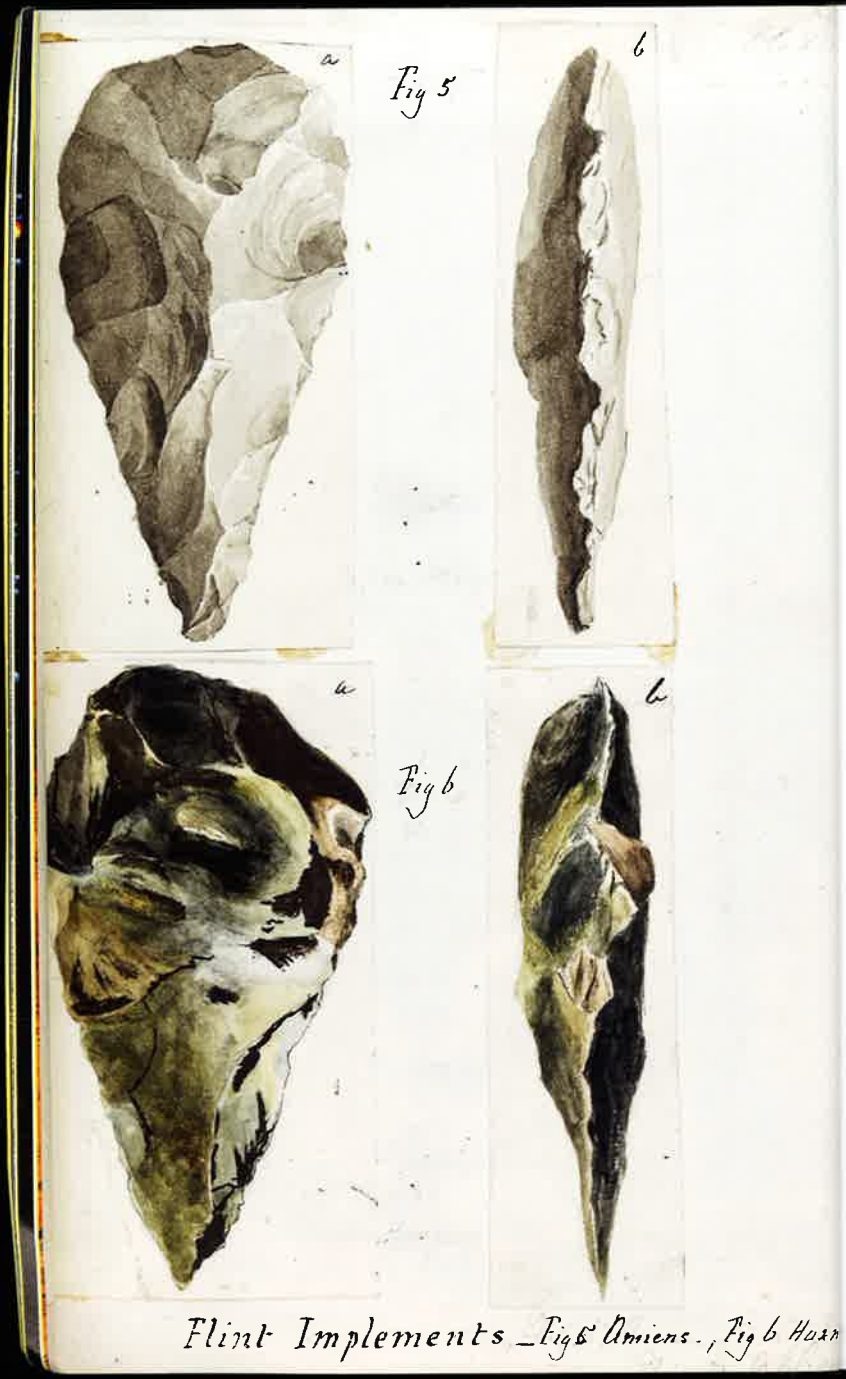
In this sense, histories of the human are histories of artifacts and the interactivities between artifacts, seen as potentials rather than accomplishments, as if the Earth is a vast design studio in which human capacity is being tinkered with in unexpected ways. Artifacts are interfaces, enabling different forms of human engagement with the world but equally enabling the world to engage with the human differently. It's never simply human plus artifact plus Earth, with artifacts acting as interfaces between humans and between humans and the Earth. The human is both inseparable from "its" artifacts and challenged by them, and the Earth, understood as countless interacting life-forms, is also an active protagonist.

If the human is a designing animal and the Earth is its design studio, this animal is not a unique and distinct creature moving and thinking within that vast studio. The figure of the human is not sharply defined. It is part of the living Earth that it designs in just as the living Earth is part of it. The material world, whether the flows in a river valley or in the veins of our own bodies, is never just outside, waiting for human thought and action. It is precisely the lack of a clear line between human and world that provokes or energizes design as the attempt to draw such a line, our forever incomplete attempt to fashion a self-image and the forever unsatisfying attempt to come to terms with what we see in this continually reconstructed mirror.

The archaeology of design is not a self-congratulatory linear narrative about the steady evolution of a singular creature progressively adapting itself to the world with ever more sophisticated capacities and adapting to its own adaptions. Nor is it about the unevenness of such apparent progress with countless different directions, gaps, reversals, and loss of capacities. Rather, it is the history of a question mark.

From the moment we wake up in the morning, we are enveloped in design with our clothes, our shoes, the makeup we put on, our glasses, cell phones, furniture, appliances, computers, and even the paint on the walls surrounding us. This world of design extends out through the streets of the city across the countryside, over and under the oceans, into the atmosphere, and deep into outer space. *Voyager 1*, the spacecraft launched in 1977, is now beyond our solar system in interstellar space, travelling a million miles a day and continually reporting back. It is the piece of design that has reached the farthest away from us. Or, rather, we are stretching ourselves out by a million miles a day. Our eyes are now in interstellar space. In reverse, the world of design reaches deep into our bodies in a galaxy of chemicals and technologies. The artificial heart valve that has saved millions of lives since the early 1950s is like another satellite. This and countless other design innovations have doubled the average life expectancy over the last one hundred years. We are completely suspended in design.

"Nothing resembles
man less than a man."
–Balzac



3

BLOWS OF DESIGN

Design can revolutionize thinking. It's an immediate jolt, or one that happens retroactively – years, even hundreds of thousands of years, later – like a time bomb.

On May 26 and June 2, 1859, geologist Joseph Prestwich and archaeologist John Evans gave matching papers to the scientific elite at the Royal Society and the Society of Antiquaries in London. They asserted that some teardrop-shaped stone objects found alongside the bones of long-extinct mammals in digs in France and England exhibited the uniquely human intelligence of design:

> That they really are implements fashioned by the hand of man, a single glance at a collection of them placed side by side, so as to show the analogy of form of the various specimens, would, I think, be sufficient to convince even the most skeptical. There is a uniformity of shape, a correctness of outline, and a sharpness about the cutting edges and points, which cannot be due to anything but design.[1]

The objects seem to have been systematically shaped by many blows with other stones to produce a thick round end and a thin sharp end. More impressively still, they are symmetrical along the axis from thick to thin and from front to back. The clarity and double symmetry of the shape, its repetition in hundreds of examples, and even the sense of shape gradually coming into focus with the traces of every chip on the surface of each object, was taken to be human. A kind of speculative picture of the early human started to be painted with just the evidence of this object whose visible design makes it an artifact "fashioned by the hand of man," in the mantra of Evans and Prestwich. It was imagined to be a cutting instrument, with its heavy round end shaped for the hand and its pointed end giving the human body a new set of abilities to cut into the world.

These objects produced by what Prestwich evocatively called "blows applied by design" had been found in geological layers containing bones of animals thought to have lived in an epoch long before the human. A new alliance between geology and archaeology had literally repositioned human culture within geology itself – detailing the evidence of human inventiveness in the absence of any human remains in a kind of archaeology of the mind. Prestwich insisted that "the argument does not rest upon the evidence of skill, but upon the evidence of design."[2] The objects were not just made, they were thought. They were neither accidental effects of breaking stones nor copies of existing objects. Stones chipped by natural forces get ever more irregular whereas Prestwich observed that these "artificial" stones get more regular with each chip – "more and more finish, form, and evident art." They are human artifacts because the regularity of the shape "surely implies design, the application of forethought, and an intelligent purpose." The physical implement is first and foremost an instrument of thought.

The archaeologists stare obsessively at the object, measuring it, drawing it, and holding it in their own hands. They feel its weight and the transformation of their own body, imagining themselves as primitive, as if imagining the birth of humanity in the birth of technology. In their portrait of the human becoming human, found stones were used as hand tools to make a better hand tool. The evidence of forethought, of thinking ahead, is in the shape of this piece of stone, the sense of design – as if design is precisely that, a form of thinking ahead. Without even having to say it, the reading of the object depends on the idea that the human is a designer. Yet the only certain information the archaeologists had is a meticulous description of the physical object and the geological layer in which it was found, with detailed sectional drawings of the dig trying to locate the object in time by pinpointing the location of each find and the layering of all adjacent fossils, bones, tusks, teeth, shells, soil, rocks, gravel, minerals, and plants.

Evidence of such "designedly made" objects that had been "shaped by art and man's device," as Evans put it, shockingly overturned the self-image of humanity.[3] The religiously based agreement that the species was six thousand years old was abruptly challenged by the idea of an extended human prehistory. The human was suddenly so much older than previously thought.

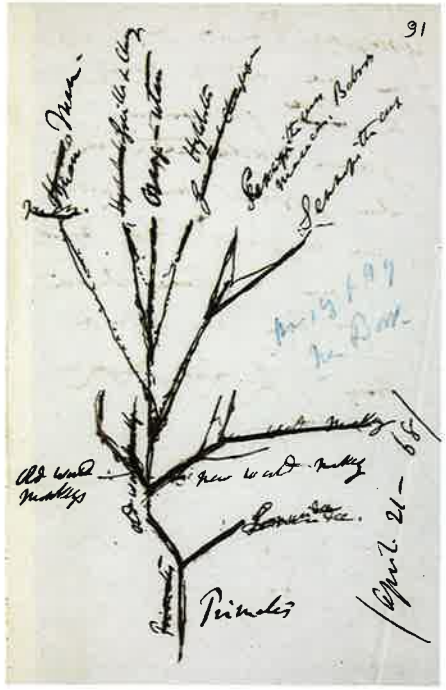
Just six months later, *Charles Darwin*← published *On the Origin of Species by Means of Natural Selection.* The transformative book embraced the idea that humans were ancient but more

radically rejected the idea that any organism, including the human, had been designed by a divine intelligence. Darwin scandalously argued that the relentlessly impressive appearance of a "unity of design" throughout the organic world is actually a product of the essential mutability of all species. Countless incremental adaptions increase the chances of survival in changing environments. Clearly defined organisms with precise functions are paradoxically the product of extreme malleability. The *human eye*→, to use one of Darwin's examples, is the product of millions of minute variations in millions of minute elements over millions of years. It has an extremely long ongoing history, evolving from a simple nerve covered in pigment in primeval organisms into a highly sophisticated "living optical instrument" that is perfectly adjusted to human needs. The organ is so well adjusted to its task that is "scarcely possible" to avoid imagining that it has been designed analogously to the way humans design instruments – as when the analogous instrument of the telescope has been "perfected by the long-continued efforts of the highest human intellects."[4] Yet nothing in the organic world is the product of such a designing intellect. Natural selection is design without a designer.

For Darwin, the human ability to design does not set it apart from other animals. His follow-up book, *The Descent of Man in Relationship to Sex* started with the "indispensable" proof of the antiquity of humans demonstrated by the discovery of ancient designed stone tools.[5] The species in its current state is clearly "the most dominant animal that has ever appeared on the Earth." It is capable of astonishing levels of invention and control, independently inventing new tools everywhere on the planet since deepest antiquity. There is an immense difference between the human mind and that of an ape. Yet the difference is only one of degree.

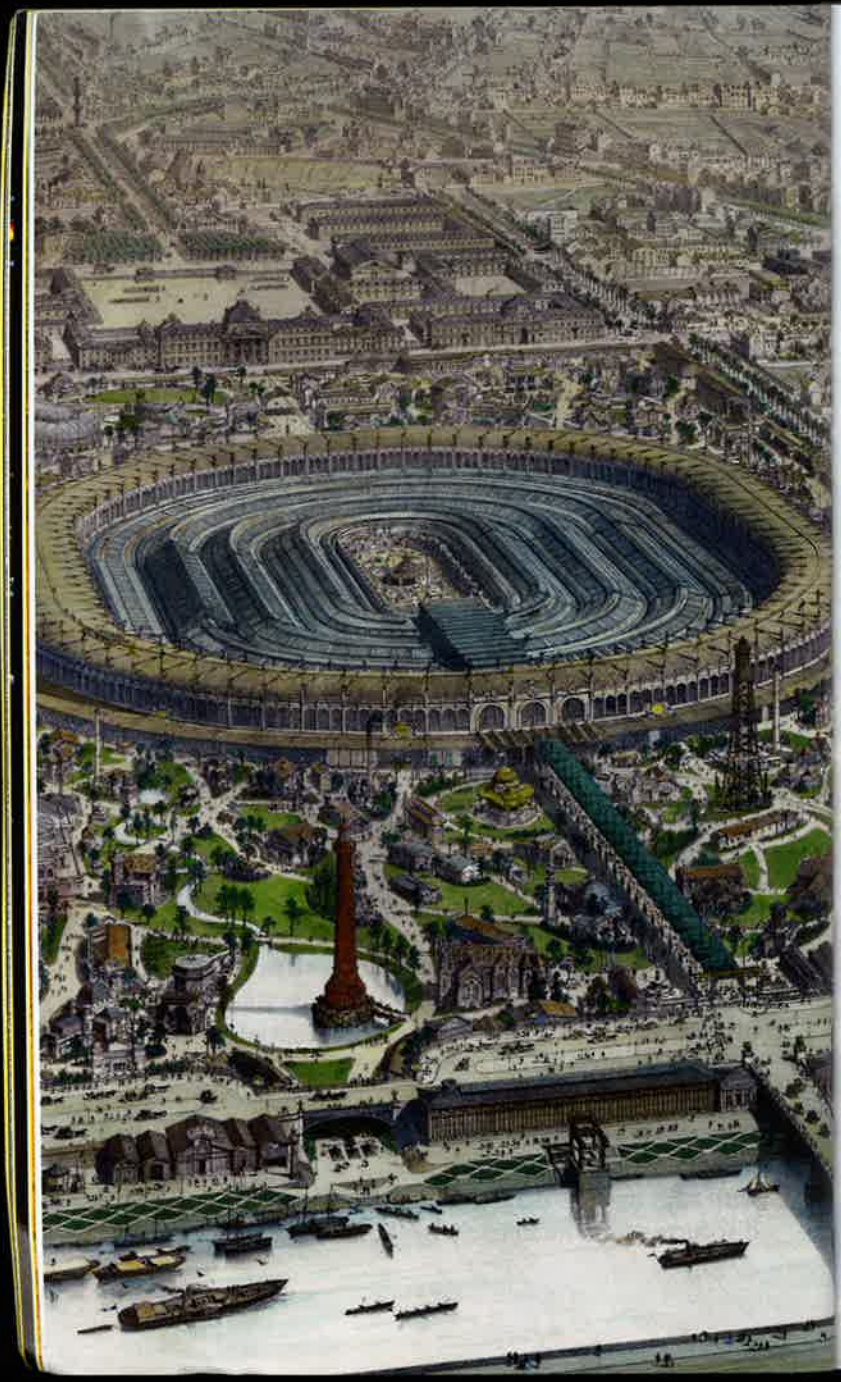
Even if apes are unable to think of refashioning stones into a more precise tool, they do use stones as tools for fighting and opening nuts, make platforms for sleeping, and reason. Darwin insists that human intelligence does not necessarily progress. It can also regress and only differs by degree from that of other animals like the apes, which in turn only differ by degree from other species, even if that difference is again immense, and so on to include every organism on the planet. The human was not only a prehistoric creature living on Earth much earlier than previously imagined, as revealed by technological fossils, but it is embedded in a genetic continuum as a biological relative of all species that ultimately descend from a single original primeval life-form.

This double revolution dramatically transformed thinking about mentality, biology, and technology. The revolutions were interlinked, with human prehistory being a requirement of the idea of countless little biological variations over extremely long periods that allow for the appearance of design. Darwin financially supported some of the archaeological digs by the very people, like John Evans, who had first authenticated the ancient tools. He even speculated that starting to use stone tools would have affected the evolution of the shape of human hands by favoring the hands best suited to manipulating those tools – a speculation in a routinely overlooked passage that has only recently been confirmed.[6] The human hand is uniquely adapted to make and use tools.[7] The inherited structure of the body is ultimately altered by its technological extensions. For all Darwin's opposition to the idea of a designer of nature, the human can actually change the shape of its own organism over countless generations. Human designs eventually redesign the human. We are gradually redesigned by our tools.



Darwin's family tree of the primates

This shocking encounter with prehistoric humanity and the blurring of any line between human and animal coincided with the equally shocking encounter with extreme industrialization in the mid-nineteenth century. The sustained attempt to develop and promote a concept of "design" in everyday objects as a necessary response to the massive impact of industrialization on human life was made during the dramatic encounter with the design of the very first tools and with a destabilizing sense of human intimacy with apes and the extended organic world. The emergent discourse about modern design became entangled with



this new sense of prehistory and primeval origins. The contemporary progress of design was overlapped onto a sense of deep time – as already became obvious when the very stone tools that had finally been authenticated in 1859 were placed at the center of the 1867 *Universal Exposition of Art and Industry in Paris*←. The innermost ring of the vast elliptical exhibition building devoted to all dimensions of human endeavor was a display of the "history of labor" in the gallery surrounding the central garden. The chronological display started with the earliest stone tools alongside the bones of extinct animals and then passed through ever more smooth and polished stone tools and on through five thousand objects of applied art from France in a series of rooms for each period from the Bronze Age up to the year 1800. This polemical promenade of design objects was interpreted as "an exposition of the mental development of the human race."[8] The massive global portrait of industry and culture from around the world at the exposition was literally wrapped around a didactic portrait of the evolution of design. Design itself was understood as the very principle of human evolution in an uncritical celebration of progress – as if nothing was more human than the ability to modernize oneself.

The concept of modern design that was already being incubated in these years didn't simply rest on the newly established concepts of human biological and technological evolution. Rather, it was part of the ongoing testing of those concepts. Both the biological and technological arguments had an extended history. The first publication of detailed drawings of stone "weapons" found alongside "extraordinary" bones of extinct animals had already been made in 1800 by John Frere, along with a speculation that they might come from "a very remote period indeed; even beyond that of the present world."[9] Mammoth bones

were obsessively studied in the 1820s and started to be associated with finds of stone tools in many different countries in the 1830s but the overlap in time of human artifacts and animal fossils remained an implausible speculation. Jacques Boucher de Perthes transformed the argument by having a geologist prepare detailed drawings of the geological layers where he first started finding stone tools in 1841. He published his "geo-archaeology" claim that he had found many such "axes" (*haches*) in the same layers as extinct mammoths in his self-published 1847 book on primitive industry and the arts at their origin.[10] But the scientific community was not convinced. The turning point a decade later was the ability to use the relatively new technology of photography to take two images on April 27, 1859, of a stone tool sticking out from the side of an ancient layer 17 feet down one of de Perthes's digs near Saint-Acheul in the Lower Somme river valley in France. Prestwich and Evans were present as the embedded object was uncovered and *documented*→.[11] They were disappointed that it turned out to be a much more crudely formed object than most of the ones they had seen and drawn, an "unfinished implement," making the case for design more difficult. But the antiquity of such objects could now be demonstrated. They returned to England with the object the very next day, quickly confirmed similar evidence of prehistoric design in local digs and immediately reported to the scientific community, showing the object and the photograph – noting the similar findings that had been made France, England, Belgium, Germany, Italy, and Brazil. The sense of time was permanently revolutionized and the ever-expanding field of prehistory was unleashed as a form of permanent self-reflection on the species through a restless debate about the meaning of technofossils.

The unfinished stone tool presented to the Royal Society by Prestwich and Evans

Darwin's religiously unacceptable suggestion that humans might have descended from apes made shortly afterward was likewise built on a much longer tradition of thinking by a number of writers, including his own grandfather Erasmus Darwin, who speculated at the end of the eighteenth century about a continuous evolutionary development from microorganisms to contemporary society. Yet the idea of natural selection that Darwin had formulated and detailed by 1844 and finally published in 1859 was quickly surrounded by critiques and alternative theories. It would take a substantial amount of time to be generally accepted, and it still remains contentious – as does the status of prehistoric artifacts.

In fact, the purpose of the carefully shaped symmetrical hand axe that launched the whole debate was never clear

and is still unclear today. The apparent presence of design was treated as the oldest evidence of the human, but design for what exactly? Prestwich already noted in his lecture to the Royal Society that most of the hundreds of ancient artifacts being lifted out of the ground looked like they had never been used: "as sharp and fresh-looking as though they had but recently come from the hands of the workman."[12] The sheer number of them had at first made Darwin doubt that they were human-made tools at all, and he sympathized with one of the responses to Prestwich's lecture that if they were human, then humans must have spent all their time chipping stones.[13] But he was soon persuaded by his closest colleagues and added a passage to 1861 American edition of *Origin of Species* that eagerly embraced the discovery of stone tools as definitive evidence that man "existed at a period very remote if measured in years."[14] He was fascinated with the subject yet still hesitated as to the meaning of human design. He saw the production of the first crafted tool as a very minimal functional improvement on found splinters of stone that could be used as tools and was particularly struck by the fact that it took "an immense interval of time" until Neolithic humans updated the technology with more refined and polished shapes.[15] Human tools are able to permanently reshape the human body but do not necessarily evolve under functional and environmental demands.

In the end, the design of the earliest tools might be as much about their ornamental beauty as about defined function, visually striking designs to help the survival of the craftsperson's genes by attracting mates. The crafted shape of a tool could be like the elaborate display of colored feathers of a peacock and all the other seemingly unnecessary structures, colors, and

First hand axe to be published, 1800

patterns in the natural world. Darwin explained all this "ornament" with his crucial concept of "sexual selection" that supplemented "natural selection." He devoted a huge amount of his texts to the question of ornament as a major evolutionary force in the natural world, marveling at its diversity. More than half of *The Descent of Man* was about the question of ornament. It goes through the countless modes of "decoration" in animals before making a detailed account of all the ways that ancient and contemporary humans use an array of "artificial ornaments" and actively reshape every part of their bodies, often through dramatic painful physical modifications. The point is that these modes of self-fashioning actually bind humans closer to nature and the animal world rather than separates them from it. Even the uniquely naked skin of the human body is portrayed as the evolutionary consequence of an aesthetic choice. Given all the "strange" characteristics that are appreciated by different animals, Darwin finds it unsurprising that the loss of hair could be "esteemed as ornamental" by our "semi-human" ancestors, even as it created a real survival disadvantage in both hot and cold parts of the planet.[16]

This permanently complicates the archaeologist's foundational gesture of using design as evidence of human thought and life. The most carefully and repeatedly made tools are not necessarily made to be used. The exhibition of design itself may even be the primary goal of some of the oldest of human objects. It is as if they were made to look like they had been made. Their sharply defined form is an enigma – a puzzle at the intersection between human design and the design of the human. If design is the first sign of the human, it is the beginning of a permanent question.

Design has gone viral. The word *design* is everywhere. It pops up in every situation. It knows no limit. We are ambushed by wave upon wave of design biennials, weeks, fairs, festivals, neighborhoods, capitals, stores, magazines, books, websites, blogs, awards, programs, schools, centers, departments, museums, exhibitions, associations, councils, committees, and congresses. Along with "designer" hotels, drugs, bodies, and food we can have "happiness by design," "diplomacy by design," "social impact design," or "design for social justice." A new wave of "designers" shape "experience," "interfaces," "software," "brand," and "interaction." New university programs are devoted to "biological design" and "social innovation design." "Design thinking" has become a dominant business model affecting everything from politics to education, personal relationships, research, communication, and philanthropy. At a time in which the largest company in the world has based all its success on design, business schools now have design programs and the position of Chief Design Officer has recently assumed the same status as Chief Financial Officer. Companies that had nothing to do with design now build design into every dimension of corporate life. Politicians believe their success is dependent on design thinking. Cities have design departments whose role goes far beyond the usual focus on transportation, buildings, parks, street furniture, and signage to brand themselves. Even experts in "design risk assessment" have appeared to evaluate the danger that the incorporation of design brings to any scene. Design has become dangerously successful.

"The human hand is human because of what it makes, not of what it is."

–André Leroi-Gourhan

Homo naledi hands with features of both climbing trees and tool manipulation

Camillo Golgi's technique to reveal paths of nerves in the brain, 1875

4

THE INVENTION OF THE HUMAN

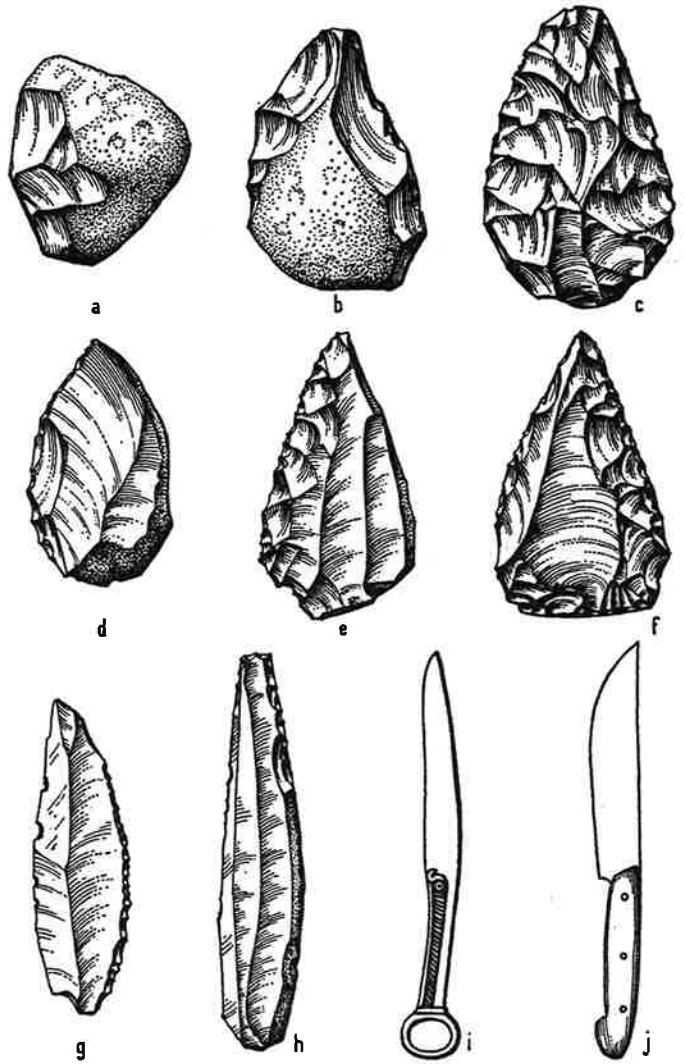
The question "Are we human?" immediately triggers a chain of parallel questions: What is human? When did we become human? Are we still human? Were we ever human? and Are we human yet?

The human might be the species that asks this kind of question of itself, yet the very act of asking indicates that there is no clear line between human and nonhuman. Despite its massive impact on, under, and above the planet and its apparent domination of other species, the human is never unambiguously distinct from the animal or from the wider systems of the Earth. Which raises an even more fundamental question about this human animal: How was the human invented? In other words, how did a self-questioning species emerge? And what role did design play?

The emergence of the human through the continuous invention of artifacts involves an uncanny mirroring. The human becomes human in seeing itself in the things it makes, or seeing its possibility in those things. So the human doesn't simply invent tools. Tools invent the human.

More precisely, tool and human produce each other. The artifacts that prosthetically expand thought and reach are what make the human human. As Bernard Stiegler, reading the work of the influential paleoanthropologist André Leroi-Gourhan, puts it: "The prosthesis is not the mere extension of the human body; it is the constitution of this body qua 'human.'"[1] Leroi-Gourhan echoed the nineteenth-century idea that the human species was unique in evolving organically through its technological extensions: "The whole of our evolution has been oriented toward placing outside ourselves what in the rest of the animal world is achieved inside by species adaption."[2] The body itself is only human by virtue of technology: "the human hand is human because of what it makes, not of what it is."[3] What is human is the gesture of externalization, which is not from some preexisting interior, like thoughts in the brain, but is a gesture that constitutes a new sense of interior. The human is always being invented as such by the gestures that transform it. Brain, body, and artifact cannot be separated. Thinking only occurs in the intermingling between them. Artifacts themselves are thoughts that potentially also trigger new modes of thought.

The human brain is therefore an effect of new tools rather than the generator of new tools. Tools are an opportunity for it rather than an accomplishment of it. The intentionality and anticipation of effects that is distinctly human arises from the activity of making itself. Human intentions are provoked by making tools rather than executed by them.[4] And what makes a tool a tool? Strictly speaking, a tool is not produced to carry out a defined utilitarian task. Tools are born as challenges to existing concepts of utility. They open up new understandings of what could be useful. Utility is not a given unambiguous need. Ambiguity about utility is what drives new forms of utility.

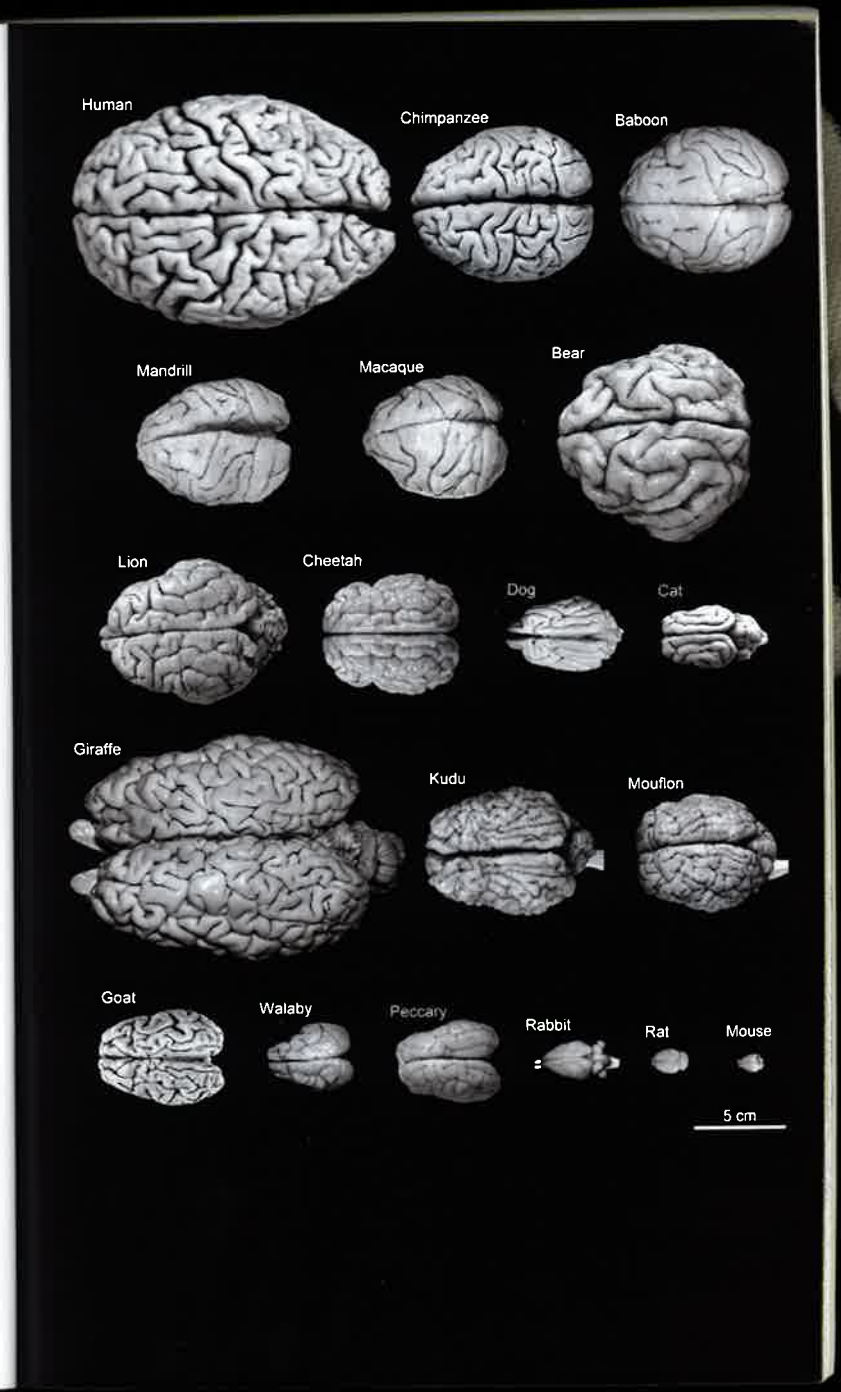


Leroi-Gourhan's illustration of evolution of the knife

Some paleoanthropologists argue that the main driver of human accomplishment is simply a uniquely human capacity for variability, an impulse to generate a multiplicity of ways to do things in reaction to different circumstances.[5] This variability itself can be understood as design capacity. When other species have figured out a way to do something, they keep repeating it forever until changes in the context reinforce a different direction. Humans continuously imagine different ways even in the same context, to the point of malfunction. The human is the only species that has tools that don't work, which is paradoxically the origin of its intelligence.

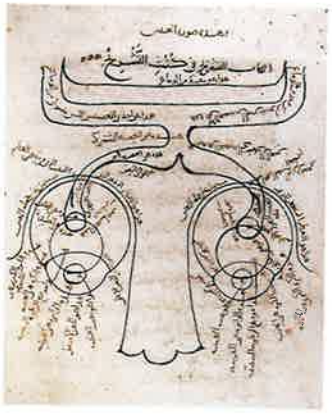
Design might simply be a name for this impulse to do things differently. Earlier attempts to explain the apparent exponential acceleration of human invention in the last 40,000 years presupposed some sudden increase in the cognitive capacity of the human brain as the enabling trigger. Recent accounts see this acceleration of invention occurring more gradually throughout the last 200,000 years, finding no evidence in fossils of change in the cognitive capacity to design. The ever-increasing size of groups in proximity to one another and the connectivity between these groups through migration formed a collective brain more likely to invent alternative ways to do things.[6] As more and more people shared knowledge and the accuracy of the knowledge being passed between groups and generations increased, the frequency of invention increased and continuously reinvented the brain in a kind of chain reaction of design.

The human brain itself is a malleable artifact whose circuits are continually rearranged through engagement with material culture. It is an unfinished project with a forever uncertain future and an equally uncertain beginning. The idea of a sudden flourishing of design gives way to the thought, as Patrick Roberts puts it, that "there is no single evolutionary event or moment where the brain becomes definitively 'human.'"[7]

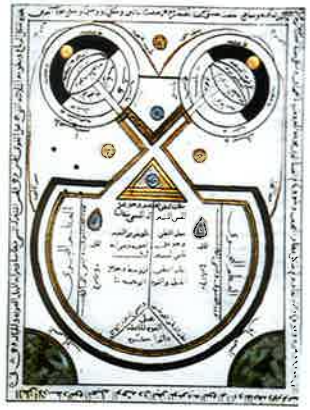


The archaeology of design is not about gradual shifts or revolutionary leaps. Design is by definition unevenly distributed in space and time, often flickering as some innovations disappear for a very long time only to be reinvented again. There is wide technological variability at any one time with the specific tools and ornamental sets reflecting behaviors in response to specific contexts. This variability itself ultimately contributes to the inventiveness of the species. The human invented by its artifacts is nowhere the same.

The incalculable diversity and interdependency of species on the planet that results from incremental adaptions to changing environments, including adaptions to the adaptions of others, finds its echo within the human species and is accelerated through the technological extensions that are an intimate part of its biology. Nothing could be more natural. The invention of artifacts that reinvent the inventor is precisely not controlled by the human in the sense of a singular animal imposing itself on the surrounding living world. The human is permanently suspended between



Ibn al-Haytham, ca. 1027



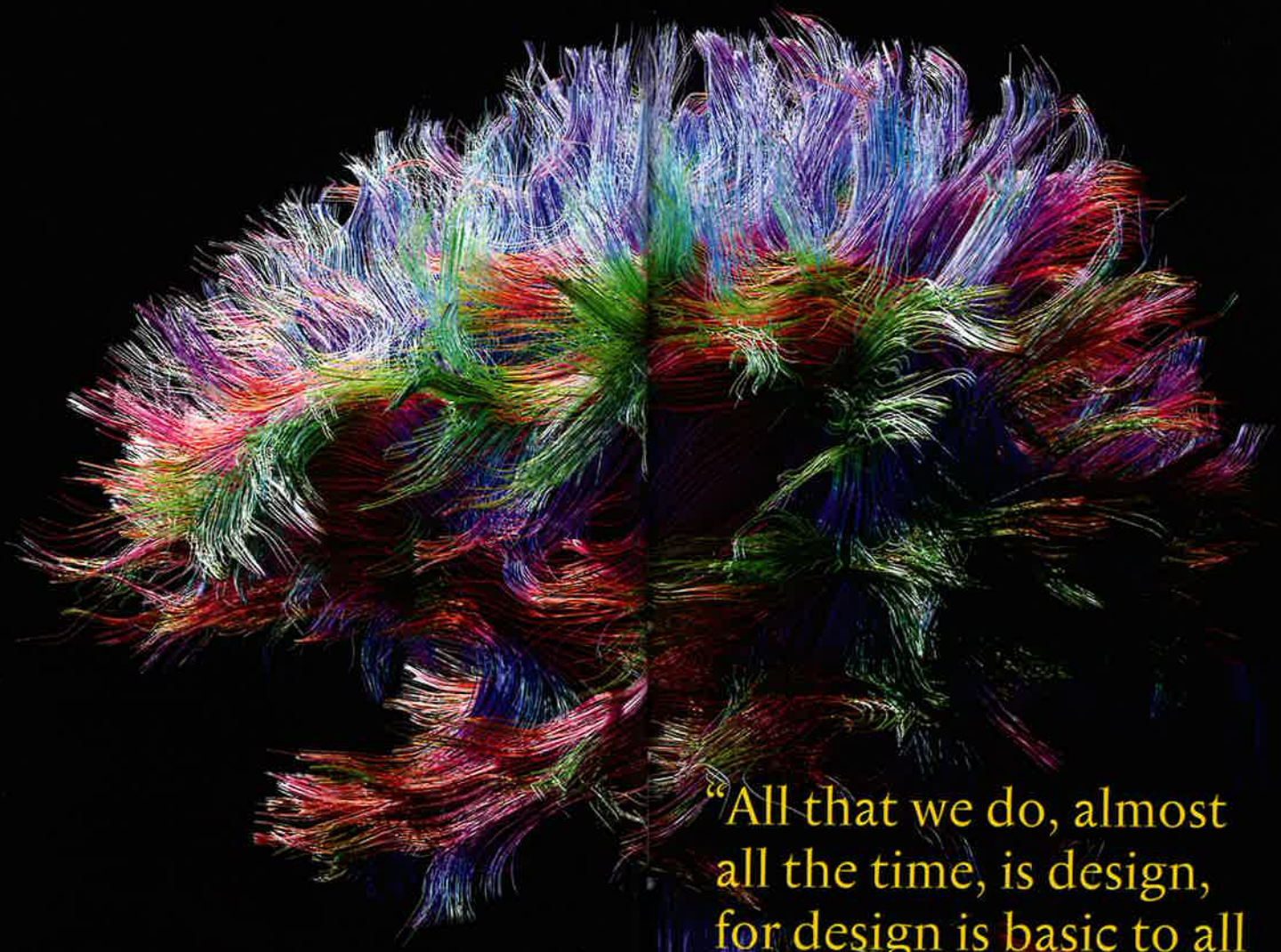
Khalifa ibn Abi al-Mahasin al-Halabi, 15th c.

being the cause and the effect, between designing living systems and being designed by them.

What is human in the end is neither the designer nor the artifacts but their interdependency. It is precisely the fully organic condition of technological life, the fact that it is alive, that raises the urgent questions about design. In particular, it raises the question of how, where, and when invention itself was invented. How did that impulse to do things differently arise?

Cerebellum, Santiago Ramón y Cajal, 1904

Design is always understood to be a good thing. The empire of design reinforces the idea that good design is good business that makes good people. This concept has been so successfully promoted that all design is thought to be good design. The word *good* no longer even needs to be said. The very word *design* already means "good" – as if we don't need to think about the fact that the same concept is active in weapons, surveillance, invasions, policing, nationalism, incarceration, and terrorism. Good design might not be such a good thing.



"All that we do, almost all the time, is design, for design is basic to all human activity."

–Victor Papanek

Diffusion MRI image of brain

35,400-year-old cave painting, Sulawesi Island, Indonesia

5

THE ORNAMENTAL SPECIES

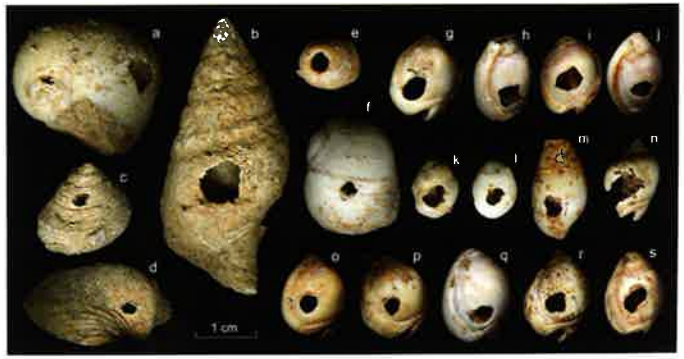
Archaeologists and paleoanthropologists have long tried to understand why it took so long for the human to act like a human.

Until recently, there seemed to be a huge gap between the appearance of the anatomically modern *Homo sapiens* with its uniquely agile hands and large brain 200,000 years ago in Africa and the "behaviorally modern" human that appeared around 40,000 years ago. The symptoms of recognizably human behavior were the sophistication and complexity of tools, symbols, burial rituals, and techniques. Even then, this acceleration only became exponential in the last 12,000 years, when "humans redesigned themselves as organic beings," as John Hoffecker puts it, with abstract thinking, composite tools, long-distance networks of production and exchange, cooperative labor, and so on. Countless inventions steadily transformed the species and dramatically altered its relationship to the environment through the "domestication (that is, *re*designing) of plants and animals."[1]

From the deep time perspective of geology, the human ability to redesign itself and the living environment happened only yesterday. But the apparent gap between human anatomy and behavior has been rapidly dissolved by recent findings of ever-earlier evidence of distinctly modern human behavior in the fossil records. The fixation on the period from 40,000 years ago turns out to have been a Eurocentric bias concentrating on the time that *Homo sapiens* finally started arriving in Europe, having migrated out of Africa in waves starting as early as 135,000 years ago. The Eurocentrism of archaeology and anthropology has been undermined, for example, by the discovery in 2014 that some stenciled images of *human hands in a cave*↓ in Indonesia are at least 40,000 years old, preceding anything similar found in Europe, as do the oldest images of animals yet found, painted at least 35,400 years ago in the same cave.[2] The appearance of these key symptoms of modern behavior more or less simultaneously in the most dispersed places on the planet where the species had migrated undoes conventional wisdom. The human is not a European invention after all. Nor is it so young given the recent discoveries that elaborate burials, geometric engravings, and ornamental beads are already evident more than 100,000 years ago in Africa and the Middle East.

The finding of very old *ornamental beads*↓ is crucial. Ornaments are a key symptom of the human ability to externalize its thoughts in symbolic form – generating and sharing information rather than simply processing it. Archaeologists treat marine shells with holes punched in them to be strung together in necklaces as a pivotal "information technology" that establishes a sense of self and group identity. It is a "media of communication" that broadcasts personal information to strangers who are close enough to understand the meaning of your ornaments but not close enough to already know you personally. The ornaments simultaneously create a sense of self and foster ever-wider social networks by aiming at this middle distance between locals and strangers.[3] The discovery of such shells in layers dated between 135,000 and 120,000 years old has completely overturned previous accounts of the emergence of the emergence of the human.[4] As the evidence of communication through ornament gets ever older, human inventiveness appears to get ever closer to the anatomical beginning of the species.

Ornament both marks and expands the human. It is both a sign of the ability to invent and the very mechanism



of invention. The systematic use of shells very far from their marine source is a symptom of crossing demographic thresholds and creating long-distance networks that further increases the odds of technological innovation. Symbolic behavior fosters the capacity for more complex tools, techniques, and strategies, rather than the other way around.

It is not ornament per se that defines the species. Neanderthals, the hominoid species genetically closest to *Homo sapiens* that became extinct 40,000 years ago, also used marine shells in parallel to modern humans. Ornament is essential to the life of animals in the most obvious sense of systematic visual patterns operating as an information system tied into survival through sexual reproduction. What is uniquely human is the chain reaction, the continuous reinvention of the human triggered by the invention of artifacts that create the conditions for further such inventions. This creative capacity to invent ultimately plays a survival function as utilitarian as that of any other tool but does so indirectly by constantly introducing potential new forms of utility. The immediate practical necessities to support life might not be sufficient. There is no survival advantage in having a tool that kills animals more efficiently if you cannot find sexual partners to reproduce. An attractive or intriguing artifact might ultimately be more practical than a seemingly practical one in offering the potential of other ways to do things. Ornament in this sense is both a tool of communication and the opening to new forms of tool – or at least there is finally no clear or permanent line between ornament and tool. The human cannot think of one without the other and precisely what is human is to think about this. Or, to say it another way round, the human is that species that keeps reflecting on the possible uses of its artifacts and communicating these reflections by making new artifacts, flickering back and forth between ornament and tool.

The invention of the human was never simply about the ability to make tools as such. *Stone tools*↓ as old as 3.3 million years have been found, long before the different hominin species. Even the hand axe associated with *Homo erectus*, with its consistent teardrop shape in comparison to the more random shapes of earlier tools, is as old as 1.7 million years. Its symmetry – which required a huge investment of energy and a series of different tools and striking techniques to produce – offered no apparent functional advantage over the previous tools and it is found in very large numbers with so many having no traces of ever being used. The status of these obsessively crafted objects was already a puzzle when they were found and discussed for the first time in the mid-nineteenth century. That puzzle has only deepened as the artifacts that preceded them have been found, favoring the possibility that the object was made to be looked at, tool as ornament, with its beauty offering a sexual advantage as a kind of advertisement of the good genes of whoever made it, as Darwin's theory allows.[5] Such a tool was already externalized thought, evidence of a proto-mind coinciding with a major increase in brain and body size.[6]

3.3-million-year-old tool found at Lomekwi, Kenya

1,4 million years old

300,000 years old

This is a collective mind as the artifact that is systematically shaped beyond its material function was continually remade, seen, and shared between groups and between generations, becoming incrementally more precise with minor local variations. Yet the same basic shape was produced in the same way without major adjustment for over a million and a half years across Africa, the Middle East, Asia, and Europe until the invention of a succession of ever more refined and complex tool sets marked the emergence of creativity itself and "the redesigned human."[7] Or, in Slavoj Zizek's words, "the very birth of humanity out of design."[8]

The use of a specific red-colored ochre for bodies and objects – carefully selected, ground into pigment, and transported over long distances – likewise precedes *Homo sapiens*. It has been found in layers as old as 500,000 years ago, even though the pigment is much less likely to have survived in the fossil records than stone. There is much debate about whether this use of pigment could have been symbolic, but

there is general agreement that the addition of beads as body ornamentation is the crucial step associated with the emergence of human inventiveness that was associated with a massive growth in the use of red pigment.[9] The new use of beads as a form of information technology was itself remarkably stable, with evidence of the same shells being used across vast territories for tens of thousands of years with only minor shifts in the manufacture and design of these "thinking strings."[10] It was a default "design tradition" that likely acted as the most basic element of more complex design systems.[11] This new complexity of symbolic design precedes and becomes entangled with the new complexity of tools that combined many parts made of multiple materials able to be assembled in different ways that is evident around 65,000 years ago in the ever-changing fossil records and likely to be found ever earlier.

It is this multiplicity and malleability itself that is evidence of the capacity to invent that makes us human, that invents the human even. The ability to go beyond what is needed, to make something different or differently is crucial. The making of useless things, or things whose use has yet to be discovered, makes all the difference. Yet for that very reason, nothing in the fossil record, nor any artefact of contemporary life today, can simply be divided between useful and useless, tool and ornament. More often than not, what is seen as ornament is doing the real work and what looks like a tool is really for show. And the vibration between them is the very engine of design. Nothing is more serious than ornament if we really want to address the human ability to invent a planetary-sized ecology of technology as a designed form of organic life.

Design routinely constructs radical inequalities. The expansion of the capacity of one group is done at the expense of another group. At the same moment that every element of our world is being designed, that businesses and government deploy "design thinking," and the planet itself has become a human artifact, billions of people are on the edge of survival. It is not that there is a privileged world of design and an unprivileged world outside design. Design is not simply concentrated where wealth is concentrated. Rather it is everywhere, and it engineers concentrations of wealth and privilege. The spaces in which people and resources are exploited have been designed. They are the result of systematic decisions over centuries sustained by the latest technological and administrative systems. The apparent lack of design in vast parts of the world – the Arctic, the Amazon, the desert, the oceans, the atmosphere – is a mirage, a deadly effect. Inequalities are being crafted in everything we see, don't see, or don't want to see.

77,000-year-old incised ochre
Blombos Cave, South Africa

"Technology wasn't invented by humans. Rather the other way around."

–Jean-François Lyotard

Are We Nothing But Machines II,
Mia-Jane Harris

6

NEWS FROM NOWHERE

The thought of the posthuman is not what happens after twentieth-century modern design. On the contrary, modern design was a reaction to that thought.

Just four years after Charles Darwin dramatically complicated thinking about the design of the human, the writer Samuel Butler published his 1863 polemic "Darwin among the Machines," the first of his speculations that the tools that humans had originally deployed as prosthetic extensions of their bodies were now evolving as living species in their own right. Technology itself had become biological, a form of "mechanical life" that was already deploying humans to nourish it. It was just a matter of time before the machine world would have no need of its human slaves to keep it alive: "we are ourselves creating our own successors . . these glorious animals."[1] The possibilities that humans may either become superhuman or have manufactured their own demise were already a subject of public debate.

The image of the human as a prosthetic being that expands its biology and mentality with layers of technology is both the image of the prehistoric emergence of the species with the first stone tools and the image of an inevitable future where the fleshy body is left behind. In a sense, modern design was incubated with an eye to these two new

horizons, as if suspended between them. With the dramatic acceleration of industrialization in the mid-nineteenth century, workers were increasingly treated as disposable machine parts and machines were treated as organisms with an internal life that needed to be preserved. This reversal became the focus of much public discussion, with many writers speculating on the possible demise of the human at the hands of the mechanized world that it had produced. In an international debate lasting more than half a century, modern design was itself designed as an instrument to engage with the biology of the machine world in a way that supposedly both affirms and protects the human.

The construction of the basic argument for what would eventually be labelled "good design" involved hundreds of voices. A whole series of new institutions were set up in different countries – including associations, schools, museums, and magazines. Countless political, financial, regional, national, local, personal, and professional agendas were involved. It was a massive, extended, uneven, and nuanced debate. Yet the core of the argument remained surprisingly consistent. Design was framed as a way to deal with the increasingly dominant logic of the industrialized and globalized world while resisting the perceived dehumanizing impact of that world.

Each designer and design theorist in the ongoing discourse was obliged to take a position on the relationship between human and machine. It was not so much a discussion about particular forms as it was about the possible relationship of these forms to the human and technological worlds. The debate flickered back and forth between the sense that technology is the greatest threat to our humanity and the sense that technology might be the most human thing about us, since only the human invents tools to make tools

and has always used its own artifacts to reinvent itself. In a sense, the debate about design was looking for a way to preserve both thoughts, constructing design as a way to both reinvent and protect the human.

The concept of modern design that is now a routine part of most dimensions of everyday life was originally a reaction to the exponential acceleration of mechanization in the so-called Industrial Revolution that was initiated in England and expanded itself across the planet as a vast interconnected mechanism digesting ever more territory, resources, and people. The rapid massive shift from the energy of humans and horses to that of machines, compounded by the revolution of time and space with the emergence of train networks, and compounded again with the arrival of instantaneous communication by telephone, telegraph, and radio was itself seen as an all-consuming life-form with its own biological needs and even desires. The acceleration of industrialization was accompanied by an increasingly urgent questioning of what constitutes the human. The word *design* was called on in the 1830s to explicitly negotiate between human and machine in a discourse that again started in England, migrated to continental Europe, and kept expanding to eventually become global in a kind of belated echo of industrialization itself. The concept of design (and even the use of the word *design*) that was developed by this debate and is itself now a global commodity, remains a nineteenth-century product.

The British government was convinced in the 1830s that Prussia and France would dominate the newly emerging global market because their industrial arts were of a higher quality. They tried to emulate the continental rivals by setting up a comprehensive infrastructure of schools, journals, museums, and programs of public education

through lectures, exhibitions, and night classes.[2] The expression "School of Design" was invented in response to the wide array of institutions in Europe ranging from technical training centers to elite art academies, of which only the Royal Free School, founded in 1767 in Paris, included the word *dessin* (drawing) in its long title. For the British reformers, design was much more than drawing, even if training in drawing was fundamental. Rather, it was a morally infused way of making decisions about objects that galvanized government, business, industry, class, and art interests.

The basic idea was to spread knowledge of the "principles of design" to both the manufacturers of objects and the people who used them. These principles were simply the attempt to make ornament subservient to the form of the manufactured object and the form subservient to its function, underpinned by the quasi-aristocratic sense of "good taste." "Good" was the key word, linking a sense of morality to a sense of controlled aesthetics. "Good art" in everyday objects has "moral benefits."[3] It was thought that the exhibition of good design would raise the moral status of the designer in society. The design reformers occasionally suggested that their main commitment to "progress in good design" did not even require them to discuss morality itself.[4] The whole point is that the virtue of design is meant to be self-evident. Design itself was understood as a form of education. But the reformers never felt that they had made any progress in their campaign. After each major international exhibition, starting with the *Great Exhibition in the Crystal Palace of 1851*→ that they had organized, the sense of local design inferiority deepened. Yet the feeling of failure acted as a kind of motivating engine and by the end of the century Germany and France were as jealous of British design culture as the British had originally been of them. Key writers like Adolf Loos and Hermann Muthesius used English design as their model and

DAS ANDERE
EIN BLATT ZUR EINFUEHRUNG ABENDLAENDISCHER KULTUR IN OESTERREICH; GESCHRIEBEN VON ADOLF LOOS 1. JAHR
GOLDMAN & SALATSCH
Société Franco-Autrichienne
MOBELSTOFFE
LYONER SEIDEN- UND SAMT BROKATE
ECHTE UND IMITIERTE GOBELINS
ENGLISCHE UND FRANZOSISCHE TEPPICHE
STICKEREIEN UND APPLICATIONEN
SPITZENVORHÄNGE
WIEN, I. GRABEN 20.
Société Franco-Autrichienne

Das Andere (The Other), edited by Adolf Loos

the arguments that had been formed in England in the face of industrialization were imported when the epicenter of the debate moved to Germany. Muthesius, for example, had lived in England as a kind of cultural spy for the government and played an important role in setting up the Deutscher Werkbund in 1907 as a collaboration between designers, industry, and government to explicitly pick up the English arguments. Loos immediately attacked the Werkbund for its attempt to invent the design of the everyday object – preferring the ready-made simplicity of English objects. Yet the Werkbund's eventual celebration of "form without ornament" would retroactively appear as a Loosian manifesto.

The different positions remained entangled with each other as the debate migrated. The work of those trying to defend the human from the machine often influenced those trying to embrace the machine and vice versa. This had already been the case in England when the task of finding a philosophy of design appropriate for a machine age became energized by those most critical of the machine. *William Morris*←, for example, had led the view of the machine as a human tool that had now become a new life-form that was turning humans into its tools, as he argued in his 1886 lecture:

> I am thinking of the modern machine, which is as it were alive, and to which the man is auxiliary, and not of the old machine, the improved tool, which is auxiliary to the man, and only works as long as his hand is thinking.[5]

Morris appealed to preindustrial craft and polemically withdrew from the enslaving space of the factory to his own workshops, yet he played an active role in the ongoing government attempt to develop a design culture in the schools of design, museums, and manufacturing. He submitted his own designs for machine-printed fabrics and carpets while warning against machines. At a government commission formed in 1882 to address the deficiencies of British design, he made it clear that he was not against the machine as such but against the enslavement of humans to machines. He advised the government that understanding the machine and industrialized manufacturing processes is "the very foundation of design."[6] In fact, Morris thought that the machines that had so damaged humanity by turning workers into machine parts were much better designed than the products made with them. His portrait of a socialist utopia resisting "mechanical life" in favor of human life in his novel *News from Nowhere* of 1890 includes "immensely improved machinery" capable of freeing workers to work on what they wanted to work on.[7]

The thinking of Morris actually became a model for many of those in the Werkbund debates that were trying to embrace the repetitive standardizing logic of the machine while reaffirming deeper human values that would supposedly control the machine. In a 1902 book that begins with an epigraph by Morris, Muthesius himself portrayed the machine as a thoroughly human artifact that simply needs to be tamed by human will: "the machine

itself, however, is simply an improved tool. To exclude it as such from our human production would be foolish."[8] The back and forth in the continuous dialogue that incubated modern design was never really a back and forth between the separate needs of the machine and the needs of the human. Rather it was an engagement with the complexity of the disquieting interdependency of human and machine. The participants in the famous Werkbund debate about the merits of standardization at Cologne in 1914, for example, exaggerated their differences. Most of those who responded to Muthesius's call for the standardization of design with a counterdemand for the preservation of individual expression quietly changed sides immediately after the polemical confrontation. Some, like Walter Gropius, would even become the very spokespeople of the necessity for machine age standardization. The main currency on both sides was always the "human," and the ultimate embrace of the machine was never in doubt.

The discourse shaping modern design remained full of these permanent paradoxes. The Berlin critic Adolf Behne cannily argued in 1926 that those designers who only care about the mechanical logic of function, and aim to make a building a "pure tool," actually end up with an anthropomorphic architecture: "In fact dehumanization is the very thing that leads to humanization, to anthropomorphism."[9] And in reverse, those who claim to care only about "human will" end up producing an inhumanly standardized architecture.

Behne insisted that from the first very first tools and shelters, architecture has always been a combination of function and play: "Primitive man is not simply utilitarian. He demonstrates his instinct for play even in his tools, which he makes smooth and beautiful beyond the demands of necessity, painting them or decorating them with ornaments."[10] There

is no line between tool and toy. In fact, Behne argued that it is play that generates form in the first place. Function itself is unable to "arouse human interest in any way." Any attempt to separate function and play is foolish. The supposedly pure functionalist is actually more interested in redesigning humans than in function itself:

> The functionalist . . . does not see [purpose] as something complete, unalterable, rigidly prescribed; rather, it is a means to broaden and refine, intensify and sublimate, move and mold human beings. For him every satisfied purpose is an implement for creating new, more refined human beings.[11]

Modern design keeps declaring its loyalty to the human but actually flips back and forth between ignoring the human and inventing a new one.

These paradoxes that were already triggered by the question "are we human?" in the mid-nineteenth century made their way from England into the Werkbund and then into the Bauhaus, across to the United States and then dispersed globally, and became embedded in the idea of good design that became the slogan for modern design after World War II. The promise of good design is to produce good humans. But this promise is inseparable from a globalized industrial complex that threatens humanity. Good design tries to hold back the disturbing thoughts that were so palpable in the nineteenth century that we might no longer be human or are obsolete in our very humanness. Good design tries to block the very thoughts that inspired the idea of modern design in the first place.

Design is also the design of neglect. In June 2015 eight-year-old Adou Ouattara, from Ivory Coast, was discovered by border control X-ray machines as he was being smuggled into Spain from Morocco inside a roller suitcase. Everyone could see into the small suitcase as the image went viral in all media. Likewise, we look down on an overcrowded boat off the coast of Libya in a drone photograph and they look directly back at us. In the pages of a Sunday magazine, we watch a ten-year-old boy named Hassan trying on a life vest in a shop in Izmir full of designer jeans in different styles and T-shirts piled up on the shelves and emergency clothing on the table. With the attentive shop assistant fitting the boy and the adult smiling in the mirror (presumably the father), the scene appears normal. Perhaps they are going on a boat trip. Emergency, and the role of design within it, has become routine as we all watch it. On August 5, 2010, a chunk of ice four times the size of Manhattan broke away from the ice shelf on the northwest coast of Greenland. Millions of people watched the video from a remote camera that had been set on the ice shelf just a few days before. The situation of the refugees and of climate change has been obvious for a very long time and is watched in real time by all, yet there is little action. The world has developed an ability to watch everything yet do nothing. This lack of action is also designed. Neglect has been shaped.

"These forms were born as though by magic! The spontaneous objectification of an idea springing from the dark, but wonderfully persistent, consciousness of the cave dweller."

–Henry van de Velde

Huge ice island breaks off northwestern coast of Greenland, August 5, 2010

7

GOOD DESIGN IS AN ANESTHETIC

Good design is an anesthetic. The smooth surfaces of modern design eliminate friction, removing bodily and psychological sensation.

Good design is meant to be contagiously virtuous. Even the smallest object, a door handle for example, is thought to change the well-being, emotions, and thoughts of whoever uses it, touches it, looks at it, or even reads about it, and also the lives of whoever encounters those who have encountered it, and so on in a kind of viral chain reaction that ultimately transforms society.

A well-designed object is one that does ever more good to ever more people. An ambition to social reform is embedded in each seemingly modest project. Nineteenth-century arguments about the morality of design still infuse contemporary design discourse today – along with all the complications, contradictions, and barely suppressed violence that comes with any such declarations of a moral high ground.

Good design is "an ethic rather than an aesthetic," as the British architects Alison and Peter Smithson put it in the 1950s. Its goodness supposedly comes from the rejection

of any waste and the direct presentation of the facts – finding whatever form and materials most efficiently resolve all the practical demands of production and function. Good design should be a surprise. It invents a novel way to reduce any excess in the making, distributing, and using of things. It gets rid of any external dissimulating layers to uncover the hidden material facts, the material realities that can be reorganized to liberate new social realities. No outcome is prescribed. Yet good design has a recognizable aesthetic. Good design looks like good design. It is irreducibly associated with a certain visual smoothness. The goal of reducing functional, economic, and social friction is indistinguishable from a frictionless aesthetic that acts as a kind of self-advertisement of design. So strong is this visual effect, so reassuring and dazzling are the surfaces, that it becomes unclear whether good design is doing good things at all. The ethic turns out to be an aesthetic.

Modern design was launched in defense of smooth surfaces. English Arts and Crafts design was on a path toward simplification and seamless surfaces. The word *smooth* played a big role. Already in 1894, Alfred Lichtwark, the influential social commentator, museum director, and pioneer of public art education programs in Germany, praised the English model of "smooth walls" and "smooth, polished, light forms" for furniture as having a "calming effect" after the assaults of ornament.[1] Adolf Loos in Vienna celebrated the surfaces made by metalworkers for being "smooth and polished, no ornament, no decoration" in a 1898 newspaper article.[2] Hermann Muthesius used the English model in his much-discussed essay on "New Ornament and New Art" (1901) where he called for a "cleansing" away of ornament in favor of forms closer to those of sailboats, electric lamps, and bicycles. Modern art would be modern by virtue of its rejection of superfluous

ornament. The moral and physical health needs of "modern humanity" called for light and air and "smooth and simple furnishings" that are easy to clean – a "sanitation" of body and mind.[3]

Loos's famous essay "Ornament and Crime" (1908) inevitably celebrated what it called the "smooth object." It pointed to the "completely smooth" surfaces of shoes, cigarette cases, and gingerbread that are untainted by the "pathological" use of ornament that has "no human connections at all" for "modern man."[4] Cleansing anything superfluous was a moral project. Le Corbusier followed the argument closely, declaring in *Vers une architecture* (1923), his most influential book, that "façades were smooth" in all the great periods.[5] People should be proud to live in the most modern of houses with walls as "smooth as sheet-iron," like the ancient walls of the perfected machine that is the Parthenon, where "the impression is of naked polished steel." Such smooth surfaces are "naked," "bare," "clear," "honest," "direct," "pure," "clean," "healthy," "moral" – a chain of synonyms used to create an atmosphere of polemical virtue. Aesthetics became ethics. Design in the machine age would necessarily be as smooth as the surfaces of the well-oiled machines that are allergic to friction. To embrace mechanization was to embrace "smooth . . . surfaces that are faultless."[6] Ornament is friction. It has to be flattened out into a plane.

One by one, modern designers identified their modernity by embracing "smooth surfaces butting up against other smooth surfaces," as Robert Mallet-Stevens put in 1924.[7] The cult of the smooth underpinned the extraordinary influence of the Bauhaus school directed by Walter Gropius in the 1920s. Despite a huge diversity of avant-garde experiments within his "factory," a singular recognizable

industrial design aesthetic emerged that still represents the very idea of good design today. The inner needs of function turned out to be a visual effect, the effect of truth-telling, as if a smooth surface, a rounded corner, or a continuously folded metal tube could only tell the truth and that truth itself was beautiful.

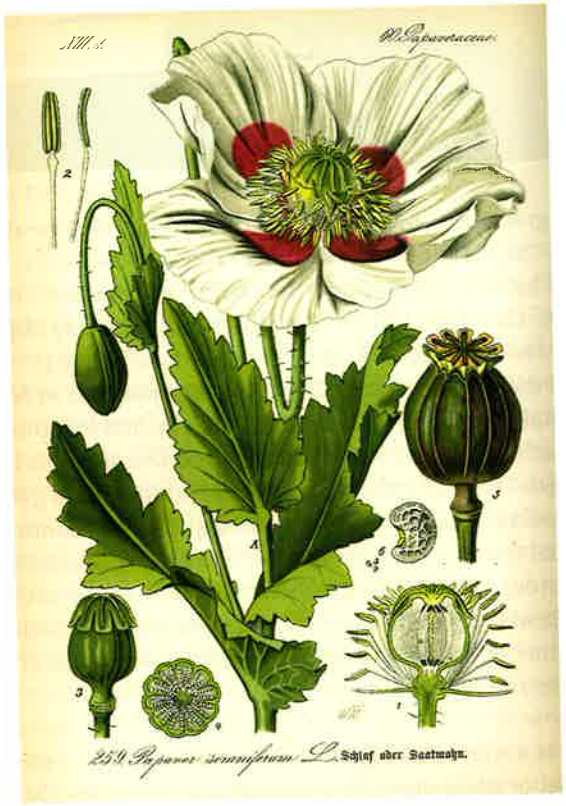
This logic was reinforced in countless exhibitions and publications that were themselves treated as equally smooth interfaces with perfected layouts, posters, labels, and typefaces. The promotion of modern design was itself designed. There was even a genre of well-designed publications of well-designed exhibitions of well-designed objects. The public, patrons, professionals, manufacturers, officials, and critics were relentlessly trained to appreciate the virtue of modern design and given a language with which to describe it.

Since 1938 the Museum of Modern Art held travelling exhibitions of modestly priced "useful objects" for the household demonstrating the "aesthetic" virtue of "good modern design" in a machine age.[8] The museum acted as the arbiter of good taste, abandoning any line between museum and market. A Department of Industrial Design was created in 1939 and its first director, Eliot Noyes, a former student and employee of Walter Gropius, added a special section on "Good Design" in 1941 to the fourth edition of the popular *Useful Objects* series. A placard listed four principles of good design as "criteria which the spectator himself may apply in judging the design of other objects . . . thereby creating a demand which will tend to increase the number and general availability of well-designed objects."[9] The public was trained to recognize the aesthetics of modern design in the "contemporary sense of beauty" that combines function, material, and production

– the "graceful . . . handsome . . . simplicity . . . functional design," as the press release put it. The approach was echoed by Max Bill, a former student of the Bauhaus, in his 1949 *Die Gute Form* traveling exhibition of everyday objects for the Swiss Werkbund. In 1950 Edgar Kauffmann Jr. started the major series of *Good Design* exhibitions at MoMA with Charles and Ray Eames designing the first exhibition, and *Good Design labels*↑ were attached to the products being endorsed. This was imitated by endless international good design awards, exhibitions, and publications that continue the visual training program today. For all the supposedly self-explanatory goodness of its smooth surfaces, good design never speaks for itself. It is always labeled and surrounded by an army of earnest promoters describing its fusion of aesthetic and ethical virtue.

Design is never shocking, disturbing, alienating, incomprehensible, or discomforting in this global campaign. On the

contrary, it is the antidote – offering identity, stability, efficiency, clarity, comfort, support, integration, and so on. Good design is resolved, responsive, healthy, and efficient. All good, all the time. Yet the very insistence on the morality of the smooth surfaces of modern design hints that things are not so simple. What is the human that needs this smoothness so badly? Or is made to feel needy, inadequate, wounded, or incomplete in the face of good design and offered the chance to rebuild itself by simply choosing the right product?

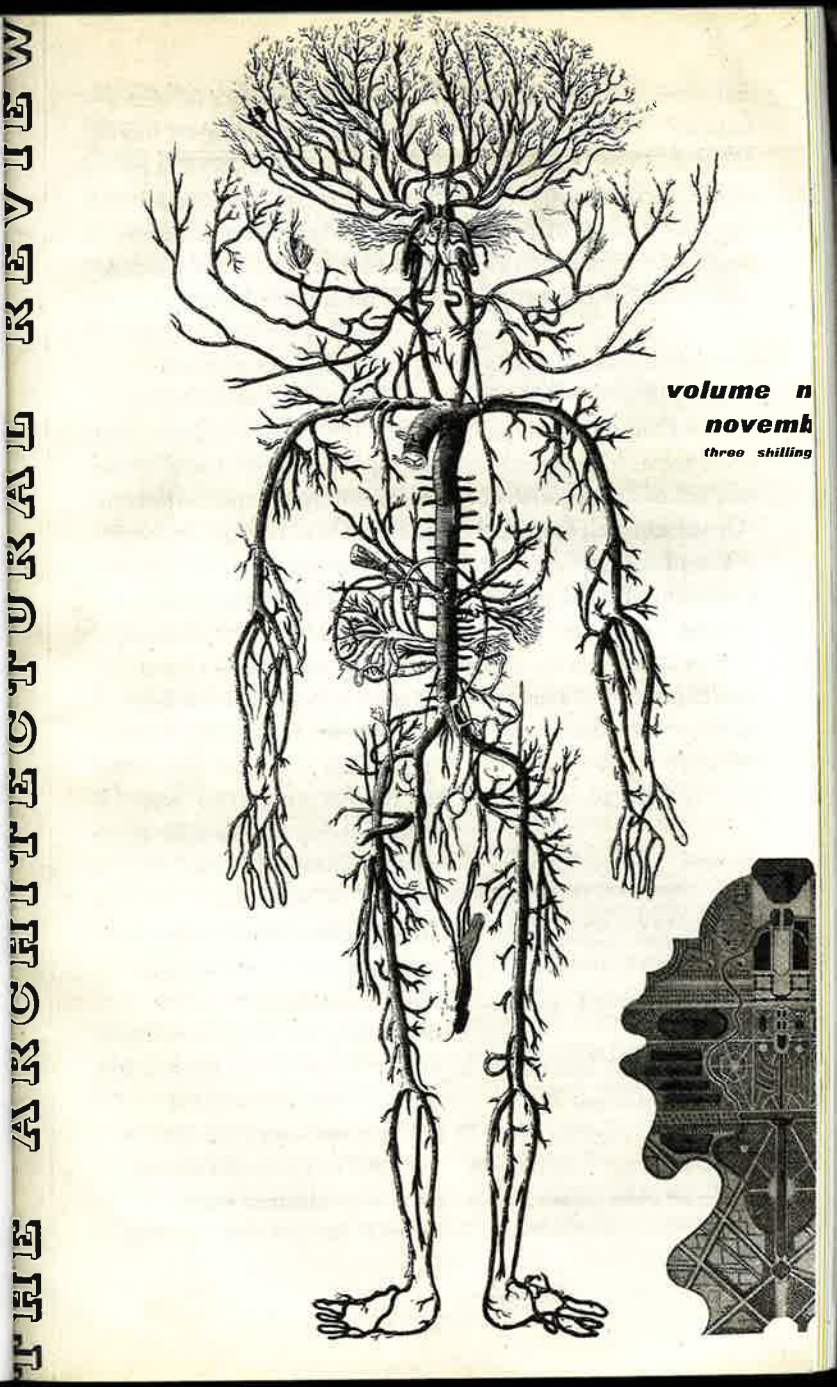


If Alfred Lichtwark had already welcomed the sedative effect of smooth surfaces at the end of the nineteenth century, Le Corbusier saw them as an anesthetic to calm "the nerves shattered in the aftermath of war" at the same time that actual anesthetics (cocaine) were being "peddled" in the street of Paris.[10] *Cocaine*← was one of the first substances used as anesthetic for surgery by Karl Koller (on the recommendation of Freud) in 1884. The history of modern anesthetics uncannily parallels that of modern design. *The first public demonstration*↑ of an operation under anesthesia (with ether) took place at Massachusetts General Hospital in 1846.

Anesthesia is the removal of feeling, the temporal suppression of the central nervous system in order to achieve lack of sensation. *Aesthetics*, from the Greek, had everything to do with sensation, with perception by bodily feeling, and nothing to do with the intellect or the ideal until the nineteenth century. The modern idea of aesthetics as a branch of philosophy is contemporary with the age of industrialization. Aesthetics in the modern sense is itself therefore already an anesthetic – it has removed all bodily

sensation, all feeling. For Le Corbusier, even the touch of the modern object becomes a reassuring visual effect: "Our hand reaches out to it [the modern object] and our sense of touch *looks* in its own way as our fingers close around it."[11] Smooth white surfaces restore the "calm" that preceded the brutality of the arrival of all the mass-produced ornaments of modern industry. Le Corbusier repeatedly uses the word *calm* to represent the new beauty of the machine, the effect of putting all extra domestic objects into built-in storage, the demeanor of the modern engineer, and the final effect of mastering the world of mechanization that had so challenged humanity.

The shock of war, the shock of the machine, the shock of the metropolis have in common anesthesia, the temporary removal of feeling, whether physical or psychological. In "Experience and Poverty" (1933) Walter Benjamin wrote about people returning from World War I poorer in experience, unable to communicate, silent, in shock after feeling the full force of modern technology: "A generation that had gone to school in horse-drawn streetcars now stood in the open air, amid a landscape in which nothing was the same except the clouds, and, at its center, in a force field of destructive torrents and explosions, the tiny, fragile human body."[12] Feeling was no longer possible. Humans were anesthetized. This poverty of experience finds its parallel in modern architecture, in glass-and-steel buildings on whose smooth surfaces the inhabitant cannot leave any traces, any memory. In his writings on Baudelaire, Benjamin speaks of the smile of passersby in the metropolis ("keep smiling") that protect them from an unprecedented number of close encounters with strangers by developing mimetic tactics. The smile "functions as mimetic shock absorber."[13] Modern design is likewise a shock absorber, its frozen smile barely hiding the terror it tries to cover over.



Benjamin's understanding of modern experience is neurological.[14] "The shock experience which the passer-by has in the crowd corresponds to what the worker 'experiences' at his machine."[15] War, machine, and metropolis are all shock environments, conditions of danger where one has to be able to react quickly to protect oneself from sudden, unforeseeable threats. Nerves are on the periphery.

The elimination of ornament is not simply an aesthetic choice but a neurological or even narcotic one. Loos argues that we no longer have the nerves to eat, dress, and decorate as in previous centuries. Modern man has a whole new set of nerves with completely different sensitivities. In "Ornament and Crime," he speaks of his "horror" in front of the decorated animals in culinary displays, particularly if he thinks he has to eat "one of these stuffed animal corpses. I only eat roast beef!" He feels the same nausea in the face of any excessive ornament, whether on food or architecture: "We lack the steady nerves to drink from an elephant's ivory tusk on which an Amazon battle scene has been engraved. . . . Our temples are no longer painted blue, red, green, and white, like the Parthenon, no, we have learned to appreciate the beauty of naked stone."[16]

A LA SORBONNE

Amphithéatre Michelet

46, rue Saint-Jacques à 8 h. 45

Quatre conférences en langue Allemande

ADOLF LOOS

"Der Mensch mit den modernen Nerven"

Vom Gehen, Stehen, Sitzen, Liegen, Schlafen, Wohnen, Essen und Sich-Kleiden

1926

Mercredi, le 17 Février — Jeudi, le 25 Février

Lundi, le 22 Février — Lundi, le 8 Mars

ENTRÉE LIBRE

The rejection of ornament is a physiological reaction, as Loos put it in 1919, when discussing the English military uniform as a model for modern dress: "The nerves of the modern man rebel against a demand to go back twenty, fifty, or a hundred years."[17] By 1921 he was arguing that

the whole biology of man had evolved to *give modern man a whole new set of nerves*.[18] And in "Ornament and Education" (1924) he wrote: "Modern Man, the man endowed with a modern nervous system, doesn't need ornament. On the contrary, he loathes it. Every object that we call modern lacks ornament. Our dresses, our machines, our furs, and every object of everyday use don't have – since the French Revolution – any ornament."[19]

In "Karl Kraus," Walter Benjamin quotes Robert Scheu, brother of Gustav Scheu (for whom Adolf Loos built a controversial house in Vienna in 1912): "Kraus," writes Robert Scheu, "discovered a great subject that had never before set in motion the pen of a journalist: the rights of the nerves. . . . He became the advocate of the nerves . . . but the subject grew under his hands, to become the problem of private life."[20]

Private life, the interior, becomes newly fragile, like that of the nervous individual analyzed by psychoanalysis or the vulnerable body of the tuberculosis patient penetrated by X-rays. Everybody becomes like a child or a patient needing to be wrapped in soft lining. It is as if the new nerves are so new that the modern individual has only just been born and needs a protective incubator to survive, to gain the necessary strength. Loos's architecture is such an incubator.

Loos was himself fragile. He suffered from numerous nervous and physical ailments throughout his life and at the end, he checked himself into the sanatorium run by his friend the psychiatrist Dr. Schwarzmann, in Kalksburg, where he died in 1933. A year earlier, Buckminster Fuller had included "nerve shock proofing" in his list of basic requirements for all houses.[21] Frederick Kiesler and Richard Neutra would develop entire theories of design based on

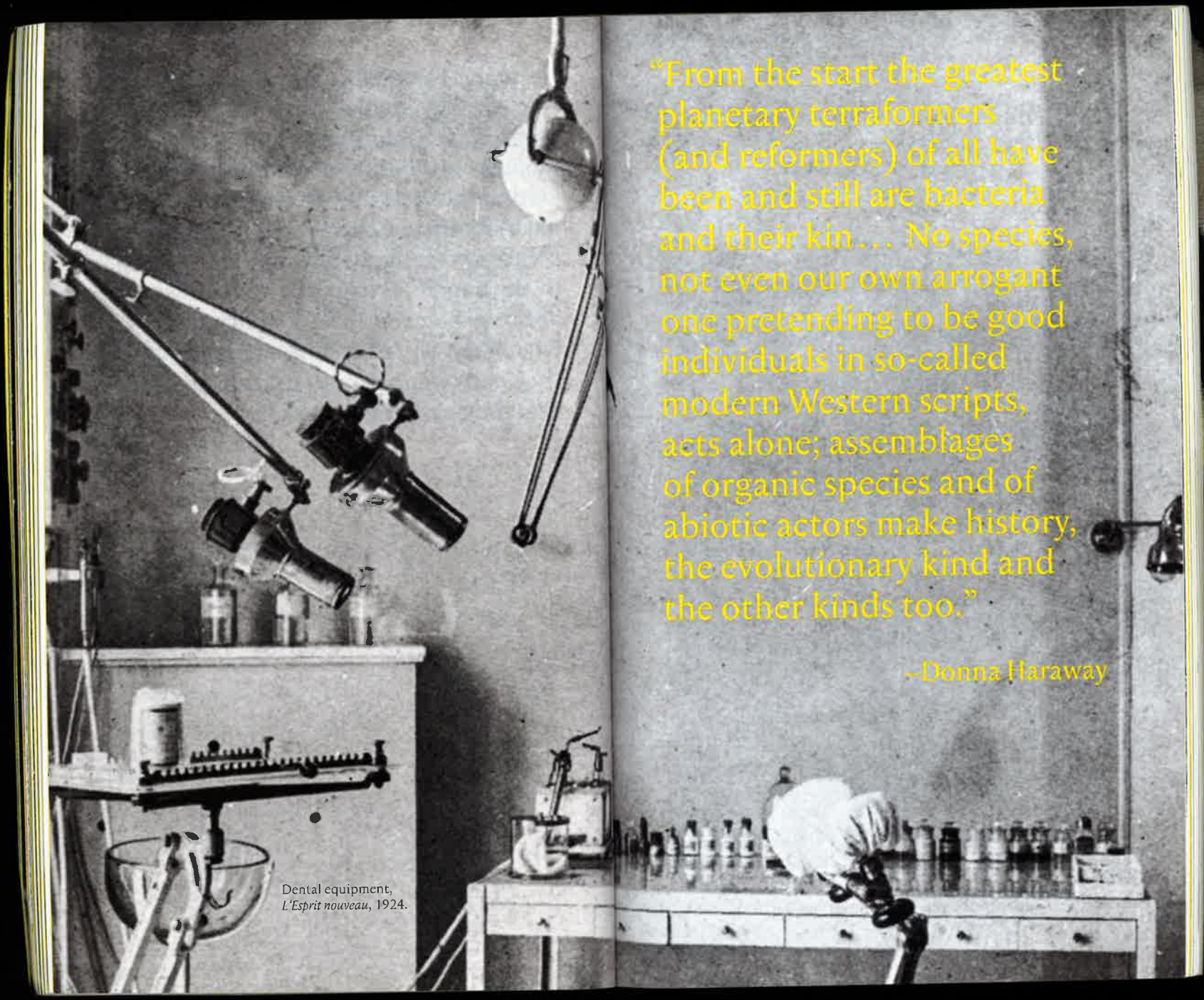
the nerves. It is as if nerves themselves were the true clients of modern design.

After World War II, Charles and Ray Eames defined design itself as a "shock absorber." Involved during the war in the military production of *leg splints*↑ and body shells for injured soldiers – shock absorbers for a traumatized body – they developed these splints upon hearing that the metal Thomas metal splint used by the army was causing further injury because of amplified vibration during transport. If the soft plywood splint holds the wounded leg so much more tenderly than the Thomas splint, which led to gangrene and death, the postwar house is for the Eameses no longer just glass and steel where you cannot leave any traces, as in the post–World War I house. The steel and glass is just the frame to accommodate a galaxy of objects that define a new lifestyle: "The house must make no insistent demands for itself, but rather aid as a background for life in work . . . and as re-orientator and 'shock absorber.'"[22] The interior becomes a showroom full of objects. Shock is absorbed through the consumption of design.

But what is this shock? Domestic life could no longer be taken for granted post–World War II. It became an art form carefully constructed and marketed by a whole new industry: a form of art therapy for a traumatized nation, a reassuring image of the "good life" to be bought like any other product. Instead of offering a complete environment to the postwar consumer, the Eameses offered a variety of components that individuals could construct and rearrange themselves. The shock in the postwar years is the shock of nuclear annihilation. "Good design" offers "good life," a galaxy of happy, self-contained objects for people who do not feel safely contained and cannot be sure of life itself. The Eameses perfected the "keep smiling" strategy. Perhaps no other designers can be seen smiling so often and so polemically. If the ever-scowling Adolf Loos had insisted in "Ornament and Crime" that the craftsman is "so healthy he cannot invent ornament," the ever-beaming Eameses, the poster children of good design, encourage the postwar consumer to keep clinging to smooth design as if to a psychological life raft. The real function of good design remains anesthetic, a symptom of a trauma that cannot be expressed, a smooth line of defense.

Today the mantra *human-centered design* is chanted again as the way to approach any question, as if the human is a specific knowable entity. It presupposes a kind of transparent human, which is such a fragile, utopian, or even dystopian idea. Freud insisted that real needs are the ones that can never be expressed: "The mind is like an iceberg, it floats with one-seventh of its bulk above water." The distinction between needs and desires is anyway never clear, and both are multiple and typically contradictory.

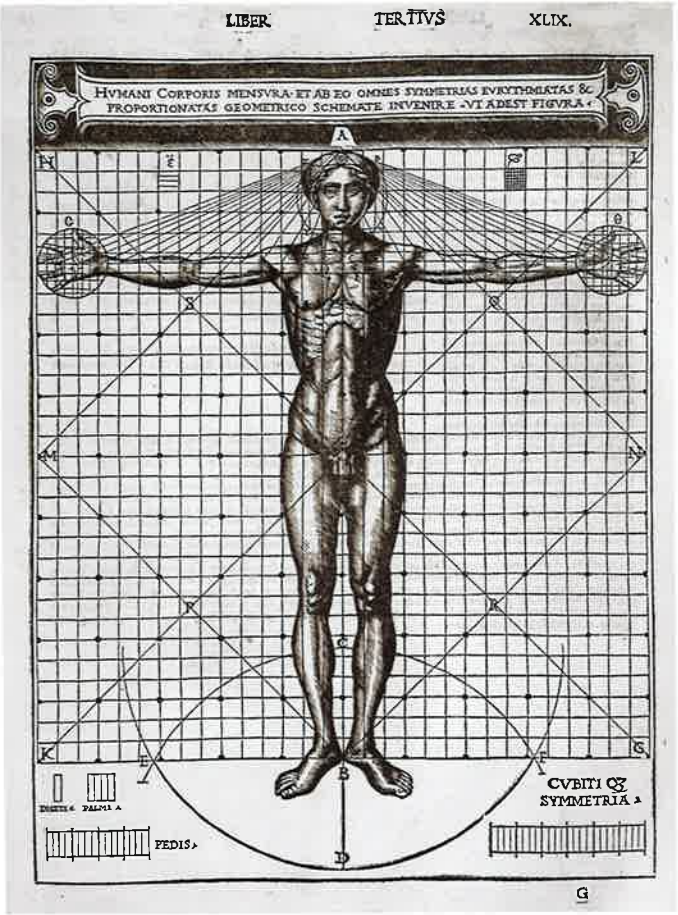
No one is even really sure about what they see looking back at them in the mirror in the morning in that poignant moment just before assembling some kind of self-design with which to navigate the outside world. The precise context of design is the indeterminacy of the human. Design has never been about giving someone or some group what they ask for but what they wish they had asked for and retrospectively pretend that they did ask for.



Dental equipment,
L'Esprit nouveau, 1924.

"From the start the greatest planetary terraformers (and reformers) of all have been and still are bacteria and their kin . . . No species, not even our own arrogant one pretending to be good individuals in so-called modern Western scripts, acts alone; assemblages of organic species and of abiotic actors make history, the evolutionary kind and the other kinds too."

–Donna Haraway



Measure of the human body, Cesariano's translation of Vitruvius, 1521

8

THE DESIGN OF HEALTH

Design is medicine. If classical theories of the Greek polis followed theories of the four humors, contemporary ideas of health organize design theories today.

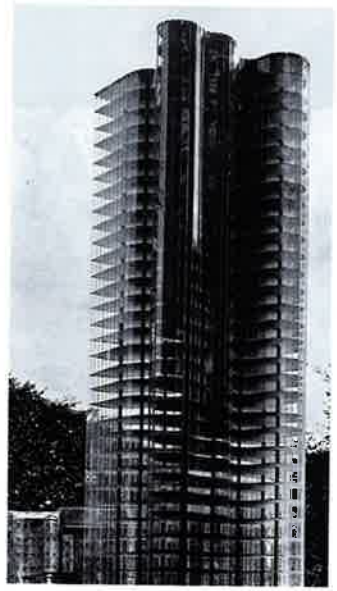
Vitruvius in the first century BC launched Western architectural theory by insisting that all architects needed to study medicine: "Healthfulness being their chief object."[1] He devoted a large part of the first of his *Ten Books on Architecture* to the question of health. He gives detailed instructions on how to determine the healthiness of a proposed site for a city by returning to the ancient method of sacrificing an animal that lives there and inspecting its liver to make sure it is "sound and firm." Likewise for the healthy site of each building, he discusses the theory of the four humors at length and emphasizes the direction of the winds and the sun. Too much of one humor enfeebles and "impairs the fluids of the human body." In reverse, those who are unwell can be cured more quickly through design, building up the system of those "exhausted by disease," including consumption. Vitruvius discusses the internal workings of the body just as much as he discusses the internal working of buildings. Established theories of medicine are used as a kind of foundation for architectural theory. Architecture itself becomes a branch of medicine.

As Renaissance schools of medicine used casts of body parts, design schools such as the Accademia del Disegno in Florence in 1563, used cast fragments of historical buildings for teaching, and anatomical dissection was a central part of the training. As doctors investigated the mysterious interior of the body by cutting into and dissecting it, architects tried to understand the interior of buildings by slicing section cuts through them. In the sketchbooks of Leonardo da Vinci, cutaway views of architectural interiors appear beside anatomical drawings. He understood the interiors of the brain and the womb in architectural terms, as enclosures that must be cut through to reveal their secrets. The central reference for architecture was no longer a whole body but a dissected, fragmented, analyzed body. Likewise in the mid-nineteenth century, Viollet-le-Duc illustrated his *Dictionnaire raisonné de l'architecture française du XI au XVIe siècle* (1854–68) with perspectival *exploded cuts*↘ showing medieval buildings as if dissected. Influenced by George Cuvier's *Léçons d'anatomie*

Pietro Berrettini, original drawing, ca. 1618

comparée (1800–1805) and Jean-Marc Bourgery's *Traité complet de l'anatomie de l'homme, comprenant la médecine opératoire*, he treated medieval architecture as a body to be analyzed.

As medical representations changed, so did architectural representations. In the twentieth century, the widespread use of *X-rays*→ made a new way of thinking about architecture possible. Modern buildings even started to look like medical images, with transparent glass walls revealing the inner *secrets of the building*←. Indeed, the architecture of the early twentieth century cannot be understood outside of tuberculosis. The symptoms, if not the principles, of modern architecture seem to have been taken straight out of a medical text on the disease. A year before the German microbiologist Robert Koch discovered the tubercle bacillus in 1882, a standard medical book gave as the cause of the disease, among other things, lack of exercise, sedentary indoor life, defective ventilation, deficiency of light, and depressing emotions.[2] It took a long time for these notions to lose credibility. Tuberculosis was thought to be a wet disease produced by damp cities. In an uncanny echo of Vitruvius, the TB patient was thought to need a new environment to dry out the inside of their bodies.



Modern architects offered health by providing exactly such a change of environment. Nineteenth-century architecture was demonized as unhealthy, and sun, light, ventilation, exercise, roof terraces, hygiene, and whiteness were offered as means to prevent, if not cure, tuberculosis. The publicity campaign of modern architecture was organized around contemporary beliefs about tuberculosis and fears of the disease.

"Historic Paris, Tubercular Paris," Le Corbusier, *La ville radieuse*, 1933

Alvar Aalto, Paimio Sanatorium, Paimio, Finland, 1932

In engaging TB, architects were not just tuning in to one illness among others. As Susan Sontag has argued, few diseases have been so "spectacularly, and similarly, encumbered by the trappings of metaphor" as tuberculosis and cancer.[3] In his book *The Human Motor*, Anson Rabinbach goes as far as locating TB as part of a complete reconceptualization of the human body.[4] He argues that the obsession with fatigue that took over between 1895 and World War I marked rising anxiety about the industrial age. Diseases like TB were blamed on fatigue, and exercise programs offered to combat them. There was a widespread call for organized sports. Gymnastic exercises, which had been limited to the military throughout the nineteenth century, were now advocated for schools. Furthermore, the military itself was reorganized on the basis of the new "sciences of work." Medicine and biology became the basis of political theory. Through this "biologization of

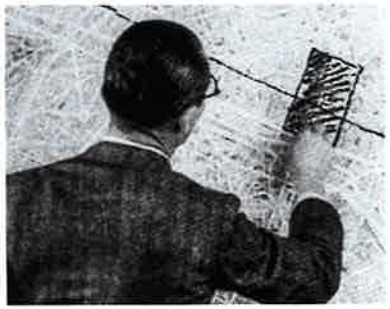
politics," the sciences of the body were firmly established as the basis of "social hygiene." By 1910 they were split into physiology and psychology but successfully recombined as *psychotechnics* during the war. On the basis of this military success, an amalgamation of European scientific research and US Taylorism became standard equipment of modern industrial management. The dream of a body without fatigue reached its sinister peak in the dictatorial regimes of the 1930s. The TB scare was key in the emerging bond between the body, the military, industry, and politics.

We can see this trajectory in architecture. Architects repeatedly used disease imagery to express concern for social order. Architecture's traditional role of imposing order takes on different meanings with different diseases. The reconfiguration of the medical body by new sciences leads to a reconfiguration of architecture. Take Le Corbusier. The opening pages of *Vers une architecture* (1923) give his diagnosis of the state of architecture, condemning the traditional house for producing the debilitating effect of tuberculosis (consumption). He goes on to promote the healthy engineer over the unhealthy architect:

Children during heliotherapy session, 1937

> We have become sedentary beings, that is our lot. The house eats away at us in our immobility, like consumption. We will soon need too many sanatoria.... Engineers are healthy and virile, active and useful, moral and joyful. Architects are disenchanted and idle, boastful or morose. That is because they will soon have nothing to do. *We have no more money* to pile up historical keepsakes. We need to cleanse ourselves.... The diagnosis is clear. Engineers make architecture.... People still believe, here and there, in architects, just as people blindly believe in doctors.[5]

Throughout the book, health is a battle cry. The final chapter opposes the healthy modern workplace to the unhealthy private house: "The machine that we live in is an old coach full of tuberculosis." Like so many architects, Le Corbusier expands the medical argument from the house to the city. In *Urbanisme* (1925) he opposes the fatiguing city and looks for a "cure," concluding that *"surgery"*↓ is required to remove the "cancer" of degenerate street layouts and "rotten old houses full of tuberculosis." He relates disease of the streets to the disease of the house. But while he associates the house with actual tuberculosis, the city is metaphorically cancerous.



In his film *L'Architecture d'aujourd'hui*↑ (1929), made in collaboration with Pierre Chenal, Le Corbusier argues that disease breeds in the city because in the twentieth century people still live as if in the Middle Ages. He explicitly equates disease with disorder in the city. His solution: cut through the fabric of the old city and exercise on the roof garden. The film's tour through his villas of the 1920s emphasizes once again the value of sunbathing and exercise. It culminates in close-ups, shot on diagonal from below, of a man and two women excitedly working out in a kind of sexualized intensity on the roof garden of Villa Church in exercise clothing and high heels. The house is first and foremost a machine for health, a form of therapy.

Le Corbusier had long been obsessed with health. Arriving in Paris from his small hometown, La Chaux-des-Fonds in Switzerland, he complained about feeling exhausted all the time until he met Dr. Pierre Winter, who introduced him to exercise as a way of combating fatigue and stress. They played basketball together every week. Winter would become a contributor to *L'Esprit nouveau*, which regularly covered sporting events and informed its readers of new athletic records. In an article in *L'Esprit nouveau* called "Sports," Winter writes:

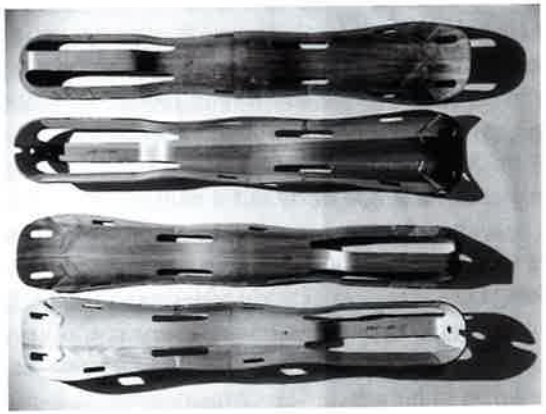
> Let us put our personal life and our social life in order. If everybody methodically studies his daily timetable with a view to taylorizing his acts and gestures . . . if we all banished idle habits and lackadaisical work, wasted effort . . . if sleep were better regulated . . . when all those extra minutes were added up, one might find time for sport, for tending to the body, . . . to regulate one's life is to control it and is a great source of deep joy. . . . Sport introduces an element of ORDER in life.[6]

Winter was an enthusiast of the authoritarian wing of the syndicalist movement in France and a follower of Georges Valois (the self-proclaimed French Mussolini). In a 1926 article for Valois's journal on Le Corbusier's plan for a new kind of city, Winter writes: "Only a strong program of urbanism. The program of a Fascist government is capable of adapting the modern city to the needs of all." This intimate bond between architecture, urbanism, disease, war, industry, and politics is explicit throughout the work of Le Corbusier and many of his colleagues in the interwar period.

The intersection between design, medicine, and war keeps running through architectural discourse into the second

half of the century. The Eameses' famous designs of the 1940s and 1950s, for example, are usually understood as reacting against the cold materials and forms of 1920s and 1930s furniture design that looked like doctor's equipment and as expressing a new concern for the body, for natural materials and organic forms. But there is nothing natural about the work. In fact, the Eames plywood chair is the result of medical and military research.

During World War II, Charles and Ray Eames had formed a company with John Entenza to mass-produce plywood war products. In 1941–42 they developed a molded plywood splint for the US Navy to replace a metal leg splint that did not sufficiently secure the leg and even led to gangrene and death. By the war's end, more than 150,000 *Eames splints*↓ had been shipped to the Navy. The splint performed very well in the field and was praised for its lifesaving features. In addition, the company designed and developed a plywood body litter and an arm splint, molded plywood aircraft parts, etc. By 1945 the Eameses were producing molded plywood chairs with the technology they had developed for the military. A photograph of the plywood lounge chair



of 1946 shows Charles Eames reclining on it, the position of his leg indicating that he had not forgotten where it came from. In addition, the Eameses produced molded plywood children's furniture, *molded plywood animals*←, lightweight plywood cabinets, and even plywood Christmas decorations made out of leftover splints. Military and medical equipment had become the basis of domestic equipment.

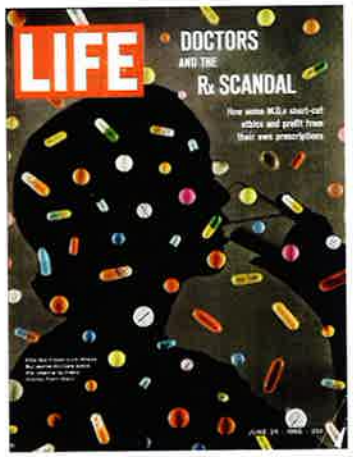
For the Eameses, as for Le Corbusier, the designer is a surgeon. In the course of an interview Charles Eames said: "The preoccupation with self-expression is no more appropriate to the world of art than it is to the world of surgery. That does not mean I would reduce self-expression to zero; I am sure that really great surgeons operate on the edge of intuition. But the rigorous constraints in surgery – those are important in any art." Yet the Eameses' orthopedic body is not Le Corbusier's tuberculoid body. At any one time there is more than one such theory. Even the polemical pages of *L'Esprit nouveau* offer a number of theories of health: from Dr. Winter's hygiene and exercise through Dr. Allendy's homeopathy to Jaques-Dalcroze's rhythmic gymnastics. Each produced a unique image of the healthy body. The modern body housed by modern architecture was not a single body but a multiplicity of bodies. The body was no longer a stable point of reference around which an architecture could be built. Architects like Le Corbusier and his colleagues actively redesigned the body with their architecture rather than housing it or symbolizing it. A new spirit (*l'Esprit nouveau*) requires a new body, as Dr. Winter writes in his article "Le Corps nouveau":

> A truly new spirit can only exist in a new body. Instinctively, modern man knows that. . . . We have to realize that the most formidable discovery of our time is *Health* understood in this more comprehensive sense. Physical health, basis of mental health, basis of every balanced activity, of all production, in all domains, and in that of art as much as in all the others. . . . The body will emerge naked in the sun, washed, muscled, supple.[7]

The body is not simply physical. *L'Esprit nouveau* was also obsessed with the relationship between psyche and body. It published articles by Dr. Allendy and his colleague Dr. Laforgue on the differences between Freudian psychoanalysis and French psychiatry with titles like "The Conscious and the Unconscious," "Neuroses," "Dreams," and "The Oedipus Complex." While Le Corbusier was sometimes dismissive of psychoanalysis, he repeatedly spoke of the intimate relationship between mind and body, portraying mental stability as the product of a healthy physical environment. In *Urbanisme* he argues that degeneration of the city leads to "physical and nervous sickness" and in *La Ville radieuse* he proposes that the new living cell be a machine for the "*Recuperation of physical and nervous energy* . . . the upkeep of the human machine: cleaning, draining the toxic substances, recuperating nervous energy, maintenance or increase of physical energy."[8]

If architectural discourse has from its beginning associated building and body, the body that it describes is the medical body, reconstructed by each new theory of health. Today, there are new instruments of medical diagnosis and new systems of architectural representation. Each implies new positions for design.

"Every age has its signature afflictions," Byung-Chul Han writes in *The Burnout Society*. We can add that each affliction has its architecture. The age of bacterial diseases – particularly tuberculosis – gave birth to modern architecture, to white buildings detached from the "humid ground where disease breeds," as Le Corbusier put it, smooth surfaces, big windows, and terraces to facilitate taking the sun and fresh-air cure. The discovery of antibiotics and particularly streptomycin in 1943 (the first antibiotic cure for tuberculosis) put an end to that age. In the postwar years attention shifted to psychological problems. The same architects once concerned with the prevention of tuberculosis became obsessed with psychological problems. The architect was not seen just as a doctor but as a shrink, the house not just a medical device for the prevention of disease, but for providing psychological comfort, what Neutra called "nervous health."[9] The twenty-first century is, according to Han, the age of neurological disorders: depression, ADHD, borderline personality disorders, and burnout syndrome. What is the architecture of these afflictions? What does it mean for design?



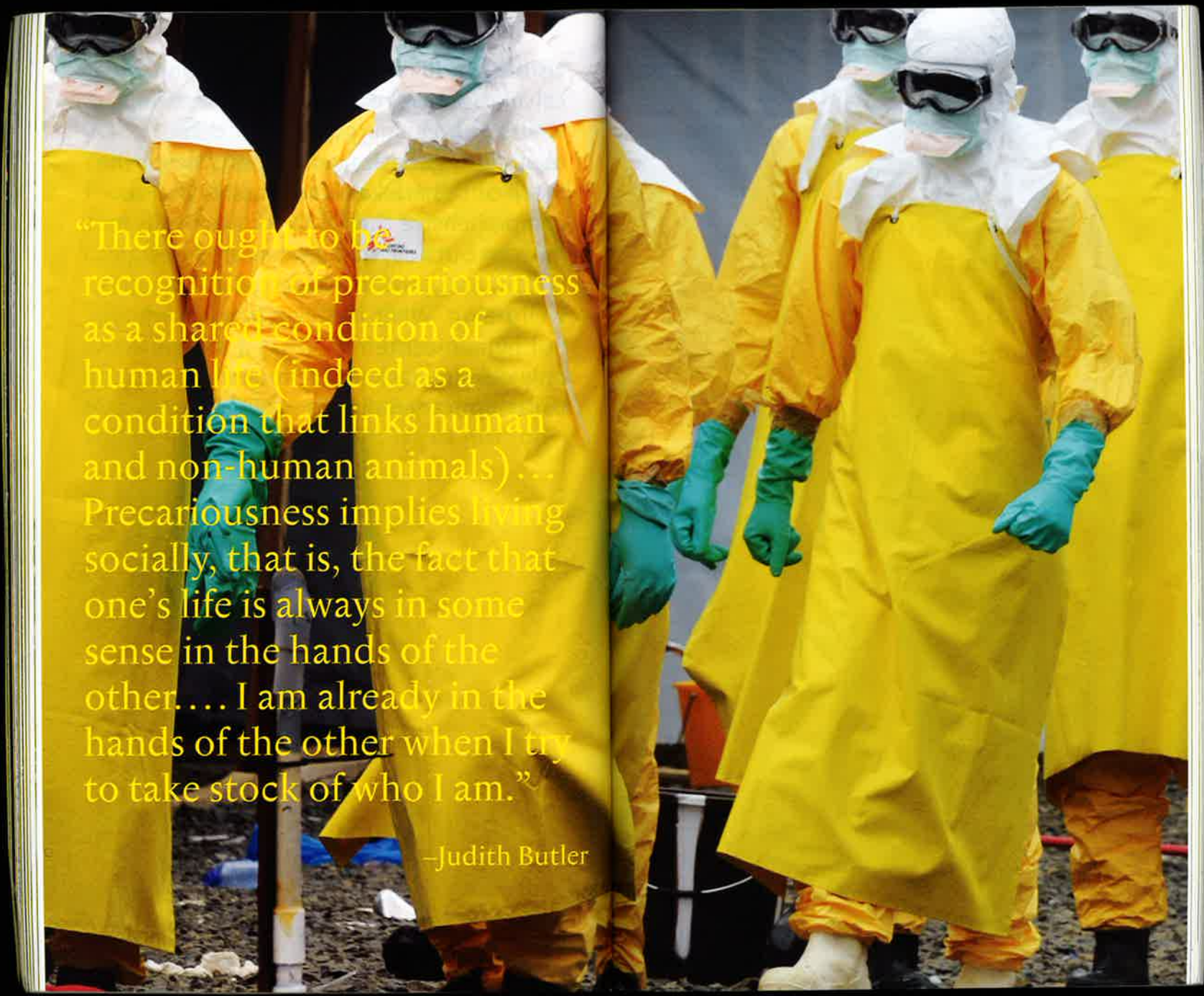
The twenty-first century is also the age of allergies, the age of the "environmentally hypersensitive" unable to live in the modern world. Never at any one time in history have there been so many people allergic to chemicals, buildings, electromagnetic fields (EMF), fragrances. . . . Since the

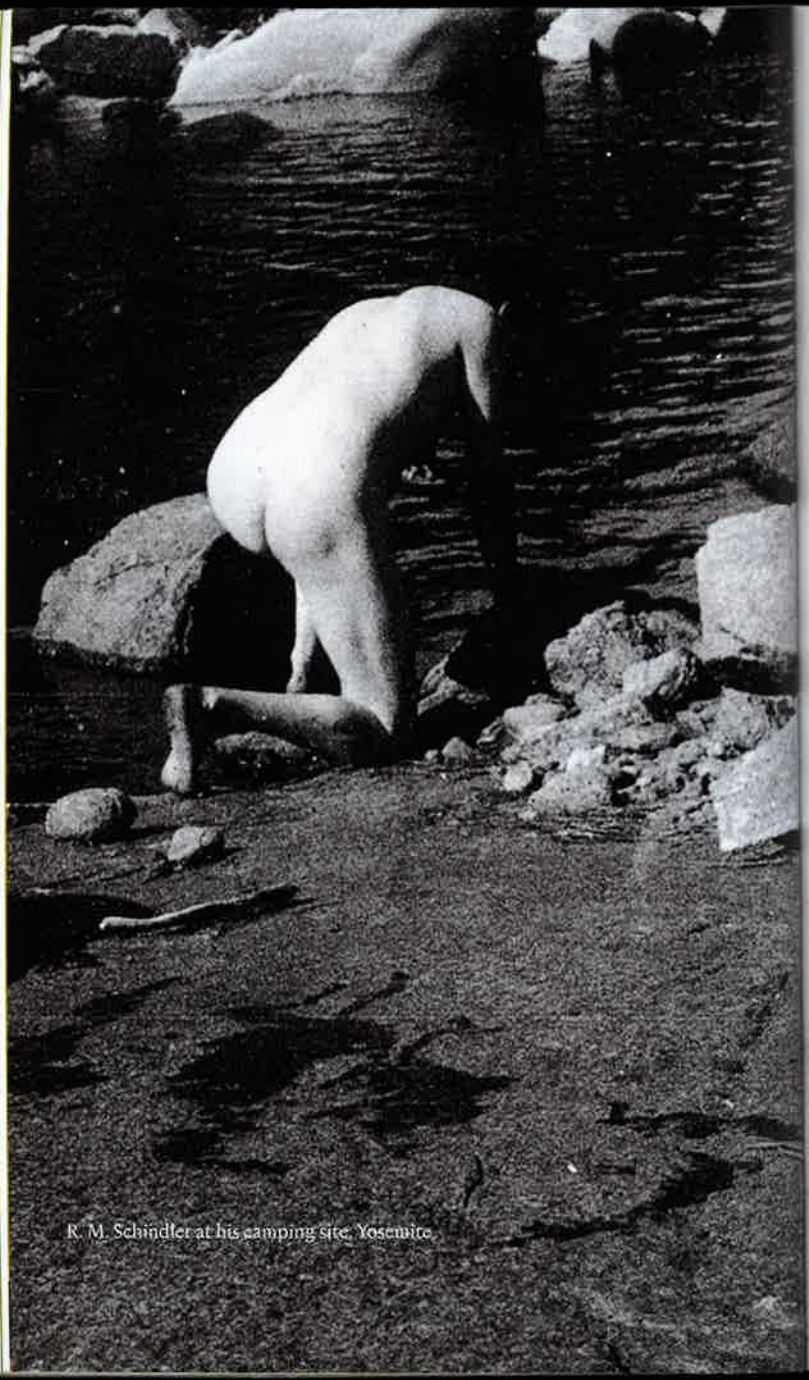
environment is now almost completely man-made, we have become allergic to ourselves, to our own hyperextended body in a kind of autoimmune disorder.

There are communities of the afflicted living in a kind of re-play of the 1960s in bubbles, tents, and old cars that have been "cleaned" of all toxic materials, usually in the desert or far away from civilization. Nomads moving at the very sniff of a chemical coming from a shifting wind that brings "whiffs of industry, detergent, fabric softener, fertilizers, pesticides, herbicides . . . exhaust from cars," as Dodie Bellamy puts it in "When the Sick Rule the World."[10] They are the dropouts of our age. On the other side of the spectrum, there is the "burnout society" that Han writes about. Those who in working for themselves push themselves harder than anybody could have pushed them, the achievement subject, who turns out to be much more disciplined than the obedience subject, despite the fact that he obeys only himself – master and slave conflated. No one can be so brutal with anybody as with oneself, pushing the limits of the imaginable, this creature does not experience it as pain or as obligation but as self-realization. The environmental hypersensitive are not mentioned by Han perhaps because he considers them, as many in the medical establishment do, afflicted by a neurological disorder: depressed or hypochondriac. The seemingly opposite symptoms might be two sides of the same coin.

Implied in all of this is a different city and new questions for design. Or very ancient questions about the limits of the body and mind, and how to take shelter in a threatening world.

The idea of the transparent human fully articulate in its likes and dislikes is a market-driven concept of an ideal consumer constantly offering feedback to reduce any friction in the production, distribution, and consumption of artifacts. If Freud says you can never know yourself, perhaps Amazon agrees, as its algorithm informs you that "people like you also bought x" before tweaking the algorithm in response to unexpected responses from people like you. *Human-centered* means "market-centered" in an age in which the market is not just for visible products but all the interconnected calculations of government, education, health, water, energy, finance, debt, copyright, genetics, and access. When the reach of the market is so massive and so comprehensive that it no longer seems to have an outside, human-centered design is ultimately not so interested in human well-being. What if design is precisely not human-centered? What if design is only design inasmuch as it challenges contemporary definitions of *human*?


"There ought to be
recognition of precariousness
as a shared condition of
human life (indeed as a
condition that links human
and non-human animals)...
Precariousness implies living
socially, that is, the fact that
one's life is always in some
sense in the hands of the
other.... I am already in the
hands of the other when I try
to take stock of who I am."
–Judith Butler



R. M. Schindler at his camping site, Yosemite.

9

HUMAN-CENTERED DESIGN

If the human is a question mark, *design* is a word for how that question is engaged. Design literally takes shape, makes shape, through the indeterminacy of the human. Or, to say it the other way around, there would be no concept of design if the human was something clear and stable.

Design projects an image of clarity – a crisply defined object, instrument, or space – precisely because things are not clear. Yet design discourse acts as if human needs and desires unproblematically organize design. *Human* is a magic word invoked to make design seem more ethical, sensitive, organic, responsive, and responsible. *Human* is always something positive and essential – as if we all already know what it is or have no fear of really knowing what it is.

Design is defense. Most theories of design present the human as under some kind of threat that needs to be urgently countered by design. The defense is seen to draw from some quality deeply embedded in the human, as if design itself is the natural human way to preserve the human. The most radical attempts to reshape the human are typically carried out under this guise of reinforcing and protecting the human. Design is a paradoxical gesture that changes the human in order to protect it.