

Talk to Me

Paola Antonelli

whether openly and actively or in subtle, subliminal ways, things talk to us. They do not all speak aloud; some communicate in text, diagrams, and other graphic interfaces; others empathetically and almost telepathically, just keeping us company and storing our memories; still others in sensual ways, with warmth, scent, texture. Objects populate our homes and our lives; buildings and places have identities and characters; cars and airplanes speak and listen; virtual worlds beckon us; London's Tower Bridge and artist Marina Abramović's chair even send tweets.¹

That objects—everything that humans build, at all scales (fig. 1), from the spoon to the city, the state, the web, buildings, communities, systems, and artificial realities—have meaning is nothing new.² It has been true for eons, since long before late-twentieth-century design prophets such as Donald Norman, after decades of functionalist preaching, had an epiphany and declared the era of “emotional design” to be upon us.³ The bond between people and things has always been filled with powerful and unspoken sentiments going well beyond functional expectations and including attachment, love, possessiveness, jealousy, pride, curiosity, anger, even friendship and partnership—think of the bond between a chef and his knives. Philosophy has studied humans’ relationships with objects throughout history and from multiple angles, but the relatively young field of design has taken to it slowly. After all, design’s first preoccupation following the technological and aesthetic earthquake of the industrial revolution was to bring visual discipline and intellectual rigor to the cacophony of formal experiments ushered in by the new manufacturing capabilities. This was often achieved by suffocating objects’ excessive expressiveness and irrational side, qualities equated by some with decoration, as in Adolf Loos’s well-known 1908 essay “Ornament and Crime.”⁴



The push toward formal reduction and functionalism did not deter the great modern architects from imbuing minimal shapes with maximum pathos. But in the hands of mainstream practitioners and instructors, twentieth-century clichés such as “form follows function,” the modernist motto originally uttered in slightly different form by Louis H. Sullivan, and “design is problem solving” (about which more later) have been responsible for a great deal of soulless and lobotomized design and architecture.⁵ While a belief in sentient and self-reflective buildings was kept alive by architects such as Erich Mendelsohn and Frederick Kiesler, philosopher-architect Rudolf Steiner, and even psychologist Carl Jung, design, still lacking a cohesive theoretical backbone, did not even acknowledge the need for a position on the matter.⁶

Finally, in the 1960s, the course of design changed in that era’s confluence of political and

social turmoil, technological breakthroughs, and cultural shifts. In the minds of visionary architects and designers, buildings and cities began to breathe, walk, plug in, and talk, as did objects. The 1960s were also an important decade for the digital revolution: the foundations were laid for what we today call interface and interaction design, and the seeds were planted for several groundbreaking innovations of the 1980s. It was also in those years that semiotics and structuralism, especially the work of Roland Barthes and Michel Foucault, achieved worldwide prominence, contributing to the formation of a new theory of design. All these forces joined to make the communication between people and objects a mandatory element of the design process.

In contrast to the twentieth-century triumph of semiotics, which looked down on communication as nothing but a mechanical transmission of coded meaning, the twenty-first century has begun as one of pancommunication—everything and everybody conveying content and meaning in all possible combinations, from one-on-one to everything-on-everybody. We now expect objects to communicate, a cultural shift made evident when we see children searching for buttons or sensors on a new object, even when the object has no batteries or plug. *Talk to Me: Design and the Communication between People and Objects* thrives on this important late-twentieth-century development in the culture of design, which can be described as a shift from the centrality of function to that of meaning, and on the twenty-first-century focus on the need to communicate in order to exist (fig. 2).





Fig. 3
Sun Haipeng. Super Baozi vs. Sushi Man. 2009. Video (color, sound), 1:30 min.

Super Baozi is a steamed-bun martial arts superhero that loves to reenact scenes from Bruce Lee movies. It is one of the most recent additions to the army of animated objects, from sponges to toatoes, that have captured the popular imagination.

also not enough simply to ascribe meaning. Design now must imagine all its previous tasks in a dynamic, animated context, as Khoi Vinh points out in his essay on page 128. Things may communicate with people, but designers write the initial script that lets us develop and improvise the dialogue.

Rules of Engagement

In our relationship with objects, as in any relationship, indifference is the worst offense and laziness the worst sin. Endowed with more and more complex behaviors, objects from refrigerators to mobile phones to income tax websites have become particularly touchy and moody (fig. 3); our relationship with computers sometimes approaches codependence. Objects have become as complex and demanding interlocutors as people, as Jamer Hunt laments in his essay on page 48, so it seems logical to apply the rules of human communication to them, too. In checking the five axioms of human communication, developed by psychologist and philosopher Paul Watzlawick, against our experience of communication with objects and systems, we find some interesting insights and parallels, in particular in his first, third, and fifth axioms.⁷

The first axiom tells us, "One cannot not communicate." Any kind of gesture, behavior, and attitude can and will be interpreted as communication. In e-mail, for example, responding immediately to a message creates a particular subtext, as does not responding at all; a congratulatory message sent "reply all" can be interpreted as displaying presence and authority or else insecurity, and an ill-advised response by a person who received only a blind copy reveals . . . something else.

The third axiom says, "The nature of a relationship is dependent on the punctuation of the partners' communication procedures." Communication, Watzlawick posits, is cyclical, with each partner believing that he or she is simply responding to the other; some of the most common problems of the digital era arise from the cycle of amplification and reaction that marks our text exchanges, something that serial e-mail gaffers and awkward users will be familiar with. The problem is acute enough to require the invention of ToneCheck, developed by Lymbix, an emotional spell-check for e-mail messages that alerts the writer to excessive displays of anger, sadness, or insensitivity.⁸

The fifth axiom, "Inter-human communication procedures are either symmetric or

complementary, depending on whether the relationship of the partners is based on differences or parity," reminds us that the relationship between people and objects is not always complementary in the expected proportions, and hardly ever symmetrical. Power imbalance has worried generations of thinkers who have predicted a somber world in which machines are more intelligent and therefore more powerful than human beings. This event, known as "the Singularity," was first mentioned by computer scientist and writer Vernor Vinge in a speech in 1993. "Within thirty years, we will have the technological means to create superhuman intelligence," he said. "Shortly after, the human era will be ended."⁹ Author and futurist Ray Kurzweil reiterated the omen in 2005, saying that it would take place by 2045; writer Adam Gopnik has argued that the Singularity happened a long time ago, when we first delegated some of our important skills to machines.¹⁰ Whichever timeline we believe—if we believe it at all—the test proposed by computer scientist Alan Turing to determine a machine's ability to demonstrate human intelligence, including empathy, the serendipitous powers of distraction and humor, and creativity, has yet to be passed.¹¹ In 2011 a computer called Watson beat the two sturdiest human champions of the television quiz show *Jeopardy!*, but designers cannot count on CPUs—whether as mighty as Watson's or as nimble as an iPad's—to know how to behave like real people.

Under these complex circumstances, new branches of design practice have emerged that combine old-fashioned attention to form, function, and meaning with focus on the exchange of content and affect between user and used. Communication design focuses on delivering messages, and it encompasses most graphic design, signage, and communicative objects of all kinds, from printed materials to three-dimensional and digital projects. Interface and interaction design, which is sometimes brought under the more generic and functionalist rubric of user-experience design, delineates the behavior of products and systems, as well as the experience that people will have with them. Information or visualization design includes the maps, diagrams, and visualization tools that filter and make sense of the enormous amount of information that is more widely available than ever before. Critical design is one of the most promising and far-reaching new areas of study, using conceptual scenarios built around hypothetical objects to comment on the social, political, and cultural consequences of new technologies and behaviors. Its disciples are experts in "What if?"

Predigital, Digital, and Postdigital Affairs

In 1907 Guido Gozzano, an Italian poet, wrote "L'amica di nonna Speranza" (Grandma Speranza's friend), an unassuming and touching poem that described in loving detail dozens of "good things of awful taste" from his grandmother's apartment.¹² Empty candy boxes, a cuckoo clock, a stuffed parrot: the scene is at the same time sad, dusty, and alive with the sound of intimacy. It is just one of many literary examples of the close relationship between people, objects, and places. Rob Walker's *Significant Objects* project reminds us of Gozzano's nostalgic inventory.¹³ Walker has launched a number of projects devoted to things, buildings, cities, and their personal biographies, whether real or imagined, including "*Consumed*", his weekly column devoted to our relationships with brands, which ran in the *New York Times Magazine* from 2004 to 2011. For *Significant Objects* he handpicked objects from thrift stores and other treasure troves and paired them with great writers—including Nicholson Baker and Jonathan Lethem—who endowed them with stories.

The postdigital design movement is an extreme expression of this romantic attachment to physical things. It is made up of technologically savvy designers and artists who prefer the innocence of old-fashioned objects, such as the London-based *Newspaper Club*: sexy geeks who declare themselves to be "about ink on newsprint" and will help anybody publish a newspaper.¹⁴ In 2010 James Bridle, one of the club's founders, published a compendium of Wikipedia entries on the Iraq War, collected between December 2004 and November 2009, in twelve classically bound, encyclopedia-style volumes, because "physical objects are useful props in debates like this: immediately illustrative, and useful to hang an argument and peoples' attention on."¹⁵

This project makes a crucial point: in an era when so many mediums and channels are available, the key to effective and elegant communication is choosing the right one, the right interpreter. The most recent technology, in other words, may not be the most appropriate. Transmedia storytelling, a technique for telling stories on multiple platforms—such as a combination of television, Internet, and mobile text—is not a novelty anymore, and a few years have gone by since the first college application submitted on video made news. Our fever about virtual and augmented reality has subsided, as Kevin Slavin points out in his essay on page 164.



Sometimes the best way to say it is still with lowers.

In 2009, in "The Demise of 'Form Follows Function,'" Alice Rawsthorn wrote that "the appearance of most digital products bears no relation to what they do"; often—and especially after the first coming of the iPod, in 2001—these products are handsome, minimal boxes that perform a large number of functions.¹⁵ Since machines have become more or less standardized in shape, and since materials, finishes, and colors do not provide enough distinction, designers have had to resort to an old human trick: a face. We expect our smart objects to communicate their complexity as well as their instructions in a clear and engaging way through their interface. Interfaces not only provide thresholds onto explanation and response, instruction and information, but also personalities. The term is commonly used to indicate the point of contact and communication between

a machine and a human being; lately it has expanded to include communication with and access to wider systems and infrastructures such as cities, public services, territorial and metaphysical networks, and virtual worlds. The term has come to be identified with the digital era, but interfaces existed long before the digital revolution, for example in every clock and watch face and in the dashboards designed by masters such as Henry Dreyfuss and Rodolfo Bonetto.

In the computer world the term is shorthand for GUI (graphical user interface), HMI (human-computer interface), or HCI (human-computer interaction) and represents one of the most important and active areas of contemporary design, technology, and cognitive science. Its history arcs from its mechanical ancestors, well described by Alexandra Midal in her essay on page 92, to its graphic breakthrough in the late twentieth century, using a pointing device and icons that relied on



Fig. 4
Igor Krizhanovsky and Elliot Goukhman of ELRO.com. Nadra Bank ATM interface design. 2007

Fig. 5
Benrik and Turned On Digital. Situationist App. 2011. Xcode software

analogies to the objects normally found in an office (desk with files and folders, trash bin, calculator, alarm clock), to the most recent gestural interfaces.¹⁷ Some well-known milestones in the development of interfaces are the stuff of legend: Doug Engelbart's invention of the mouse and hypertext and his use of networked computers for collective activity in the second half of the 1960s; Alan Kay, Larry Tesler, and Dan Ingalls's first GUI, developed at Xerox PARC and used in the Star computer in 1981; Jef Raskin and Steve Jobs's commercial GUI, which appeared in the Lisa (1983) and Macintosh (1984) computers; and Marc Andreessen's 1993 Mosaic, the GUI that made the World Wide Web really available to the wide world. Interfaces represent a new dimension of our existence, a space in which we all spend a considerable amount of our time on earth. Even those who call themselves Luddites and profess virginal innocence from the temptations of networked technology are at least guilty of interacting with ATMs or ticket-vending machines. ATMs, among the most universal of interfaces (fig. 4), are represented in *Talk to Me* by two examples, a functional unit designed by Barclays, the bank that originally introduced the ATM in 1967 (page 45), and a new system developed by IDEO for the Spanish bank BBVA (page 44).

To help the public feel comfortable with advanced technology, designers often rely on the strategy of incorporating instinctive traits and appealing to our instinctive reactions, such as in computer interfaces in which items are moved around by hands and fingers or by being blown on or even shaken. These new technologies have already found widespread commercial application and have made their way into culture: Jeff Han's multitouch screens, which debuted in 2006, were used by CNN anchors to cover the US presidential elections in 2008, and John Underkoffler's gestural interface, called g-speak, which he has been working on since 1996, was made famous by the movie *Minority Report* (2002).¹⁸ Other examples include the multitouch screens of Apple's iPhone (2007) and iPad (2010), and the gestural interfaces used in *Guitar Hero* (2005), *Nintendo Wii* (2006), and *Microsoft Kinect* (2010). With ever more-sophisticated movement- and voice-recognition software, objects are being transformed from tools into companions, and buildings from enclosed shelters into open environments.

The hardware supporting the interface—whether it is the physical shape of a computer or the chassis of a car, a robot, an ATM, or a self-service check-in kiosk—is equally significant. In choosing a sympathetic body for a mechanical mind, designers, engineers, and scientists are ever wary of the theory of the uncanny valley (page 168, fig. 8), which posits that people cannot feel empathy for machines that look almost like real humans.¹⁹ The diagram that gives the theory its name shows these awkward examples in a dip that looks like a valley: on its left are playful, cartoonish, fictional creatures, such as AIBO, Tamagotchi (page 170, fig. 10), and stuffed animals, and on the right are healthy, real human beings. One of the most famous examples from the valley is the Japanese *Repliee Q1* Expo, introduced at the 2005 Aichi Expo, which was modeled after a young Japanese woman but seemed more like a Madame Tussauds wax figure come

Fig. 6
Antoine Bardou-Jacquet
and Ludovic Houplain of Hs.
The Child. 1999. Video (color,
sound), 3:06 min.

A couple rushes to the hospital—the wife is about to have a baby—in a taxi that travels through a New York in which everything is spelled out in text, to the sounds of Alex Gopher's "The Child."

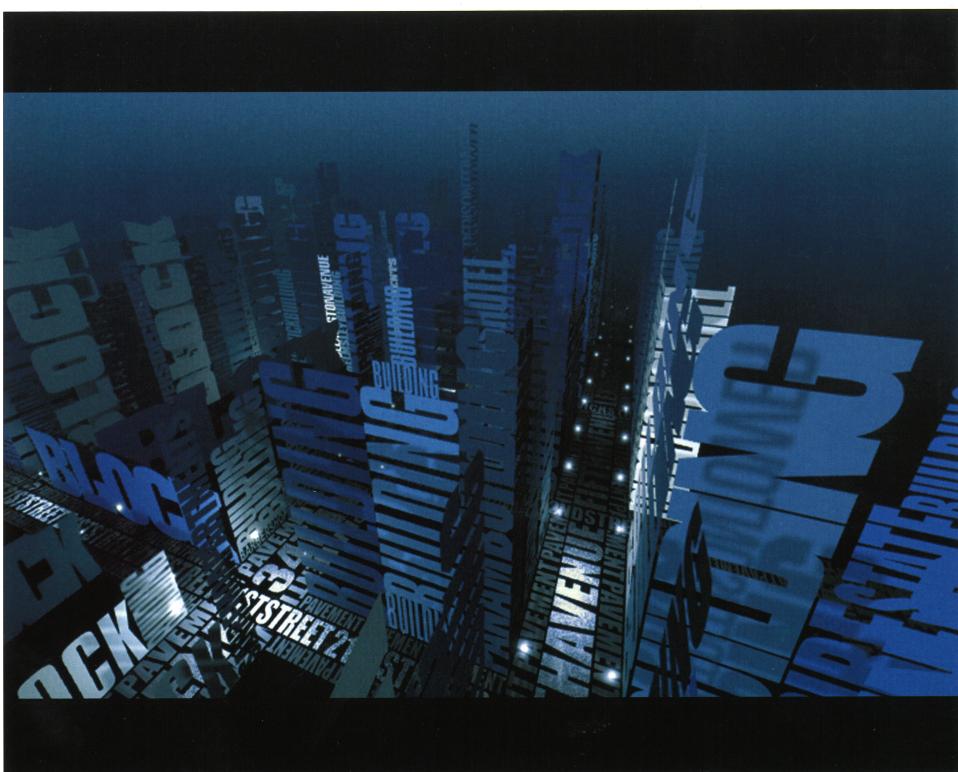


Fig. 7
Chaos Computer Club.
Blinkenlights. 2001.
Photograph by Dorit Guenter



to life. The theory also applies to voices: the warnings delivered in an airplane cockpit are recorded in a human voice to effectively alert the pilots with real human urgency that they can trust; the (usually female) voice is affectionately known as Bitching Betty. Voice operation is one of the elements of interaction that is being the most thoroughly studied, from in-vehicle communication systems for cars, with their obvious safety advantages, to dictation software. Every talking object becomes an entity, immediately taking on a more important role. When there's a voice, there's a conversation.

But voice and human- or petlike appearance are not necessary for a powerful interaction to take place. Some objects express themselves subtly and intensely using abstract interfaces, such as the breathing light on Apple's white iBook G4 (2004) (unfortunately abandoned in later models because it lacked bedside manner, keeping the owner awake while the computer slept). Apple's mastery of metaphors, in both hardware and software, is one element of the company's effective interaction design. The iPad calls up a nearly atavistic memory of the acts of writing and drawing on a tablet, which is offered as a counterbalance to overwhelmingly key-based technology—just what we need; Apple was similarly shrewd

back in 1984 with the Macintosh 128K, whose domesticated presence (like a little dog sitting patiently on its master's desk) and expressive interface built on analogies and metaphors (smiling computer, trash bin, folders, question mark, little bomb) were just what we needed to comfortably integrate technology into the home.

Interfaces for the People

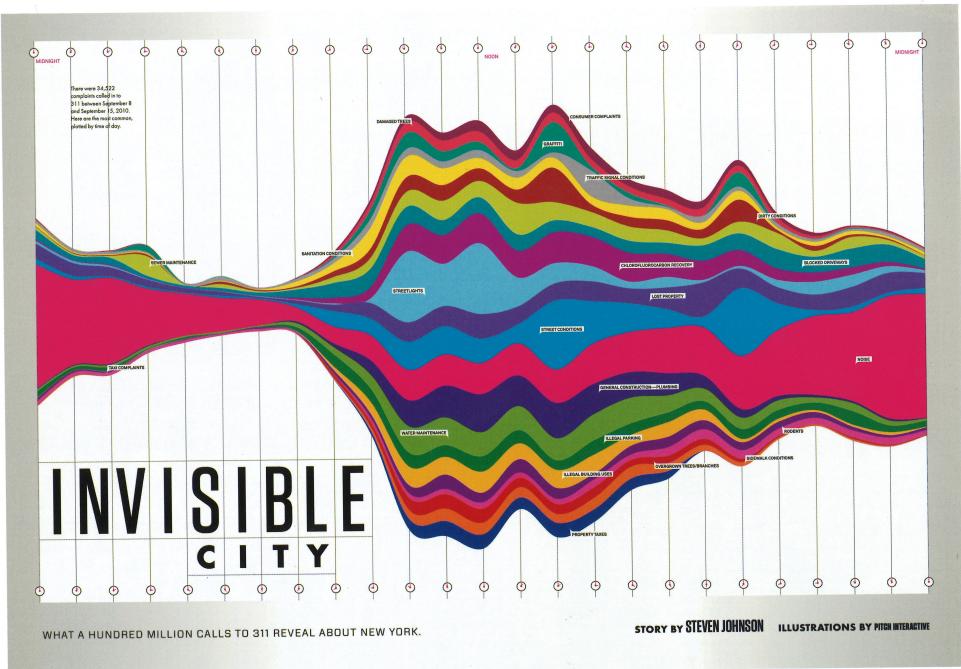
Interfaces, whether on smartphones or facades, whether composed of pixels, LEDs, or neon tubes, are laid on the surfaces of objects, spaces, and buildings but provide them with communicative depth and dynamism. Portable devices such as wristbands, sensors, and implants use interfaces that let individuals monitor themselves and be monitored by others at a distance, a very helpful way for elderly people to keep their doctors and family up-to-date on their well-being. Some websites are interfaces publicizing knowledge at different scales and with different consequences, from digital water coolers where employees rate their employers to the world-destabilizing force of WikiLeaks. Any device that receives and sends texts can call on flash mobs to commit acts of civil disobedience, but the same interfaces can be used for acts of civil responsibility, such as activating a tsunami-alert service or mapping emergency areas. Interfaces can amplify or reduce communication to human scale, whether, for example, bringing the government to the individual or the individual to the government.

We can now design the face we wish to present to the world. Where in the past we relied on family name, academic pedigree, business cards, looks, and accomplishments to augment our naked social selves, today we have the additional option of offering our riches to the world with blogs, personal websites, Flickr streams, Facebook and other social networks, and avatars. With these interfaces we think we can control the way we are perceived by the world (although things do not always work out as planned; reports are increasing of job applicants being rejected because their personal pages revealed information that didn't match the wholesome image they brought to their job interviews). By contrast, some interfaces disrupt this facade, encouraging people to let go of control and reach out to others in serendipitous ways. An app called Situationist, inspired by the Situationist International (a group of European artists and political agitators in the 1950s and '60s), connects willing participants, alerting them to each other's proximity using geotags, and

Fig. 8
Wesley Grubbs and Mladen Balog of Pitch Interactive
Invisible City: What a Hundred Million Calls to 311 Reveal about New York, 2010. Processing software. Published in *Wired* magazine, November 2010.

delivers instructions for situations both intimate and friendly, and political and subversive (fig. 5).²⁰

When interfaces allow users access to networks and systems, users can connect, acquire, and exchange information. At the local level, interfaces can help people share car rides and homegrown vegetables, provide support for the elderly, and find company. At the global level, people can hook their energy-monitoring systems into a local grid and contribute to data-aggregation projects that raise awareness of energy-consumption. A well-designed network or system can be a potent way to deliver an important message, such as sex columnist and activist Dan Savage's It Gets Better Project, prompted by a rash of suicides by gay teenagers in 2010. The project began modestly, with a video of Savage and his partner posted to YouTube, and quickly gathered steam to include video testimonials by hundreds of people, including celebrities and politicians such as President Barack Obama, encouraging lesbian, gay, bisexual, and transgender teenagers to see past the oppressive atmosphere of intolerance and hatred that they live in—that is, to tap into an international network of hope and acceptance.²¹



TALK TO ME

14

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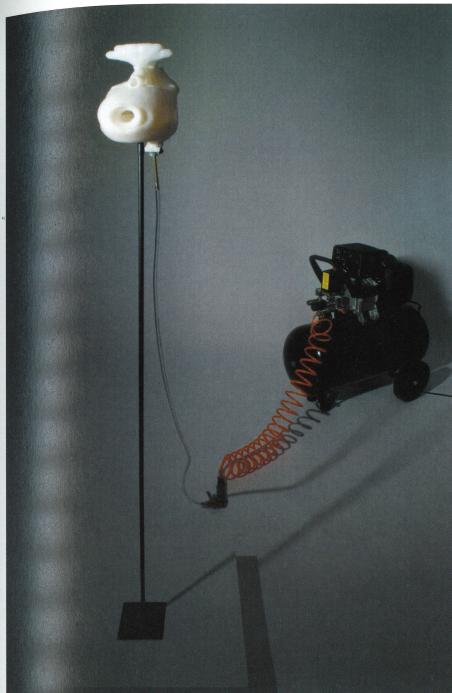


Fig. 9
Marguerite Humeau, Design Interactions Department, Royal College of Art. *Lucy from Back, Herebelow, Formidable* (the rebirth of prehistoric creatures), 2010–ongoing. Metal, plastic tube, and air compressor, 45 5/16 x 19 11/16 x 59" (115.1 x 50 x 149.9 cm)

A great deal of communicative experimentation takes place in cities, which, because of their density, are the perfect testing ground (fig. 6). *City* (1988), William H. Whyte's great observation of the physical interactions among people, cars, buildings, and a city's other animate and inanimate inhabitants, would benefit from an update to include the additional layer of exchange now provided by digital technology.²² New buildings talk in ways no one could have imagined in the analog years. In "Living Skins: Architecture as Interface" (2006), critic Peter Hall cited the Blinkenlights project (2001, fig. 7) as a pioneer in massive-scale urban communication: members of the Chaos Computer Club installed 144 bright lights in the front windows of the top eight floors of Haus des Lehrers, a building on Berlin's Alexanderplatz, transforming the facade into a giant computer screen. Using mobile phones, passersby could play Pong or send images to be rendered on the very low-res, very big, very dramatic screen.²³

The city talks to citizens, and citizens certainly talk back. Several municipalities, New York among them, have set up services to enable people to communicate with the local government via phone and web. In New York that system is called 311, after its phone number. Pitch Interactive, a visualization design company, created an analysis of 34,522 complaint calls to 311 (2010, fig. 8)—a colorful depiction of the pet peeves of New Yorkers. Several countries have set up nationwide systems; in March 2010 Gordon Brown, then the United Kingdom's prime minister, announced a plan to endow every citizen with his or her own web page, in order to give them improved access to government benefits, information, and services.²⁴

Design has a whole new set of clichés to deal with; postdigital design, in its embrace of the analog, expresses a fatigue not only with the medium but also with the forms of digital technology, and the apparent rejection of aesthetics expressed by hackers is an aesthetic ideology in itself. This accusation has also been leveled at Google, whose antistyle has been channeled and crystallized in many contemporary interfaces and has set a template for the DIY physical-design movement. Technological progress always brings formal innovation, which starts as creative flair but may soon degrade into routine. Thus the groundbreaking elegance of Braun, since the 1950s, or Apple, since the 1990s, can become mannered if this approach is not reinvented every time, an easy formal recipe for displaying zeitgeist sensitivity.

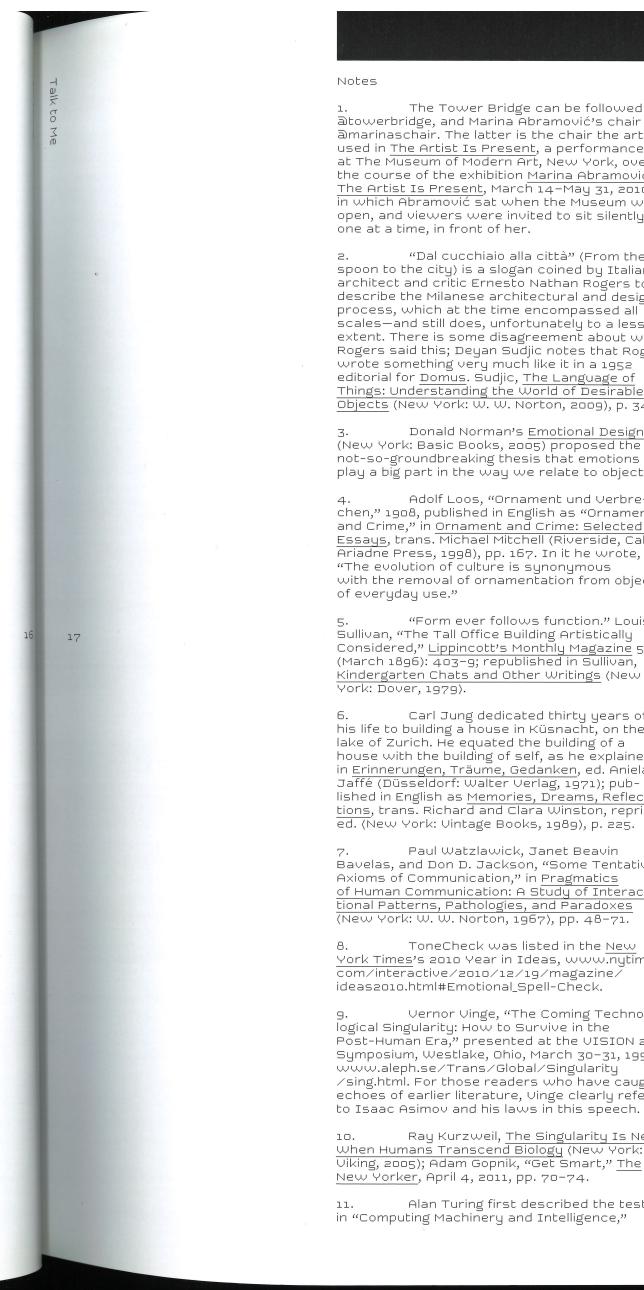
Talk to Me is an opportunity to anchor design's new dimension and highlight innovative

interfaces that can inform designers in the future, whether they use the skin and shell of objects as an interface or animate them from within, designers are using the whole world to communicate and are set on a path that is transforming it into an information parkour and enriching our lives with emotion, motion, direction, depth, and freedom. Now that the technological means are widely available, designers have become sophisticated enough to modulate them with a sensitive touch. They have matured past the first moments of irrepressible and immoderate enthusiasm for the new medium and have learned to wear technology, instead of letting technology wear them. It can be difficult to keep perspective on the magnitude and scope of all the interactions we engage in or witness or hear about; design is flowing into politics, philosophy, science, and religion in ways both ancient and new. The predigital Arecibo message was one such metaphysical venture, a string of digits launched in 1974 from the Arecibo radio telescope in Puerto Rico and transmitted via FM radio waves to a star cluster twenty-five thousand light-years away—a shout out into the void, a soaring attempt to talk to creatures whose essence we can't even imagine.

Design and design-related experiments are propelling us further and further into the unknown. Interfaces have been proposed that help us communicate with God; a Taoist prayer hall went electronic;²⁵ an app has been created for Catholic confession; the young designer Marguerite Humeau has been resuscitating long-extinct prehistoric creatures by resuscitating their voice boxes (fig. 9); and designers Jon Ardern and Anab Jain, with their evocative multidimensional camera (page 163), have attempted to embody Hugh Everett's many-worlds theory in an object that adds to the cinematic tradition of *The Matrix* (1999), *Lost* (2004–10), *Fringe* (2008–ongoing), and *Source Code* (2011), to name just a few.²⁶

It might seem that design has abandoned its tested, grounded, functionalist territory to venture into an ambiguous universe where its essence is confused and a crisis of identity arises—is the 5th Dimensional Camera art or scientific modeling? Is Humeau's work creative paleontology? Are Sputnikov's devices (pages 177 and 182) contributing to interpretive anthropology? Is Pachube (page 41) mere coding and infrastructure engineering? Not at all. I claim them, with their powerful visions and their focus on knowledge and awareness, as design, and I praise their radical functionalism. Ambiguity and ambivalence—the ability to inhabit different environments and frames of mind at the same

time—have become central to our cultural development. They are qualities that embody the openness and flexibility necessary for embracing diversity, and they are critical to the questioning and imagining that are the preferred methods of inquiry. Communication is at the nexus of all these necessary human features: the most crucial function for design today.



Mind: A Quarterly Review of Psychology and Philosophy 59, no. 236 (October 1950): 433–60, mind.oxfordjournals.org/content/59/236/433.full.pdf+html.

12. Guido Gozzano, “L'amica di nonna Speranza,” in *La via del rifugio* (Turin: Renzo Strehli, 1907). Author's trans.

13. Significant Objects, significantobjects.com/about. The project is currently on hiatus and was ceasing in early 2011, published by Fantagraphics Books. Among the highlights of phases I provided about ten objects for writers. I consider Rob Walker to be a Talk to Me soul mate; in a blog post, the curatorial team dubbed him the Object Whisperer, wp.moma.org/talk-to-me/2010/09/the-object-whisperer-an-interview-with-rob-walker.

14. Newspaper Club, www.newspaperclub.co.uk/about.

15. “On Wikipedia, Cultural Patrimony, and Historiography,” The Blog of James Bridle, booktwo.org/notebook/wikipedia-historiography.

16. Alice Rawsthorn, “The Demise of ‘Form Follows Function,’” *New York Times*, May 30, 2009, www.nytimes.com/2009/06/01/arts/01ht-DESIGN1.html.

17. Jean-Baptiste Labrune, Jamie Zigelbaum, and Hiroshi Ishii, “From PreHistoric Interfaces to NearFuture Interactions,” [www.slideshare.net/jlabrune/user-interface-history-to-near-future](http://slideshare.net/jlabrune/user-interface-history-to-near-future). This slide show is concise and incisive but, as the authors are all part of the MIT Media Lab, rather MIT-centric.

18. Until recently, commercial screens could sense only a single finger at a time.

19. See “Crossing the Uncanny Valley,” *The Economist*, November 18, 2010, www.economist.com/node/17519716. Masahiro Mori first published his theory in “The Uncanny Valley,” trans. Karl F. MacDorman and Takashi Minato, *Energy* 7, no. 4 (1970): 33–35.

20. Guy Debord, *La Société du spectacle* (Paris: Buchet-Chastel, 1967); published in English as *The Society of the Spectacle*, trans. Donald Nicholson-Smith, reprint ed. (New York: Zone Books, 2008).

21. It Gets Better Project, www.itgets-better.org.

22. William H. Whyte, *City: Rediscovering the Center* (New York: Doubleday, 1988).

23. Peter Hall, “Living Skins: Architecture as Interface,” Adobe Design Center Think Tank, n.d., www.adobe.com/designcenter/thinktank/livingskins.

24. “Every Citizen to Have Personal Webpage,” Telegraph, March 20, 2010, www.telegraph.co.uk/technology/news/7484600/Every-citizen-to-have-personal-webpage.html.

25. “Taoism Goes High Tech,” *Wall Street Journal* (blog), February 14, 2011, blogs.wsj.com/hong-kong/2011/02/14/taoism-goes-high-tech.

26. The many-worlds theory, one of quantum theory's most cinematic offshoots, postulates that what is happening in this universe becomes, in other universes, a branch from which other events and other branches sprout.

Notes

1. The Tower Bridge can be followed at towerbridge.org, and Marina Abramovic's chair at amarinaschair.com. The latter is the chair the artist used in *The Artist Is Present*, a performance at The Museum of Modern Art, New York, over the course of the exhibition *Marina Abramovic: The Artist Is Present*, March 14–May 31, 2010, in which Abramovic sat when the Museum was open, and viewers were invited to sit silently, one at a time, in front of her.

2. “Dal cucchiaino alla città” (From the spoon to the city) is a slogan coined by Italian architect and critic Ernesto Nathan Rogers to describe the Milanese architectural and design process, which at the time encompassed all scales—and still does, unfortunately to a lesser extent. There is some disagreement about when Rogers said this; Deyan Sudjic notes that Rogers wrote something very much like it in a 1952 editorial for *Domus*. Sudjic, *The Language of Things: Understanding the World of Desirable Objects* (New York: W. W. Norton, 2009), p. 34.

3. Donald Norman's *Emotional Design* (New York: Basic Books, 2005) proposed the not-so-groundbreaking thesis that emotions play a big part in the way we relate to objects.

4. Adolf Loos, “Ornament und Verbrechen,” 1908, published in English as “Ornament and Crime,” in *Ornament and Crime: Selected Essays*, trans. Michael Mitchell (Riverside, Calif.: Adriatic Press, 1998), pp. 167. In it he wrote, “The evolution of culture is synonymous with the removal of ornamentation from objects of everyday use.”

5. “Form ever follows function,” Louis H. Sullivan, “The Tall Office Building Artistically Considered,” *Lippincott's Monthly Magazine* 57 (March 1895): 403–9; republished in Sullivan, *Kindergarten Chats and Other Writings* (New York: Dover, 1979).

6. Carl Jung dedicated thirty years of his life to building a house in Küsnacht, on the lake of Zurich. He equated the building of a house with the building of self, as he explained in *Erinnerungen, Träume, Gedanken*, ed. Aniela Jaffé (Düsseldorf: Walter Verlag, 1971); published in English as *Memories, Dreams, Reflections*, trans. Richard and Clara Winston, reprint ed. (New York: Vintage Books, 1989), p. 225.

7. Paul Watzlawick, Janet Beavin Bavelas, and Don D. Jackson, “Some Tentative Axioms of Communication,” in *Pragmatics of Human Communication: A Study of Interactional Patterns, Pathologies, and Paradoxes* (New York: W. W. Norton, 1967), pp. 48–71.

8. ToneCheck was listed in the *New York Times*'s 2010 Year in Ideas, www.nytimes.com/interactive/2010/12/19/magazine/ideas2010.html#EmotionalSpell-Check.

9. Vernor Vinge, “The Coming Technological Singularity: How to Survive in the Post-Human Era,” presented at the VISION 21 Symposium, Westlake, Ohio, March 30–31, 1993, www.aleph.se/Trans/Global/singularity/sing.html. For those readers who have caught echoes of earlier literature, Vinge clearly refers to Isaac Asimov and his laws in this speech.

10. Ray Kurzweil, *The Singularity Is Near: When Humans Transcend Biology* (New York: Viking, 2005); Adam Gopnik, “Get Smart,” *The New Yorker*, April 4, 2011, pp. 70–74.

11. Alan Turing first described the test in “Computing Machinery and Intelligence,”