

An Introduction to Product Design



We're surrounded by legions of products, most of them unremittingly lousy. What separates the good from the bad from the ugly? Take out your well-designed pencils for Product Design 101.

Last night I went to a corner liquor store to buy some toothpaste. While the beer and candy aisles of the store were heavily trafficked, the back "household goods" section was not. And that's where I was, searching for Crest among reams of dust-covered carbon paper for typewriters nobody now uses; scissors made in China with finger holes too small for toddlers; and paper-thin polyester argyle dress socks hanging like petrified bats from plastic hooks. All these products were uncomfortable, ugly, hard to use, and obsolete—so useless that nobody had ever wanted them. And since they rolled off the production lines 10, even 20, years ago, they have rotted beneath the flickering fluorescent lights of this liquor store and thousands like it, grimy unmarked gravestones in the cemetery of bad product design.

I left the store empty-handed and wondered why a free market society would produce so many things that are so wholly crappy. I also wondered what it is that keeps one product relevant, useful, and beautiful for decades (i.e., Crest) and another instant-landfill fodder (i.e., unwearably thin argyle polyester socks). What is it exactly that makes one product's design good and another so bad?

Basic economics dictates that good products are items consumers buy from manufacturers angling to make a profit. What makes a product successful is not one but many things, a tangled web of form and function that enables the product to (a) serve an unmet need, (b) be easy to use,



Story by James Nestor
Illustrations by Andrew Holder

(c) be attractive, and (d) be efficient to produce. In other words, the product needs to make sense to the consumer. A tube of Crest makes sense; so does a bottle of Chartreuse. These things are useful and pretty, sure, but they are more than the sum of their parts. Good products have a feel about them that other products don't.

Early products fit the needs of the environments from which they were produced. Near forests, people might have built wooden arrows that helped them hunt animals beneath a canopy of trees; by the sea, they built hooks from bone to gather food from the deep. But product modality changed as trade developed between cultures. Those products that garnered the most in trade had to catch a merchant's eye—an elaborate engraving on a sword, an ornate frieze on a clay vessel. Aesthetics became a factor.

By the Industrial Revolution, the cost of products had decreased as manufacturing processes developed. To compete and stay viable, good products also had to make economic sense.

By the 1950s, superindustrialized production lines became so efficient that more products became available to more people than at any other time in history. To keep people buying products more often, manufacturers developed various modes of planned obsolescence, in which products were developed in timely fashions and styles. Trends ruled.

In a world of new concerns, where landfills are growing, resources are dwindling, and economies are recessing, why is Crest a well-designed product and polyester argyle socks so crummy? Why is an Alessi tea kettle



better than the one I just bought at Walgreens? What makes an Eames side chair look timeless and a knockoff look so silly?

Good product design is about how the product works, the thought, organization, process, and manufacture of the thing that just makes it feel right. Take a quintessentially good modern product design—the iPod. Before the iPod there were many MP3 players on the market, some of which were more powerful, had more features, and cost less money. These were hard to use, ugly, and temperamental, and didn't make sense to a lot of consumers. Apple took the contents of these devices, thought them over, reorganized their parts, and processed them into a product that was accessible, simple, convenient, and pretty. The iPod rules the MP3-player market not by its technology but through its good design.

If the iPod—and history—shows us anything, it is that a good product exceeds the physical object, the way in which its parts are pieced together. **Not to get too high flown, but good product design makes sense; bad product design doesn't.** Which is why the same plastic, chemicals, ink, and paper that make Crest so good (and often sold out) can also make children's left-handed scissors and polyester socks so bad (and destined to rot on shelves for an eternity). It's not the materials themselves that make a product successful; it's the feel of the thing, or rather, how the thing makes us feel. Good products make us feel good.



Words you should know

Charrette: An intense period of design activity in which a group collaborates to work out a solution to a specific design problem. It's like a workshop, but sounds either more important or more pretentious.

In situ: The state in which designed products are tested. Architects use the term differently, to describe buildings created from raw materials at the location upon which the building will be built.

Maslow's hierarchy of needs: A theoretical psychology used by manufacturers to develop products that appeal to consumers. The pyramidal hierarchy begins with complex human needs at the top (creativity, morality) and ends with base needs at the bottom (food, water, air).

Open design: Like its computer programming cousin "open source," this is a process in which products are developed through publicly shared information. The open design approach is usually used for creating charitable products or new technologies.

Poka-yok: A Japanese-derived term of imbuing fail-safe devices in a product that help prevent consumers from using it incorrectly. The little tabs on cassette tapes that prevent overrecording are one example; so is the pop-up window in word-processing programs asking users if they want to save the document before shutting down.

TIMTOWTDI: Pronounced "Tim Toady," this acronym for "There is more than one way to do it" stresses that a problem can have numerous product development solutions. As for the people who use this phrase, we need only say "TDSLTMAMTMF" ("These dudes should spend less time making acronyms and more time making friends"). ▶

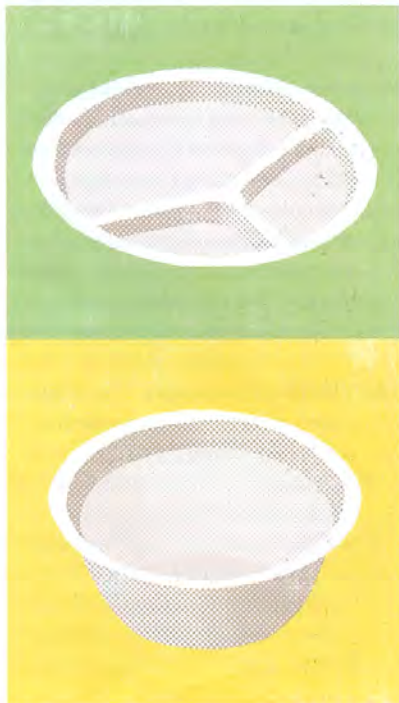
Best Buy

Under \$100

Biopac biodegradable plates
biopac.co.uk

The United States produces a staggering 693,150 tons of garbage every day—about 250 million tons a year. Twenty-five percent of this waste by volume is polystyrene, an industrial polymer used to make, among other things, the petroleum-based plastic commonly known as Styrofoam. Scientists can't agree on how long it will take Styrofoam to degrade; a good guess is between 500 years and never. Whatever the number, it's clear we need a useful, cheap, environmentally conscious alternative to Styrofoam.

In response, British-based company Biopac has produced vegetable-starch-eating disposable plates (along with biodegradable plastics for medical supplies and horticulture products). Biopac's organic shapes and simulated woodgrain finishes make the line of fully decomposing, food-oriented disposables not only beautiful but essential to earth-minded picnickers.



Good design isn't inextricably wed to a high price tag. These classic designs run the gamut of types and prices.

Over \$100

Technics SL-1200 turntable
panasonic.com

In the 1960s and early 1970s, playing an LP on a turntable was a tenuous affair: At higher volumes feedback often resonated through the tone arms; some motors played too fast, others too slow, and there was no way of adjusting the speed; vibrations from even walking a few feet from some players could be enough for needles to pop and skip. Turntables were generally noisy, temperamental, and difficult.

In response to these common complaints, Japanese company Matsushita (which became Panasonic) released the first SL-1200 turntables in 1972. The SL-1200 included a heavy base to greatly minimize skipping and feedback; a magnetic direct-drive system to avoid wear and slippage; and a revolutionary variable pitch control to allow adjustment of the record's speed. The result was a turntable that played quieter, cleaner, and more accurately than any of its competitors. Soon after its introduction, the SL-1200 became the industry standard for radio and the de rigueur accessory for audiophiles.

The SL-1200 has remained in continuous production for 37 years as the world's best-selling turntable because it is easy to use, striking to look at, and ridiculously durable. Just ask your local DJ.



Over \$1000

606 Universal Shelving System
 by Dieter Rams for Vitsoe
vitsoe.com

Dieter Rams, one of the world's most influential product designers, was at a crisis in the early 1980s. He saw in the world around him nothing but "an impenetrable confusion of forms, colors, and noises." The result of his malaise was his now-famous ten commandments of good product design. Rams argued design must be innovative, useful, aesthetic, unobtrusive, honest, durable, and thorough to the last detail; help a product be understood; be concerned with the environment; and be designed as little as possible.

Though articulated later in his career, these commandments are strikingly presaged in this 1960 shelving system. Easy to install, fully portable, and modular, the Universal Shelving System is customizable with a series of adjustable-depth shelves, multiuse cabinets, wall-mounting, and compressed-feet stabilizers. Twiggy-thin and streamlined, Rams's design cuts a striking profile, lending any interior a razor-sharp focus and freshness.

The 606 Universal Shelving System has been in continual production for nearly 50 years for a reason, actually many reasons. It is built to last forever and can be easily moved from location to location, and its "anti-waste" and "anti-style" design ensures its appeal in the next century as it has in the past.



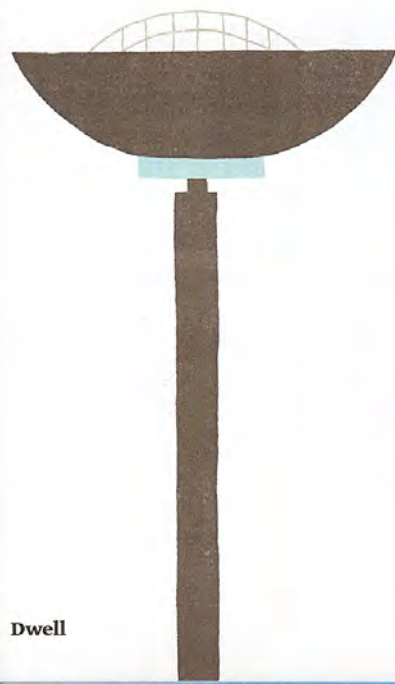
Buyer Beware

Under \$100

Torchiere halogen lamps

Introduced in 1982, torchiere halogen lamps were an inexpensive and potentially energy-saving alternative to incandescent lamps. By the mid-1990s, 40 million had been sold in the United States as the lamps became the default accessory in college dorm rooms nationwide. That is, right before they started killing people. The flaw is in the tungsten metal filaments of halogen bulbs, which consume significantly less electricity (good) yet burn at over 1,000 degrees Fahrenheit to do so (bad). By 1997, the lamps were responsible for 189 fires and 11 deaths. The U.S. Consumer Product Safety Commission and the halogen lamp industry cooperatively called for a recall of over 40 million of these lamps.

While many of their functions are admirable (they're inexpensive and conserve energy), torchieres break the prime directive of product design: They are dangerous (not to mention ugly). Today, hundreds of millions of pounds of torchiere lamps sit alongside head-cracking lawn darts, bottles of unused fen-phen, and explosion-prone fuel tanks of Ford Pintos in landfills nationwide as examples of lethally bad product design.



Bad design can be not just unattractive but unhealthy. Steer clear of this trio of second-rate offerings.

Over \$100

Maple baseball bats

In Babe Ruth's era, ballplayers used bats made from hickory, a solid, heavy wood that rarely breaks. But hickory's weight led many players to switch to lighter white ash-wood bats. Though ash tends to flake or crack, it seldom shatters into large pieces, and these bats have been in heavy rotation for over 50 years with few incidents of injury-causing breakage.

In the late 1990s, however, maple bats gained popularity as Barry Bonds's tool of choice in his record-breaking home-run streak. Today, half of all professional players use maple bats. **Though lighter than hickory and ash, maple breaks in a more dangerous way, with a tendency to explode upon impact, sending large, jagged shards hundreds of feet into the air.**

In 2008 alone, Pittsburgh Pirates hitting coach Don Long suffered nerve damage when his cheek was sliced open by one of these shards, fan Susan Rhodes's jaw was cut in two places while sitting four rows back in Dodger stadium, and umpire Brian O'Nora left a game bleeding profusely from the shrapnel of a shattered maple bat. After review in 2008, a Major League Baseball safety committee decided to allow their continued use.



Over \$1000

French bulldogs

I am not trying to make you hundreds of thousands of French bulldog owners mad. You are beautiful people. I adore your loving pets and admire your beautiful shoes. In fact, a friend's French bulldog is at my feet now. (This is true.) Damn, it's cute. But please, for a moment, consider the following.

French bulldogs are bad design. Their production is costly, environmentally damaging, and, worse, inhumane. Most Frenchies cannot be naturally birthed and require Caesarean-section deliveries, which are expensive and can permanently damage the mother. As a pure breed, French bulldogs are not cost-efficient and are not user-friendly. Centuries of inbreeding have made them genetically inferior in nature and susceptible to many congenital conditions, including severe breathing impairment, eye infections, irregularly sized digestive systems that make them vomit, impaired thyroid function, eye proptosis (i.e., eyes popping out of their heads), and a laundry list of other cruel and costly ailments.

If Frenchies were store-bought products the EPA, FDA, and UN would ban them. These dogs are a real dog. ▶



Like a Rock

When it comes to great product design, the material is often the message. Matuse's wetsuits prove why.

For the last 50 years wetsuits have been made from neoprene, a petroleum-based rubber filled with nitrogen to create an insulating barrier against cold water. Neoprene has about a 70 percent water impermeability, which makes a two-to-three-millimeter-thick suit comfortable to wear in 60-degree-or-higher water. However, in colder water, neoprene suits cannot provide sufficient insulation unless they are up to five or even seven millimeters thick. Thick neoprene suits restrain swimming performance in the water, forcing surfers to choose between being either cold and flexible or warm and immobile.

In the early 1970s, Yamamoto Corporation of Japan developed an alternative called geoprene. Geoprene is an organic rubber constructed out of 99.7 percent limestone (primarily made up of the ancient shells of marine organisms). It offers up to 98 percent water impermeability at half the thickness and lasts twice as long as its neoprene counterpart (which can degrade after six months as nitrogen leaches from the suit).

"People were shocked to try on a suit that was so warm, flexible, styled right, and that would last longer, perform better, and was environmentally friendly," says John Campbell, founding partner of Matuse Wetsuits, the first U.S. wetsuit manufacturer to use high amounts of geoprene in its suits. In 2005, Matuse expanded its line of geoprene suits and, as a result, opened up new possibilities in cold-water surfing. "I have a year-and-half-old Matuse I surf in when the water is 30 degrees and it's minus 5 out," says Yassine Ouhilal, a surf photographer who lives and surfs in Nova Scotia. "I could never have done this in a neoprene suit."



Books you should read



The Champ

Phaidon Design Classics: 001-999
Phaidon Press, 2006

This quintessential collection of 999 product designs in three high-numbering volumes explores product design from the late 1600s to the present. They include everything from 300-year-old scissors to modern airplanes and the work of such 20th-century stalwarts as Marcel Breuer, Le Corbusier, Henry Dreyfuss, Ray and Charles Eames, and a host of up-and-comers. In homage to one of the primary principles of good design—durability—most of the products featured here are still in production.

The Challenger

Designing the 21st Century
by Charlotte and Peter Fiell
Taschen, 2005

This new tome offers ruminations and forecasts on the future of global product design. It features interviews with contemporary designers from across the globe, each of whom is determined to push product design forward, whether it's for a wine glass or a windmill.

The Dark Horse

Humble Masterpieces: Everyday Marvels of Design
by Paola Antonelli
Collins Design, 2006

The curator of the Museum of Modern Art's Department of Design and Architecture offers a treatise on the extraordinary beauty of 100 ordinary things. Safety pins, condoms, and the Rubik's Cube are just a few of the common items Antonelli vets under a microscope, explaining the origins of these simple objects and why we can't live without them. ▶▶

Product Developments

We asked three product designers from three different fields what the future holds. Oddly, none of them mentioned crystal balls.

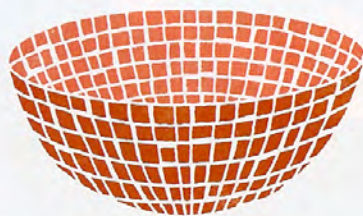


Furniture

Stephen Burks is the principal of the New York studio Readymade Projects, whose works range from consumer products to lighting, furniture, home accessories, and more. He is considered one of the leading lights of American design, with clients ranging from B&B Italia to Calvin Klein.

"The future of furniture design is bridging industrial production with artisanal handmade craftsmanship. There is a growing interest in having character in a piece, a story. People with a \$10,000 sofa or a \$5,000 lounge chair now want to fill in the blank with some piece of authenticity that goes beyond just branding. This is where artisanally made furniture fits in. To do this, I see a move toward working more with the developing world.

I have clients—Cappellini, B&B Italia, Moroso—that are looking to create a bridge from handcrafted production from places like India, Peru, and Senegal into first-world distribution. Even though a lot of these companies may not be espousing the mantra "Save the planet," they are acting in that direction. When a company like Cappellini says they want to make a brand of handcrafted, eco-conscious furniture, that has huge implications. More companies will follow."



Transportation

Grant Petersen is the owner of Rivendell Bicycle Works, the Walnut Creek, California, bike manufacturer that for the last decade has spearheaded a back-to-basics retro-future revolution in biking.

"Bike makers are searching for less costly, more consistent ways to make bikes, with the ultimate goal of being able to outsource the labor to any country in the world. The future is injection-molded thermoplastic frames, with integral batteries and rechargers. The bikes will be disposable and recyclable, and they'll have a *Wall-E* look about them.

But if the goal is to get more people on bikes, I don't think 'a better urban bike' will do it. We need infrastructures—cities and laws and support—for the bicycle and against the car. Take away parking spaces for cars, give bikes the right of way at intersections, put car-parking garages a quarter mile from shopping centers, shorten commutes, and create light-rail systems with free bike parking, and people will ride bikes more. City planners, not bike designers, are the ones with influence."

Consumer Electronics

Iain Roberts coleads the Chicago studio of Ideo, one of the most innovative design companies in the world. Ideo's product designs range from the first computer mouse for Apple to the SmartGauge digital instrument cluster for Ford hybrid cars.

"We're seeing a blurring of boundaries in consumer electronics: the

physical and digital, the consumer and creator. In the case of products, increasingly everything has a chip inside of it, and that's enabling us to create richer, more connected experiences. We're seeing experiences that tie together multiple channels—mobile, Internet, TV—which allow us to do more with the same product. In some ways, products are becoming as much about service delivery and media consumption as anything else.

From a design perspective, this provides us interesting challenges. The dominant element in a lot of the products we are designing is the screen: It's changed the way we design and now we're needing to build the product around it. We're looking to tie the physical and graphical interaction together as closely as possible, paying new attention to materials, surface finishes, and details as well as focusing on sensory aspects such as touch and sound. We're looking to products to engage all the senses." ■■■

