Longbranch Research Associates *presents*:

So-Called Experts

a book always in progress & free

by Stephan Michelson

Chapter 1

Design I

as of September 10, 2016

> That the fitness of any system or machine to produce the end for which it was intended, bestows a certain propriety and beauty upon the whole, and renders the very thought and contemplation of it agreeable, is so very obvious, that nobody has overlooked it.
>
> Adam Smith (1759)
> *The Theory of Moral Sentiments* (at 177)

The fins on the 1955 Chevy broke with tradition. Before then, shapes on automobiles were rounded. The appearance of angles, of distinct straight lines, was a cultural shock. Refrigerators, washing machines and radios from the 1940s and 1950s all have that well-rounded look. That was the accepted norm until, by the 1960s, we thought them fat and ugly. We were "rescued" from the 1940s-50s clunkiness by a new art, industrial design. Art? No longer was the craft of making a good pot, a functional toaster, sufficient. Now it has to be art?

The Museum of Modern Art includes, in its collection, designed objects—clocks, pots, chairs. Which leads inevitably to the question, what *is* good design? The old, round, substantial kitchen implements of the fifties are back; at least their imitators are, in a design fashion called "retro." Although we want to feel good, aesthetically, in our kitchens, is this the place for a fashion statement? Should we paint them retro yellow? Please, no. First and foremost, like your garage, the kitchen presumably is the place for efficient, functional equipment. However, as you spend considerable time there, of course it should also look good. As should your living room. But not, I will argue, to the detriment of functionality.

To some extent "good design" is a cultural phenomenon. To some extent good design is also, if not art, then both craft and science. Consider, for example the Barcelona Chair designed by Ludwig Mies van der Rohe and Lilly Reich, presented at the World's Fair in Barcelona, Spain, in 1929. Let us ask, given the general shape of the chair, how to form the curves in the legs. As Kimberly Elam tells us, the back and front legs are an arc of a single circle. The same radius describes the curve of the steel from the front of the seat. Then an "S" curve is formed, where the rear legs are the arc of a circle one-half the radius of the other two.[1]

This is fascinating information, and no doubt this kind of mathematical symmetry is recognized in some visceral way by the viewer.[2] It is lovely. But that seems to me to be a secondary consideration: Is it comfortable? "Design" is first about the usefulness of objects. I don't skimp on aesthetics, as you will see when you get to my diatribe on doors. But none of that counts if the object does not function well, if the door is not easy to open and close, if this is not the chair you want to sit in. No reviewer tells us if it is.

The red chair on the right, "Chair One" by Konstantin Grcic, is as striking as the Barcelona Chair. Mr. Grcic, named "Designer of the Year" in 2010 (at Design Miami—no doubt there are other "Designers of the Year"), has created functional objects with a striking visual presence. But do they do what they are intended to do, such as provide comfortable seating? Reviewers do not tell us.[3]

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1 Kimberly Elam, *Geometry of Design: Studies in Proportion and Composition*, Princeton Architectural Press (2001), pages 56-57.

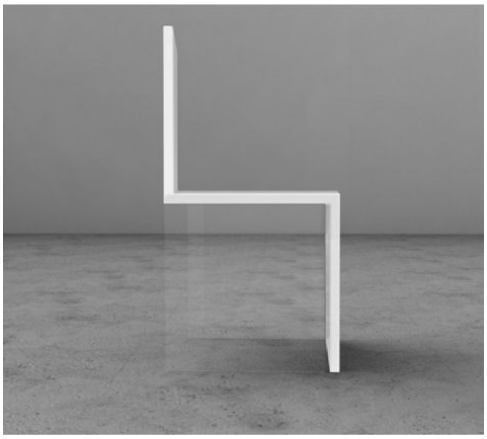
2 Design as mathematical relationships is perhaps brought to its extreme in Jay Hambidge, *The Elements of Dynamic Symmetry* (Dover, 1926), put together from essays written in 1919 and 1920. He is especially fond of the number 1.618, whose inverse is .618, and whose square is 2.618. Curious, I admit, but a fundamental route to good design? I don't think so.

3 See Tim McKeough, "Konstantin Grcic on Being Designer of the Year at Design Miami," *The New York Times*, December 2, 2010 (at D2), from which this chair picture was copied. There was no photo credit.

This green "Stretch Chair" (on the left) by Carnevale Studio, can be purchased for $895 at ABC Home in New York where, I am sure, one can sit on it. This yellow PS 142 by Eugenio Gerlie (on the right) carries a price of $2,195 at M2L. The *New York Times*, from which these pictures emanate, also showed some sleek tables, making no comment about them, either. Apparently whether the top of a table will scratch easily, or will melt under a hot beverage, are not characteristics of "design." I do not understand the purpose of an "article" about design that contains no text. Perhaps the *Times* had nothing flattering to say about them.[4]

Consider the "Magica Chair" (below, left) designed by Davide Conti,. *Design Bureau* notes:[5]

> Sharp 90-degree angles and a stiff surface mean this chair is better suited for marveling than kicking back.



The trick is that the opaque plexiglass "chair" form is attached to a transparent plexiglass cube, deliberately making a chair no one would want to sit on.

Displaying chairs and benches, the magazine *Interior Design* does say "Comfy seating makes work seem easy," allowing the reader to assume that all chairs pictured are comfy. However on the previous page the title was "blank slate," offering no clue whether the chairs pictured there performed their primary function well.[6]

blank slate

What these pieces lack in color, they make up in style

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4 "Entertaining, by Design," *New York Times*, September 28, 2011.

5 Photo and quote from *Design Bureau* No. 6, July-August, 2011, at 16.

6 84 *Interior Design* 13 (May, 2013) first quotation at 148, second at 146.

In another almost wordless review, the *New York Times* shows us the chair on the right, not telling us who made it, out of what (stainless steel, I presume), at what price it sells, or where. Nor did it tell us whether the reporter thought it was comfortable to sit in.[7]

Bravo to Hanna Goldfield, reviewing the nth remake of New York City's Tavern On The Green.

> Like most things on the menu, the lamb sounds better than it looks or tastes and costs more than it should.[8]

Why there is more to this review, I do not know. Goldfield sticks to the essence of a restaurant—the food. Does it taste good, is it well priced? She knows that people go to restaurants for other reasons ("Of course the food is beside the point") but if one serves food, the reviewer should tell us about it. If one designs a chair, the reviewer should tell us what it is like to sit in it. Reviewers of furniture, or architecture, could learn from restaurant reviewers: Provide some functional judgments.

Clothing was originally intended to cover the body. How much of the body is to remain exposed may change over time, but that which covers nothing is the Emperor's new clothes. Years ago I saw a girl on a bus in New York City naked above the waist. She did not think she was naked. She thought she was wearing a fashionable top made of clear plastic, and no bra or T-shirt underneath. Perhaps some reviewer told her this is "the latest thing," failing to tell her what adult women know, to hold some of it back.

The Basics

Henry Petroski belittles the concept that "form follows function." Perhaps he agrees that the first priority of good design should be function, but he asserts that function does not lead to design. "Form Follows Failure" he says, loudly enough to be a chapter. Petroski asks why a given function, say, in eating utensils, has evolved into such different forms as the fork, knife and spoon in the west, chopsticks in the

7 Julie Lasky, "Going For The Remix," *New York Times* May 22, 2013. This is a review of the Contemporary Furniture Fair at the Jacob K. Javits Convention Center.

8 Hanna Goldfield, "Tavern On The Green," *The New Yorker* June 9 & 16, 2014 at 26. Adam Platt, writing in *New York Magazine* June 16-19, 2014, expresses the same sentiment ("The wood-roasted Maine mussels didn't taste of wood or smoke at all..." (at 72) although his writing lacked Goldfield's pizzazz. Pete Wells, in the *New York Times*, June 25, 2014, praised the mussels, but not the food in general.

east. He even speculates a little on the origin of chopsticks, missing what seems to me to be the most obvious explanation.[9]

China and Japan had metals, as woks and swords attest. But an economy in which metal is expensive would generate a cuisine in which all the cutting was done centrally, as in wok cooking. Reasoning backwards, then, I propose that, if one calculated the relative cost of, say, metal to wood, one would find a greater cost ratio in the east than in Europe. It's all there, in their cuisine and eating implements.

In Ethiopia and other poor countries one scrapes up food with bread. In some cultures the cook encases the food in the bread (pita, taco, etc.). It is only in western Europe, where each person (at least each adult) was expected to have his own knife, that metal eating implements were developed. Many forms can follow function, but perhaps the choice of form is not as haphazard as Petroski implies. Perhaps form follows cost.

Not only raw materials, but skilled labor or fuel for the fire might be expensive. Scarce resources or the skill to turn those resources into useful products; or the transportation required to take those products to market; or even the lack of markets themselves, including the capitalist framework in which roads would be secure and contracts would be enforced; all of this is part of the "economics" influence by which products to serve the same function would differ in different cultures.

David Pye thinks that there is no such thing as function:

> . . . the form of designed things is designed by choice or else by chance; but it is never actually entailed by anything whatever.[10]

Pye does not really believe this. With Petroski, he merely asserts that function does not dictate a particular form. He continues,

> Nothing in the realm of design ever "looks like that because it has got to be like that," as some eminent person said on television.

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9 Henry Petroski, *The Evolution of Useful Things*, Random House (1992), Vintage Books (1994). He makes the argument in Chapter 1, and continues, with this title, in Chapter 2. Subsequently, Pettroski went on to write *Success Through Failure*, Princeton University Press (2006). So that's his thing. As he says in the Introduction to the latter book, "the development of new artifacts and new technologies follows from the failure of existing ones to perform as promised or as well as can be hoped for or imagined." That, it seems to me, confuses motivation with inspiration. Grcic, for example, was not responding to a failure of previous chairs, unless they were his previous designs.

10 David Pye, *The Nature & Aesthetics of Design*, Van Nostrand Reinhold Company (1962), at 13.

Thus Pye would attribute design differences more to whim than to failure. Pye, too, ignores economics.[11]

And pre-existing technology. The National Steel Guitar is an example. In the 1930s, function required that a guitar be louder than was possible from the standard wood construction. The Dopyera Brothers (think "DoBro") mechanically transferred the vibrations from the bridge to a metal cone, which amplified them. Then the electric guitar came along to fulfill the amplification function better. The steel guitar was a brilliant, if temporary, solution to the problem of amplification. It survives today for its distinctly non-wooden sound quality, not for the reason it was invented.

Petroski would see this issue as a "failure" of the acoustic guitar. Technically it is a failure of the wooden guitar to achieve a value of a parameter for which it was not designed and that, for a time, became important. The harpsichord "beat out" the clavichord for much the same reason: the latter was too quiet. And perhaps the piano replaced the harpsichord for the same reason, although I think the ability to vary the volume of notes, by touch, was more important. In an era when we can amplify without distorting the sound, most of us prefer the naturally quieter wooden guitar, but also, because we are accustomed to it, the volume-variable keyboard, the piano. That is, products surely follow consumer tastes.

The wooden guitar was hardly a failure. The idea that products fail, and that new products are designed to correct those failures, is surely correct. The original rolling luggage was re-designed by an airline pilot, 15 years after its invention, placing wheels on an end (not what was seen as "the bottom"), and replacing the pull-strap with a stiff telescoping one. On the other hand, I do not think the "failure" of shoe laces brought about the use of Velcro fastening for some footwear. Did someone invent plastic shoes because leather shoes—or canvas sneakers—failed? Petroski does not help us understand why so many products, foisted on the public as solutions, are themselves failures. Are we really that inept?

David Pye thinks so, and is willing to live with it.

> Nothing we design or make ever really works. . . . Never do we achieve a satisfactory performance . . . Every thing we

11 Dan Costa, the editor of PC Magazine, suggests (July, 2013 edition) that

> Sometimes invention is driven by necessity, and other times it's just about getting rich . . .

Or not, but economics rules. Pardon me for considering design to be a category of invention.

> design and make is an improvisation, a lash-up, something inept and provisional. We live like castaways.[12]

My 1986 Toyota Cressida *always* worked until, in May of 2015, it didn't. Like the one hoss shay, it was reliable in its life and in its death. A new style of tennis dress, not for watching, but for playing, was not generally well-received at Wimbeldon, 2016.

> "When I was serving, it was coming up, and I felt like the dress was just everywhere," Rebecca Peterson of Sweden said. "In general, it's quite simple, the dress, but it was flying everywhere."[13]

Why did she wear it, you ask. Nike has contracts with some players. The company provides, the outfit (plus money), the player wears it, Nike sells it. That's the deal. But apparently the designers did not actually test the dress before foisting it on the players (some, but few, of whom actually liked it).

These philosophers of design, these so-called experts, tell us little. People who design are interested in creating something different, but the creation of the Barcelona Chair or Chair One or the Magica Chair or a looser fitting sports dress is not a statement that previous chairs or dresses were failures. These designers simply had another idea. So Pye is correct, the design is the product of the designer—be it nature, human or other. And Petroski is correct: The designer may see something that he thinks he can improve. And neither is correct: If you cannot sit in it comfortably, it is not a well-designed chair. If you cannot play tennis in it, it is not a well designed tennis dress.

Petroski also tells us, from very little and biased evidence, that the quality of products has declined.[14] When you compare new buildings to old, you are comparing everything built now with only the survivors of those built then. It is true that, with computer aided design incorporating engineering concepts, we can calculate the minimum materials and structure necessary to carry the loads in our planned building. Whether we choose to build that minimum building, or something better, is not constrained by our abilities, but by our taste and its cost. Once again, Petroski does not take economics sufficiently into account.

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12 David Pye, *The Nature & Aesthetics . . .* at 13 & 14.

13 Ben Rothenberg, "For Some at Wimbledon, Nike's Dress Just Doesn't Do It," *New York Times*, June 29, 2016.

14 Henry Petroski, "They Don't Make 'Em Like They Used To," *New York Times* June 27, 2014.

The idea that form does not ineluctably follow function is trivial. The idea that form is not strongly influenced by function is nonsense. You do not need wheels to roll something down an inclined plane—balls or rods will do it—but a wheel is a cross-section of both a ball and a rod. The remainder of the rod or ball is unnecessary. One quickly comes to a wheel by combining function with economy. Design is about three things: We want our products to work, to be efficient, and to look good. It is as simple as that to say, but apparently very hard to achieve.

Indeed, even Apple, known for its design savvy, lets dis-function slip though its processes. Here is one review:

> Last year, Apple put out a battery case that looked comically pregnant — "a design embarrassment," said *The Verge* — and a rechargeable mouse with the charging port on the bottom, meaning you have to turn it over to charge it. And the remote control for Apple TV violated the first rule of TV remote design: Don't make it symmetrical, so people can figure out which button is which in the dark.[15]

Apple is undoubtedly better than most producers, but the lack of basic design smarts, the lack of attention to functionality in products, is stunning. What is more stunning, exemplified here by its exception, is the lack of attention to functionality in reviews.

The Kitchen

The original toaster, prior to 1900, toasted one side of bread at a time. It used slim bands of a high-resistance steel wire (nichrome), wound in a spaced spiral around a thin insulator. The power went on, the wire heated up and evenly toasted the bread. It was improved in 1913. On opening the side door, the toast flipped over. So when the first side was done, one opened the door, closed it, and waited for the other side to toast. The result was one hot, one cold side. Two slices could be done at a time, on the two sides of this toaster, but only on one side of each piece of bread at a time.

Whoever first thought to put the toast *between* two sets of heat elements, to toast both sides at the same time, had to sacrifice the functionality of some of the heated wires. That is, he had to realize what was more important, efficiency in toasting or producing toast with two hot sides. He also had to determine how to get the toast out of there. The obvious (and superior) way to do that would have been a

15 Farhad Manjoo, "What's Really Missing From the New iPhone: Cutting-Edge Design," *New York Times*, September 7, 2016.

trap door. Gravity would take the toast down and out on a slide. The inventor did not do that, however, and the pop-up mechanism was born.[16]

I bought such a plain, ordinary, stainless steel two slice pop-up toaster in the 1950s. It lasted into the 1970s. The one I bought to replace it lasted only into the 1980s, half as long. The one I purchased next was designed around a "better" idea. It used a glow tube—the kind of electric element used to ignite gas heaters and clothes dryers, replacing the ever-on pilot light. In the toaster, the concentrated heat was to be diffused by a V-shaped reflector. It did not work. The glow tube got hot and the bread was toasted, but not evenly. That type of a toaster may still be around, but it did not start a trend, and is not worth buying. Apparently the designers did not test it with real bread. They obviously did not figure out on their own what the buying public later told them: it made lousy toast. Or perhaps, and this is the gist of my complaint, they did not care.

Just about any toaster you see now has that original, old-fashioned, flat resistance wire, wrapped around an insulator, as its heating element. West Bend does make a toaster that ejects the toast out the bottom—and excellent toast it is, too—but like most things made today, the toaster I purchased did not function over a long period. Too much plastic, which melts when it gets hot. Surely someone tried the prototype model once. He (unlikely she) found that the toast was well made, and put the toaster on the market without long-term testing. With a better grade of plastic, or with metal, the bottom-drop toaster could have been a winning design. Smartly, the toast slides down on to a plastic tray, saving it from entering the pool of coffee on your counter. Yes, *your* counter.

All other toasters, save toaster-ovens or continuous conveyor toasters we see in restaurants, pop up. That is to say, the essential elements of today's toaster are the same as those of toasters designed in the 1920s. Every other element of newer design is trivial. I do not think they particularly look better, either. Except around the margins (wide for bagels, lift up for small slices, etc.), toasters have hit a dead end. Nonetheless, there are new designs every year. It's like a columnist who has nothing to say, but has an obligation to write. How many columns have you read that seemed to have been written for a deadline, not an audience?

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16 Wikipedia tells us: The automatic pop-up toaster, which ejects the toast after toasting it, was first patented by Charles Strite in 1919. In 1925, using a redesigned version of Strite's toaster, the Waters Genter Company introduced the Model 1-A-1 Toastmaster, the first automatic pop-up, household toaster that could brown bread on both sides simultaneously, set the heating element on a timer, and eject the toast when finished.

Boiling Water

The four basic elements of a good pot for boiling water are first that you can get the water in easily, second that the pot is stable, third (which leads the same place) that it heats the water quickly, and fourth that you can get the water, now boiling hot, out easily. A fifth consideration might be that it lets you know when the water is boiling. Overriding these elements is a sixth, safety: You should not be burned by the pot, the water, or the heating element. The second and third factors both ask that the bottom be wider than the top. The common cylindrical Pyrex pot, with the metal band around the middle, does not make sense. You want the most weight, and the most surface area, on the bottom. If the pot is heated from the outside, you want its material to be a natural heat conductor, whereas glass is sort of an insulator. You can pour hot water into a glass container, such as the original Chemex coffee maker; and you can heat it in such a container, as I will show below. But do not apply the heat to the outside to heat the water on the inside. That is bad design.

The main functional element in getting water out from where it was heated is that the user should not have to touch anything hot. That seems simple enough, doesn't it? Yet how many such pots require you to touch a piece of metal attached to the pour spout? The answer *should* be "none," but alas is "many." Consider the pot above on the right.

If you swipe quickly at the little lever on the spout-cap, or if you use an implement to do so, you can open it without hurting yourself. Is this acceptable design? There are several kinds of cap-opening mechanisms. The industry has been careless, but not oblivious. I do not see how a designer can manage to ignore the problem of getting hot water out without hurting the consumer.[17] No design that fails to do this should ever be drawn; and if it is, it should be shredded before anyone outside the design firm sees it.

As an example, consider this pot on the left. Being widest in the middle, it fails as a design, but it has an interesting mechanism to open the pour spout. You push

17 Petroski tells us that, after "canning" was developed as a means of preserving food, in glass, there was a need to develop a more sturdy container. First iron, and then steel were used, but not for decades did anyone develop a means to get the food out of there—a can opener. *The Evolution . . .* Chapter 11.

down on the black knob, it pushes down on the outside of the hinged water spout top, which opens it. Your hand does not get near the heat. This seems like the beginning of a good idea. People who have used this pot report that the spout is badly formed. Hot water gets in places it should not, while steam heats your fist. It should not be so hard to design a pour spout.

The cap covering the pour spout on the pot below on the right demonstrates extremely bad design. You have to actually grip it and pull it off. Perhaps the designer thinks that the little knob will let you do this safely. More likely, he never thought of it. The point of the knob on the spout is to mimic the knob on the top, which you open only when the pot is cold, unless you have just made one pot of tea and now want to make another. Then, it is hot.

Bethanne and I took our friend Betty to dinner at a highly praised restaurant in Asheville. A break from every-day life for all of us. Betty runs a business called "Good Help," which is exactly what it says it is. She volunteers for many good causes, is an all around good person. Sitting in the elegant ambiance of that fancy restaurant, mild-mannered Betty started going off about water kettles that require you to touch a hot spout to pour the water out. Hers was a whistling pot which, to add insult to the real possibility of injury, did not whistle. I had not told her about this book, or anything about my writing about design. The things I am saying here are on other peoples' minds, too.

On the left is a simple pot, made by Oxo, with a "trigger" mechanism to open the pour spout, and a whistle that works. The trigger latches with the pour spout open, then closes by pushing a button on the top of the handle. Made of steel, a good heat conductor, it is larger at the base, where it can gather heat and be stable, than the top. This is a well-designed pot, a sensible buy for under $30. See, it is not that hard.

These bad pots, which ask that you touch a hot cap to pour the water out, are not only everywhere, they are expensive. The one with the knobs, above, wants $50 of your money, plus whatever skin you burn. Chantal, which made the pot on the left, provides an insulated holder because it recognizes that the handle gets hot. There is no protection from the cap over the pour spout. Maybe you are supposed to use a spoon to knock it open. Asking price: $100.

Michael Graves is a famous designer, not the least for his tea kettle. The kettle with no trigger, no latching mechanism, no way to get water out except by pulling on the "bird" that, I presume, whistles when the water boils. The bird figure, which comes in different colors (the handle color always matching) is not a conductor but still, this is not where a consumer should be placing her hand when the water has just boiled. That point goes unnoticed when a critic wants to compare Graves' pot with one by Frank Gehry:

> [T]he Frank Gehry teakettle on sale at his retrospective costs $500, and with its massive mahogany handle it is hard to see using it for anything but decoration. Michael Graves, on the other hand, sold his teakettle design through Target . . . . Its design aimed to boil water as quickly as possible.[18]

True, the Graves design has a wider bottom than top, a basic feature of a good kettle. And its handle is insulated. But you might think a designer would want the knob on the cap to bear some relationship with the bird—itself a knob—and functionally, without a trigger to open the spout, the Graves design is a failure. I have no doubt that Gehry's is even worse. So much for artists and architects designing a good pot.

Some years ago, Chef's Catalog sold an initial design of a water-boiling-pot based on a different concept. The heater element is inside: Why take up one of your stove burners for such a common task? Why not allow the pot to be located near the water, or near where you intend to pour it? (Of course there should be a water faucet at the stove, like in the kitchens of Chinese restaurants, but usually there isn't.) The

18 Ingrfid D. Rowland, "The Frank Gehry Story," *New York Review of Books*, March 24, 2016 at 42.

best part is that the pot separates from the plugged-in base. You can put the pot in the sink, unencumbered by its cord, fill it up, place it on its base and press down the switch at the rear, under the handle. The switch lights up until the water boils and the unit turns itself off. You lift the pot from its base and pour.

Although there is a thumb switch on the top of the handle to open the lid, there is nothing to open to enable pouring. There is no cover over the pour-spout. That may facilitate the pour, but the domed, smooth cover allows anything, including soap if you are washing the outside, to enter the pot. Leaving the spout always open is not a good solution to the problem of avoiding injury when uncovering it. Sure, there is some inefficiency in letting heat escape out the always open spout, but I am not chafing at that bit. I care about the awkwardness of leaving the water unprotected from flying or falling debris.

The push-button in this Chef's pot opens the top which, as you can see, has no handle or gripper. However, as the large pour-spout has no cover, I let fresh water flow directly from the faucet into it. The push-button does not open the top very far. Not far enough to make cleaning the inside easy. They might just as well have had a solid, always closed top. The pot might have been better designed with a screw cap, using the push-button to open a cover over the pour spout.

This pot comes with a water-level meter, a vertical plastic window with white quantity markings, placed behind the handle. It cannot be read, especially while holding the pot under the faucet, for two reasons. First, the window is hidden by the handle and, in most cases, your hand. Second, water is not visually distinctly different from the plastic see-through. They could have copied a trick from Zojirushi, which puts a small hollow red ball in the plastic chamber of its coffee maker. The ball floats on top of the water, telling you how much water there is. This pot cannot be cleaned by hand, only by swishing water with baking soda or Oxy-Clean around in it, and then not very well. The window telling me how much water there is cannot be cleaned by any means.

Here is a smart concept, a water pot with an internal heating element, that separates easily from its cord, fills and pours easily (without hurting the consumer),

has a push-button lid opener and a level measure. Yet, overall, it is a design failure. Had Steve Jobs been an executive at Chef's Catalog, surely he would have told the designers to go away and do better.

In an earlier version of this chapter, that was the end of this water pot diatribe. Friends who read it thought I was a grouch (one calls me "cranky"), and said I had no design sense to boot. I concluded with this comment:

> Maybe some day the "new, improved" model will solve these problems. What I don't understand is, if Betty and I (and presumably millions of others) can independently articulate these issues, why the pot designers do not incorporate solutions into their products.

By 2007 it was clear not only that others thought as I did, but that revisions along the lines I envisioned had worked their way into industry. The design was revised in all but one of the ways I suggested, and other improvements were made, also. However, as is typical, the pot was rushed to market before it was adequately tested. Rev. 2 is strikingly faulty.

Glass is a poor conductor, but it isn't conducting in this use, to the right. A metal plate on the bottom heats up rapidly and induces a furious boil, then shuts itself off. The cover, now flat, extends half-way over the pour spout. That is their solution to the problem of letting steam escape without designing an opening device. I still would prefer to be able to close off, then open, the pour spout. However, with the flat top, although some foreign matter could get into the open spout, none is guided there as from the dome. That is an improvement.

The pot executes the stability rule: It tapers to a larger bottom than top. The powered base of the older pot was larger than the pot. It took up unnecessary space. This new base has the same diameter as the bottom of the pot. Very good. The base has space where one can store the electric cord, leaving only the amount required to be exposed.

As the pot is glass, it does not need a separate window into the level of the water. The level markings are now on the side of the handle, where they can be read: ounces on one side, milliliters on the other. One can push the button on the top to open the lid, exposing a wide enough space so that one can get his hand in there to clean out the rust from our water. I did so just before taking this picture.

The lid mechanism lasted perhaps a month. It could be that a good mechanism was designed, then cheapened in production. It relies on some thin curved metal rods and plastic inner parts. If they had just held it for testing a minimal amount of time, its flaws would have become obvious. At times it is impossible to open the top. The push button release does not depress. At first I would try to manipulate the top—push it right left, up, down, the 1/16th of an inch it will go, until the button would work. Ultimately I gave up. At first I left the top open. However, the automatic shut-off fails in that circumstance. Such a beautiful, but functionless design! Is this really the best "experts" can do?

Making Tea

All pots discussed so far confuse *heating* water with *boiling* water. The two that remove from their bottoms are supposed to shut off when the water boils. Whistles do not work until there is steam, which requires boiling water.

If you are about to ask why one would heat water to any temperature other than 212°F, you are not a tea expert. Neither am I. We were first introduced to the notion that different teas want to be steeped at different temperatures by our local (Asheville) boutique tea house. They write on the bag the temperature the water should be. Interesting, but essentially useless information without a mechanism to achieve that temperature.

Before I introduce you to pots that solve this problem, let us think about it for a minute. One can say that the best temperature to brew coffee is 204°F, and design a pot that delivers water at that temperature to the grinds. The water passes through the grinds and emerges out the filter just seconds later. It may have cooled, but not egregiously. The temperature you set is essentially the temperature at which the coffee was brewed.

The tea world is different. David Servan-Schreiber, whom you will meet in Chapter 3 on health, tells us to steep green tea for ten minutes before drinking. Now we have two problems. The first is to heat water to an appropriate temperature---different for different teas. The second is to hold the temperature while the tea leaves are immersed. This book wants to convince you first that there may be such a thing as real expertise in certain fields, second that, if there is, few have it, third that you almost never have access to those who do at a price that makes the access worth while, fourth that sometimes you do, because they write books or articles or hold workshops, and fifth that some expertise is so over-the-top that it hardly matters, unless you want to become an expert yourself. All of that occurs in the making of

tea. I am about to introduce you to two pots and a glass cup that claim to solve both problems, just so you know what they are. Unfortunately—but as we have come to expect—their solutions are flawed, and they present additional problems. I also do not think that brewing tea at exactly the right temperature is important. I did say I wasn't a tea expert, didn't I?

This "Utilitea" pot seems to have been designed after the first Chef's water-boiling pot, copying some bad elements, improving others. The water level window hidden behind the handle, and being clear plastic which is indistinguishable from water itself, are retained, as is the plastic stick-out button on the bottom which acts as a switch, and lights up to tell you when the heat is on. The pour spout is open, and the top slopes into it, directing any debris that might be there. (Why copy such bad ideas?) A button opens the lid, which allows cleaning if you have small hands.

You can now dial the temperature at which the pot shuts off. Well, *some* temperature. The temperature regions are meant to indicate green tea (the most counter-clockwise), white tea, oolong tea and black tea (boiling). However, the thermostat has no temperature markings, probably because the mechanism is not accurate enough to guarantee, say, plus or minus two degrees. Because one cannot brew tea at a constant temperature—it will cool in the process—this may not be a damning criticism. We know the general temperature range, and that may be enough to get better, if not perfect tea.

Let's go to the high class model, below, called VarieTea (pronounce four syllables to get the joke). It has a series of low-current buttons (nothing moves—your skin supplies the connection), each with not only a temperature marking, but an explanation: 165 for green tea, for example. The button you touch lights up and, after you tell the pot to heat to that temperature, it flashes until it has done so. Touching the far right button will then maintain that temperature.

Like the Utilitea, the pour spout remains uncovered, but the almost flat lid does not induce unwanted debris to fall into

it. The button at the top of the handle opens the lid, apparently very well. The water level is again hidden behind the handle. A hollow colored ball would be a great improvement.

After fewer than 30 days of use, the temperature buttons stopped working correctly. Pressing "165" got you 195. It turned on the 195 light, as if you had touched that button, but would not actually heat the water. I suspect that, in our few weeks of use, we "tested" it more than the manufacturer ever had. A temperature selection mechanism that fails that quickly may be passed off as a manufacturing fault, but I call it a design fault. If it cannot be made right it was not designed right.

We received a replacement, the tea company providing shipping both ways. For some time we nervously used this pot, with its convenient temperature selection, never having tested its accuracy. Sometimes it turns itself on and can boil off its water. Perhaps that is from an electric surge. Best either to unplug the unit or to remove the pot and store it elsewhere. Either is a bother. We have moved on to the Kitchen-Aide pot, described below.

Otherwise, we have experimented to determine how long we have to heat water in our microwave—a fixed quantity of water always in the same container—to achieve a desired temperature. The microwave has been working for over ten years. You can easily achieve the outcome parameters—so much water at a given temperature—without buying a special gizmo to accomplish them. A pot that only heats water is surely one of the last items you will buy when furnishing your kitchen. But isn't it amazing—discouraging—to learn that up to the 21st century there was no such thing as a variable temperature water pot? At least one that was designed and made well?

Combining Features

More than ten years have passed since I started writing this chapter. Years in which no one knew about my critiques. People do learn, however. Designers slowly

learn that which consumers quickly could have told them. We see, this from Kitchen Aide, the best of these plug in water heaters yet. It has a variable temperature control, it produces an audible signal when the water reaches your selected temperature. As it contains a temperature gauge, you do not have to rely on dial settings. You can tell at a glance if the water in the pot is cold or has retained some heat. The gauge is analog, a fitting choice for its "retro" design.

Yet, it has the following design flaws that anyone could articulate once he/she had used it. First, the spout is always uncovered. Kitchen-Aide apparently gave up on designing a mechanism to cover it when heating, open it when pouring. Second, the water level indication sits behind the handle, where it is difficult to see, and shows water through plastic, which is almost unreadable. Third, the on-off switch is on the right side, when the temperature selection is straight ahead. Better button placement would have been just to the right of the temperature lever. Fourth, and most importantly, the temperature markings on the gauge are tiny. If this item is here to provide information to the user—and welcome information it is—then "function" means making that information easily accessible.

I will discuss setting the temperature below. For some people this 1.5 liter pot may be too large, too heavy. I think it is too bad that they abandoned the concept of a glass pot, with markings on the handle indicating how much water was inside. It is likely, however, that such a pot could not accommodate the gauge, and that is the main innovative feature of this pot. I would not criticize a designer for knowingly making that trade-off, although I suspect there is a better design available in which there are glass windows into an otherwise metal pot. At this point, this is probably the best separate (not requiring a stove-top) water-heating pot available. Some day the flaws I point out here will be corrected, I am sure. And those people who bought this pot will be mad as hell, because they should have been corrected in Rev. 1.

The scale of the temperature setter is 50 to 100. This could be an arbitrary scale, but in fact is Celsius. Each light above the temperature control flashes when the water has not reached that temperature, and goes solid when it does. The temperature gauge seems to be accurate, and contains both Celsius and Fahrenheit

markings. I do not know why the settings are in °C, but let us assume the reason is to educate the public. That will not happen if one cannot read the numbers. It is hard to believe that everyone, in whatever minimal testing was done, found the gauge markings informative. It would have been so easy simply to make the print larger. Really, did no one at Kitchen Aide think of that?

Another Kind Of Pot

I am not the only person wondering why every day objects are so badly designed. There are people out there doing something about it, and others who are noticing it. Here is a quick illustration.

The pot you put on your stove has smooth sides. Heat from the burner runs up those sides and into your kitchen, but not your food. Above is an alternative design that captures some of that heat. Whether it cleans as easily as others, I do not know. Design, in the sense of functionality as well as beauty, is alive and well.[19]

Keeping Tea Hot

A good solution for keeping tea hot while brewing is a double-glass-walled cup by Bodum. It comes with a deep tea strainer and a cap. The cap also acts as a holder for the strainer. Until it breaks, which it does oh so easily, the thing works. Good design, competent manufacturing, but the wrong material. A more break-resistant kind of glass would put this design over the top.

In another solution, the material is porcelain. It apparently has an insulating material, not air, between its

19 From Tuan C. Nguyen, "The best butter knife ever and 9 other brilliant redesigns," *The Washington Post*, August 22, 2014. Photo credit to Lakeland.

double walls, and does not insulate as well as the Bodum. It holds 13 ounces, (one more than the Bodum). Its steel tea basket does not sit as low as the Bodum's, which might be too much water for some teas. But it makes a competent cup of tea, and keeps it hot longer than an uninsulated cup.

Coffee

There can be many expert opinions about the best way to make coffee—French Press, drip, steam, vacuum, for example. Then, within each category, there are brands. Chemex fanatics, for example, would not like it to be called just another "drip" system. The newest thing is a drip coffee maker that accepts packets, the way a razor accepts blades. The Kuerik, the backbone of Green Mountain Coffee Co. We all know that razor makers would gladly give the razor away, as long as they continue to sell you replacement blades. However,Green Mountain cannot be sure you will purchase its coffee, and so does not give away its machines. When shaving, blades now indicate when the company would like you to replace them. You may find, as I have, that there are several good shaves left in such "worn out" blades.[20] No such problem with "modern"coffee. One and done.

Although the one-cup maker is effective for my bank's give-away coffee, for our home kitchen it is bad design. It is designed to make money, not to make coffee. Your cost per cup, if you buy pre-filled capsules, is many times that of coffee purchased by the pound. Someone—I doubt that it was the original designer—has invented a re-usable filter into which you can place your own coffee, to make just one cup. This, I think, could evolve into a good design feature, if it would allow for different sizes of cup. Even coming off patent protection, the prices of Kuerik-style coffee makers are unreasonably high, and the small, empty fill-it-yourself capsules especially so.

One-cup-at-a-time makes sense in many settings. There are now combination coffee-makers—on one side you make a pot, and on the other, one cup. Again, these designs do not mean that previous designs were failures. Rather, a design for one purpose may not serve another. It is not clear, however, that designers know the difference. They make new designs because designing is their job.

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20 You might notice, also, that toothpaste manufacturers would have you lay on enough paste to cover the brush length. I have found that enough to cover its width—maybe one-third of that recommended—is easily sufficient. Moral: Do not trust the manufacturer to correctly advise on use of that which it sells.

I describe how to make the best compromise coffee (you do not have to grind it just before brewing), for your morning cup, in Chapter 4 of this book. That is, how to grind and mix the coffee. I provide few comments on how to brew it.

I do not often make French Press coffee, but I have a one-cup version in which I more often make tea. The press acts as a strainer. I know there are special tea-making pots out there, but except for the double-wall glass "cup," above, I do not know why. Another aspect of good design is multi-functionality. Remember the "Baconeer?" It has returned as a rack you put into the microwave (just as "Stripe" toothpaste, where the stripes were the distinguishing characteristic, failed and then came back as a minor feature of other brands). Not only would they sell us a single implement for one purpose only, to cook bacon, there are special form-fitted gizmos to cook eggs, too. Forget it. What happened to pots and pans—utensils useful for many things? Single item specialization is not good design. If you already have a French Press coffee maker, use it for tea, also.

Storing Liquids

Bethanne makes several kinds of cold tea, which she stores in the refrigerator. She ordered bottles from a catalog. I do not know what the lines indicate, in terms of liquid measure, but nonetheless they do allow one to use these bottles in a measured way (fill up to the fourth line from the bottom with X, then to the top line with Y, for example). A little more information (even meaningless numbers) would have been appreciated. They are made of a solid break-proof glass, with a comfortable handle. They perfectly fit in the refrigerator door.

However, when you take the bottle out of the door, you might be expected to pour from it. Then the trouble begins. The cap is designed to point you to a pouring mode. Unfortunately, liquid then dribbles down the front of the bottle. The cap has two functions, to cover the bottle and, in position, to allow pouring. The pour spout has only one function.

Between them, they are poorly designed to pour liquid out of the bottle. Did no one responsible for manufacture or sales ever try to use such a bottle? Is that too much to ask? Did they just look at it, like it, and never try to pour liquid from it?

Perhaps one can argue that *better* design comes from failure, but the immensity of the failures I find around me implies that no one knows what good design is. They simply want *another* design, itself destined to be another failure. I come to design only in necessity, out of frustration with the products I am encouraged to buy, and then discouraged to use. I am not a design expert. To judge by their designs, neither are these so-called designers.

Faucets

Consider, for example, the kitchen sink faucet. For most of the 20th century, everyone who scrubbed a pot in a sink knew that the faucet was inadequate. First, it required two hands to adjust the water temperature and flow rate. You adjusted inputs—hot and cold water flows. The "modern" concept is much better: You control the outputs directly, flow and temperature; and you can do so with one hand. Second, faucets have historically been too low. You could not get a pot under one.

The universal solution to the second problem was a swing arm. Swing the faucet out of the way, put the pot in the sink, then swing the faucet back over. At some point—I remember it as just after World War II, in the plastics revolution—the flexible spray became a kitchen sink accessory. You could swing the faucet out of the way and leave it there. Use the flexible spray—remember, black and coming out of the corner of the sink, not the center?—to wash and rinse the pot, not to mention the floor and the front of your pants.

Later, the designers got clever. They incorporated the spray into the faucet. You would switch from regular flow to spray, and pull the flexible tube out of the faucet itself, obviating the separate ugly black plastic spray unit. This feature followed the invention of the single faucet lever, which, as just mentioned, solved the first problem by giving the consumer control of the outcomes, not the inputs.

Then there is efficiency in installation. With separate handles for hot and cold water, you need three holes in the sink: one for the pipe into and out of each flow control, and then one for the faucet itself, taking the outlets from the two controls. A separate spray required yet a fourth hole. With the hot-cold control at the outlet pipe itself, you need only one center hole for all the plumbing. One hole, two pipes, one handle, detachable spray head. For sure an advance in design.

For some time, this was as far as new design went. We continued swinging the faucet out of the way, putting the large item in the sink, and then swinging the faucet back. The problem was simple to see: The faucet sat too low. A solution, also, was simple: build up a platform for it. I designed two kitchens with this solution, both using chemically formed sinks (the first was Corian, the second a Corian imitation). The photo to the left shows a four inch green baseboard, followed by white Corian as the back-splash. We made the green faucet pedestal the same height as the baseboard. This house is in Portland, Oregon. The faucet is from Spain.

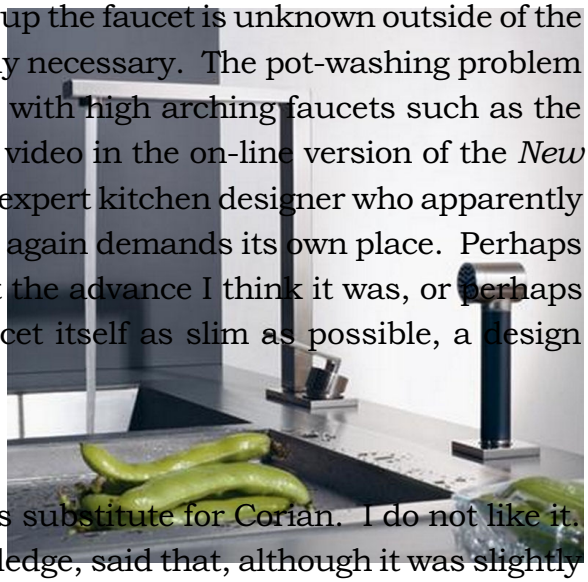
Corian or its imitators comes in half-inch sheets. Thicker parts are fabricated using a solvent glue. It bonds the layers and dissolves the crack between them. Knowing this, it was easy enough to design a platform for the sink using only a hole saw. The result is a donut-shaped ring. I instructed the installer to do this, leaving a center hole wide enough to allow the pipes through. If I recall, the outside diameter was around 2.5 inches. Until you use one, you cannot imagine the difference it makes, having a faucet four inches higher than the plumber would have installed it.

This second kitchen faucet, made in Germany by Franke, where apparently no one had thought of raising it up, was more difficult to install. The bottom of the faucet is a hollow brass pipe, maybe 1.5 inches outside diameter with an outside thread. The plumbing was long enough, .25 inch diameter copper tubes meant to hang down. The hot and cold feeds, plus a third feed of filtered water (controlled by the extra horizontal valve you can see in the picture, to the left) were fed through the brass pipe. The threaded pipe came with a nut, and this is how the faucet is attached and stabilized

to the sink. But *that* pipe was not long enough to extend beneath my clever riser. There's always something.

No water is flowing through the threaded pipe itself. That pipe just surrounds the three feed tubes within it, and then fastens the unit to the sink. We got a metal shop to fabricate an extension with the same diameter and the same threads. By using a large enough outer diameter, we created space in the riser for a nut joining the two pipes. Then the hole in the sink was cut with a smaller diameter hole saw, so that the bottom nut secured against it.

That is, we solved a problem that should not have existed. The original designer should have recommended constructing exactly such a riser, and allowed for it by specifying a long enough single threaded pipe.



As far as I know, the concept of raising up the faucet is unknown outside of the two homes in which I did it. Nor is it currently necessary. The pot-washing problem has at long last been recognized, and solved with high arching faucets such as the one on the right, by Lot. It was praised in a video in the on-line version of the *New York Times* on August 3, 2013, by a so-called expert kitchen designer who apparently did not mind that, as in the 1950s, the spray again demands its own place. Perhaps integrating the spray into the faucet was not the advance I think it was, or perhaps that advanced is sacrificed to make the faucet itself as slim as possible, a design feature that serves no function.

Counter Material

Let me make a quick detour about this substitute for Corian. I do not like it. My builder, on whom I relied for expert knowledge, said that, although it was slightly harder to work with, the end result for the customer was the same. Not true. Here is my kitchen sink, underneath the faucet just discussed. The sink was installed

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used just before this photo), the sink does come out a pleasing white, marred only by an afternoon shadow. However, cracks have formed around the hole drilled out for the drain. They are dark, no doubt, from rotted food particles that are permanently embedded in them. No amount of scrubbing cleans the cracks. You see a similar crack in the cheap plastic insert

that prevents flatware from sliding down into my disposal. I can replace the insert easily, but not the sink.

Did the builder not know how badly the fake-Corian would hold up? Very likely he did not, and still does not. Have you ever known a builder to return to the scene of his crime years later, asking how well his work has fared over time? They never do. And yet we gullible consumers ask these very people about product longevity! I deserve the cracks in my sink, for asking a question of someone who could not have known the answer, except to provide one that moved the conversation along into a sale.

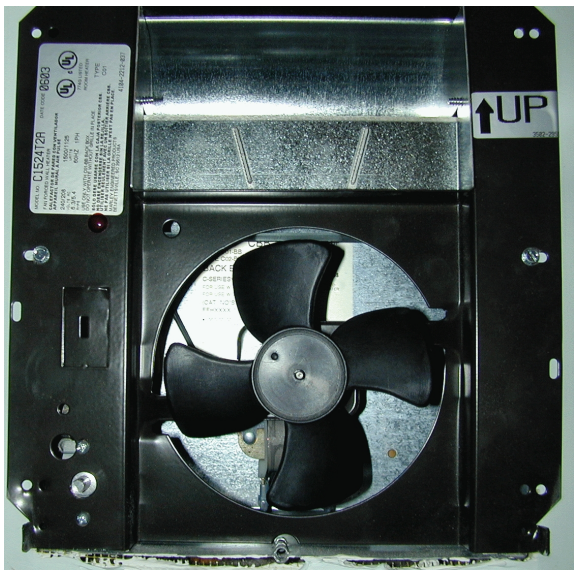
Do the manufacturers know? Or, perhaps more relevantly, do they care? It is difficult to get accurate information about things like this. Consumer Reports exists for just this reason, but this issue is difficult to survey. I, for example, do not remember the name of this substance; only that I chose it because it had a deeper sink than Corian produced, and I was told it was otherwise equivalent. I was given the easiest answer by an installer who would have had no way of knowing the truth. Yet he was willing to pretend to be an expert in the matter.

The Bathroom

If only implicitly, design is everywhere. Consider the in-wall electric heater. It goes in a room that otherwise has no heat, or may have insufficient heat. I put them in spare bedrooms, in case guests want to be warmer than I want the house to be. Here is a picture of one in a vestibule bathroom. The vestibule is heated, but except for this unit the bathroom is not. I presume that a guest will close the bathroom door when inside, losing the vestibule's heat.

It is annoying that this heater's thermostat is set at a mark on the bottom of a knob which itself is at the bottom of the unit. For a year I blamed the electrician, who must have installed it upside down. Let's review the physics of the matter. Heat rises. Unless you blow it

down, it won't go down, and blowing cools it. So heaters are optimally installed close to the floor. Most people's hands are seldom near the bottom of a heater. Unless picking something off the floor, you just would not go there.



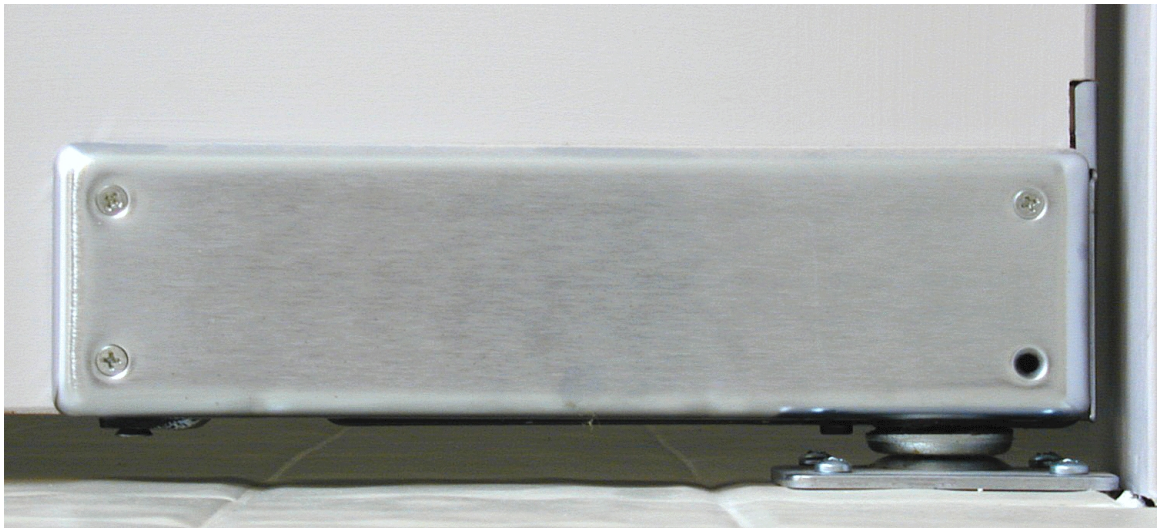
It follows that no designer with any common sense would place the temperature regulator at the bottom of a heater. A thinking designer surely would place the knob at the *top* of the heater, and place the marking at the top of the knob. Then the heater can be close to the floor, and the user can see the temperature gradations, comfortably looking down at it. The heater, I thought, must have been installed upside down.

No, it wasn't. To the right is the heater with the grille off. The top is correctly up. The control knob goes over the metal post at the bottom left. The electrician followed the directions. I am tempted to turn it upside down anyway, but I haven't yet. They seem to insist that it should go the way it is, with the control knob in the worst possible place.

Swinging Doors

I installed swinging doors to a toilet. Like entering an old western bar, I bang the doors open, hoping there is no one already inside, not likely to appreciate my dramatic entrance.

The doors pivot, as you would expect, on a post, top and bottom, at the outside edge. A spring, which brings the door back to the center, takes up some space. The spring is hidden behind a plate, behind the stainless steel plate pictured below, attached to my gray door. You see the problem immediately. The plate has four screw holes, but accepts only three screws. There is nothing to screw into at the bottom right. On the other side of this door, or this side of the other door, the empty hole is on the bottom left. If there were to be only three screw holes, there would have to be two kinds of plate. The manufacturer would have to see to it that two of each kind were placed in each two-door kit. Someone would screw up—pardon the pun. The workers do not have the big picture. They just won't get the right plate combination into every package.



Any experienced manufacturer is aware of these issues, of the difficult management task of getting the right combination of plates into each kit. Yet I get many packages with the right parts. It can be done. Perhaps the difficulty is in making the parts, punching different holes.

This manufacturer found a simpler, but much worse solution. Only one kind of plate was designed, with four screw holes, only three of which are to be used. To assure you that the manufacturer was aware of the problem, and this is how it was solved, consider this: The kit contains only twelve screws—three per plate. After all, why provide a screw the customer cannot put anywhere? Why pay for screws the customer cannot use?

A number of cosmetic fixes could be devised. One answer would be to include four fake screws, screw heads with a small tube of adhesive. Dab the metal around the hole, hold the screw there for a minute, and the final customer need not know that only three of the four screws are real. It's not a detail most customers want to know. Neither, however, do they want an obvious useless hole in the door plate. Whatever concept of "design" went into this swinging door kit, it was woefully inadequate. It did not start at the beginning and take us to the end.

Soap Dispenser

Below on the right is a picture of a liquid hand soap dispenser, in which only liquid hand soap has been used. Ugly. You see that it has rusted where it looks like two pieces of metal have been joined. The rust has dribbled down the side. It is irreparable. Sleek and modern enough, but made of the wrong material. This material failed in ordinary use with its expected contents. Bad design.

I do not remember, a year later, where I bought such an item. So there is no way to "punish" the retailer, and through it the manufacturer. The concept that in capitalism we informed consumers rule is nonsense. We have better things to do with our fast-disappearing brain cells than remember where we bought a soap dispenser, and better things to do with our time than complain about it. There is no mechanism to get really useful and well-made products into our hands. We trust some retailers more than others, but none can be counted on in all cases.

The consumer necessary to make the economist's model work would keep a database of his or her purchases. It could perhaps be organized by room, as I have organized this chapter. Had I done so, I would know where this soap pump came from, and when. I would send it back, in this condition. Like the contractor, the retailer probably has little information about what happens to its products. Had the manufacturer only held off for a few months, it would have become obvious that liquid soap and this dispenser were not made for each other. I am sure no one knew. But the designer should have known. That is his (her) job.

Design In Industry

The automobile reviewer tells you this car is OK, but the rear window is small, there are posts in the way of side vision, and altogether one's inability to see rearward dooms this model to a low grade. Makes you wonder, doesn't it, why the manufacturer could not see these design flaws. The small size of the original Volkswagen Beatle's rear window was one of the first things they fixed when, years after the original design, they did an overall review. The original VW designer didn't see this problem, either; but the review was fifty years later. We expect designers to remember, or to learn. Yet, in late 2006, this was the reviewer's knock on a new Toyota FJ Cruiser. Not only was the rear window small, the rear-mounted spare tire impeded visibility further. Did no one at Toyota notice? Or is there something about the system within which design occurs in industry that left so much for the reviewer to complain about?

Jerry Lehmann, a senior roommate during my sophomore year in college, worked at a General Motors plant one summer. The task assigned to his group was to electroplate the Buick radiator grill. You may remember the design. Think of a checkerboard pattern of squares, maybe ½ inch on a side, slightly concave. Only half the checkerboard's squares are represented, say, the white squares. Where the others are missing is where the air flows in. They were held together by a cris-crossing pattern of steel rods welded or cast together behind them. Only the squares, however, were seen from the front, and therefore only they were to be plated.

It was indeed a striking, innovative grill design. Also difficult to electroplate. The plating department had not been consulted by the designers, who had neither clue nor thought about fabrication. Their problems passed down the line for others to solve. Jerry saw through this. Jerry had organized a number of projects to utilize our student energy to help residents of our small Ohio town who had decrepit homes. He thought in terms of cooperation, not competition. He would have structured a more cooperative design team, where later inefficiencies could be prevented earlier, utilizing feedback from the fabricators to the designers.[21] Perhaps that happens now. Jerry saw the need in 1957. General Motors didn't.

With a large view, a view of the final product, a view of efficient production, of course production engineers would be included in an industrial design team. Why weren't they? Raymond Loewy, the father of industrial design, set it up so that design was unaffected by production concerns. No doubt this was the genesis of General Motors' failure:[22]

> When the final okay for production is given the design cycle is complete. It is up to the engineering and production departments to draft it and detail it.

Loewy had to fight his way into industry, proving the worth of design by increasing sales of tractors. Other departments already existed. The industrial design

21 Another solution would be to make the grill out of plastic. No electroplating needed. Toyota put a similar but plastic grill on its Rav4 for some model years around 2008.

22 Raymond Loewy, *Never Leave Well Enough Alone*, Simon & Schuster (1951) at 314.

department became one of them, another separate entity in a not very well functioning organization. Each department solved what it saw as *its* problems, even if it created unnecessary problems for other departments. So, in the 1950s, we had the beginnings of industrial design, but what was missing was organizational design to effectuate coordination and communication among departments.

Ultimately, design should be useful for the consumer. It should also be useful for the producer. Good design is determined not only at the end, but in the process of construction. Who "designed" the clear plastic "shirt" worn by the girl in the bus? Thinking what?[23]

The Living Room

Bethanne and I have invented a new way to hang fabrics. Think of tapestries or throws or quilts—anything like that, made of cloth, that you want to put on a wall. Bethanne is a leading designer of Jacquard art fabrics that are woven on industrial looms. Many such fabrics presented as "art" have been woven at The Oriole Mill through her "mill access" classes at The Jacquard Center. She is also called upon to exhibit her own work, and that leads to the hanging problem.

Unlike the automobile grille, the swinging door plate, even the kitchen faucet riser, the hanging apparatus at its best is invisible. Paintings are hung from their frames. Sculptures that hang on walls do so from clasps attached to the rear, hidden by the work itself. Sculptures meant to be seen from all angles do not hang at all. Our challenge was to devise a way to hang weavings invisibly.

One could attach grommets to the top of the fabric, at some even spacing (say every six inches), and hanging it on hooks. That "solution" violates obvious criteria (you alter the art work and you see both the wall pieces—nails or hooks—and the pieces attached to the art). It exposes another problem: The fabric will sag between the grommets. So from this thought process we understand that the hanging device must attach all along the top of the fabric. Fastening should not be occasional.

Bethanne's first solution was sticky-back Velcro. She had 2 inch wide hard-wood strips (about a quarter of an inch thick) cut to length, with a few screw holes pre-drilled. Whoever was to hang her art had only to get the wood piece screwed at the right place on the wall, and level. Bethanne sewed the other Velcro part to the top back of the art. Now the installer had to attach the wood piece to the wall so it was level, then press the fabric to the wood, evenly across the top.

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23 From *Walden* by Henry David Thoreau, at 23: "Let him who has work to do recollect that the object of clothing is, first, to retain vital heat, and secondly, in this state of society, to cover nakedness . . . "

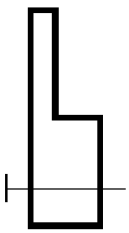
Functionality implies practicality. No installer actually pressed it quite evenly. You start at one end and, as you go along, you make corrections. Oh, it's going too high. Rip some back, and press it lower. But now it's too low, angle it up again. No one but the artist, hanging an exhibit, is going to spend the necessary time to get it even. Good design is not theoretical. It needs to be effectuated.

Then there is taking the piece down. Just rip the two Velcro pieces apart? Actually, Velcro binds to itself stronger than the adhesive binds to the wood. So inevitably, on take down, at least some of the Velcro separates out. Oh, sure, they re-attached it before sending it back to her; but it never stuck again quite as well. The problem could be solved by reinforcing the adhesive with screws, maybe even tacks or staples at each end. But in addition, some of the wood strips were broken in transport.

What is needed, then, is a *stiff* element attached to the fabric, so there is no fudging on hanging it up. The wood against the wall, however, contained an essential element: We could be reasonably sure that a museum or gallery could put a stiff rod on a wall so it would be level. That is, the hanging is best done in two parts, but both parts should be stiff. Then they should link, one to the other. The second part has to be attached to the fabric, also. Hmmm, this is complicated.

The element we kept from the initial method was that Bethanne could sew a fabric to the back of her weaving, without its showing on the front. We determined that she could attach (or even create in her weave file) a two-inch strip of strong fabric so that it formed a pocket large enough to hold a half-inch wide piece of thin metal. Stock aluminum not even an eighth of an inch thick would do the trick. The pocket, however, had to extend out from the back of the fabric. Think of it as attached only along the top. The fabric, with a flat rod sewn into it, could pivot on a "hinge" formed by sewing it along its top, just a bit down from the top of the weaving.

Now we had to have a wall piece fabricated. We designed it so the wall itself would be part of the structure. From an end, it looks like the drawing on the right. The right side is to the wall. What looks like a pin sticking through indicates where one would screw into the wall. We determined that this shape should be made of metal, with pre-drilled screw holes every six inches, starting three inches in from one end. Furthermore, the wall piece did not have to be as wide as the bar embedded in the weaving. Cut a little less wide than the weaving, the bar sewn into the weaving would hang over the ends of the shorter wall piece, hiding it. Therefore we could have this



wall piece fabricated in increments of six inches, starting at 18 inches. Each piece would have at least two screw holes, and could be screwed into a gallery wall as level as the old wood strips.

The prototype was made of two steel pieces, spot welded and ground down. It occurred to me that, if the machine shop precision drilled the screw holes, there was no need to weld the two pieces together. Screwing them into the wall would join them. That being the case, we had the pieces made of aluminum, so the hanging device would be lighter. It became obvious that both the internal and the wall-mounted pieces could be cut with a hack saw. I did not have to order an assortment of lengths. After cutting, it is important to file or grind the ends, or they will tear the cloth, if not someone's hand. Cutting with a hack saw, and filing, are doable in Harry Homeowner's garage. That's me.

The rod sewn into the pocket of a fabric attached to the weaving, pivoting on its sewn end, slips over the upper extension of the wall piece, and is kept snug by that extension against the wall. The weight of the weaving itself pulls down against the sewn top. It would never pull the rod out of its notch formed by the wall piece and the wall. Indeed, as soon as the first prototype was made, we could see that we needed to add another rod to add weight to the bottom of the piece. Now that we *could* pull on the fabric to smooth it out, without pulling it off the wall, it was obvious that we *should*.

This design meets these criteria: It is easy to install on the level, it keeps the top even, and it is invisible. Even more: It is no longer heavy, and all parts can be sawed to length at home. We made one more modification. As described above, the installer had to put up two pieces of metal, correctly. The "L" shape that you see in this picture is two rods, one wider than the other.

We thought there was no need for them to come joined, as screwing them both into the wall would accomplish that end. Apparently our concept mystified gallery installers, no matter how we explained it. So I ended up using some of the screw holes to attach the two pieces. I used a short pop rivet, which did not protrude out the back side, but squeezed against the sides of the drilled hole and kept the two pieces together. That created one rod to hang on a wall. The only installer task is to get it level, with the wider side out, the narrower side to the wall. They can do that. We have done everything else.

If you want to use this idea, you are welcome to it. (You are *not* welcome to try to patent it. Credit The Oriole Mill.) The point is that this is good design, because

we had the right functional criteria, and we set about meeting them. Perhaps, because our product is never seen by the ultimate consumer, the gallery patron, you could think that this is not "design" (or design that you care about) at all. What I mean by "good" design, however, is that it serves its purpose well. A "beautiful" automobile the shape of which costs the driver 2-3 miles a gallon in wind resistance is not good design. An ugly car that is extremely cheap can cost the driver the same mileage, and still appear efficient because it is light and under-powered. See, for example, the original Toyota Scion, the Honda Element or the Kia Soul. They represent good designs from several points of view, but they fail both the wind resistance test and, to most people, an aesthetic test. As one might expect, designers later made both cars less boxy, with more power, heavier, and therefore failing in their original design criteria: inexpensive, with large carrying capacity and low fuel consumption.

One of the things our metal shop helped us with was choice of material. I suggested galvanized steel for the inner rod. "Oh no, you would never use galvanized steel with fabric" said the President of the company. Although I do not know why he said that, I accept it as coming from an expert. Unless I am confusing conviction with expertise.

We were able to get our fabric hanger worked out and fabricated by our local metal shop, just as a different shop had worked out a solution to our faucet problem. Design may fail in production, as did the Buick grille, but it would be best to see that as a failure of the design process, in not including all relevant actors at the design stage. One would think that design criteria would include appropriate materials for the every-day use to which the product is to be put. So often, as in the soap dispenser above, they are not.

The reason those criteria are set badly goes back to Jerry Lehmann's observations about how design was organized at General Motors: The effort needs to be cooperative from the designer through the producer to the user. The development of our weaving hanger worked because we brought it to the fabricator as a problem, not as an instruction. With him, we determined the appropriate dimensions and materials to accomplish our goal. He also went through the nuisance stage of making a prototype and discussing changes to get, eventually, a substantial order for materials and shop work. All of this leads to my next essay, which discusses designers who obviously do not use or even understand the use of the product they are designing.