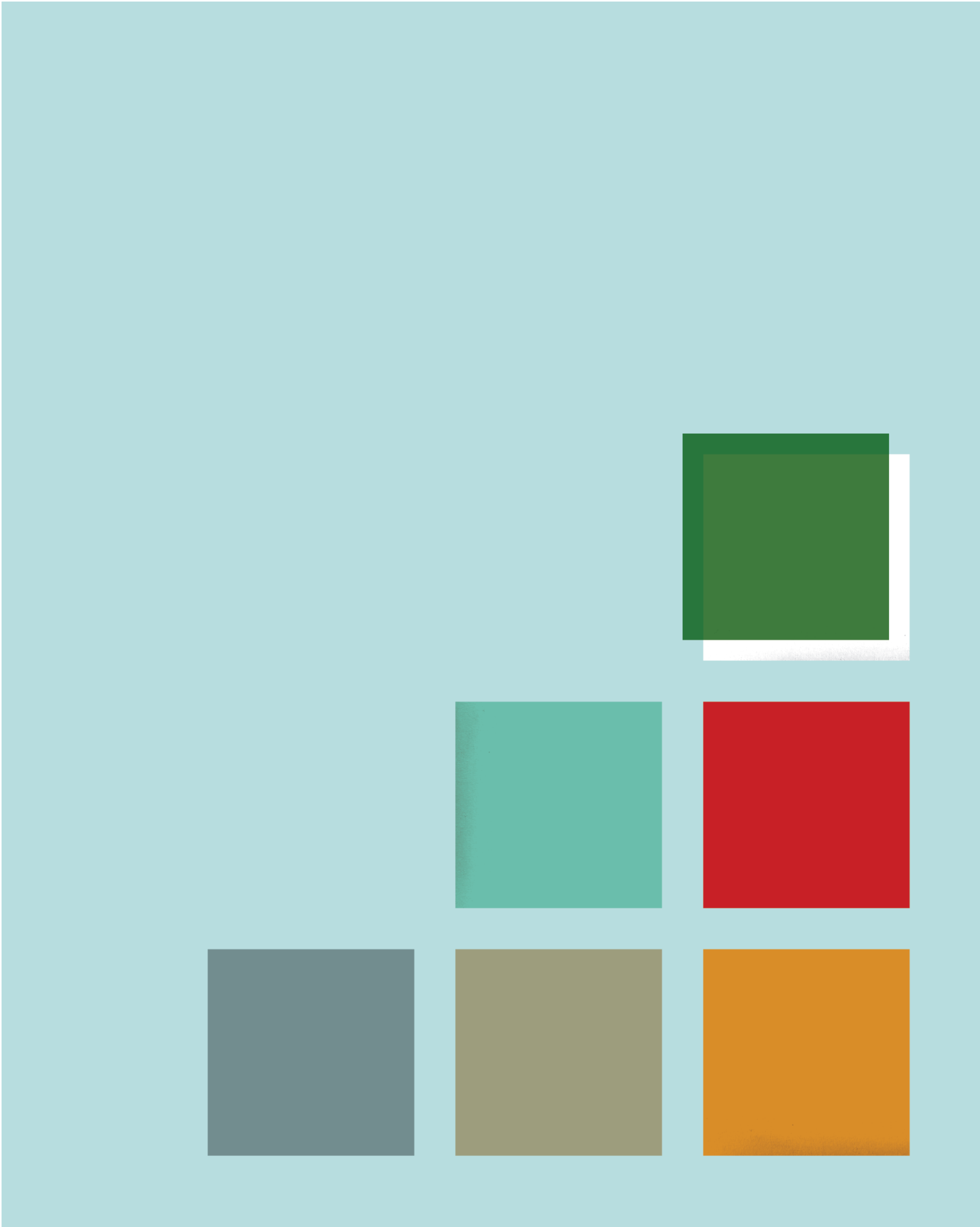

DESIGN IS THE PROBLEM

The Future of Design Must be Sustainable

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Rosenfeld

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Process

Producing things is both expensive and resource-intensive in terms of material, time, attention, and money. It doesn't matter much what the product is. Whatever can be done to reduce the use for these resources is important, but sometimes it's possible to radically reduce something to almost nothing if we rethink the problem and its context.

For example, while it doesn't cost much to ship a single bottle of Coca-Cola around the world from the original bottling plant in Georgia, multiplied over the hundreds of billions of bottles that Coca-Cola sells each year, that's a lot of financial and environmental impact—even at today's artificially low shipping costs. Long ago, the Coca-Cola company realized that this would be cost-prohibitive for their product and began sending the recipe instead. Using the Coca-Cola recipe and local bottles and ingredients, they can radically reduce the cost of a bottle (or can) most anywhere in the world. In many cases, the ingredients other than water (such as sugar—or now corn syrup, vanilla, etc.) may need to be shipped from their points of origins. However, the amount of material is vastly reduced with this licensing model, and it has allowed Coca-Cola licensees to operate over 600 bottling plants around the world.

Whatever can be done to reduce the use for these resources is important, but sometimes it's possible to radically reduce something to almost nothing if we rethink the problem and its context.

Sending the Recipe

Another example concerns the future of space exploration. Many space enthusiasts maintain enthusiasm for sending humans back to the moon, to Mars, and beyond. However, humans require tremendous resources for supporting life. When humans aren't involved, the materials and energy needed are drastically reduced. Probes, satellites, and rovers have allowed us to explore Mars, other planets, and the edges of the solar system for far less money and materials. Realistically, this will more likely be the future of space exploration, especially because of the distances involved. For sure, it's not the same. It's difficult to get the public excited about a probe when their heads are filled with images of people walking on distant planets. And probes will never be able to do everything that humans can (though they can do many things humans can't). However, the material requirements will reduce human exploration, and this is a model for how other solutions can be made more sustainable.

Already, some products are disappearing into bits from atoms. The digital music example of transmaterialization in Chapter 8 also serves to illustrate the strategy of informationalization. In fact, without the ability to faithfully reproduce music digitally, it wouldn't have been a possibility to turn music products into music services.

Email is another good example of informationalization. While we can't send everything through email that we once sent via physical mail, most of what we communicate doesn't require physical material—especially business correspondence where sentiment isn't as important—opening the opportunity to communicate digitally at a vastly lower environmental impact.

Informationalization is all about sending the message, the recipe, the data, whenever and wherever the physical thing itself can be replicated at the destination. The history of horticulture has been a story of this process. It is one thing to send the fruit or tea or spices from a faraway land, but another to send the plant itself—or, better yet, the seeds—in order to provide a continuous supply of the material. Where it simply wasn't practical in the past to send the plant or fruit (forcing us to send seeds instead), now, it's getting more and more costly to send the product than the recipe. Of course, it's also less sustainable to do so.

Email is another good example of informationalization.

Taking the Recipe Concept Even Further

What other things can we send the recipe for instead of the object?

One solution is in the advances made by rapid prototyping machines. We already have the ability to print books at the source, instead of at a central printing facility (think downloadable PDF and ink jet printer). Why not do the same with furniture, dishes, machine parts, and other products? Rapid prototyping processes (and the machines that employ them) already do this for some applications (such as prototypes). Currently, these machines are limited in what they can produce, and the cost of the finished object is much more expensive than other forms of production. However, as the price falls for both machines and materials, at some point these devices will be affordable for people to have in their homes (or at a local site).

Perhaps the best example of informationalization is the biology of nature, in particular, DNA.

There are a few different rapid prototyping processes, each employing slightly different materials and methods. Some use a powdered plastic material, others a liquid. Some are capable of producing hard plastics, others soft (like rubber). Some can even produce objects in color. There was a time that having a laser printer at home, or a color printer, was too expensive for most people. There may be a time when, like color printers now, rapid prototyping machines will allow us to send just the instructions to produce a design, rather than the finished object itself. This will drastically reduce the transportation impact, and because these processes are usually very efficient, possibly the production impact as well for many product solutions. Designers continually need to stay abreast of new manufacturing processes in order to take advantage of advances that affect how and what they can realize. These technologies offer the potential to build things that cannot be built in other ways while also reducing their environmental and possibly even social impact.

Perhaps the best example of informationalization is the biology of nature, in particular, DNA. Consider how efficient this material and process can be: one cell, carrying a nanoscopic bit of molecules, can be responsible (in the right environment) for creating an entire organism. Even a simple virus, carrying a bit of DNA code, can splice into the replication process to insert itself, be replicated, and slowly change an organism. As well as being an example of how nature has, once again, beat us to an efficient design strategy (see Biomimicry in Chapter 3), this example may provide a new kind of design process and solution.

Since the 1980s, science fiction writers and some designers have been hypothesizing that the design of complex objects, like cars and buildings, can be produced via DNA code. Imagine a small set of DNA code that, when inserted into a vat of biological material, will code-assemble a complete car—structure, electrical system, engine, body, interior, and all—simply by chemical instruction. Or consider nanotechnology and the billions of dollars spent on research into nanoassemblers—submicroscopic machines that can build products one molecule at a time. If these visions come true, the roles of designers and engineers will change radically into something more like chefs developing a recipe. In the process, the materials and energy required to produce such solutions may become efficient to the point where they begin to approach the efficiency of nature's exhibits.

Imagine a small set of DNA code that, when inserted into a vat of biological material, will code-assemble a complete car—structure, electrical system, engine, body, interior, and all—simply by chemical instruction.

Architecture for Humanity

In 1999, Cameron Sinclair and Kate Stohr started an organization, Architecture for Humanity,[1] as a response to the housing needs of refugees in Kosovo. Dissatisfied with the mundane demands of his current architecture job, Cameron reasoned that his skills—and those of other architects—could have more impact helping those in real need. He recognized that while food, water, and medical needs were a primary focus, shelters for refugees were unnecessarily costly, ill-suited to the locations in which they were deployed, and too few to respond quickly for the amount of need. And this was a perpetual problem (see Figure 9.1).

FIGURE 9.1
Architecture for Humanity's Open Architecture Network makes plans for all kinds of temporary and permanent structures available to everyone around the world.

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1 en.wikipedia.org/wiki/Architecture_for_humanity

Architecture for Humanity (continued)

Armed with this understanding and drive, the two quickly organized a small competition to design and engage architects. They rightly assumed that, if they had ideas for better (medium-term) transitional housing solutions, and could engage others in the process, still better solutions could be created. This was the first stage of using the strategy of informationalization to better solve the temporary housing challenge (though the two would probably have never used this term).

The response was overwhelming. Over 220 entries to the competition were submitted, from 30 different countries—all with only a minimum of awareness in the industry. People, of course, weren't sending actual housing prototypes, merely renderings, descriptions, and specifications. Because the field of architecture has developed enough language and conventions for evaluations, Kate and Cameron—and the other judges they had assembled—could make a reasonable critique of the entries without having to build each one. Another key learning fact that emerged immediately was that there wasn't a single, *best* solution. In fact, the solutions were surprisingly ingenious and suited to different uses— even more than Stohr and Cameron had envisioned at the start of the competition. What they had amassed was a catalog of many, outstanding solutions. The next question was "what to do with them?"

AFH quickly learned that the realities of the relief industry, which were scouting suitable locations, getting materials through customs, securing work permits and approvals, etc., were next to impossible. They were not going to be able to select one or even a few of the structural designs to be created in mass quantity, get materials where they were needed, or have housing built. They needed a different solution. So, the two did something different than standard operating procedures in the relief industries. The competitions had been so successful, and had taught them the power of bringing multiple minds to bear to a challenge, so in 2007, they created the *Open Architecture Network*. Employing "Creative Commons" licensing, this allowed any designer or architect to upload any solution to the network, and it could be downloaded by anyone who needed it wherever they were. In effect, they created a recipe catalog for relief housing accessible from anywhere with an Internet connection. The catalog is open so the recipes are ever-

Architecture for Humanity (continued)

expanding, in order to meet the ever-expanding needs of refugee, relief, and temporary housing needs.

The end-solution requires some management and tools for sifting through the designs to find the best and most appropriate way to make the system more usable, but it is an extraordinary solution and one that thrives on the idea of informationalization.