Introduction

Communities can be defined in many ways: physical proximity, ethnic, linguistic or religious identities, professional education, and status. The readership of a journal constitutes a community, and in the case of *Design Issues*, one defined by a shared interest in design with all the challenging yet marvelous complexity embedded in our understanding of this term. A review of the table of contents for this issue vividly demonstrates how global the *Design Issues* community truly is. The authors come from around the globe (Brazil, Chile, Finland, the Netherlands, and the United States) and address themes that cut across boundaries of all types: national, disciplinary, cultural, and philosophical. Based on the contents of this issue, the thoughtful reader can make a series of observations about the current concerns of this community. Increasingly we recognize the limitations of conceptual frameworks, models, and vocabularies rooted in traditional ways of understanding design. Claudio Pinhanez, for example, argues that with its focus on the creation of tangible artifacts—things—design as a discipline has neglected to develop a sophisticated understanding of service design for customer-intensive systems. He goes on to offer a definition of customer-intensive systems that can inform contemporary design practice. Christoph Bartneck explores evaluative criteria within the human-computer interaction community. In the process of developing his insights, he raises a series of provocative questions about the limits of models rooted in science for understanding the phenomenon of HCI design. Turkka Keinonen introduces a set of terms—a design vocabulary—to suggest a different way to conceptualize the design of complex environments. An awareness of the limits of traditional models for thinking about design is not confined to commentators dealing with design practice. Victor Margolin, one of the editors of this journal, asks: What is the use of history? Chronicling the past is clearly not enough for Margolin and he calls upon historians to bring their distinctive perspective to bear on imagining the future.

At first glance, the other articles included in this issue might seem to address more limited historical episodes and local themes. D. J. Huppatz explores nostalgia as a design strategy in the context of Hong Kong in the 1980s and 1990s as the former British colony confronted its impending handover to the People's Republic of China in 1997. Michael Golec describes how the 1959 redesign of the journal *Science* communicated a new found role for science as a valuable tool in the Cold War arsenal of the United States. Eduardo Castillo Espinoza reviews the history of the School of Applied Arts at the University of Chile between 1928 and 1968. Collectively, these articles serve as a reminder that in an age often characterized as

driven by the dynamics of globalization the local is the unavoidable complement to the global. Wherever the members of our community may be, as human beings we all live someplace, lead lives shaped, in no small part, by local circumstances and experiences. Each day we struggle to achieve a balance between the intimate and the public, the weight of the past and the promise of the future, the local and the global. As one voice for this community, *Design Issues* can do no less than share in this quest.

Bruce Brown
Richard Buchanan
Dennis Doordan
Victor Margolin

Services as Customer-Intensive Systems

Claudio Pinhanez

Footnotes for this article begin on page 12.

Introduction

Visiting the design section of a bookstore is a simple way to inventory traditional objects of the design discipline: you will find books on the design of everyday objects, furniture, houses, gardens, books, cars, clothes, posters, textiles, glass, type, ceramics, literature, logos, and, more recently, software interfaces and websites. In many ways, design seems to center around the creation of tangible artifacts, with the notable, but recent, exception of "interaction design." By doing so, design as a discipline currently has almost no participation in the services sector, more than half of the world economy.

Service design is simply the application of human-centric ideas and methods of design to services. Its importance, needs, and methods have been addressed by a small group of researchers,[1] some design institutions such as the British Design Council,[2] and an even smaller group of practitioners such as some groups in the design houses Live | Work, 31Volts, and IDEO.[3]

Which types of services can be designed? Healthcare systems, government services, entertainment experiences, transportation services, retail experiences, maintenance and support systems, education, travel and tourism, telecommunication services, utilities, information services, and much more. In many ways, most of our service-related daily experiences are devoid of thoughtful design, except in their tangible aspects. Cars are designed, but not the transportation experience, seen as the interaction of people, cars, and public transportation systems; or the experience of buying cars and maintaining them. There is, however, some anecdotal evidence that the impact of good design in services can be tremendous. One of the most famous is the case of the Shouldice Hospital & Hernia Center in Toronto, Canada, where the redesign of the hospitalization services decreased patient stays in the hospital from an average of four to fifteen days, with reported gains in productivity, healthcare quality, and patient and family satisfaction.[4]

This realization of the need of systematic understanding of services is not limited to the design field. Similar shortcomings have led to calls for the establishment of science, management, and engineering disciplines specific to services in the so-called Service Science, Management, and Engineering (SSME) initiative.[5]

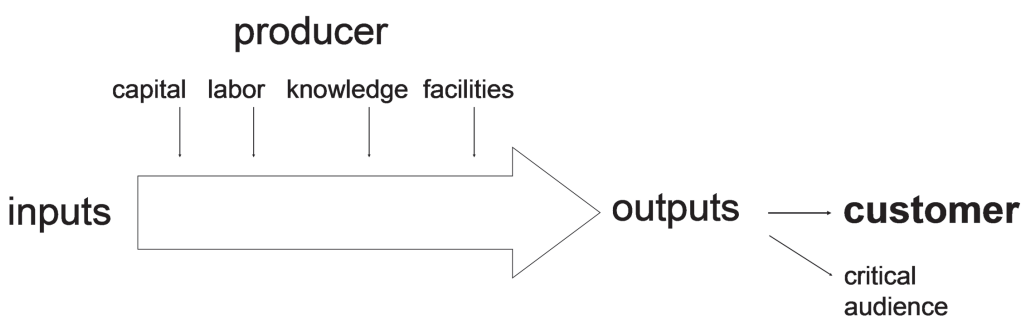
However, the ongoing controversy about what characterizes service systems[6] makes advancing these new disciplines a constant struggle against definitional problems. To circumvent this issue, we approach here the discussion about service design using our definition of *customer-intensive systems*,[7] which slightly modifies a definition proposed by Sampson[8] and, in different forms, also by Gadrey and Gallouj,[9] and Karni and Kaner.[10] We then argue that almost all commonly-agreed service industries deliver services through customer-intensive systems. We continue by examining ideas for representing service processes better; aiming to develop an improved language for service designers. We discuss how service design is likely to be different from current design practices, illustrating the concept with an overview of the design of the computer-human interface of online services.

Customer-Intensive Processes and Systems

Our first step is defining customer-intensive systems as systems in which the beneficiaries of the system's processes also are part of the input to the system and, at the same time, sufficiently different to the provider system. We formally construct this definition by first defining customer-intensive production processes. A "production process" is a process in which inputs are transformed into outputs by a "producer," using the basic four means of production: capital, labor, knowledge, and facilities (see Figure 1). We define "customers" as the persons or organizations who receive most of the value created by a production process. To simplify the presentation of the ideas in this paper, we consider, without significant loss of generality, only the case in which the customer of a production process is a person, and not an organization.

The core of our framework relies on some recent work in services theory by Sampson,[11] which proposes a new unifying definition for service processes based on the level of customer intensity in the inputs to the production process. However, his definition is somewhat ambiguous about the separation between customers and producers. Our definition[12] explicitly states that what characterizes customers is the lack of control over the means

Figure 1
A production process.



of production. Accordingly, a production process is a "customer-intensive process" when:

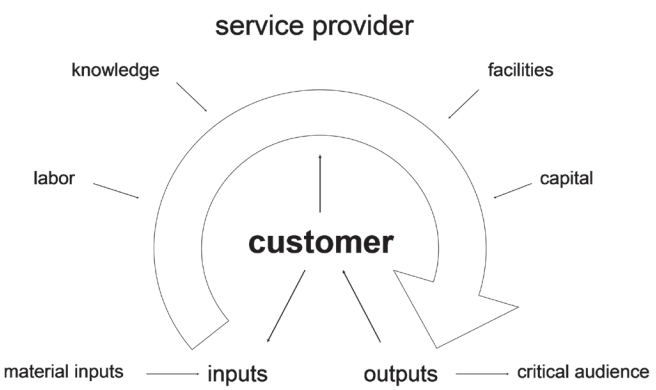
1 The customer does not control most of the means of production.
2 The customer (self, belongings, information) is a significant part of the input to the production process.

The first part of our definition states that the customer does not control the basic factors of production—resources, capital, and labor—and therefore cannot determine when and how intensively resources are used; where his or her information or belongings are stored, and who can access it; how much effort is expended on a given task or goal; and what the price of the service is, and how it changes through time.

The second part of the definition tries to differentiate between manufacturing and service production processes using Sampson's notion of customer intensity.[13] Thus, the customer can be the input to the production process in different forms: as herself (body or mind), such as when the services of a doctor in a hospital are sought; as his or her belongings, such as when the customer's car is taken to a repair shop; or her information, as when providing financial information to apply for a loan in a bank. Since the customer input is part of the production process, it is quite common that the customer also provides the means of production, commonly in the form of labor, but sometimes in the form of knowledge, capital, or facilities, for example, in home-cleaning services.

We believe that the centricity of the customer in customer-intensive processes requires a strong visual representation that clearly differentiates it from the traditional views of production processes. Figure 2 shows our proposal for the visual representation of service processes which has, as its strongest feature, the placement of the customer in the center of the process. The means of production brought by the service provider are shown in the outside part of the arrow: similarly, "means of production" when provided by the

Figure 2
A customer-intensive process.



customer are represented in the inside part of the arrow. Notice that we do not explicitly depict the means of production provided by the customer in the diagram of Figure 2; mostly for simplicity, but also because the customer does not always provide all types of means of production in a service process. Also depicted in Figure 2 are the material inputs to the process, and the connection from the outputs to the critical audience. Since both are beyond the realm of the customer, they are positioned outside of the arrow.

Our intention here is not to echo the rhetoric about the importance of customers for the modern enterprise. Instead, we are advocating the use of a customer-centric representation of service processes because: (1) a customer-centric representation highlights the significance of the customer input and participation in a service process; (2) the use of circular instead of linear representations for a process focuses attention on the central element of the representation, and can be used to accentuate fundamental components of the customer's world such as presence, property, information, and time; and (3) because, indeed, the customer is the center of a service process.

We define a "customer-intensive system" by analogy to our definition of customer-intensive processes, in a system where: (1) the customer does not control most of the means of the production of the system; and (2) the customer is a significant part of the input to the system.

But are there service systems that are not customer-intensive? We look into this issue at the industry level, using the North American Industry Classification System 2002 as a tool.[14] Among the sixty-two segments listed for the service industry, only three cannot be considered customer-intensive: publishing industries (including software publishing), motion picture and sound recording industries, and broadcasting and telecommunications (in fact, only the broadcast portion). Carefully examining these three, traditional service industries, which are not customer-intensive according to our definition, we see production systems that look more like manufacturing systems than what most people would agree to call service systems. In any case, those three industries represent a very small part of the traditional services spectrum. Combined, they account for little more than one percent of all American businesses. Therefore, for the reminder of this paper, we simply ignore those industries when we are discussing service design issues.

How Much Different Are Service Processes?

The main goal of our ongoing research is to better understand the differences between manufacturing and service processes, the latter understood as customer-intensive processes. Most important, customer intensity implies that a service process: (1) consumes input loaded with human values (such as hope, concern, pride, and

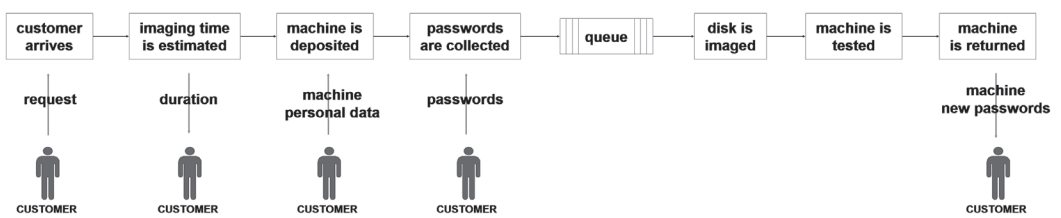
disgust); (2) is timed from a human (the customer's) perspective; and (3) is evaluated at every step the customer has access to or participates in. In services, the customer is on the conveyor belt.

In most cases, service systems tend to address this "unbearable" presence of human values in the production process by having the human values handled by people, often without explicit design and engineering. A contact center agent can feel affliction in the voice of a customer, and "bend" a procedure or rule in a way that automated voice response systems cannot. The key challenge for service engineering, in our view, is to create architectures and technology that can recognize and deal with the human perspectives attached to service inputs and processes, to allow automation and efficiency without dehumanization.

As an example, we are developing new ways to represent service processes that highlight the impact of customer centricity. To illustrate the potentials of shifting from the traditional, linear representation of processes to the customer-centric representation, we examine here the representation of a simple service process. A very common IT support service process is the procedure to rewrite the hard disk of a personal laptop computer with basic system applications and a set of standard applications. This process is called, in the IT industry, "imaging a hard-disk," and its basic sequence of steps involves the customer bringing the laptop to the IT support station; agreeing with the estimated time needed to perform the process; and providing the hard-disk and machine passwords. Often, it takes some hours for the procedure of physical imaging the disk to be performed. After imaging, the machine is tested and returned to the customer, together with a set of provisional passwords.

Figure 3 compares the traditionally used linear representation of a service process (top) with the proposed customer-centric representation (bottom) for the imaging a hard-disk service process. Notice that, for the sake of a fair comparison, we included in the linear representation explicit customer elements such as the information and property brought to the process by the customer, although the inclusion of such elements is far from usual by process designers.

Figure 3
Linear and customer-centric representations of a typical IT support process: "imaging the hard-disk" of a laptop.



The bottom of Figure 3 shows the same service process of "imaging a hard-disk" in the customer-centric representation. The most important difference is that, in this representation, the central position of the customer makes visually clearer that the process begins and ends with the customer, and that the imaging a hard-disk process is about the customer's machine, personal data, and passwords because they are input to the process.

Of course, it is very difficult to determine what the best representation is for a certain task. Nonetheless, we have observed in our own work that the customer-centric view, besides naturally emphasizing the fundamental customer's role in a service process, is quite good at depicting some of most fundamental components of the customer experience: presence, property, information, and time. Figure 4 shows an enhanced representation of the imaging a hard-disk process of Figure 3, which depicts each of those experiential components in a highlighted way:

- Customer time: Time in the diagram of Figure 4 is shown not linearly, but centered in the customer, clockwise, as if the customer were the center of a clock. It is a strong visual statement that the service process is running on customer's time.
- Customer presence: Whenever the presence of the customer (in this case, physical) is necessary to steps in the service process, the corresponding slice of time is grayed. For instance, in the service represented in Figure 4, the customer's presence is essential in all the initial steps of the process, as well as in the last step. The diagram shows that there is a considerable span of time, from the time the machine enters the queue to the time the machine is returned, where no feedback is provided to the customer. Feedback-free long spans of time tend to increase the customer's anxiety, often impacting customer satisfaction.
- Customer property: The temporary possession of customer's property, physical or informational, by the service

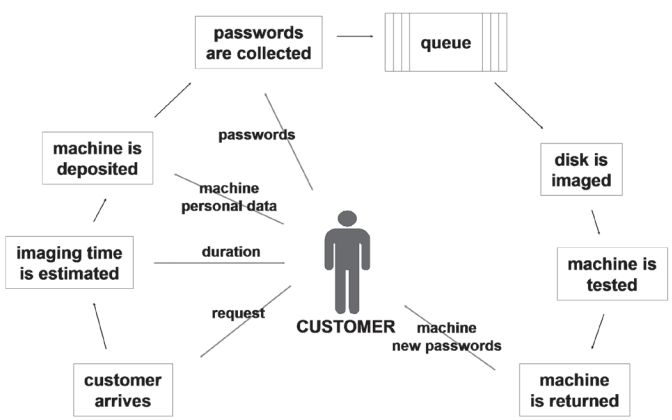


Figure 4
Customer-centric representation of the "imaging a hard-disk" service process.

provider is represented by plotting the property components on the outside of the sequence of steps. For instance, after the step called "machine is deposited," the service provider has the possession of both the machine and the customer's personal data inside it. Possession of customer property has to be dealt carefully by any service provider, given not only the legal implications, but also the level of trust required from the customer, and the high expectations about how the property is going to be kept. Scratching the cover of a laptop in a traditional manufacturing process would be handled by simply rejecting the part, while in a service process, it is hard even to predict the customer's reaction and how to mitigate the effects of the damage.

- Customer information: Information and physical property are perceived in very different ways by people, so our representation differentiates them by marking in bold type any physical property that goes through the system. This is not to be viewed as a statement that physical matter is more important than information. Instead, it should be seen as an acknowledgement that flows of the customer's physical objects and information have different characteristic and challenges. Often, physical property is unique and cannot be replaced. On the other hand, information can be easily copied, altered, and moved around, bringing high stakes to issues such as privacy and security.

Note that the diagram of Figure 4 should not be seen as a definitive proposal of what and how to represent service processes, but as an example of the richness of options available when the customer-intensive framework is adopted and we move to a customer-centric representation.

Implications for Service Design: An Example

Unlike engineering, design as a discipline has always had a strong focus on the human aspects of the designed object. Our customer-centric perspective is, therefore, relatively well-aligned, at least in surface, with traditional views and methods of design.

However, there are important differences that are likely to affect how service design is and will be practiced. The first is the fact that customers (and their belongings) being part of the production process is not the traditional context of industrial or media design. Incorporating the user as input, and respecting its impact on the process and its outcome, creates fundamentally new constraints in service design that we believe is going to require new methodologies and practices.

We have looked into these issues in the context of the design of online service systems.[15] We advocate the customer-intensive systems framework for the design of computer-human interfaces

of online services to support a better understanding of the different issues faced by online service designers, engineers, and delivery personnel.

Similar to what we've done in this paper, it is important to carefully distinguish online service applications not only from traditional personal software applications but also from online information applications such as the ones used by news and entertainment websites, by mirroring the above definition of customer-intensive systems to online applications.[16] Thus, we define an online service application, or simply an online service, as a computer application in which:

1 The user does not control most of the means of production.
2 The user (self, belongings, and information) is a significant part of the input to the production process.

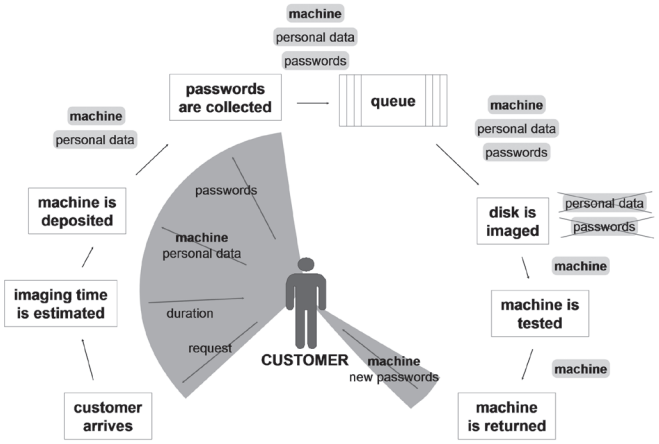
Part one of this definition tries to establish a difference with traditional tool applications, which tend to assume that user communications with her data, other databases, the World Wide Web, or other users is not mediated by a service provider. Note that, for the generic class of computer applications, we use the term "user" instead of "customer," but for online applications we can simply use the term "customer."[17]

In part two of the definition, we ensure that only service-related concepts and methods are applied to online applications that actually behave as services. Following our previous discussion about services systems which are not customer-intensive, we do not consider interactive online information providers such as "CNN.com" to be true online services, since they have characteristics closer to manufacturing systems than to services.

Having made a clear characterization of online service applications as customer-intensive systems, we can then take up the task of creating a more appropriate framework, based on service concepts, for the design of its interface. Although service design often must go beyond the design of the interaction mechanisms and context, their design is a key component of the design of the service experience, both in human-delivered and computer-delivered services.

Our approach[18] is to consider the six basic characteristics of services, as traditionally defined in services theory. We compiled and fused service characteristics listed by different authors,[19] producing a "compromise" list of basic service characteristics which we believe most would agree with: customer-as-input, heterogeneity, simultaneity, perishability, coproduction, and intangibility. We then derive from these characteristics a list of fifteen different issues that we believe are very important for the design and evaluation of the human-computer interface of online services: trust, privacy, and security; personalization, service recovery, and quality consistency; performance consistency and fairness; demand management and

Figure 5
Important issues for interfaces of online services.



marketing; customer empowerment and training; service expectation, process satisfaction, and anger/frustration management; respectively. The precise definition and relevance to online services of these fifteen issues is discussed in detail elsewhere,[20] and it is beyond the illustrative argument we are making here.

Moreover, we also have observed that the interactions between service providers and customers are often long-term relationships. In our customer-intensive systems framework, we can argue that the need for relationships stems from both the users' lack of control of the means of production, therefore forcing them to connect to another entity, the service provider, and establish a relationship; and from the fact that, in most cases, there are a multitude of competing service providers, so it is also interesting for the service provider to seek long-term relationships. In fact, in examining the collection of fifteen issues identified as most relevant to online service interfaces, it becomes apparent that most of them are core issues to establish and/or maintain a relationship.

Figure 5 summarizes the fifteen important issues for interfaces of online services, and highlights the key aspect of an online service interface: being inductive to establish and maintain relationships. Note that our view of interfaces as relationship maintainers sharply contrasts with traditional understanding of software tool interfaces, which have been regarded as agents for conversation,[21] action,[22] direct manipulation,[23] or representational action.[24] Furthering the understanding of the relationship aspect of services and online services, in particular, is currently a key part of our research efforts.

Coda

The main goal of this paper is to propose a new framework based on the notion of customer-intensive systems to better address the design of services. Although we believe that this notion is an

important advance from previous characterizations of services, we are still not totally satisfied with it, especially the importance placed on the ownership and control of the means of production. Nevertheless, we have shown here that our definitional stance can advance the discussion about better representational methods for service processes, a fundamental issue for service design in our minds. We also have illustrated how an appropriate framework for services can guide the understanding of the fundamental issues faced in the design of services, as discussed in our example of the design of online service interfaces.

We end by observing that service design, due to its customer-intensive nature, but especially in the case of labor-intensive service delivery systems, is likely to require design to go beyond its traditional focus on artifacts and into the design of human-to-human interactions as its centerpiece. In that sense, a service designer is likely to need to resemble more a theater director than a traditional visual or industrial designer. Designing a service often includes the design of the personnel (casting), their training (rehearsal), what they say to the customer (scripting), how they talk to the customer (characterization), and how they move in the space (staging). Maybe this is the opportunity to bring the theatre "types" back to the design schools, who have been largely absent since the time of Oskar Schlemmer at the Bauhaus, but this time with the larger mission of setting up the foundations of service design.

1 In works such as B. Mager, *Service Design: A Review* (Koln, Germany: International School of Design, 2005); S. Holmlid and S. Evenson, "Bringing Service Design to Service Sciences, Management and Engineering" in *Service Science, Management and Engineering: Education for the 21st Century*, B. Hefley and W. Murphy, eds. (New York: Springer, 2008), 341–346; L. S. Cook et al., "Human Issues in Service Design," *Journal of Operations Management* 20 (2002): 159–174; S. M. Goldstein et al., "The Service Concept: The Missing Link in Service Design Research?" *Journal of Operations Management* 20 (2002): 121–143; J. Meis, "Service Design and Service Management with the Service Blueprinting Methodology" in *Proc. of 17th International Conference on the Applications of Computer Science and Mathematics in Architecture and Civil Engineering, 2006*, Weimar, Germany.

2 See B. Hollins, *What Is Service Design?* 2006 (www.designcouncil.org.uk/en/About-Design/Design-Disciplines/Service-design-by-Bill-Hollins/). Accessed on July 24, 2008.

3 As commented by R. M. Saco and A. P. Goncalves, "Service Design: An Appraisal," *Design Management Review* 19:1 (2008).

4 As described in a business case developed by James L. Heskett, "Shouldice Hospital Ltd.," *Harvard Business Publishing* 18 (1983).

5 See J. Spohrer et al., "Steps toward a Science of Service Systems," *IEEE Computer* (2007): 71–77; *Service Science, Management and Engineering: Education for the 21st Century*, B. Hefley and W. Murphy, eds. (New York: Springer, 2008), xxvi, 384; and J. Spohrer and D. Riecken, eds., *Communications of ACM: Special Issue on Services Science* 49:7 (2006).

6 For a short history, see S. E. Sampson and C. M. Froehle, "Foundations and Implications of a Proposed Unified Services Theory," *Production and Operations Management* 15:2 (2006): 329–343.

7 See C. Pinhanez, "Service Systems as Customer-Intensive Systems and Its Implications for Service Science and Engineering," *Proceedings of Hawaiian International Conference on System Sciences, HICSS-41* (Big Island, Hawaii, 2008).

8 See S. E. Sampson, *Understanding Service Businesses* (Hoboken: John Wiley & Sons, 2nd ed., 2001), 512; S. E. Sampson and C. M. Froehle, "Foundations and Implications of a Proposed Unified Services Theory," *Production and Operations Management* 15:2 (2006): 329–343.

9 See J. Gadrey and F. Gallouj, *Productivity, Innovation, and Knowledge in Services: New Economic and Socio-Economic Approaches* (Cheltenham, UK and Northampton, MA: Edward Elgar, 2002), xxviii, 307.

10 R. See Karni and M. Kaner, "An Engineering Tool for the Conceptual Design of Service Systems" in *Advances in Services Innovations*, D. Spath and K.-P. Fähnrich, eds. (Berlin/Heidelberg, Germany: Springer, 2007), 65–83.

11 See S. E. Sampson, *Understanding Service Businesses*, 512 or, more concisely in S. E. Sampson and C. M. Froehle, "Foundations and Implications of a Proposed Unified Services Theory," *Production and Operations Management* 15:2 (2006): 329–343.

12 As proposed in C. Pinhanez, "Service Systems as Customer-Intensive Systems and Its Implications for Service Science and Engineering."

13 See S. E. Sampson, *Understanding Service Businesses*, 512.

14 Described in *North American Industry Classification System: United States, 2002* (Lanham, MD: Bernan, National Technical Information Service, 2002), 1419.

15 Discussed in detail in C. Pinhanez, "A Service Science Perspective on Human-Computer Interface Issues of Online Service Applications." (To appear in *International Journal of Information Systems in the Service Sector*, 2009); C. Pinhanez, "Service Systems as Customer-Intensive Systems and Its Implications for Service Science and Engineering."

16 Ibid.

17 Ibid.

18 Ibid.

19 Including V. A. Zeithaml, M. J. Bitner, and D. D. Gremler, *Services Marketing: Integrating Customer Focus across the Firm* (Boston: McGraw-Hill/Irwin, 4th edition, 2006), xxvii, 708; J. A. Fitzsimmons and M. J. Fitzsimmons, *Service Management: Operations, Strategy, and Information Technology* (Boston: McGraw-Hill/Irwin, 2004); S. E. Sampson, *Understanding Service Businesses*, 512; C. H. Lovelock and J. Wirtz, *Services Marketing: People, Technology, Strategy* (Upper Saddle River, NJ: Pearson/Prentice Hall, 5th edition, 2004), xviii, 652.

20 See C. Pinhanez, "A Service Science Perspective on Human-Computer Interface Issues of Online Service Applications." (To appear in *International Journal of Information Systems in the Service Sector*, 2009); and C. Pinhanez, "Service Systems as Customer-Intensive Systems and Its Implications for Service Science and Engineering."

21 See, for example, J. Walker, "Through the Looking Glass" in *The Art of Human-Computer Interface Design,* Brenda Laurel, ed. (Reading, MA: Addison-Wesley, 1990).

22 As in D. A. Norman, *The Psychology of Everyday Things* (New York: Basic Books, 1988).

23 Presented in B. Shneiderman, *Designing the User Interface: Strategies for Effective Human-Computer Interaction* (Reading, MA: Addison-Wesley, 1987).

24 In the celebrated Brenda Laurel, *Computers as Theatre* (Reading, MA: Addison-Wesley, 1991).

Designer Nostalgia in Hong Kong

D. J. Huppatz

As a means of framing and filtering the past, nostalgia asserts a sense of stability in a context of imminent change. The nostalgic reconstruction of history at once seems to extinguish history's temporal distance, while providing for a pleasant experience through the repression of its negative aspects. In the late twentieth century, nostalgia became a common experience as history and tradition began to play a crucial role in consumer culture. The uncertainty faced by Hong Kong in the 1980s and 1990s, with the anxiety of the 1997 handover looming, made it an exemplary production site for a wide range of nostalgic cultural products. Through the analysis of two prominent exponents of Hong Kong nostalgic design—graphic designer Alan Chan and fashion house Shanghai Tang—this article examines nostalgia's appeal to both local and global audiences. Alan Chan's graphic design work in the 1980s, and his subsequent move into product design in the 1990s, were marked by the appropriation of nineteenth-century China Trade paintings and Shanghai commercial imagery from the 1920s and 1930s. The fashion house Shanghai Tang provides a further example of Hong Kong's nostalgia fever, but with a more eclectic approach to Chinese history taking in not only modern Shanghai, but Qing dynasty and Maoist nostalgia as well. On the one hand, both companies are products of a specific local context that reflects Hong Kong identity. On the other, both appeal to a particular global imaginary in order to sell nostalgic Chinese fantasies to a global market.

A combination of the Greek words *nostos* (to return home) and *algia* (a painful condition), the term "nostalgia" was coined by Swiss physician Johannes Hofer in the late seventeenth century to describe extreme homesickness among Swiss mercenaries fighting in distant lands.[1] It described a medical condition, the symptoms of which included despondency, melancholia, mood swings, weeping, anorexia, and suicide attempts. Nostalgia remained a medical or psychological disease until the twentieth century, during which the term lost its medical usage and its core referent, "homesickness," but retained some sense of "home-like" sentiments as it was assimilated into Western popular culture after World War II. In popular culture, nostalgia's appeals to continuity of identity proved popular in the face of the various forms of discontinuity inherent in modernization's program of rapid change. For Fred Davis:

> The nagging sense of the absence of a future undercuts what is perhaps the chief unspoken aim of nostalgia's

1 F. Davis, *Yearning for Yesterday: A Sociology of Nostalgia* (New York: The Free Press, 1979). The original article is Johannes Hofer, "Medical Dissertation on Nostalgia," published in 1688 in Latin (English translation by Carolyn K. Anspach, *Bulletin of the History of Medicine* 2 (1934): 376–391). In a design context, see also Jonathan M. Woodham, *Twentieth Century Design* (New York: Oxford University Press, 1997). Chapter 9 of this text, "Nostalgia, Heritage and Design" examines late-twentieth-century nostalgic design in Britain and the U.S.

> exercise, that is, to assuage apprehension of the future by retrieving the worth of the past.[2]

This "apprehension of the future" was precisely the situation of late-colonial Hong Kong, with only the certainty being change after June 30, 1997. The uncertain future related not only politics, but covered all aspects of social life with Hong Kong's imminent change from a British colonial city to a Chinese city. It is in this context that Hong Kong's nostalgia fever of the 1980s and 1990s arose—cultural products from film and literature to advertising and design tapped into the colony's anxiety about future change.

Hong Kong's Nostalgia Fever

Hong Kong's "nostalgia fever" of the late 1980s and 1990s has been widely characterized as a symptom of handover anxiety, incorporating a broad range of cultural products that might construct a cultural identity based on a particular history before it (potentially) disappeared. In an article about nostalgic films, cultural critic Rey Chow noted that the colony's nostalgia fever included not only films but also the renovation of architectural landmarks, the popularity of old postcards, posters, and publications, as well as the fashion for collecting antiques.[3] However, the specific place and time that clearly stood out as a reference in this wave of nostalgia was modern Shanghai—the glamorous decadence of the "Paris of the East" in the 1920s and '30s was a key touchstone that embodied Hong Kong's contemporary aspirations and fears.

Art historian David Clarke, in his book *Hong Kong Art: Culture and Decolonization*, argues that Shanghai nostalgia was:

> … handover-related in that it showed a fascination with a city whose past might prefigure Hong Kong's future: Shanghai was also a modern Chinese capitalist city that had been taken over by the Communist regime.[4]

While he skirts around the issue of Shanghai's semi-colonial status, Clarke suggests the popularity of Shanghai nostalgia lay in its prefiguring of Hong Kong's future. In the contemporary case of Hong Kong, such nostalgia perhaps represented a yearning for the "golden age" of Shanghai modernism. The connections between the capitalism and global trade in the Shanghai of the 1920s and '30s and Hong Kong of the 1980s and '90s are hardly coincidental. Significantly, commercial Shanghai modernism was unpopular with the Chinese Communist regime, so it is unsurprising that the revival came primarily from Hong Kong rather than the mainland.

In the local film industry, Shanghai stood out as a cultural touchstone. Stanley Kwan's *Rouge* (1988) and *Centre Stage* (1991) are among the best-known of the Hong Kong nostalgia genre. Chow argues that temporal dislocation is the key to Hong Kong nostalgia films such as these because:

2 Ibid., 71.

3 Ibid., 133.

4 D. Clarke, *Hong Kong Art: Culture and Decolonization* (Durham, NC: Duke University Press, 2002), 187.

> … they are not, despite their often explicit subject matter, nostalgic *for* the past as it was; rather they are, simply by their sensitivity to the movements of temporality, nostalgic in tendency. Their effect is tenacious precisely because we cannot know the object of such effect for sure. Only the sense of loss it projects is definite.[5]

Similarly, Ackbar Abbas reads Hong Kong's nostalgia fever in terms of preservation, "memory without pain," in which history becomes a kind of surface decoration.[6] For Abbas, the historical past disappears in a series of pop images, as the specifics of history disappear in the generalized nostalgic spirit of the pre-handover period. This generalized nostalgia without a clear object of loss is at odds with Fred Davis's account of nostalgia in which "there is *some common* experiential base to which the word points and which it *qua* word evokes."[7] For Davis, nostalgia's material is not merely a general past, but "the past which is the object of nostalgia must in some fashion be a personally experienced past."[8]

Adding a further dimension to Hong Kong nostalgia, Dai Jinhua notes the parallel fashion for nostalgia in 1990s mainland China:

> Nostalgic atmosphere, in embellishing the vacuum of memory and in creating personal identities within the span of historical imagination, simultaneously accomplishes a representation of consumerism, as well as a consumerism of representation.[9]

Given the decline of revolutionary communism in the 1980s and 1990s, the question of collective representation in China was up for grabs. But in the mainland case, nostalgia, Dai argues, was an expression of the individual or the consumer, rather than the collective. And, unlike in Hong Kong, modern Shanghai was not the touchstone. Meanwhile, in a global sense, theorists of postmodernism such as Fredric Jameson, and of globalization, such as Roland Robertson, have suggested that nostalgia is common to postmodern culture in general.[10] Images of the past that reappear in popular representations were part of a global tendency in late-twentieth-century design. American graphic designers such as Paula Scher and Louise Filli, or British designers such as Neville Brody and Peter Saville, for example, revived an eclectic mix of prewar modern styles in the 1980s as a challenge to the purity of international-style modernism exemplified by Swiss School graphic design.[11]

However, the particular situation of Hong Kong during the 1980s and 1990s was unique, and the example of Alan Chan's and Shanghai Tang's rise to prominence there exposes the complexities of nostalgic design in the late twentieth century. Their cultural products not only were designed for local consumption in their exploitation of particular local histories, but also provided exotic Asian imagery

5 R. Chow, "A Souvenir of Love" in R. Chow, *Ethics after Idealism: Theory, Culture, Ethnicity, Reading* (Bloomington: Indiana University Press, 1998), 147.

6 A. Abbas, *Hong Kong: Culture and the Politics of Disappearance* (Minneapolis: University of Minnesota Press, 1997), 83. Abbas also has written specifically about the relation between prewar Shanghai and contemporary Hong Kong in "Cosmopolitan Descriptions: Shanghai and Hong Kong," *Public Culture* 12:3 (2000): 769–786.

7 F. Davis, *Yearning for Yesterday: A Sociology of Nostalgia*, 7.

8 Ibid., 8. Davis distinguishes nostalgia from "antiquarian feeling," a term he uses to describe a time that has not been personally experienced.

9 D. Jinhua, "Imagined Nostalgia" in *Postmodernism & China*, A. Dirlik and X. Zhang, eds. (Durham, NC: Duke University Press, 2000), 211.

10 See F. Jameson, *Postmodernism, or the Cultural Logic of Late Capitalism* (Durham, NC: Duke University Press, 1991); and R. Robertson, *Globalization: Social Theory and Global Culture* (London: Sage, 1992).

11 See also E. Guffey, *Retro: The Culture of Revival* (London, Reaktion Books, 2006), especially chapter 4; and R. Poynor, *No More Rules: Graphic Design and Postmodernism* (New Haven, CT: Yale University Press, 2003), especially chapter 3.

for a predominantly Western tourist and export market. Thus, they provide an insight into the nostalgic formation of the Hong Kong identity, and its appeal to a particular global imaginary. Significantly, both Alan Chan and Shanghai Tang continued expanding their businesses after the 1997 handover, suggesting that, while the local context of Hong Kong's nostalgia fever may have been a starting point, their continued global appeal means that a careful consideration of Hong Kong in an international context also is crucial.

Alan Chan: Shanghai Retro

Alan Chan was born in Hong Kong in 1950 and, after completing a ten-month graphic design evening course, worked in advertising during the 1970s before setting up his own company, Dimensions Advertising, in 1980. He founded Alan Chan Design Company in 1986, with its core business as corporate identity, brochures, annual reports, advertising, packaging design, posters, and interior design. Among its hundreds of international awards and accolades, the Alan Chan Design Company made *Graphis* Magazine's "Top Ten Design Firms of the World" list in 1997. More recently, Chan's position as a leading Hong Kong designer was confirmed with a major retrospective at the Hong Kong Heritage Museum in 2003, "The Art of Living," featuring a selection of his designs and artwork.

Chan is best known for his nostalgic designs; an early example of which is his visual identity for the Canton Disco (1984), which included signage, menus, coasters, and stationery (Figure 1). The menus feature a repeated motif of a swimmer against a flat background of bright green, pink, or yellow (a different color for each type of menu). The swimmer, with his slicked-back hair and 1930s bathing costume, was appropriated from an old cigarette card, illustrated in a Western style. With its decorative line work and irregular lettering, the logo is clearly influenced by contemporary

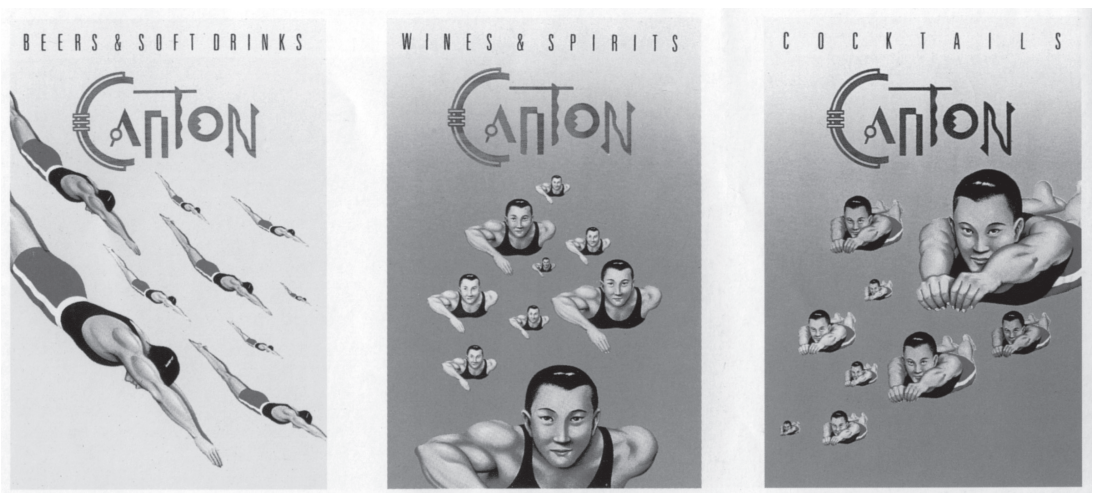


Figure 1
Alan Chan, Canton Disco menus, 1984.
Permission of Alan Chan.

Euro-American, postmodern typography, particularly the Milanese studio Memphis. This decorative and colorful approach to typography is similar to art deco, itself in keeping with the style of the 1930s swimmer illustration. The disco's name, Canton, utilizes the English name for Guangzhou, the trading port in neighboring Guangdong province, and all of the text is in English rather than Chinese characters. Described by Hilary Binks as "Hong Kong's most upmarket and fashionable discotheque of the 1980s,"[12] Chan's designs were clearly meant to appeal to the expatriate community, or to a cosmopolitan Hong Kong audience with Euro-American tastes. This example of Chan's work might be termed "international postmodernism" with a Chinese flavor, in which an already modernized Chinese figure and local reference is appropriated and reused, a Hong Kong version of Paula Scher's or Louise Filli's contemporary retro designs.

Another well-known early Chan design project is his corporate identity and packaging for the Fook Ming Tong Tea Shop (1987), comprising a series of tin tea caddies and packaging, decorated with reproductions of China Trade paintings which illustrate the tea-making and trading processes (Figure 2). The Fook Ming Tong Tea Shop is situated in the Prince's Building, in the heart of Hong Kong's wealthy business and tourist district, and its products are stocked in the Peninsula and Mandarin Oriental luxury hotels. Its trade consists of high-quality Chinese teas for tourists and local tea connoisseurs. In addition to designing the packaging and graphics, Chan helped design the shop's interior, which features antique Chinese furniture and traditional Chinese tea shop signage. The design project thus comprises a blend of traditional Chinese elements in the interior with Europeanized fragments from the eighteenth-century China tea trade in the packaging; all for a predominantly Western or at least a cosmopolitan local audience. The China Trade paintings featured on Chan's packaging were part of a large export trade in late seventeenth-century southern China in

Figure 2
Alan Chan, Fook Ming Tong Tea Shop packaging 1987. Permission of Alan Chan.

12 H. Binks, *Alan Chan* (Hong Kong: Alan Chan Design Company, 1991), unpaginated.

Figure 3 (top)
Alan Chan Creations, Calendar Girls coasters. Permission of Alan Chan.

Figure 4 (bottom)
Alan Chan Creations, Calendar Girls notepads. Permission of Alan Chan.

goods produced specifically for the European market. Guangzhou was southern China's eighteenth-century trade center before the foundation of Hong Kong diverted much of the trade to the British colony. Interestingly, China Trade porcelain, lacquer work, silks, paintings, and other goods were either reproductions of European models or executed in European styles.[13] In a repetition of the China Trade, Chan is functioning as a cultural broker, reselling China Trade paintings as packaging for luxury goods in a style readily recognizable to a global market. As a marker of design success, Chan created a similar range of tea caddies and coffee containers for the Mandarin Oriental Cake Shop in 1989, then opened his own tea shop, the Mr. Chan Tea Room, in 1993 and added a Tokyo franchise in 1996; all utilizing a similar design style.

In 1990, Chan founded Alan Chan Creations as a vehicle for his nostalgic Chinese style, which then was applied to a wide range of products including stationery, T-shirts, tea containers, cards, coasters, watches, coffee mugs, and mouse pads. The products were no different from similar products around the world, except for the distinctive decorative veneer applied to them. Their staple imagery was modern design from 1920s and 1930s Shanghai, China Trade paintings, commercial imagery from early Hong Kong, and, more recently, Maoist and Cultural Revolutionary imagery. In Hong Kong, Alan Chan Creations were (and still are) distributed by large department stores and luxury hotels, as well as the Alan Chan Creations shop in Victoria Peak's tourist precinct. Initially marketed to tourists in Hong Kong, Chan soon began distribution of his products in Japan, and later even wider distribution throughout the U.S. and Europe.

In a copybook illustration of postmodern eclecticism and pastiche, Chan's products display a variety of recognizable signs, from his ubiquitous "calendar girls" appropriated from Shanghai advertising calendars (*Meinu Yuefenpai*), to early modern commercial images including newspaper and magazine advertisements, matchbox covers, fans, and old photographs applied to numerous products from coasters to stationery (Figures 3 and 4). A typical Chan coaster set comprises a pastiche of early-twentieth-century Chinese newspaper advertisements, mostly for Western or Western-style products such as toothpaste, butter, and medicines, with the text and simple line drawings converted to gold on a black background (Figure 5). A typical mouse pad is decorated with a pastiche of Shanghai calendar girls (Figure 6). Even the swimmer from the Canton Disco designs reappears on a notepad. What these images have in common is a narrative of Chinese history that will appeal to both Western consumers and to a local audience—a modern commercial China already integrated into global trade networks.

When asked in an interview why he had used the calendar girls, Chan replied:

13 Margaret Jourdain and R. Sloan Jenyns argue that the "China Trade" was a copying culture in which Chinese manufacturers "imitate models sent from Europe with the most exact and servile fidelity." M. Jourdain and R. Sloane Jenyns, "Chinese Export Art in the Eighteenth Century," *Country Life* (London, 1959): 13.

Figure 5 (top)
Alan Chan Creations coaster set. Permission of Alan Chan.

Figure 6 (bottom)
Alan Chan Creations, Calendar Girls mouse-pads. Permission of Alan Chan.

> Firstly, the illustration technique and the attention to detail is unique…. Secondly, the concept of Chinese women seen from a European perspective is particularly interesting. I was trying to find a solution that would appeal to both Western and Chinese tastes. From a commercial point of view these paintings of fashionable Chinese ladies, as seen from a Western perspective and illustrated by both Oriental and Western technique, are a sound formula.[14]

In his search for an "East meets West" mix acceptable to Western taste, Chan had discovered an earlier period of hybrid Chinese culture in interwar Shanghai.[15] The other issue he raises, that of using images from an already existing European perspective, is one I will return to later. For the moment, the issue of the Hong Kong identity is worth analyzing further because, as Chan added: "Nostalgia for the past is growing. The products offer a sense of history and cultural identity."[16] Thus, for Chan, while the products of Alan Chan Creations were supposed to appeal to Western tourists, they also were intended to provide Hong Kongers with some kind of cultural and historical identity. Their nostalgic appeal to prewar Shanghai modernism offered a continuity of identity for a colonial city-state heading towards potentially drastic changes after 1997.

Shanghai's historical connection to Hong Kong is worthy of further discussion since it presupposes a different historical narrative to both the official British colonial and the Chinese narratives of Hong Kong. With civil war raging in China in the years immediately after the Japanese withdrawal in 1945, Hong Kong experienced waves of immigration from the mainland; particularly from Shanghai. In these years, according to Leo Ou-Fan Lee:

> … while the majority of the refugees lived in dire poverty in the outskirts of the city, Hong Kong's commercial and cultural elite underwent what might be called a process of "Shanghainization": Hong Kong was no longer a city to visit or to take a vacation, but a place to stay.[17]

Lee cites the film industry, department stores (particularly Wing On and Sincere), restaurants, and textile manufacturers as examples of Shanghai cultural productions reestablished in Hong Kong after, or immediately before, the Second World War. Shanghai modernism and the impact of Shanghai capital, culture, and expertise on Hong Kong run counter to both the colonial narrative of the city's modern development under benevolent British laissez-faire capitalism, and the mainland Chinese narrative of both Shanghai and Hong Kong as products of foreign imperialism. This alternative narrative highlights the continuity of Shanghai commercial culture in Hong Kong, reinforced by Chan's many references to Shanghai-modern design.

14 Z. Lynch, "Reviving Those Sweet Shanghai Smiles," *Hong Kong Apparel* 1 (1996): 52.

15 For a discussion of an alternative Hong Kong "East meets West" design aesthetic, see my article on graphic designer Henry Steiner: D. J. Huppatz, "The Chameleon and the Pearl of the Orient," *Design Issues* 22:2 (Spring 2006).

16 Z. Lynch, "Reviving Those Sweet Shanghai Smiles": 53.

17 L. Ou-Fan Lee, *Shanghai Modern: The Flowering of a New Urban Culture in China, 1930–1945* (Cambridge, MA: Harvard University Press, 1999), 330.

The particular aesthetic Shanghai migrants brought with them was both cosmopolitan and urban, mixing American and European art deco and modern styles with local references. The advertisements and calendar girl posters used extensively by Chan reflect Shanghai's urban lifestyle of the 1920s and 1930s. Virgil Kit-yiu Ho has analyzed the adoption of modern Western lifestyles in Shanghai during this period, including an intriguing analysis of new models of beauty. He writes about the Shanghaiese adoption of Western criteria for (particularly female) beauty, whereby physical attributes became paramount:

> In an article "On Woman's Beauty and Ugliness" published in a vernacular magazine, the author teaches his readers how to appreciate a beauty. The long list of the "basic" parts of the female body to be appreciated includes the breasts, buttocks, thighs and shins. The spiritual quality of charm, which used to be cherished as an essential hallmark, has almost completely given way to sheer physical attraction. The new concept of beauty has taken a more sensual and erotic orientation, which is almost certainly a cultural expression of the influence of the West on Cantonese values.[18]

These are the calendar girls reproduced on Chan's products: Chinese women conforming to Western stereotypes of beauty: images that would regain popularity in 1980s and 1990s Hong Kong. David Clarke argues that:

> The allure of Chan's designs is reinforced by his frequent recourse to representations of the female body. Images culled from promotional calendar and poster art of a bygone era, and which in their time signified a specifically Chinese contemporaneity, now refer to a past with a feminized and modern flavour.[19]

In modern Shanghai, the male body image also was transformed into that of the modern Western gentleman in suit and tie—tall and muscular with a fashionable short Western haircut. Advertisements of the ideal new modern man "suggest the desirability of a visibly robust male body, perhaps a new, alien, yet 'modern' and ideal symbol for the urban male."[20] This virile new male is illustrated by Chan's swimmer of the Canton Disco, dressed in the latest swimwear with a fashionable short haircut.

As well as fashion and body image, the advertisements in pictorial magazines utilized by Chan were for a range of Western consumer goods—from soaps to electric and gas cooking equipment, cameras, phonographs, and fountain pens. The calendar poster also was developed as a form of advertising modernity to promote Western goods in the early twentieth century, chiefly by British and American tobacco, medical, cosmetic, textile, and oil companies.

18 V. Kit-yiu Ho, "The Limits of Hatred: Popular Attitudes towards the West in Republican Canton," *East Asian History* 2 (December 1991): 91.

19 D. Clarke, *Hong Kong Art: Culture and Decolonization* (Durham, NC: Duke University Press, 2002), 186.

20 V. Kit-yiu Ho, "The Limits of Hatred: Popular Attitudes towards the West in Republican Canton," 92.

Shanghai modernism thus was linked to global capitalism, adapting to local conditions via processes of selection and transference—the calendar posters typically combined elements of traditional Chinese painting with modern design. Lee suggests that traditional visual styles were used to "tone down" the foreign nature of the products.[21] Thus, while traditions were disappearing in modern Shanghai due to rapid modernization, traditional Chineseness became embodied in a style that could be used in a modern advertising format to make alien products seem familiar. In her analysis of Shanghai's "Butterfly" fiction of the same period, Rey Chow argues that traditionalism was created by producing a traditional "aura."[22] She notes that this Shanghai-style new "aura" of native culture later flourished in overseas Chinese markets, particularly Hong Kong:

> With the "exiled" Chinese, the marketable quality of "tradition" has long been blended with a pragmatism that justifies modernized life-styles *and* Euro-American living standards."[23]

Chan's Shanghai-modern revival suggests many parallels between the two periods, particularly Shanghai's semicolonial adoption and adaptation of modernism, and Hong Kong's colonial adoption and adaptation of postmodernism. In the 1990s, Shanghai-modern imagery was reframed by Chan and applied to consumer objects in a second-order nostalgia for an earlier period of both Chinese modernity and global capitalism. It also reinforces a narrative of Chinese commercial culture in which Hong Kong is seen as the inheritor of Shanghai's position as a cosmopolitan and capitalist Asian metropolis. This is nostalgia's continuity in the face of discontinuity—the threat that, first, such commercial culture may not continue after 1997 and, secondly, with China gradually opening up to world markets, Hong Kong's unique position as mediator between China and the West may be lost.

Shanghai Tang: Branding Chineseness

David Tang, founder of the exclusive China Club and fashion house Shanghai Tang, is a similar though more flamboyant cultural entrepreneur than Alan Chan. Like Chan's designs, Tang's aesthetic involves recycling images from prewar Shanghai, but his range of references is even more eclectic, taking in Maoist and Qing dynasty nostalgia as well. Schooled in Britain from the age of thirteen, Tang studied philosophy and law at London University. A contemporary "dandy," famous for his upper-class English accent, love of Cuban cigars, and wide-reaching social network, Tang noted in an interview that he was "shocked China wasn't marketed to an upscale audience before."[24] Besides the China Club and Shanghai Tang, Tang also is involved in various other businesses including the Hong Kong art gallery Hanart TZ, well known for its promotion of mainland Chinese avant-garde art of the 1980s and 1990s. He described himself

21 L. Ou-Fan Lee, *Shanghai Modern: The Flowering of a New Urban Culture in China, 1930–1945*, 77.

22 R. Chow, *Woman and Chinese Modernity: The Politics of Reading between the West and East* (Minneapolis: University of Minnesota Press, 1991), 38.

23 Ibid., 83.

24 L. Skov, "Fashion-Nation: A Japanese Globalization Experience and a Hong Kong Dilemma" in *Re-Orienting Fashion: The Globalization of Asian Dress*, S. Niessen, A. M. Leshkowich, and C. Jones, eds. (London: Berg, 2003), 230.

in a 1997 interview as a contemporary cultural broker between China and the West.[25]

Tang's first major cultural project, the exclusive China Club, opened in 1991 on the top floor of Hong Kong's old Bank of China building. The club, designed in a Shanghai-modern style, included a dining room, bar, smoking room (particularly for cigars), and library filled with rare books. The walls were filled with a variety of Chinese cultural references—from kitsch Maoist posters and art to contemporary avant-garde mainland art including Wang Guangyi and Yu Youhan's playful appropriation of Maoist propaganda. Tang's use of Shanghai-modern nostalgia was expanded to include the now-deflated seriousness of Maoist propaganda, appealing to Hong Kong's political and business elite as kitsch.

Tang's other significant cultural venture, the upmarket department store Shanghai Tang, sought to recreate the glamorous decadence of 1930s Shanghai. The store features not only men's, women's, and children's clothes; but also shoes, accessories, and home furnishings including cushions, photo frames, towels, and teapots. Readymade clothes primarily are variations on traditional Chinese clothing in bright colors and patterns in a variety of luxury fabrics such as silk, leather, suede, and cashmere, finished with fine detailing including the ubiquitous Chinese "frog" clasps or knot buttons. The store also offers an "Imperial Tailors" service, which "revives the diminishing art of Chinese haute couture" via a team of "traditional Shanghaiese tailors," some of whom fled Shanghai during the Cultural Revolution to settle in Hong Kong.[26] The tailoring service offers unique hand-cut and handsewn, made-to-measure fashion in luxurious materials. The flagship store in Hong Kong's Central district opened in 1994, and global expansion began in 1997 with a store on New York's fashionable Madison Avenue (closed two years later, but subsequently reopened nearby), followed by stores in Singapore, Shanghai, Beijing, London, Bangkok, Honolulu, and Paris,

Figure 7
Shanghai Tang, interior of Pedder Street store. Permission of German Elkin-Kobahidze.

25 O. Schell, "David Tang: Chinese Puzzle" in *Cigar Aficionado* (July-August 1997) (Accessed online August 6, 2006 at: www.cigaraficionado.com/Cigar/CA_Archives/CA_Show_Article/0,2322,527,00.html).

26 Shanghai Tang promotional brochure, "Imperial Tailors" (2003): unpaginated.

Figure 8
Shanghai Tang, logo. Permission of German Elkin-Kobahidze.

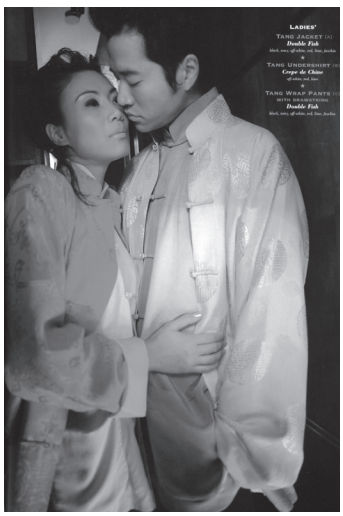


Figure 9
Shanghai Tang, Tang Jackets, male and female versions. Permission of German Elkin-Kobahidze.

as well as two new stores in Hong Kong in the Peninsular Hotel and Hong Kong International Airport.[27] Riding fashion's "Asian wave" of the 1990s, the New York store's opening generated international celebrity interest, with fashion icons such as Diana, Princess of Wales, and various Hollywood celebrities photographed wearing Shanghai Tang.

Shanghai Tang's design aesthetic is all-embracing, extending from the store's interior to the staff uniforms, distinctive packaging, and stationery. The flagship Pedder St. store (Figure 7) includes not only recreation Shanghai art deco furniture, but also details such as reproductions of two stained-glass panels from Shanghai's famous luxury hotel of the 1930s, the Cathay Hotel. Even the clothing label, "Shanghai Tang: Made by Chinese," and the logo follow the same aesthetic. The logo features a pink line drawing of the Pedder St. building on a lime-green background. Stylized Chinese characters ("Shanghai Tang") in yellow with pink outlines encircle the building's top, while below it on a separate banner are the English words "Shanghai Tang" in lime green on a purple background surrounded by five yellow stars (Figure 8). Like the clothes, the logo appears on bags, stationery, clothing labels, and brochures in variations of the signature Shanghai Tang color scheme of purple, bright-yellow, lime-green, and pink.

Although design references from prewar Shanghai dominate, Shanghai Tang also recycles designs from imperial and Maoist China in what Lise Skov describes as "a pastiche-like appreciation of the Chinese past."[28] The "Tang Jacket," for example, is derived from a combination of a late Qing Manchu official jacket and the Ma Hwa hip-length jacket (Figure 9). Featuring low collars and central Chinese "frog" clasps in a range of patterned fabrics including silk, cotton, and linen, both male and female versions also are available in various colors including lime-green, orange, fuchsia, and red. In Tang's nostalgic Chinese fashion grab bag, Mandarin collars lose their associations with conservative Confucianism, Mao suits lose their political symbolism and no longer suggest the Cultural Revolution's authoritarian discipline, and "coolie" pants lose their connection to indentured labor. The Maoist and Communist party references also include military jackets, a liberal sprinkling of red stars on promotional material and clothing, and accessories such as the "Waving Mao" and "Waving Deng" watches. These garments, effaced of their practical significance and political and economic relevance, easily become stylized Chinese exoticism for an elite global market.

Shanghai Tang can be seen as a Chinese version of Ralph Lauren's Polo brand that recycled nostalgic styles from American "history" in the 1970s and 1980s. Lauren based his collections on Hollywood-filtered American fantasies including mythical figures such as the pioneer, the cowboy, the Indian, and the British aristocratic. His flagship store in Manhattan, Rhinelander

27 At the time of writing (June 2007), there were more than twenty stores worldwide, with plans for future expansion.

28 L. Skov, "Fashion-Nation: A Japanese Globalization Experience and a Hong Kong Dilemma," 230.

Mansion, provided a theatrical staging for nouveau riche American aspirations—stately English aristocratic room "sets" in dark wood and finished with family portraits complete the fantasy of tradition for a newly wealthy clientele who have none. Lauren presents a pastiche of American nostalgic styles, reflecting a yearning for tradition, stability, and history in a rapidly changing society. Shanghai Tang produces a similar nostalgic "stylism," with similar theatrical set interiors suggesting that, while the content they sell (Chineseness) is "local," the forms and marketing are imported. What differentiates the two brands is that, unlike Tang, both Lauren's designs and his public persona are imbued with an aura of authenticity and sincerity at odds with Tang's parody and playfulness. Lauren's styles, while on the one hand particularly American, on the other seem to have crossed cultural boundaries with ease to become part of a global fashion language. While the global appeal of Lauren's clothes can be explained by the postwar spread of American popular culture, particularly Hollywood cinema, Shanghai Tang's appeal is less obvious.[29]

The global appeal of Shanghai Tang's kitsch design mix may be explained in terms of its debt to a particularly Western cinematic vision of China. Their "Kung Fu" pants and shirts, for example, evoke Bruce Lee films, while the tightfitting cheongsams are familiar to Westerners from *The World of Suzie Wong* (1960) or, more recently, Wong Kar-Wai's nostalgic cheongsam homage, *In the Mood for Love* (2000). Shanghai Tang's peasant clothing references evoke the costume dramas of fifth-generation historical films by directors such as Zhang Yimou and Chen Kaige. Thus, it was no coincidence that Shanghai Tang's promotional "face" during the late 1990s was the mainland Chinese actress Gong Li, best known for her lead roles in many of Zhang Yimou's nostalgic films. As a period actor adorned in sumptuous costumes—from the imperial China of *Red Sorghum* (1987) and *Raise the Red Lantern* (1992), to the decadence of prewar Shanghai in *Shanghai Triad* (1995)—Gong Li has been associated with several Chinese historical periods and, for a Western art house cinema audience, she was *the* face of Chinese nostalgic cinema during the 1990s.

As a local phenomenon, Shanghai Tang's statement of intent reveals the store's position within Hong Kong's stereotypical role as the conduit between East and West:

> Shanghai Tang sets out to create the first global Chinese lifestyle brand by revitalizing Chinese designs—interweaving traditional Chinese culture with the dynamism of the twenty-first century. Thus, resulting in a vibrant fusion of "East Meets West."[30]

A specific example is Shanghai Tang's "Pagoda Print Qi Pao" (2003), a sleeveless, tight-fitting, lime-green dress with hot-pink trimming (Figure 10). Available in silk or cotton, the green fabric is printed

Figure 10
Shangai Tang, Pagoda Print Qi Pao, 2003.
Permission of German Elkin-Kobahidze.

29 While the longing for tradition also may play a part in Shanghai Tang's *local* appeal, according to Hazel Clark, the Pedder St. store's customers for the Imperial Tailoring service comprise 40 percent local expatriates, 30 percent local Chinese, 25 percent Western tourists, and 5 percent Japanese tourists, suggesting that, even in Hong Kong, the local Chinese audience is not the primary one. See H. Clark, "The Cheung Sam: Issues of Fashion and Cultural Identity" in V. Steele and J. S. Major, *China Chic: East Meets West* (New Haven, CT: Yale University Press, 1999), 163. This emphasis on expatriates and tourists is further confirmed by their recent positioning in Hong Kong's International Airport and the Peninsular Hotel.

30 From the Shanghai Tang Website: www.shanghaitang.com.

with a white "pagoda print" reminiscent of eighteenth-century Chinosierie patterns, which were used to decorate Chinese exports from ceramics to furniture fabrics. Both the pattern's history and the dress's form are complex. According to Hazel Clark, the tight-fitted qi pao, or cheongsam, came to signify Chinese (and not necessarily Western) modernity in the 1920s and '30s, while its association with calendar posters, makeup, and art deco interiors made it a symbol of Western decadence after 1949. In the 1950s, the cheongsam was associated specifically with Hong Kong, particularly with the popularity of *The World of Suzie Wong*, but by the late 1960s its handmade process proved too expensive, and it was replaced by imported ready-to-wear fashions such as the miniskirt. In Hong Kong in the 1960s:

> Foreign goods and culture were desirable as they connoted social progress, informed taste, and elite style. The cheongsam, by contrast, appeared too old-fashioned and too obviously "Chinese," especially for a younger generation who wished to be seen as "modern."[31]

In contrast then, Hong Kong in the 1990s saw a revival of the cheongsam in the form of an off-the-shelf, colorful, and patterned symbol that could function both nostalgically for local consumers and as Chinese exotica for expatriates or tourists.

Shanghai Tang's global expansion in the late 1990s highlights David Tang's aim of selling Chineseness to a global market:

> I thought it was crazy that there wasn't a recognized or respected Chinese brand on the market … "Made in China" had the bad connotation of poor quality and tackiness. But I knew China had the capacity to produce the best clothes on the market, because they were already making clothes for famous Western brands.[32]

And following this logic, mainland Chinese workers manufacture the bulk of Shanghai Tang's ready-to-wear line, while a handful of Shanghai tailors custom-craft fashions in Hong Kong. However, despite the Chinese rhetoric, Shanghai Tang was taken over in 2001 by the Swiss-based luxury brands conglomerate Richemont, whose other brands include Cartier, Montblanc, Piaget, and Alfred Dunhill. The latter collection is far from Chinese and, while David Tang remains the company's spokesman, current CEO Raphael le Masne de Chermont and creative director Joanne Ooi are not locals. Nor indeed are most of the other head designers, who were trained overseas, primarily at Central St. Martin's College of Art and Design in London. While mainland Chinese provide the labor, the design, branding, and marketing is dominated by Western-educated designers who produce Chinese exotica for a global market.

While known for promoting a playful Orientalist position, Shanghai Tang recently pursued a slightly different direction under

31 See H. Clark, "The Cheung Sam: Issues of Fashion and Cultural Identity."

32 J. Meili Lau, "Recasting Chinoiserie as Modern-Day Chic," *International Herald Tribune* (online edition, September 17, 1997, accessed August 6, 2006 at: www.iht.com/IHT/SR/091797/sr091797e.html.)

creative director Joanne Ooi. From 2003, she initiated the idea of Chinese-themed collections: the first in autumn/winter 2003 entitled "Miao Hinterland." Drawing inspiration from traditional dress from southern Chinese ethnic minorities, particularly their embroidered patterns and silver ornaments, this collection typifies a type of "internal Orientalism," whereby living Chinese minority culture is appropriated and exoticized.

Losing its humorous pop cultural edge, in this collection, Shanghai Tang has resorted to repackaging clothing and functional objects of some of the poorest and most disadvantaged Chinese ethnic groups for a particular global market nostalgic for "authentic" (that is, premodern) native culture.[33]

Globalizing Chinese Nostalgia

In the lead up to the 1997 handover, the nostalgia of Chan's or Shanghai Tang's designer goods helped construct a particular Hong Kong identity that was opposed to the conformity of communist China. While their use of pastiche and appropriation can be seen in the light of international postmodernism, it is important to note that not only were their references specifically local, but these techniques also were key design techniques in 1920s and 1930s Shanghai design and advertising; with imitations and adaptations of modern Western styles and processes common. Their work thus can be seen as a continuation of the local processes of cultural transfer typical of eighteenth-century Canton, 1920s and 1930s Shanghai, and early twentieth-century Hong Kong. In the anxious years preceding the mainland's reclamation of the city, Hong Kong thus is identified with the particular historical narratives of South China's port cities and their connection to global trade and capitalism.

In this context, Shanghai's romance and glamorous decadence, and Canton's commercial culture, could be seen in opposition to the mainland's collective expressions exemplified by the Cultural Revolution (and, more recently, the 1989 Tiananmen Square massacre). However, even imagery from the Cultural Revolution eventually was adapted by Chan and Shanghai Tang, and marketed as luxurious kitsch.[34] This suggests that, while Hong Kong's pre-handover nostalgia fever may have provided the fertile ground for such designers, their flowering continued in a global context beyond 1997. If the pre-handover condition of Chan's and Tang's work can be perceived as defining possible Hong Kong identities via nostalgic appeal to Shanghai's interwar culture, the post-handover condition would seem to demand a different perception: by the early twenty-first century, selling Chineseness was becoming extremely profitable. While the 1980s saw the emergence of high-end Japanese fashion brands including Issey Miyake, Comme des Garçons, and Yohji Yamamoto—all in one sense or another selling "Japaneseness"—in the 1990s, Hong Kong emerged as the launching pad for the construction and distribution of brands such

33 The Shanghai Tang Website provided the details of this collection: "Taking its inspiration from the traditional clothing of ethnic minority tribes of Southern China. The Miao, the Yao, and the Dai are a few of the disparate tribes, residing in Guizhou and Yunnan provinces, which inspired the fall collection. Highlights of the collection include the black dupioni silk coat embroidered with cloud pattern and worn with fringed red cloud scarf, the denim coat trimmed with ribbon and sequins with welt seams, fringed velvet qi pao with asymmetrical hem, and the peony-embroidered, three-quarter silk coat. In the tradition of the Miao style, various outfits were adorned with delicately made antique silver ornaments." (Accessed online November 2003 at: www.shanghaitang.com.)

34 The general 1990s Mao revival in mainland China and Hong Kong is well documented in G. Barmé, *Shades of Mao: The Posthumous Cult of the Great Leader* (London: M. E. Sharpe, 1996).

as Alan Chan and Shanghai Tang, similarly selling "Chineseness" in the global cultural economy.

Although the initial stage of Hong Kong's design nostalgia can be associated with handover anxieties, both Chan and Shanghai Tang expanded in the years after the handover both in new products lines and in their international reach. Chan's 1999 packaging for Kee Gift biscuits and pastries, for example, comprised tins and bags decorated with collages of old postcards and paintings from colonial Hong Kong. In the same year, Alan Chan Creations produced a new line of mouse pads featuring Shanghai calendar girls and advertising collages. His international distribution in the twenty-first century expanded, particularly with the creation of a Website for online sales. Similarly, Shanghai Tang's nostalgic project has expanded globally since the handover, with an online sales Website in addition to projected new stores opening worldwide in the near future.

In the global context, Arjun Appardurai argues that generalized nostalgia has become a significant trend in contemporary global culture:

> Rummaging through history has become a standard technique of advertising, especially of visual and electronic ads, as a way to draw on the genuine nostalgia or age-groups for pasts they actually know through other experiences; but also as a way to underline the inherent ephemerality of the present. Catalogs that exploit the colonial experience for merchandising purposes are an excellent example of this technique. …Rather than expecting the consumer to supply memories while the merchandiser supplies the lubricant of nostalgia, now the viewer need only bring the faculty of nostalgia to an image that will supply the memory of a loss he or she has never suffered. This relationship might be called armchair nostalgia, nostalgia without lived experience or collective historical memory.[35]

The "armchair nostalgia" experienced by the tourist or the cosmopolitan expatriate is separated by Appadurai from "genuine" (personally experienced) nostalgia which might be experienced by Hong Kong's older generation. However, the latter are no longer the primary target market for either Shanghai Tang's or Chan's designs (if, indeed, they ever were). Their designer nostalgia, comprised of stylized and decontextualized fragments, evokes a safely depoliticized past—a nostalgia common to postmodern cultural production in general as, for example, Fredric Jameson argues with regard to film.[36] While both Chan's and Shanghai Tang's most popular "lost object of desire" was prewar Shanghai, by simultaneously evoking modern Shanghai, the Maoist era, Qing dynasty China, and colonial Hong Kong, they present mutually conflicting historical narratives for the "armchair nostalgia" enthusiast, creating a Chinese historical pastiche invested with the aura of tradition.

35 A. Appadurai, *Modernity at Large: Cultural Dimensions of Globalization* (Minneapolis: University of Minnesota Press, 1996), 78.

36 See F. Jameson, *Postmodernism, Or the Cultural Logic of Late Capitalism* (Durham, NC: Duke University Press, 1991), 19.

Science's "New Garb": Aesthetic and Cultural Implications of Redesign in a Cold War Context[1]

Michael J. Golec

New

On January 9, 1958, President Dwight D. Eisenhower delivered his State of the Union Address to the American people. Written in great part as a response to the Soviet Union's October 1957 launch of Sputnik, Eisenhower's speech acknowledged what he and many Americans perceived as a realignment of the world's political and geographic boundaries. Evaluating this astounding turn of events, Eisenhower observed, "Every human activity is pressed into service as a weapon of expansion. Trade, economic development, military power, arts, sciences, education, the whole world of ideas—all are harnessed to this same chariot of expansion." Referring to the organizing efforts of the Soviets, he continued, "The Soviets are, in short, waging total cold war."[2] In order to confront the specter of cold war, Eisenhower proposed that the United States would have to put the sciences in service to trade, economic development, and the military. The President concluded by observing: "The only answer to a regime that wages total cold war is to wage total peace. This means bringing to bear every asset of our personal and national lives upon the task of building the conditions in which security and peace can grow."[3] On the road to peace, science and science education were two especially important areas that Eisenhower earmarked for increased government funding.

One year later, in the January 1959 issue of *Science*, Special Assistant to the President for Science and Technology James Killian Jr. reported, "He [Dwight D. Eisenhower] emphasized the importance of strengthening science education and of bringing our overall scientific and technological effort up to peak performance."[4] This was, without doubt, good news for scientists and scientific research. Killian concluded: "As a result, the Science Foundation has been able to increase its support of basic research and expand its programs for science teacher training and other efforts contributing to the quality of science education."[5]

Killian's report was well received by the readers of *Science* and its publisher. Yet, in spite of a perceived threat from the Soviets, there were members of the scientific community and the American public who were deeply skeptical about the underlying motivations for expanding the role of science in the United States. Talk of a

1 I am greatly indebted to my colleague Ann Sobiech-Munson. Her willingness to read through an early draft of this article and to offer comments helped to further extend my thoughts. Part of the research for this article was funded by a grant from the Bioethics Program, Iowa State University, and by a 2006 postdoctoral fellowship at Dartmouth College. A version of this article entitled "Visual Style and Forms of *Science* in the Cold War" is forthcoming in *Visible Culture: Visual Narrative and Design Artifacts* Leslie Atzmon, ed. (Parlor Press). All efforts were made to contact the appropriate parties and to request permission to reproduce images appearing in this article.

2 Dwight D. Eisenhower, *State of the Union, 1958*, January 9, 1958; cited January 16, 2006, and available from: www.ku.edu/carrie/docs/texts/dde1958.htm.

3 Ibid.

4 James R. Killian, "Science and Public Policy," *Science* 129:3342 (January 16, 1959): 130. Prior to his post in the Eisenhower Administration, Killian had been president of the Massachusetts Institute of Technology between 1949 and 1959. Before that, he was editor of MIT's alumni journal *Technology Review* from 1930 to 1939.

5 Ibid.

more secure and peaceful society through science was countered, as Killian observed, by complaints that science only contributes to the "convenience and comfort of life, and not to its quality."[6] Killian countered such pessimism with the claim that "[s]cience has had a major part to play in shaping [a] basic American faith in creative change and improvement."[7] He continued, "My purpose is to stress the importance of those aspects of science which enhance the quality of our society; which encourage individuality in the midst of standardization; which enhance man's excellence and dignity as well as his productivity."[8] Of course, the doubts raised by critics of the "better life through science" pitch expressed a deep anxiety about the expanded role of science and its adverse effect on culture: surely, human autonomy was threatened by the homogenizing tendencies of the scientization of culture. Killian pulled no punches in his response.[9] Exploiting the mythos of manifest destiny, he asserted that, "If research is to flourish, these traditional American beliefs in the validity of progress become increasingly important."[10]

As if in response to a newfound value for science in American culture, the editorial board of *Science* voted that same year to redesign the journal. The decision resulted in the public circulation of a more appealing image of science. Yet, accounts of the "paratextual" alteration did not acknowledge the timeliness of a new direction for science research and funding in the United States.[11]

In his editorial for the October 2, 1959, issue of *Science*, Graham DuShane introduced the redesign of the journal to its readers. (Figure 1) Entitled "New Garb," the text explained the circumstances and decisions that led up to the new design, and described what readers could expect now that changes had been made. In addition to the increase in the size of individual copies (48 pages to 64 pages) and the rise in advertising placements, DuShane commented, "The most immediately obvious change is the cover."[12] The introduction of a heavy stock, separate cover resulted from two innovations that addressed the reader's interest. The first innovation was that the American Association for the Advancement of Science (AAAS) now could mail the journal to subscribers without the additional process and expense of wrapping and folding (which previously was required with the old self-cover). The second innovation would, in DuShane's words, "permit us to carry cover pictures of subjects of scientific interest."[13] This was the greater attraction of the two for the subscriber. The new photo-cover required that the former display of the contents on the old cover move to the third inside page, a location that would remain for easy access, DuShane promised, in subsequent issues. This shift from text to image was a crucial editorial modification: it was a refashioning of the cover from the communication of the journal's contents to a far less data-directed profile. As DuShane further clarified, "Some of these [images] we will draw from articles that we are publishing, but the great majority will have come from other sources."[14] While all of

6 Ibid., 133.

7 Ibid.

8 Ibid., 136.

9 Killian did not cite particular critics. The validity of "better life through science," however, was sharply criticized by Daniel Boorstin in *The Image: A Guide to Pseudo-Events in America* (New York: Atheneum, 1971 [1960]).

10 James R. Killian, "Science and Public Policy," 136. A decade earlier, Harlow Shapley, president of the AAAS, criticized the "evil" phrase "manifest destiny" in Harlow Shapely, "Why Amend the Golden Rule?" *American Scholar* 17 (Spring 1948): 138. As Jessica Wang explains, the AAAS was not always invested in cold war ideology. Shapley's "internationalism" was one such example of progressive leadership of the AAAS. See Jessica Wang, *American Science in an Age of Anxiety: Scientists, Anticommunism, and the Cold War* (Chapel Hill: University of North Carolina Press, 1999), 122–23.

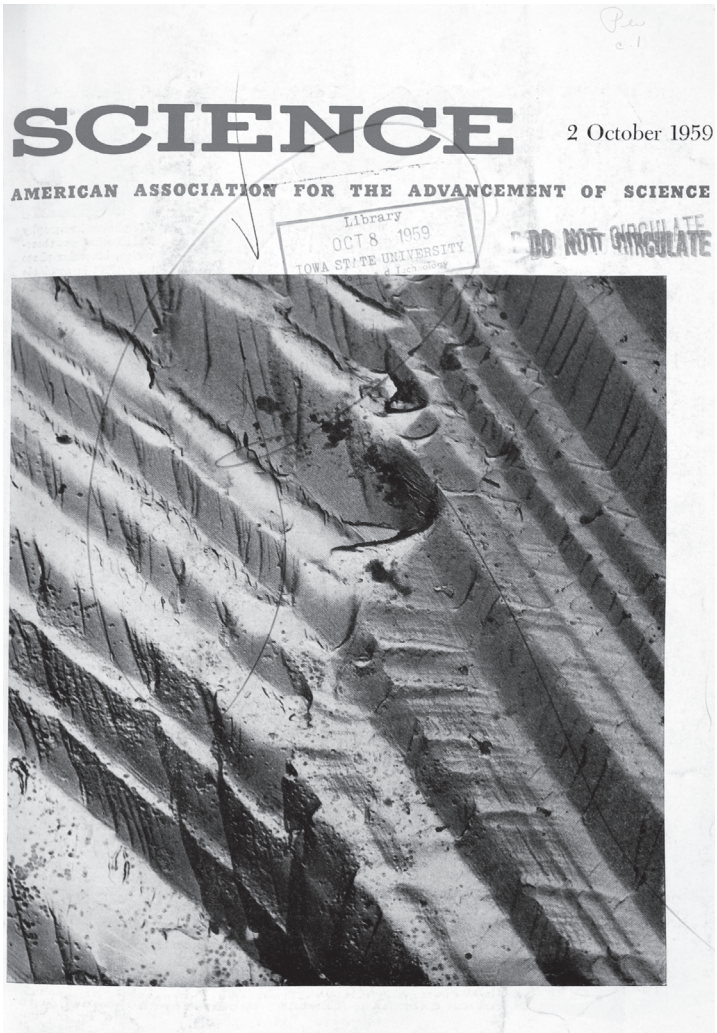
11 By "paratextual," I mean the graphic design devices and publishing conventions that constitute the mediation of image and text in the form of a newspaper, magazine, catalogue, book, poster, brochure, or Website to an audience. Paratextual elements encompass every aspect of print media that comprises its delivery to and reception by an audience. "Paratext" is the material-visual thing on display in the bookstore, shelved in the supermarket, on the computer desktop, or open in a reader-viewer's hands. See Gerard Genette, *Paratexts: Thresholds of Interpretation* (Cambridge: University of Cambridge Press, 1997).

12 Graham DuShane, "New Garb," *Science* (October 2, 1959): 829.

13 Ibid.

14 Ibid.

Figure 1
Cover of *Science* October 2, 1959. Reprinted with permission from AAAS.



the images reproduced on the "new" cover of *Science* were scientific in nature, more often than not, their origin from "other sources" left the cover of *Science* incidental to its contents.

Perhaps this is the reason why DuShane chose to refer to the redesign as "new garb," meaning an external wrapping of a distinctive or elegant sort, and implying grace and style of presentation. The decorum of new introductions and reacquaintence in the editorial was, however, interrupted by a seemingly unusual caveat. As a way of accounting for what some avid readers—especially those from within the scientific community—may have seen as a frivolous alteration to a beloved organ of the AAAS, DuShane coyly confessed, "We feel something like an elderly lady (after all, we were born in 1883) who has ventured to appear in a somewhat more daring gown than has been her custom."[15] From his vague admission, we can take the decision of the editorial board's adoption of a "new garb" for the journal as an attempt to revitalize the somewhat stiff delivery of traditional approaches to science reporting and research. "Like such

15 Ibid.

a lady," he continued, "we hope our new garb meets with favor; unlike her we won't mind sharp and constructive criticism."[16]

It is likely that, when writing for a primarily male audience in the late 1950s, DuShane's odd metaphors of lady and garb connoted grace and economy of means. The new, streamlined body of the journal, however intrepid, required less effort on the part of the reader, his attention easily directed toward the cover's bold image. In orthodox modernist terms, the use of photo-reproductions on the cover of *Science* more efficiently and immediately conveyed scientific information when compared to the old-style display of contents on past covers. Certainly, the old covers suited the scientific community, but were less attractive to the lay reader. Hence, the metaphor of daring female clothing to describe the new direction of the magazine, which signified its intended attention-getting purpose.[17]

While DuShane attributed the aesthetic change to the increase in the size of the journal, other events coincided with the redesign. These events linked the aesthetic turn of *Science*—from text to image—with the optimism of scientific progress and the urgency of cold war politics in the late 1950s.

I wish to position the 1959 redesign of *Science* within the context of the flourishing of research and an unwavering belief in progress. On the one hand, *Science's* "new garb," as DuShane referred to the change, responded to new initiatives and increased funding for scientific research. Such a response was an investment in the visual and aesthetic perspicuity of graphic design in communicating scientific discovery and knowledge. On the other hand, the aesthetic update of *Science* existed within an intermediate zone as an empirical trace of underlying realities exposed by new technologies of visualization and as signs of cold war ideology. In this, as I will argue below, images reproduced on the covers of the journal introduced dressed-up dreams of a future utopia blessed by scientific knowledge to the readers of *Science*. In its abstract, dream-like imagery, the newly refashioned journal deflected a rising skepticism and distracted skeptics who claimed that, like the covers, science was less invested in "truth" than in instrumental effectiveness. The beguiling covers masked the instrumentality of the cover design, its images, and the work that they were intended to accomplish. After 1959, the graphic design of the covers of *Science* exemplified what one critic characterized as science's need for public support, and its having to "thrive on publicity."[18]

A Science of Effect and Scientific Progress

In the pre-cold war years (dating back to 1883), a *Science* cover merely publicized science. Its enumeration of the contents of each issue of the journal was an accounting of scientific progress—both a report and a balance sheet—through the publication of research. The covers were introductions to scientific discourses that constituted ongoing debates within multiple fields of research and inquiry. In

16 Ibid.

17 A great deal can be said about DuShane's gendering of the journal. In fact, this issue alone is material for another article. For now and for the sake of brevity, I will suggest that DuShane's metaphor was reminiscent of a longstanding allegory for the enticing nature of science, dating back to the early modern period of Western scientific inquiry. Just as was the case in the 1950s in the United States, there existed a Neoplatonic tradition of portraying science as a woman. As Londa Scheibinger has explained, female science was the "natural" counterpart to the male scientist. Gendered female, science both inspired and puzzled the male scientist: thus woman as the icon of science was symbolic of scientific pursuit. DuShane's metaphorical image of the "elderly lady" daringly dressed to impress was in keeping with this tradition. Images produced during this period underscored the erotics of this tradition of scientific iconography, because the pursuit of scientific inquiry was akin to the pursuit of women. The images on the new covers were intended to beguile readers of *Science*. From this gender perspective, it was possible to conclude from DuShane's editorial that—wanting *Science* to stay in the game, so to speak—its "new garb" enhanced the appeal of the old girl, and would result in a broader audience for the journal. See Londa L. Schiebinger, *The Mind Has No Sex?: Women in the Origins of Modern Science* (Cambridge, MA: Harvard University Press, 1989), 119.

18 Alvin M. Weinberg, "Impact of Large-scale Science on the United States," *Science* (July 2, 1961): 161.

other words, *Science* made science public. Authors listed on the cover were "publicists" in the Kantian sense of speaking to an interested public capable of reasoned debate. While the old covers were no doubt concerned with impacting public opinion, their focus was on the rational discourses that constituted the practice of making scientific research available through the journal proper. In this context, *Science* was a medium for the promotion and public use of scientific research. A pre-cold war reader could expect to engage in the rigors of scientific research publicized on the old covers of *Science* as the contents of the journal.

From October 1959 on, the cover of *Science* was a means of stimulating desire in keeping with the science of effects used in late twentieth-century marketing and advertising. (Desire was the meaning and function of DuShane's metaphor of the "daring gown.") Within a cold war context, the new promotional realities of the journal were such that its cover was an instrument of publicity. The use of images often unrelated to the contents of the journal shifted its emphasis from the promotion and public use of scientific research to the promotion of science *as such*. Where *Science* in the pre-cold war context was a medium for consensus building, it was now, as Michel Foucault might say, an effect of power that operated on both a scientific public and a lay public though the materiality of its new design.[19] Since, as DuShane admitted, most of the cover images would come from sources other than the articles inside, the covers of *Science* were free-floating signifiers disconnected from the specificity of the data represented within. *Science* and its effects were directed toward instilling in the public, broadly speaking, the idea of progress as a legitimate goal for the nation.

Killian's evocation of an American belief in scientific progress was reminiscent of Vannevar Bush's report, *Science the Endless Frontier* (1945). Bush argued that advances in science would result in a panacea for a full range of social ills, economic inequities, and labor strife. To achieve these goals, he wrote, "the flow of new scientific [knowledge] must be both continuous and substantial.[20] Both Bush's and Killian's invocation of the bounty of scientific research as a universal remedy for the crushing enslavement of humankind echoed enlightenment views from Bacon and Descartes. Both enlightenment philosophers believed that humankind had a moral obligation to act on nature, and that those acts could be measured in terms of human progress.[21] Although it had roots in European enlightenment thought, the United States possessed its own special brand of technological and scientific utopianism. Europeans did not envision a future that would be determined by technological and scientific advances.[22] Americans envisioned such a future, not just enhanced but redeemed by technology and science, and as a nation they pursued strategies to make good on this possibility. One way to achieve this goal was for American mass media to reinforce the "invented tradition" of scientific progress by increasing the

19 See interviews published in Michel Foucault and C. Gordon, *Power/Knowledge: Selected Interviews and Other Writings, 1972–1977* (Brighton, Sussex, UK: Harvester Press, 1980).

20 Vannevar Bush, *Science, the Endless Frontier* (Washington, D.C.: United States Office of Scientific Research and Development, 1945), 5. Also see Vannevar Bush, "The Scientific Way," *Technology Review* 49:8 (June 1947): 463–464, 482, 484, 486.

21 On the inheritance of enlightenment rationality and the myth of American progress, see Daniel Sarewitz, *Frontiers of Illusion: Science, Technology, and the Politics of Progress* (Philadelphia: Temple University Press, 1996), 104–5.

22 Howard P. Segal, *Technological Utopianism in American Culture* (Chicago: University of Chicago Press, 1985), 2.

reputation and visibility of science within American culture.[23] As Bush's report insinuated in his paraphrase of Frederick Jackson Turner's observation: "The frontier is the line of most rapid and effective Americanization," science and technology would, under the right political conditions, extend America beyond the continental United States.[24]

Science effected Bush's "flow" of scientific knowledge through the public circulation of its images. It is, then, not by chance that the invented tradition of American progress through scientific research was supported by visual representations of never-before-seen horizons, territories, and trajectories. While Killian's rhetoric echoed a tradition of early enlightenment views of science and progress, his views were supported by already existing visual representations of science in magazines. When photographs were used to document scientific work and data, they were reminiscent of a tradition in the history of photography, allied with the history of science. Indeed, the best case that could possibly be made for public funding of science was a demonstrative one: a case where photographic images literally pictured the facts. The visual rhetoric of photography, as the public understood it, was one of "what you see is what there is." No form of representation suited the goal of advancing science and justifying massive expenditures better than photography. Since the nineteenth century, science has been guided by a belief in the objectivity of photography. An early modernist faith in the veracity of unaided imaging and mechanical reproduction contributed to the formation of an ideology of the nineteenth-century scientific atlas, a paradigm for scientific representation and mechanical documentation of nature.[25] The nineteenth-century atlases were, as Peter Galison and Lorainne Daston have reported, "manifestoes for the new brand of scientific objectivity."[26] In the cold war era, an early modernist belief in the truth-value of photography was transformed into a visual manifesto for scientific progress. In other words, cold war ideology recast the tradition of scientific progress into the marketing of science through the use of photography as a way to promote scientific achievement to the American public.

The shift was based on a political-aesthetic choice rather than on its strictly social value, as I will argue below. At the very least, the use of visual rhetoric to promote science was certainly in keeping with Eisenhower's commitment to funding the sciences, and on increasing spending on science education. While Bush and Killian regarded public and private support of science as having social value, Eisenhower's State of the Union address in 1958 underscored what was at stake politically when the government and, by extension, the public made such a commitment. The decision was institutional and its effects were political. Hence, it was not a choice that the public could have made in determining the future of science. If the public even possessed the collective force to reject Eisenhower and his administration's economic bolstering of science,

23 Eric Hobsbawm defines "invented tradition" to mean "a set of practices, normally governed by overtly or tacitly accepted rules and of a ritual or symbolic nature, which seek to inculcate certain values and norms of behavior by repetition, which automatically implies continuity with the past." Eric Hobsbawm, "Introduction: Inventing Traditions" in *The Invention of Tradition*, E. J. Hobsbawm and T. O. Ranger, eds. (Cambridge and New York: Cambridge University Press, 1983), 1.

24 Frederick Jackson Turner, *The Frontier in American History* (New York: H. Holt and Company, 1920), 4.

25 See Peter Galison and Lorainne Daston, "The Image of Objectivity," *Representations* 40 (1992).

26 Ibid., 81–82.

such power was thwarted by the images that represented science to the public. The covers emphasized aesthetic appreciation first, and scientific knowledge second. However empirical, the abstractions that flowed through *Science* offered no prospect of choice, because their interpretations hinged on specialized knowledge unavailable to the lay public. This is not to say that *Science* did not exemplify scientific advances nor contribute to an expansion of the public's knowledge of the world and beyond. It is to say, however, that the context of cold war ideology situated these covers such that their interpretations were infused with extra scientific detail.

Cover Art?

In October 1959, the U.S. Postal Service delivered new issues of *Science* to its subscribers. The cover of the issue was strikingly different than the cover of any other science journal published in the late 1950s. Unlike traditional science journals, and more like popular magazines, *Science* now sported a cover photo below its masthead. As discussed above, this event coincided with the AAAS's renewed interest in its mission to "advance science" and the government's invigorated commitment to fund science and science education. As a result, the AAAS collaborated with government agencies to promote science to the American public.[27] One of the key initiatives in this effort was the newly redesigned journal.[28]

Science was by no means unique in its use of photography. Prior to October 1959, other magazines such as *Science Illustrated* and *Fortune*, as well as popular magazines including *LIFE*, had responded to the perceived need for the greater visibility of science in the public sphere by using "full bleed" (full-page, no margin) photos of a "space pilot-to-be" testing a safety suit (January 6, 1958) and a photo of a cancer patient undergoing radiation treatment (May 5, 1958) to cite two vivid examples. In both cases, the popular press used photographs of "science in action"—a staged photo op that focused on men and machines—to convey the present and future benefits of research to the public.[29]

Prior to January 1958, the AAAS also published *The Scientific Monthly*, which had used images on its covers since December 1946. Yet it was clear that the monthly did not garner the same prestige that *Science* had. Closer to the popularizing editorial philosophy of *Scientific America*, *The Scientific Monthly* was less focused on specialized knowledge than *Science*, and emphasized general trends over specific discoveries. It had a less distinguished audience than *Science*, appealing to readers on the periphery of the established scientific community rather than to core constituencies. Perhaps it was the case that the AAAS ran the risk of diffusing its audience by offering them two options, where one journal could capture more readers. Potential advertisers were aware of this problem. Why pay for ad space in two journals and double costs, when it would be more cost-effective to maximize visibility in one journal? Indeed, the AAAS

27 Bruce V. Lewenstein, "Shifting Science from People to Programs: AAAS in the Postwar Years" in *The Establishment of Science in America: 150 Years of the American Association for the Advancement of Science* (New Brunswick, NJ: Rutgers University Press, 1999), 199.

28 It is fair to make such a conclusion, since *Science*'s direct competitor in the marketplace of ideas was the British journal *Nature*. The editors of *Nature*, at this time, felt no such pressures to redesign, or repackage, the contents of this prestigious journal. That *Science* was redesigned, while *Nature* was not until January 1974, suggests that there existed a difference in political, cultural, and social factors that determined the public profile of each magazine. The editorial decision to redesign *Science* and use photographs on the covers points us to circumstances that underscore the historical and cultural specificity of the magazine.

29 It was common practice for journalists to dramatize the social, cultural, and economic advantages of science. Popular magazines, such as *American* and *The Saturday Evening Post* exaggerated the contributions that science could make to the standard of living in the United States. See Marcel C. LaFollette, *Making Science Our Own: Public Images of Science, 1910–1955* (Chicago: University of Chicago Press, 1990). In terms of stereotypical images of scientists working, see Bernard Schiele and Daniel Jacobi, "Scientific Imagery and Popularized Imagery: Differences and Similarities in the Photographic Portraits of Scientists," *Social Studies of Science* 19:4 (November 1989): 750.

decided to merge *The Scientific Monthly* and *Science* in late 1958, and then to redesign *Science* in response to dwindling circulation and a lack of new advertising revenue.[30] It also was the case that, with many readers subscribing to just one of the two journals, many scientific papers, reports, and editorials were missing segments of a potential audience. It soon became apparent to the editorial advisory board of the AAAS that it could maximize information distribution and impact by targeting a broader audience with a single journal.

In a letter to the editorial advisory board executive officer of the AAAS and publisher, Dael Wolfe and DuShane wrote, "It seems to us that the interests of the Association and its members, as well as of scientific communication in general, would be better served by a single weekly journal that would combine the best features of both *Science* and *The Scientific Monthly*."[31] At this date, the editors and the board were not convinced that combining the two journals would require a new "look." Before the merging of the two journals took place, several issues were apparent to the editorial board with regard to the form and style of the magazine. Minutes from an editorial meeting in late 1957 stated, "The Board recommended that the combined journal be published under the title *Science* and on the same paper as the present *Science*. *The Scientific Monthly* would be mentioned on the masthead. The Board did not think cover pictures would be necessary."[32] After the merger of the two journals, the editorial staff expressed concern that their efforts were not succeeding in reaching a broader audience than the AAAS had previously reached with *Science* and *The Scientific Monthly*. The Board's disregard for the value of images on the covers of *The Scientific Monthly* was readdressed in regards to *Science* and its future profile. As DuShane reported, "*Science* unquestionably stands well as a scientific magazine and it is probable that such status is dependent primarily upon the quality of the lead articles and reports. We have the problem of maintaining this prestige and at the same time attracting a large audience of readers."[33] DuShane assumed that, to further the interests and the mission of the AAAS—a mission that was enmeshed with the Eisenhower administration's interest in funding the sciences and science education—it was not enough to rely on the quality of the articles. Rather, in addition to editorial excellence, some other element had to be addressed in order to attract a broader readership. He concluded, "[W]e want to make the magazine more readable without detracting from its prestige."[34]

The objective to make the magazine "more readable" was one that required that it adopt a form and style that also would entice a broader range of readers. The final cover photograph for *The Scientific Monthly* had a certain appeal (Figure 2). The deadpan quality of the Balanus-Fouled White Shrimp on the cover was similar to the "found" or "ready-made" images that appeared in French surrealist magazines such as Georges Bataille's *Documents* and André Breton's *Minotaur* from the 1930s. No doubt, straight scientific

30 Lewenstein, "Shifting Science from People to Programs: AAAS in the Postwar Years" 116, 32. While Lewenstein believes that the redesign was primarily for the benefit of the advertisers, questionnaires were circulated among subscribers to evaluate the new covers. This suggests that the editors were interested in the subscribers' reception. No such questionnaire was circulated to advertisers.

31 Letter of Recommendation from Dael Wolfe and Graham DuShane, December 21, 1956, Box R-2-2, Editorial Board and Board of Directors, 1958–1960, American Association for the Advancement of Science, Washington, D.C.

32 Annotated Minutes of the Editorial Board Meeting, October 5, 1957, Box R-2-2, Editorial Board and Board of Directors, 1957, American Association for the Advancement of Science, Washington, D.C.

33 Report to the Board and Agenda for the Meeting, November 1, 1958, Box R-2-2, Editorial Board and Board of Directors, 1957, American Association for the Advancement of Science, Washington, D.C.

34 Ibid.

Figure 2
Cover of *The Scientific Monthly*, December 1957. Reprinted with permission from AAAS.

images were arresting in their representations of unknown realms. The answer to the editor's dilemma was suggested in a memo from Wolfe to DuShane, Joseph Turner, and Robert Ormes; all members of the editorial board. Wolfe observed, "Illustrations are far from being the most important feature of either magazine, but they are a very obvious feature." Although he never put the case in exactly, these terms, Wolfe's observation implied that the goal was to exploit the obvious, much as surrealist photographers had reproduced what Walter Benjamin called "profane illuminations" in their magazines.[35] He commented on the fact that the current incarnation of the magazine resembled a "technical publication" more than did the competitors of *Science*.[36] By October 1959, some of these issues had been addressed in the form of the design and layout of *Science*. In a memo to the AAAS Committee on Publications, DuShane wrote:

> We have shifted from a self-cover to a separate cover on 70-lb. stock and have, in consultation with a designer, planned a new cover. We made it suitable for the display of a black-and-white picture in several possible arrangements

35 Walter Benjamin, "Surrealism: The Last Snapshot of the European Intelligentsia" in *Walter Benjamin: Selected Writings, Volume 2, Part 1, 1927–1930,* Michael W. Jennings, Howard Eiland, and Gary Smith, eds. (Cambridge, MA: The Belknap Press, 1999), 210.

36 Memo from Dael Wolfe to Graham DuShane, Joseph Turner, and Robert Ormes, February 21, 1958, Box R-2-2, Editorial Board and Board of Directors, 1958–1960, American Association for the Advancement of Science, Washington, D.C.

(white frame on all sides, bleed on two sides, bleed on three sides, bleed on right side only). The magazine title had to be designed in heavier type if it was to "carry" the color. We plan to use the same color, "artillery" red, in every issue.[37]

A letter of solicitation for photographs was circulated in order to ensure a "flow of suitable pictures": "We should like the photographs to be of both scientific interest and esthetic quality, and hope to escape from the banal kind of news picture which shows someone delivering a medal or a plaque to someone else, or pictures of buildings and meetings of no particular interest." The letter adds, "To put it more positively, we hope to have photographs of the materials of science, and of interesting scientific instruments and their modes of operation."[38] The preference for images *of* science, rather than science-in-action-type images, gave *Science* a graphic design style that was unique among its peer journals, and that contributed to the public's awareness of the work of science.

Design and editorial policies were put into action with the October 2, 1959, issue, "when the new cover and the new typeface were adopted." In order to judge the magazine's progress towards gaining a wider audience, Wolfe and DuShane circulated a questionnaire about the February 1960 issue. Selected comments from the questionnaire included: "Your cover pictures are excellent" and "The present format represents a good compromise between catholicity, technical rigor, and popular appeal." In summary, DuShane added, "Most of the comments were thoughtful, well-balanced, and constructive. The impression one gets from reading them is that the cover picture and new format are overwhelmingly approved of. Even though no question was directed to this point, many volunteered favorable comments."[39] That the questionnaire never mentioned the new cover treatment, but that the changes were an issue for readers was significant to the goals of the journal and the AAAS. The editorial decision to play up the aesthetic qualities of scientific representation had the visual-rhetorical benefit of increasing the visibility of science within the public sphere.

The rise of images of science on the covers of popular magazines such as *LIFE* in the immediate post-Sputnik-launch years indicates that there was great interest in the visual representation of America's progress on this front. These images were, for the most part, filled with scientists or others in the space program. Their appeal undoubtedly was related to their dramatic effect. These pictures showed the American public their tax dollars at work. *Science* took a very different approach. The magazine showed the actual data that science produced in the lab, through the microscope and telescope, and from x-rays. This was the real *work* of science. Here, the reader was given the data produced by and available to the scientists they observed working in more dramatic representations of science. In this sense, the reader could see himself or herself as a

37 Report on *Science* for the Joint Meeting of the Committee on Publications and the Editorial Board, September 24, 1959, Box R-2-2, Editorial Board and Board of Directors, 1958–1960, American Association for the Advancement of Science, Washington, D.C. There is absolutely no mention of the identity of the designer in any documents pertaining to the redesign of the journal. My thanks to AAAS archivist, Dr. Amy Crumpton for her help in trying to locate such documentation.

38 Letter quoted in ibid.

39 Report on *Science* from Graham DuShane, May 26, 1960, Box R-2-2, Editorial Board 1960, American Association for the Advancement of Science, Washington, D.C.

surrogate for the scientist, thus creating a greater sense of proximity to scientific research. Yet these same images *worked* in another way, in a manner that had less to do with observation and more to do with ideological motivations that promoted scientific progress, ever expanding territories, and endless frontiers.

Abstraction

Where more popular magazines of science used illustrations to convey complex data to readers, *Science* was unique in its preference for and use of images derived from advanced means of optical reproduction. On the one hand, the images were increasingly available with advanced optics and the technological colonization of images, perceptions, and meanings. Invisible micro-territories were more native to advanced imaging technologies precisely because it was the development of surface-penetrating apparatus that revealed unseen worlds to the human eye. On the other hand, these unseen worlds made their way onto the covers of *Science* because, as ostensibly objective representations, they could contend with the criticism of skeptics who could point to the abstractions and the obfuscations of the more common illustrated covers of popular science magazines.

Arthur Lidov's cover for *Fortune* magazine was one example that supported the skeptical view that science imagery was obscure. The cover for the June 1946 "Fundamental Science" issue of *Fortune* showed a vast and almost horizonless desert that framed, among other things, Newton's apple, sine-waves, and a three-dimensional model of magnetic field topology. The overall image was reminiscent of an Yves Tanguy painting, drawing on the visual tropes of uninhabited dreamscapes of orthodox surrealist painting. The unfamiliar territory of science, as it was depicted on the cover, underscored the surreality of the scientific enterprise and its often-puzzling imagery. Lidov's cover pictured science as a symbol-laden terrain that barely resembled experiences of the everyday world that Americans inhabited in the 1940s. Nevertheless, as the art director for *Fortune* Will Burtin knew, the invisible world was meaningful in its structuring of the "day-to-day existence" of many Americans.[40] No doubt, his intention as art director of the special issue was to underscore the extraordinary nature of the ordinary. Rather than convey scientific knowledge, the abstract nature of the diagrams and symbols arranged on the cover's representation of a bleak landscape would inspire awe in the face of scientific knowledge. Meanwhile, the abstractions on the cover signaled an ambivalence that was in striking contrast to the optimistic exuberance of the science in action covers.

During the same period that *Science* made its change, *Scientific American* used illustrations derived from photographic images of scientific data on its covers. But these illustrations were collages of images that were hardly matter-of-fact in their delivery

40 Will Burtin, "Burtin and Upjohn," *Print* 9 (May 1955): 36.

(Figure 3). John Langley Howard's painting-collage cover of lichen for the October 1959 *Scientific American* was one example of an illustration being preferred over a photograph, even when photographic representations were available. Like *Fortune*, the editors and art directors of *Scientific American* chose the illustrative over the photographic. Somehow the illustration softened the blow of scientific discovery. Howard's cover illustration for the popular magazine presented a humanized version of science through the interpretive hand and subjectivity of the artist, rather than a detached version of science documented by the mechanical objectivity of the camera. Howard's cover did not diverge too much from the more common display of science in action in popular magazines and arty collage covers for more specialized audiences by using scientific images that were the result of actual experiments, observations, tests, and other means of data-gathering.

Figure 3
John Langley Howard, cover of *Scientific American*, October 1959. Reproduction of cover is used with permission from Scientific American, Inc.

Howard's collage-inspired cover for *Scientific American* was reminiscent of the covers of magazines for more specialized audiences, such as Will Burtin's design for Upjohn's *Scope*. Beginning in 1941, Burtin took several freelance jobs, including Upjohn's house organ. Applying his knowledge of the world of science and technology to a publication for business that contained articles of interest to employees and customers, Burtin visualized the corporate interests of the pharmaceutical giant. His cover for the newly inaugurated *Scope* demonstrated how designers such as Burtin negotiated the relationship between research in medical science and its impact on humankind. Perhaps the first representation of what would later be known as a "test-tube baby," Burtin attempted to reconcile the clinical and objectifying work of medical research with a belief in the sanctity of human life. Burtin's compelling juxtaposition of a closeup photograph of a hand holding a test tube and an illustration of a cherubic baby is both brilliantly economical and alarmingly perverse. Here the complex play of planes—the black-and-white photograph of a test tube in the foreground, the color baby illustration and the masthead in the middle ground, and the hand in the background—mapped the interplay between science's celebration of life through knowledge and its objectification of life through research technologies. The result was a cover that lacked data specificity while promoting science as an industry for social change.

Were these covers for *Fortune*, *Scientific American*, and *Scope* pictures of the utopian spirit expressed in Bush's *Science, the Endless Frontier* and Killian's report published in *Science* in 1959? Through the use of illustration, the editors and the art directors of these three magazines intended their covers to convey the endless possibilities and social benefits of science. And yet in all three cases, a dark abstraction invaded these images. There existed three reasons why it was near impossible to explain away the lingering doubt embodied by pictures of science and scientific representation:

> **Reason 1:** There was a sense that painting, especially painting inspired by surrealism, allowed for skeptical seepage in the face of the devastating results of science in the dawning of the postwar era. Paintings were understood as screen projections of atomic age anxieties such that postwar image-making was defined as a form of "apocalyptic wall paper."[41]
>
> **Reason 2:** Modernist art in general has been characterized as a radical negation of the world, indicative of "culture in its death throes."[42] In particular, modernist abstract painting took up "skepticism [by] turning the existence of the external world into a problem" for human consideration.[43]
>
> And, **Reason 3:** There has existed a longstanding discourse in science since the development of photography on the

41 See Harold Rosenberg, "The American Action Painters," *Art News* 57 (December 1958): 48.

42 See T. J. Clark, "Clement Greenberg's Theory of Art" in *Pollock and After: The Critical Debate,* Francis Frascina, ed. (New York: Harper & Row, 1985), 50.

43 Stanley Cavell, "The Avoidance of Love: A Reading of King Lear" in *Must We Mean What We Say?: A Book of Essays* (Cambridge: Cambridge University Press, 1969), 323.

> irreducibility of veracity and empirical value in scientific representation. Photomechanical means of reproduction and representation raised questions about the reliability of hand-rendered or aesthetically motivated images.[44]

One way to combat the skepticism directed at technological progress and scientific utopianism was for designers and editors to adopt photography and optical representation as primary modes of scientific representation and communication. Yet photography was by no means a prophylactic for the world-damaging compulsion of skepticism.[45] Skepticism persisted whenever photographs and photomechanical techniques were used to inform the public on science and its benefits to society.

Enigmatic Specificity

The October 2, 1959, issue of *Science* showed an electron micrograph of a fractured quartz crystal. This image was not an artist-rendered interpretation of the complex structure of quartz crystals, but was a scientific image produced in the lab. The image was taken as part of a study of fracture surfaces conducted at the National Bureau of Standards. The new cover of *Science*, with its image of a fractured quartz crystal, was not as mundane or as matter-of-fact to the eyes of an average *Science* reader in the late 1950s as the images that had graced the covers of *The Scientific Monthly*. The new cover image displayed texture and rhythm; its impressive appearance was matched by its inscrutability. The framing of the photograph on the *Science* cover gave the reader the impression that he or she was looking through a lens, peering into a mysterious and desolate world of craters and ridges. This could be an image of a mountainside or of a steep cliff. There was no immediate way of knowing, since the image itself provided no visual context for a proper interpretation of the spectacular view now made available to readers of the journal. And if one were to rely on vision alone, all the visual cues apparent to the reader pointed toward the visible and knowable world of the earth's rough terrain. This image possessed a kind of prosaic visual poetry that drew readers into the picture, but not necessarily into the journal itself.

Yet there was very little if any information in the photo-reproduction on the new cover of *Science* that indicated its context to the reader. What was there to see here? What was this view of? Was the reader looking at something close or far away, and was it something microscopic or telescopic? The cover art easily confused the macro-view with the micro-view. The caption explained:

> Fracture surfaces are of considerable interest in determining the mode of energy dissipation once fracture has been initiated. The crystal was fractured in tension parallel to the basal planes. Replicas were made by the collodion-carbon double-replica technique, with palladium shadowing. The

44 Galison and Daston, "The Image of Objectivity" and Peter Louis Galison, "Judgment against Objectivity" in *Picturing Science, Producing Art,* Caroline A. Jones and Peter Louis Galison, eds. (New York: Routledge, 1998), 327–359.

45 Cavell remarks, in his own style, on the indexical nature of photography: "The reality of a photograph is present to me while I am not present to it; and a world I know, and see, but to which I am nevertheless not present (through no fault of my subjectivity), is a world past." See Stanley Cavell, *The World Viewed: Reflections on the Ontology of Film* (Cambridge, MA: Harvard University Press, 1971), 23.

> picture shows "steps" meeting at an angle which suggests the presence of a boundary between twin domains. Fracture markings, similar to those occurring in many materials, appear along with cleavage planes, which are of particular interest in view of the extremely poor cleavage of quartz. Such planes are less prominent in fractures propagated along the other crystallographic directions.

This information appeared on the inside of the cover, thus delaying the reader's accurate perception of the picture. Regardless of its duration, the delay in accurate perceptions of the cover image extended a horizon of understanding for the interested reader, whether scientist or layperson. The horizon was located not in the picture—no horizon was apparent—but in the long caption that informed the nonspecialist reader and the reader whose research area was not crystallography of what there was to see *in* the image.

The new *Science* cover was enigmatic in its specificity, making descriptions like the one above essential to seeing the image as a micrograph of fractured crystal quartz, rather than seeing it as a photograph of a cleaved mountain range (which it certainly resembled). Of course, a reader could see whatever he might choose to see in its fractured forms. As precise as the micrograph was, however, it's uncertain whether or not the lens was affixed to a microscope or a telescope. Only the caption provided a clue as to how the reader was to view the image. Once the caption was read, the cover snapped into micrographic mode, thus extending human perception into an invisible and uninhabitable world. This forced the reader to see what was intended by the image. And yet, where the decontextualized nature of *The Scientific Monthly* covers lent the images a surrealistic quality, images such as the one that appeared on the October 2 cover of *Science* were visually confusing because the images always were viewed apart from their original context. For all intents and purposes, this was a form of abstraction in which the cover design concealed the source of the representation that resulted in more aesthetics than science. It was only when the caption was considered in relation to the image that the micrograph delivered its data, transporting the reader from the familiar and inhabitable world of mountains or cliffs (the only available source of reference for the uninitiated) to the unfamiliar and remote world of carbon crystals.

The interweaving of vision through human perception and human mimetic faculties results from, what Walter Benjamin observed as, a "gift for seeing similarity is nothing but a rudiment of the once-powerful compulsion to become similar and to behave mimetically."[46] Benjamin saw this mimetic moment as a modern "transformation" of ancient forms of perception; a transformation accelerated by new technologies of representation. In other words, there exists a tendency for perceptions of new forms in science to mimic perceptions of archaic forms in art and religion. These

46 Benjamin, "Surrealism: The Last Snapshot of the European Intelligentsia," 720.

archaic, fossilized forms shine through in immediate perceptions. A subscriber having received the newly redesigned issue of *Science* in October 1959 would have seen an image of a fractured quartz crystal, while simultaneously seeing a prehistoric landscape in its craggy cuts and plates. The coincidence of perception—of seeing the micrograph in the landscape and seeing the landscape in the micrograph—lent pathos to the image.

The two simultaneous perceptions happened within the context of cold war threats of nuclear warfare, where scientific images opened a psychic wound perpetrated by an anxiety about being bombed into the Stone Age. As Peter Hales has observed of the iconic images of mushroom clouds produced by atomic blasts at Hiroshima, Nagasaki, in the South Pacific, and in the Nevada desert of the United States; the horror of nuclear destruction was aestheticized in mass-media representations. According to Hales, the production of an "atomic sublime" as a visual subject for popular consumption was an infusion of visual excess in forms of cloudy abstractions that immunized the American public from the realities of nuclear annihilation.[47] The abstractions that Hales discusses also were present in less obvious instances of the graphic representation of the effects of science and technology. Their massing in the cumulative effects of schema retooled, what Benjamin earlier described as the human apparatus of apperception.[48] A new form of pattern recognition was established, and thus a new critical code compatible with cold war anxiety. In this sense, cold war covers of *Science*, however unintended, exhibited less explicit signs of what Joseph Dewey has described as an "apocalyptic temper" in American culture.[49] The covers of *Science* existed between imminent atomic destruction and technological manifest destiny. In stark contrast to Bush and Killian's belief in science as having only the advancement of knowledge as its goal, the covers of *Science* were graphic means to cope with the unknowable future produced by science. Effecting such a transformation in images and in perceptions had everything to do with the mutability of signification and the framing of perceptions by historical events.

Symbolic Transformation

These newly sequestered images—traveling from lab to sitting room—made unseen worlds visually accessible to readers of *Science* extending their views into new levels of experience in an increasingly contained political sphere.[50] Yet to what extent were systems of worlds revealed by the micrographic and the instruments of the astronomical observatory? What infinite depths were explored in these images? And what inexpressible real presences were rejected by attempts at interpretation? How can we begin to address these questions when a complex set of ideas about science, nature, and the relation of humans to the world are profoundly mutable? The meaning of a science photograph is far from stable. As Georges

47 Peter B. Hales, "The Atomic Sublime," *American Studies* 32:1 (Spring 1991): 5–29. Hales makes the case for aesthetic responses to atomic blasts as unethical denials of the realities of unimaginable pain and suffering; what he characterizes as the "separation of the atomic cloud from its destructive effects" (19). Yet, it is entirely possible that the circulation of beautiful and sublime images of nuclear holocaust were, in no small part, the only possible means to directly confront the ethics of such awe inspiring devastation. One sense of the ethics of transformation (or inversion) has been explored in Hugh Gusterson, "Nuclear War, The Gulf War, and the Disappearing Body," *Journal of Urban and Cultural Studies* 2:1 (1991): 45–55.

48 See Walter Benjamin, "On the Mimetic Faculty" in *Walter Benjamin: Selected Writings, Volume 2, Part 2, 1931–1934,* Howard Eiland, Michael W. Jennings, and Gary Smith, eds. (Cambridge, MA: The Belknap Press of Harvard University Press, 1999).

49 Joseph Dewey, *In a Dark Time: The Apocalyptic Temper in the American Novel of the Nuclear Age* (West Lafayette, IN: Purdue University Press, 1990).

50 On cold war containment, see Paul N. Edwards, *The Closed World: Computers and the Politics of Disclosure in Cold War America* (Cambridge, MA: MIT Press, 1996).

Bataille observed when referring to Karl Blossfeldt's images in his remarkable *Art Forms in Nature*, "One would look in vain for relationships that convey a hidden comprehension of the things in question here. […] It seems that the symbolic meaning of flowers is not necessarily dependent on their function."[51] To put a fine point on the issue under discussion here, the ongoing symbolic transformation of the covers of *Science* exceeded their informational function.[52]

A new context produced a new meaning. A "new garb" produced a new *Science*. And through its visual practices, *Science* contributed to the production of a new context in which science was understood. The journal repurposed industrial optics—a spiny oak-slug caterpillar (November 13, 1959), a Mach Zehnder interferometer pattern (January 15, 1960), and the Crab Nebula (January 19, 1962)—so that the "shock" of the distant but close image easily transformed into images of the technologically and scientifically driven progress of the United States. In the decades after Eisenhower's 1958 State of the Union Address, a politically trained eye could have seen the images reproduced on the covers of *Science* as illustrations for Killian's assertion that science would contribute to a less-regimented and more-individualized society. This perception was in apparent contrast to the pathos of the images as representations of a potential post-apocalyptic future that looked like the archaic past. The nuclear arms race that resulted from the mutual exploitation of science and technology for security and intelligence purposes by the United States and the Soviet Union raised the specter of annihilation that shined through the covers of *Science* during the cold war. This was the inexpressible real presence hidden beneath *Science*'s "new garb."

The 1959 redesign of *Science* paralleled the new initiatives and increased funding for scientific research, furthering, as I stated above, the graphic fluency in communicating scientific discovery and knowledge. But at the same time, the new direction of *Science*'s covers exemplified the aestheticization of science in its consolidation of multiple interests that arose from debates on matters of science policy and funding for scientific research. Intermingling with technological utopianism, cold war ideology, and atomic age anxiety; the donning of "new garb" transformed *Science* into an instrument of cultural policy.

51 Georges Bataille, "Le Langage Des Fleurs" in *Oeuvres Completes* (Paris: Gallimard, 1970), 174–75. Author's translation.

52 Some years after Bataille, the philosopher of science Charles Morris used the phrase "symbolic transformation" to describe the mutability of scientific images. He recounted that, after visiting Gyorgy Kepes's *The New Landscape in Art and Science* exhibition at MIT in 1951, "Works of art and science stood side by side, and matched. Here were the extremes of an imaginative person-controlled nonrepresentational molding of a medium, and the most objectively intended literal accurate mirroring of nonhuman process. And yet the textures and the structures come out alike." See Charles Morris, "Man-Cosmos Symbols" in *The New Landscape in Art and Science*, Gyorgy Kepes, ed. (Chicago: Paul Theobald, 1958), 98.

Notes on Design and Science in the HCI Community

Christoph Bartneck

The human-computer interaction (HCI) community is diverse. Academics and practitioners from science, engineering, and design contribute to its lively development, but communication and cooperation between the different groups is often challenging. Designers struggle to apply the results of scientific studies to their design problems. At times, open conflicts between the different groups emerge, in particular between scientists and designers, since they have the least common ground.[1]

The Computer Human Interaction (CHI) Conference of the Association for Computing Machinery (ACM), which is the largest and arguably one of the most important conferences in the field, is organized through the Special Interest Group Computer Human Interaction (SIGCHI). At the 2005 SIGCHI membership meeting, discussion of the CHI 2006 conference ignited a shouting match between academics and practitioners.[2] This outbreak of emotion illustrates the tension between the different groups, and it can be explained by taking a closer look at their values, and at the barriers that separate them. Snow[3] was the first to talk about such barriers, even though he focused on only two cultures: the scientific and the literary intellectuals. While his political ideas have become somewhat obsolete with the decline of the USSR, his vision for the benefits of cooperating experts still holds:

> The clashing point of two subjects, two disciplines, two cultures—of two galaxies, so far as that goes—ought to produce creative chances. In the history of mental activity that has been where some of the break-throughs came.[4]

More recently, John Carroll[5] suggested that "An integrated and effective HCI can be a turning point in both disciplines and, perhaps, in human history." He also acknowledged several rifts that run through the HCI community. Cooperation remains difficult. At the CHI 2006 conference itself, this conflict was evident in the "Design: Creative and Historical Perspectives" session. Paul Dourish took the role of defending the science of ethnography against its degradation to a service for designers.[6] Next, Tracee Verring Wolf and Jennifer Rode defended creative design against the criticism of scientists by referring to design rigor that is as critical as scientific rigor.[7] Both groups felt the need to defend themselves, which showed that they had the feeling of being under attack. Stuart Feldman, president

1 Christoph Bartneck and M. Rauterberg, "HCI Reality—An Unreal Tournament," *International Journal of Human Computer Studies* 65:8 (2007): 737–43.

2 Jonathan Arnowitz and Elizabeth Dykstra-Erickson, "Chi and the Practitioner Dilemma," *Interactions* 12:4 (2005): 5–9.

3 C. P. Snow, *The Two Cultures: And a Second Look* (Cambridge: Cambridge University Press, 2nd ed., 1964).

4 Ibid.

5 J. M. Carroll, "Human-Computer Interaction: Psychology as a Science of Design," *Annual Review of Psychology* 48:1 (1997): 61–83.

6 Paul Dourish, "Implications for Design." Paper presented at the SIGCHI conference on Human Factors in Computing Systems, Montreal, Quebec, Canada, 2006.

7 Tracee Vetting Wolf, Jennifer A. Rode, Jeremy Sussman, and Wendy A. Kellogg, "Dispelling 'Design' as the Black Art of Chi." Paper presented at the SIGCHI conference on Human Factors in Computing Systems (CHI), Montreal, Quebec, Canada, 2006.

of the ACM, wrote another chapter in this conflict. In his opening speech at the CHI 2007 conference, he made an astonishing statement about the HCI community:

> It is also wonderful to have a group that is absolutely adherent to the classic scientific method. Not a description, I am afraid, of all the fields in computing.

However, it is obvious that the methods used by the HCI community are as diverse as its members. So, by emphasizing the classical scientific method above all other methods, Feldman was expressing the ACM's expectation of what methods the HCI community should use. This preference for the scientific method also manifests itself in the division of the CHI proceedings into "main conference proceedings" and "extended abstracts." The "main" proceedings are considered to be of higher quality, as the name already suggests, and they include a high proportion of scientific studies. These papers usually receive more presentation time at the conference. Nonscientific studies, such as experience reports and case studies, are more often found in the extended abstracts. This division also is reflected in Citeseer's estimates: the impact of the main proceedings is 1.61; while his estimate for the CHI extended abstracts is 0.51 (as of May 2003). Furthermore, the main proceedings use the "archival format," while the extended abstracts do not. The omission of the term "archival" from the format of the extended abstracts suggests that these publications are not important enough to be archived. However, both types of publications are being stored in the ACM digital library, which turns this distinction into a symbolic gesture. At the risk of oversimplification, it can be observed that scientific studies are more highly regarded, and thus published in the archival main proceedings; while nonscientific studies are less highly regarded, and are published only in the non-archival, extended abstracts. But why would the designers bother about this division? Their main focus is on improving society directly through the invention of artifacts, and not through writing papers. Chalmers gives us a hint:

> Science is highly esteemed. Apparently, it is a widely held belief that there is something special about science and its methods. The naming of some claim or line of reasoning or piece of research "scientific" is done in a way that is intended to imply some kind of merit or special kind of reliability.[8]

Being able to use such a powerful term to describe one's own activities is very attractive. Declaring that something has been designed does not carry as much value as declaring that something is scientifically proven. References to science also are frequently used to advertise products. For years, the Odol mouth refresher produced by GlaxoSmithKline claimed on its label: "According to the current state of scientific knowledge it can be shown that Odol is particularly

8 A. F. Chalmers, *What Is This Thing Called Science?* (Indianapolis: Hackett, 3rd ed., 1999).

to be recommended for complete mouth care." It follows that the denial of the status "scientific" to a study is a negative value judgment. Engineers, in particular, are very sensitive to the view that technology is hierarchically subordinate to science, serving only to deduce the implications of scientific discoveries, and to give them practical application. This sensitivity becomes clear in provocative statements by engineers such as Vincenti:

> Airplanes are not designed by science, but by art, in spite of some pretence and humbug to the contrary.[9]

Even though science is highly esteemed, Chalmers[10] argued that "There is no general account of science and scientific method to be had that applies to all sciences at all historical stages in their development." Cross, Naughton, and Walker[11] even suggested that the confusing epistemology of science may be unable to function as a blueprint for the epistemology of design. Levy[12] then suggested that transformations within the epistemology of science should be seen as active growth and development, and that they should be considered as providing an opportunity for design to participate in its ongoing improvement. As a matter of fact, any person can, in principle, contribute to the growth of science. It is an old rule of logic that the competence of a speaker has no relevance to the truth of what he says. The world's biggest fool can say the sun is shining, but that doesn't make it dark outside.[13] Designers and engineers can discover new knowledge without applying the classic scientific method or becoming a scientist. The more important question is how valuable this new knowledge is, and how efficient their methods are in finding it. Therefore, in the first part of this paper, I would like to discuss criteria that serve to assess the quality of knowledge. If design wants to make a contribution to science, then its insights must be judged against these criteria. By comparing the quality criteria of science with those of traditional design, the similarities and differences of the respective communities will become apparent. This comparison also may provide insights into the direction in which design methods have to evolve to become more scientific. This study does not attempt to discuss nonscientific knowledge that designers create for other designers. Many design books, for example, provide hands-on and relevant knowledge for the design practitioner. This knowledge does not attempt to be scientific, and it will not help to define a design science. It is, therefore, not in the scope of this study.

This comparison of quality criteria does also not imply that design *should* use the classical scientific method. Cross provided an excellent historical review of the developments in the various design methodologies.[14] He attested to a healthy growth in the field during the 1980s. The design community may continue to define its own method to turn itself into design science, as was attempted at the CHI 2007 workshops on "Converging on a Science of Design through the Synthesis of Design Methodologies,"[15] and on "Exploring

9 Walter G. Vincenti, *What Engineers Know and How They Know It: Analytical Studies from Aeronautical History*, Johns Hopkins Studies in the History of Technology (Baltimore: Johns Hopkins University Press, 1990).

10 A. F. Chalmers, *What Is This Thing Called Science?* (Indianapolis: Hackett, 3rd ed., 1999).

11 Nigel Cross, John Naughton, and David Walker, "Design Method and Scientific Method," *Design Studies* 2:4 (1981): 195–201.

12 R. Levy, "Science, Technology and Design," *Design Studies* 6:2 (1985): 66–72.

13 Robert M. Pirsig, *Zen and the Art of Motorcycle Maintenance: An Inquiry into Values* (New York: Morrow, 1974).

14 Nigel Cross, "Science and Design Methodology: A Review," *Research in Engineering Design* 5:2 (1993): 63–69.

15 Gerhard Fischer, Elisa Giaccardi, Yunwen Ye, Chris DiGiano, and Kumiyo Nakakoji, "Converging on a Science of Design through the Synthesis of Design Methodologies." Paper presented at the CHI '07 Extended Abstracts on Human Factors in Computing Systems, San Jose, CA, 2007.

Design as a Research Activity.[16] In the second part of this paper, I will challenge this goal of defining a design science, and try to outline a possible solution.

Before diving into these topics, it appears necessary to clarify the terminology of this paper. The different interpretations of the word "research" alone account for considerable friction between designers and scientists. Scientists can barely resist pointing out that designers' research does not provide reliable and valid knowledge. It follows that design decisions made on this basis are also in doubt.

First, we need to distinguish between the verb "research" and the noun "research." When designers, in particular practitioners, do research they predominantly collect relevant information. For scientists, "to research" describes the activity of conducting science, and the noun "research" is used as a synonym for "science." Since there is no verb form of "science," it appears necessary to continue to use the verb "research" for it. It follows that the activities of designers to collect information must be labeled with a different term, and "to explore" appears a good choice. A design science project that does not use the classical scientific method can then be described as "an exploration." Having clarified this important term, we may now proceed to discuss the quality criteria. The scientific reader may be familiar with them, and hence there is a danger of preaching to the converted. However, the comparison with related criteria in design may still be enlightening. Many of the concepts discussed are still under discussion. The meaning of truth, for example, has been disputed for more than 2000 years, and one can easily get lost in the labyrinth of arguments. The intention of this study is to attempt an overview, and the interested reader may further indulge in the specific topics by consulting the references provided. The overview might also help designers to better judge the quality of scientific studies they intend to utilize.

Quality Criteria for Science and Design

The generalizability of scientific knowledge is one of the most important criteria. It describes the degree to which general statements can be derived from a particular statement. The more general statements that can be derived, the better the particular statement. Newton's law of gravity was not only able to describe the behavior of the apple that inspired him, but also all other apples, fruits, organic materials, and inorganic materials. Even the motion of the stars could be described by it. His law, therefore, is of high value. If, on the other hand, a statement depends on the individual researcher, then its generalizability is low. If I state: "Bugs are awful." this may hold true only for people who share my paranoia about small creatures with many legs. Thus, objectivity is a good method for increasing the generalizability of a statement. Generalizability also is related to the repeatability of an experiment. If the results of an experiment are objective, meaning

16 Matthew R. Peters, Steven Haynes, David J. Saab, Helena Mentis, and Abigail Durrant, "Exploring Design as a Research Activity." Paper presented at the CHI '07 Extended Abstracts on Human Factors in Computing Systems, San Jose, CA, 2007.

that they are not dependent on the experimenter, then others should be able to repeat the experiment with exactly the same results. But, of course, not every repeatable experiment is automatically highly generalizable. If an experiment is conducted with only undergrad psychology students as participants, it may easily be repeatable; but the results may not be generizable to senior citizens.

Designers know a similar concept: "universality." It describes the degree to which general problems can be solved by a particular solution. The more universal a solution is the better. A hammer, for example, is more universal than a pair of horseshoe pliers, and hence more valuable. However, there often is a tradeoff between effectiveness and universality. Specific solutions usually work better than general solutions at the price of having to create a solution for each problem. The challenge is to find the right balance between universality and effectiveness. Science, on the other hand, strives towards the highest level of generalizability.

The knowledge that designers typically create in their design projects, suffers from its lack of generalizability. The solutions found for a given problem are limited to the scope of that problem, and cannot be applied easily, if at all, to different problems. Also, the solutions are dependent on the individual designer. A different designer might have come up with a different solution.

Falsifiability is another important criterion that is known to both scientists and designers. Originally proposed by Karl Popper in 2002, "falsifiability" describes the property of statements that they must admit of logical and empirical counterexamples. The latter refers to the condition that it must be possible, at least in principle, to make an observation that would show the statement to be wrong, even if that observation is not actually made. The statement "all swans are white" is in principle falsifiable by observing a black swan. The higher the number of logical and empirical counterexamples that a statement withstands, the higher is its value.

The use of falsifiability in design is similar. A solution must admit the existence of logical and empirical counterexamples. If, for example, a certain device is intended to continuously increase one's karma, then its function is impossible to falsify. Such a device could not be considered a design. Falsifiability plays a less important role in design in comparison with science, since it often deals with concrete and well-defined problems. The effects of a solution usually are easy to observe, and this criterion overlaps with the criterion of effectiveness that will be discussed later.

Truth is a key criterion in science, and it also plays an important role in design. However, its definition is still an object of philosophical discussion, and so multiple definitions of truth exist at this point in time. An in-depth discussion about the underlying philosophical issues is beyond the scope of this paper, but the interested reader may consult Kirkham,[17] who offers a survey of all the major philosophical theories of truth. The acknowledged Wikipedia[18] alone

17 Richard L. Kirkham, *Theories of Truth: A Critical Introduction* (Cambridge, MA: MIT Press, 1992).

18 Jim Giles, "Internet Encyclopaedias Go Head to Head," *Nature* 438:7070 (2005): 900–1.

lists many theories of truth including correspondence, coherence, constructivist, consensus, pragmatic, performative, semantic, and Kripke's theory. The correspondence and coherence theories probably are the most acknowledged, so this study focuses on them. In the coherence theory, truth is primarily a property of a whole system of statements. The truth of a single statement can be derived only from its accordance with all the other statements. If a new statement contradicts an existing statement, then both statements need to be reconsidered. In the previously used example of swans, one of the statements must be false. Either not all swans are white or the particular swan is not black. The equivalent concept in design is known as "compatibility." If a new component is introduced to an existing system, then it should not prevent any existing component from operating correctly. For example, the installation of new software on a computer can lead to incompatibilities in which previous functions cease to operate.

The correspondence theory of truth deals with the relationship between statements and reality. If theories correspond to observations in reality, they are considered to be true. This direction in the relationship between truth and reality usually is attributed to science. The other direction can be attributed to design. If an artifact corresponds to theory, then it is considered true. Our understanding of the physical world makes it difficult to invent artifacts that could not be explained fully by existing theories of physics. Many attempts have been made to invent a perpetual motion machine, and patents have even been filed, but no working model has ever been built. The United States Patent and Trademark Office (USPTO) refuses to grant patents for perpetual motion machines without a working model:

> With the exception of cases involving perpetual motion, a model is not ordinarily required by the Office to demonstrate the operability of a device. - 608.03 Models, Exhibits, Specimens [R-3].

However, solutions often have been used without full theoretical understanding. The Bayer Company patented aspirin as early as 1899, and has successfully marketed it ever since. Its pain-relieving effect was not understood until 1971. In 1982, John Robert Vane received the Nobel Prize in the Physiology of Medicine for this discovery.

Another important quality criterion for scientific knowledge is novelty. Rediscovering Newton's Law has little value. But newness in itself is not sufficient. A novel scientific theory does not only need to be different from existing theories, but it also has to explain more than existing theories. Galileo's theories extended Aristotle's; Newton's Law extended Galileo's theories; and Einstein's extended Newton's. In design, the same principle is known as "innovation." Novelty, in its pure "newness" definition, is even a requirement for patents. Moreover, new artifacts are expected to work not only

differently, but also better. Modern PCs are currently even powerful enough to completely simulate older computers, for example, simulating the Commodore 64 using the VICE emulator. Modern PCs can do everything that older ones can, and more.

The criterion of parsimony, also known as "Occam's razor," is the preference for the least complex statement to explain a fact. A good example can be found in the field of astronomy. The Copernican model is said to have been chosen over the Ptolemaic due to its greater simplicity. The Ptolemaic model, in order to explain the apparent retrograde motion of Mercury relative to Venus, posited the existence of epicycles within the orbit of Mercury. The Copernican model (as expanded by Kepler) was able to account for this motion by displacing the Earth from the center of the solar system and replacing it with the Sun as the orbital focus of planetary motions, while simultaneously replacing the circular orbits of the Ptolemaic model with elliptical ones. In addition, the Copernican model excluded any mention of the crystalline spheres that the planets were thought to be embedded in according to the Ptolemaic model. At a single stroke, the Copernican model reduced the complexity of astronomy by a factor of two.

In design, simplicity plays a similar role. Simplicity is the preference for the least complex solution to achieve a given goal. Just twenty years ago, the only way to print a photo required a complete photochemical process that involved various toxic chemicals and sophisticated machines. These days, everybody can print his own pictures with cheap inkjet printers.

Finally, the scientific criteria of accuracy, precision, and efficiency are discussed, together with their counterparts in design: effectiveness, reliability, and efficiency. Accuracy refers to the degree to which a statement or theory predicts the facts it is intended to predict, while precision refers to the degree to which a statement or theory predicts the exact same facts. The analogy of bullets shot at a target is useful to explain the difference between these two related concepts and, at the same time, to show the similarity between design and science criteria.

In this analogy, a gun firing at a target (design) parallels a theory predicting observations (science). The "effectiveness" of the gun describes the closeness of the bullets to the center of the target (see Figure 1). Bullets that strike closer to the center are considered more effective. The parallel is that the closer the observations concur with the predictions of the theory, the more accurate the theory.

Figure 1
High effectiveness but low reliability (left); high reliability but low effectiveness (middle); and high reliability and high effectiveness (right).

To continue the analogy, the reliability of the gun refers to the spread of the bullets. The closer together the bullets strike, the higher the reliability (see Figure 1, middle). In science, the closer the observations are to each other, the more precise is the theory. The bullets do not necessarily need to be close to the center for this. The bullets (or observations) can be reliable (precise) without being effective (accurate). However, for bullets (and observations) to be perfectly effective (accurate), they also need to be reliable (precise) (see Figure 1).

For science, efficiency refers to the resources expended in relation to the precision and accuracy of the observations predicted, and for design, efficiency refers to the resources expended in relation to the effectiveness and reliability of the goals achieved.

So far, only those quality criteria of design that have a direct relation to the quality criteria of science have been discussed. Of course, design also has criteria that are of less relevance to science. Conformity to social customs, popularity, ego satisfaction, reputation, pleasure, and commercial success are examples. It is difficult to define general design criteria, since each design can be judged only in its specific context of use. The Hummer sport utility vehicle (SUV), for example, is a car that is not intended to be environmental friendly, so it should not be judged by the fuel consumption criterion. The Hummer SUVs are not designed for driving fuel-efficiently from points A to B.

Conclusions on Quality

At first sight, there appears to be a considerable overlap in the quality criteria for design and science. Pirsig[19] attested that they are just two different complementary ways of looking at the same thing. At the most immediate level (dynamic quality), they have never been separate. Pirsig provides a description of dynamic quality as being "the continuing stimulus which our environment puts upon us to create the world in which we live."[20] The sense of quality that guides a scientist in selecting a certain hypothesis for further investigation is the same sense for quality that helps designers to choose one solution over another. Both disciplines are creative: designers create primarily artifacts, and scientists primarily knowledge. This similarity may mislead people into believing that design already is a science. In the next section, I will discuss the possibility of a design science. For now, I would like to characterize the different quality criteria using the Metaphysics of Quality (MOQ) framework.[21] Of course, it is impossible to provide an exhaustive description of his work within the limited space available, but the interested reader may consider Anthony McWatt's thesis as a starting point for delving deeper into this philosophical idea.[22]

Besides dynamic quality, Pirsig distinguishes four static quality patterns (see Figure 2) that have evolved over time, and that are ordered in a hierarchy from the inorganic (lowest coherence) to the intellectual (highest coherence). The highest pattern contains

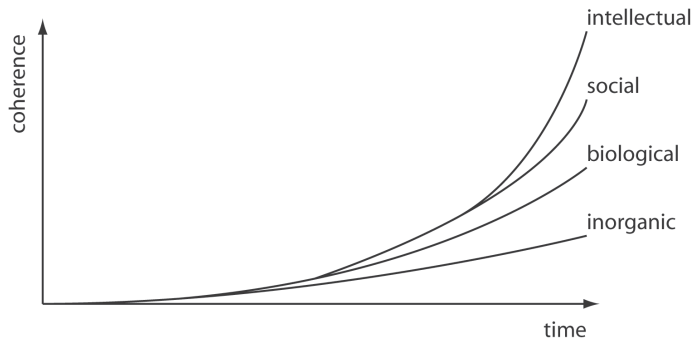
19 Robert M. Pirsig, "Subjects, Objects, Data & Values." Paper presented at the Einstein Meets Magritte Symposium, Vrije University, Brussels, 1995.

20 Robert M. Pirsig, *Zen and the Art of Motorcycle Maintenance: An Inquiry into Values* (New York: Morrow, 1974).

21 Robert M. Pirsig, *Lila: An Inquiry into Morals* (New York: Bantam Books, 1991).

22 Anthony McWatt, "An Introduction to Robert Pirsig's Metaphysics of Quality." PhD thesis, University of Liverpool, 2003.

Figure 2
The evolutionary order of static quality patterns.



intellectual patterns such as theology, science, and philosophy. This pattern is confined to the skilled manipulation of abstract symbols that have no specific corresponding experience, and behave according to rules of their own.[23] Social patterns include such institutions as family, church, and government. They are the patterns of culture that the anthropologist and sociologist study.

The hierarchical structure of the patterns suggests that the intellectual pattern takes precedence over social, biological, and inorganic matters. During the Renaissance, science rejected religious dogmas, social prejudices, and biological emotions to set its own higher intellectual patterns such as truth. When science is mixed with social patterns, such as religion, it can quite correctly be argued that these patterns corrupt science. The times in which the church could dictate truth are hopefully over, and even Galileo was rehabilitated by Pope John Paul II in 1992. However, the recent upsurge of creationism is alarming, and we can only hope that the intellectual value of truth will continue to prevail over religious beliefs, as it did in the Dover, Pennsylvania, case.[24] In this court case, the attempt of creationists to introduce their religious ideas into the biology science class of a Dover public high school was successfully blocked. In a similar fashion, social patterns are superior to biological patterns. The value of a stable family overrides the value of spreading one's genes as much as possible through adultery.

While there is a hierarchy of quality patterns, they are still dependent on each other. Every intellectual pattern also is a social and biological pattern, but not every social pattern is an intellectual one. The ideas of science come from scientists who work in a community and need food to survive. However, not every community produces scientific knowledge, and not every animal forms communities.

The quality criteria of design (universality, falsifiability, compatibility, correspondence to theory, novelty, simplicity, reliability, effectiveness, and efficiency) operate predominately at the social level. Designers, in particular practitioners, create artifacts to transform the world into a desired state.[25] Their results are essential to society, but remain subordinate to the intellectual level at which science operates. Notice that "intellectual" does not refer

23 Robert M. Pirsig, "Letter to Paul Turner Dated September 23rd, 2003."

24 Judge Jones, *Tammy Kitzmiller, et al. v. Dover Area School District, et al.* Case 4:04-cv-02688-JEJ (2005): 1–139.

25 Herbert A. Simon, *The Sciences of the Artificial* (Cambridge, MA: MIT Press, 3rd ed., 1996).

to the social title of being an intellectual, but to the quality pattern described above. Of course, designers can be intellectuals. With respect to dynamic quality, design and science are similar. But in the framework of static quality patterns, they differ. If design wants to contribute to the growth of scientific knowledge, then it will primarily have to improve the generalizability of its results. Most of all, to guarantee objectivity, its results need to become independent of the designer. Pitt claimed[26] that such a method would lead to knowledge that is "far more reliable, secure, and trustworthy than scientific knowledge."

So far, I have considered design in its classic form in which it does not qualify as a science. Still, it does have the potential to contribute to the growth of scientific knowledge. Next, I would like to discuss the challenges faced by design when it attempts to become a science.

The Challenge of a Design Science

Science consists of a method for observing reality and abstracting it into models that are then used to explain and predict reality. Newton's law of gravity, for example, explains why an apple hit Isaac Newton, and it also helps us to predict the position of the planets in the future. The various sciences claim certain parts of reality as their phenomena under investigation.

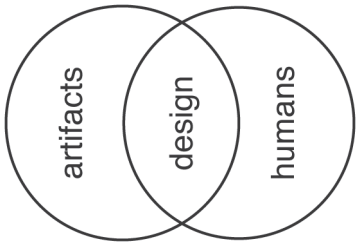
The methods of science are to some degree universal, and often are referred to as "scientific method." The scientific method is a body of techniques for investigating phenomena and acquiring new knowledge, as well as for correcting and integrating existing knowledge. It is based on gathering observable, empirical, measurable evidence, subject to the principles of reasoning. Chalmers[27] provides an impartial discussion of the scientific method, and this is probably what Stuart Feldman had in mind when he referred to the classic scientific method. However, a methodology in itself can never constitute a science. Let us take the example of the dissection method. Biologists may use dissection to analyze animals, but butchers also use it to cut steaks. The method is the same, but one results in scientific knowledge, the other in a delicious meal. Moreover, in the same way that biology is not a science of how biologists work, design science cannot be a science of how designers work. This conceptual limitation cannot be overcome even by converging on a specific design method. Again, a method does not constitute a science, and design methodologies cannot be the phenomena of design science.

The sciences distinguish themselves not through their methods, but through the phenomena they investigate. Biology, for example, is the science of living organisms. What a design science is primarily missing is a phenomenon. This demarcation problem becomes clearer when we consider that the prime objective of design lies at the intersection between artifacts and users (see Figure 3).

26 Joseph C. Pitt, "What Engineers Know" *In Techne* 5:3 (2001): 17–30.

27 A. F. Chalmers, *What Is This Thing Called Science?* (Indianapolis, IN: Hackett, 3rd ed., 1999).

Figure 3
The phenomenon of design.



Designers contribute to the creation of artifacts that interact with humans.

Everything there is to know about the artifact (Figure 3) is available from its manufacturer. Its dimensions, material properties, and functions are known. The artifacts, therefore, are not good phenomena for investigation. Also the creation of new materials and operational principles already has been claimed by engineering and physics. Engineers also discuss rational design methodology that relies heavily on mathematics.[28] Interestingly, these rational design methodologies are not often used in the area of design, even though they have one fundamental characteristic that brings them closer to science: the results produced through these methods are objective. This means that the results are independent of the designer who applies them. This independence is a major step forward in the direction of generalizability. When we take a look at the body of scientific knowledge, we also see that it is engineers who have attempted to create a consistent and logical body of knowledge for design solutions.[29]

On the other hand (Figure 3), understanding human beings is the prime objective of medicine, anthropology, and psychology. Design science would have difficulty in competing. Even "design methodology" or, to be more general, "solving human problems," already has been treated as a phenomenon investigated by psychologists.[30]

As we can see, both artifacts and humans have been claimed as phenomena by physics, engineering, psychology, and medicine. The definition of a design phenomenon is possibly the most urgent step in the development of a design science. The arena of design science is filled with actors from many different disciplines, and one may then ask why the designers in the HCI community are so keen on turning design into a science?

It is a noble goal to create good and reliable design that improves society, but this cannot be achieved by using the scientific method, nor can the claim of a design science be a good response to the criticisms of scientists. Not everything has to be scientific, and designers are playing an important role in the creation of artifacts. They should be proud of the role they already play in the HCI community.

If we attempt to turn design into a science, then we face the demarcation problem that will be difficult to overcome unless

28 Walter G. Vincenti, *What Engineers Know and How They Know It: Analytical Studies from Aeronautical History*, Johns Hopkins Studies in the History of Technology (Baltimore, MD: Johns Hopkins University Press, 1990). Herbert A. Simon, *The Sciences of the Artificial.* Christopher Alexander, *Notes on the Synthesis of Form* (Cambridge, MA: Harvard University Press, 1964).

29 Walter G. Vincenti, *What Engineers Know and How They Know It: Analytical Studies from Aeronautical History.* Vladimir Hubka and W. E. Eder, *Design Science: Introduction to Needs, Scope and Organization of Engineering Design Knowledge* (Berlin and New York: Springer, 1996).

30 J. Dorfman, V. A. Shames, and J. F. Kihlstrom, "Intuition, Incubation, and Insight: Implicit Cognition in Problem Solving" in *Implicit Cognition*, G. Underwood, ed. (Oxford: Oxford University Press, 1996). G. Feist, "The Affective Consequences of Artistic and Scientific Problem Solving," *Cognition and Emotion* 8 (1994): 489–502.

Figure 4
Ontology of Pirsig's Metaphysics of Quality

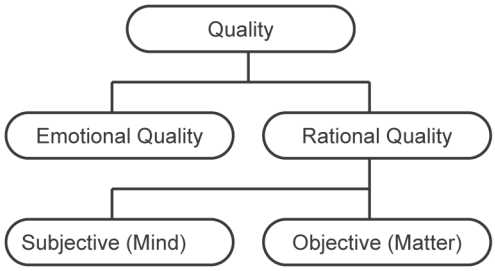
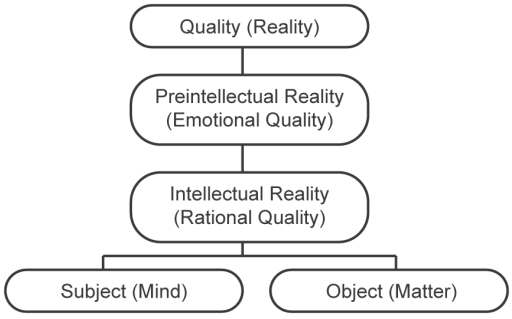


Figure 5
The process of quality.



we resolve the subject-object dichotomy that was highlighted by Descartes.[31] In this duality, objective knowledge is superior to subjective knowledge, and together they constitute an antagonistic relationship that constantly generates dichotomies: mind and matter, science and art, and feeling and reason.[32] The Metaphysics of Quality has the potential to overcome this dichotomy. It reduces this duality to a secondary role, and places quality alone at the top (see Figure 4) as "the parent, the source of all subjects and objects."[33]

Even though quality itself cannot be defined, its existence can be proved. Pirsig provides a pragmatic proof by subtracting it from the description of our world, and showing that a world without quality would be dysfunctional.[34] To understand this statement, one has to detail the process of quality (see Figure 5). Our environment presents us with a quality stimulus, which we sense pre-intellectually before we intellectualize it, thereby dividing it into subjects and objects.

The pre-intellectual sensitivity to quality can be compared to Kant's a priori pure cognition of time and space. It can even be argued that quality might fulfill Kant's requirements of necessity and universality, and thus may be considered a third form of a priori pure cognition. Pirsig describes the sense of quality this way:

> This sense [for quality] is not just something you are born with, although you are born with it. It is also something you can develop. It is not just "intuition" not just unexplain-

31 R. Descartes, *Principia Philosophiae* (Amsterdam: Danielem Elzevirium, 1644).

32 George Basalla, "Man and Machine," *Science* 187 (1975): 248–50.

33 Robert M. Pirsig, *Zen and the Art of Motorcycle Maintenance: An Inquiry into Values.*

34 Ibid., 193.

> able "skill" or "talent." It is the direct result of contact with basic reality, Quality, which dualistic reason has in the past tended to conceal.[35]

Dynamic quality, and its division into classical and romantic quality, is of most importance, since it is the point connecting science and design:

> What relates science to the arts [design] is that science explores the Conceptually Unknown [dynamic quality] in order to develop a theory that will cover measurable patterns emerging from the unknown. The arts [design] explore the Conceptually Unknown [dynamic quality] in other ways to create patterns such as music, literature, painting, that reveal the Dynamic Quality that produces them. (Square brackets were added by the author)[36]

The MOQ's view of the world as shown in Figure 4 is now able to overcome the subject-object dichotomy and the difficulties it creates for defining the phenomena of design science. Design science should focus on what is inherent to both subjects and objects: quality. Design science is the science of quality.

Discussion

Science has established several criteria for assessing the quality of the knowledge it produces. Some of these criteria overlap or relate to criteria that are used in design. Design methods are not yet optimized for the creation of scientific knowledge, and therefore they generally produce knowledge that is of lesser scientific quality. Their weakest area is generalizability, since the knowledge produced is often based on the individual designer. Currently, designers who want to work as scientists often have to become either engineers and work within a rational problem-solving framework,[37] or they can choose to become psychologists. John Carroll suggested that psychology could be considered a science of design.[38] Since designers often lack training in these disciplines, they have a natural disadvantage. It would be preferable if they could become scientists without becoming bad engineers or bad psychologists. To create a design science, we first need to define its phenomena. This can be achieved by overcoming the subject-object dichotomy. The Metaphysics of Quality has the potential to bridge the gap between subjects and objects, and by doing so it also defines the phenomena of design science: quality. The formal recognition of quality will then also have a direct influence on science:

> I think that it will be found that a formal acknowledgement of the role of Quality in the scientific process does not destroy the empirical vision at all. It expands it, strengthens it and brings it far closer to actual scientific practice… By returning our attention to Quality it is hoped that we can get technological work out of the non-caring subject-object

35 Ibid., 225.

36 Robert M. Pirsig, "Subjects, Objects, Data & Values."

37 Herbert A. Simon, *The Sciences of the Artificial.*

38 J. M. Carroll, "Human-Computer Interaction: Psychology as a Science of Design," *Annual Review of Psychology* 48:1 (1997): 61–83.

> dualism and back into craftsmanlike self-involved reality again, which will reveal to us the facts we need when we are stuck.[39]

But would knowledge about quality be generalizable? A common criticism of Pirsig's Metaphysics of Quality is the question of how we could possibly disagree on quality when quality is supposed to be universal. How is it possible that we have difficulties agreeing on which is the better poem? Pirsig considers that our previous experiences influence our perception of quality:

> The names, the shapes and forms we give quality depend only partly on the quality. They also depend partly on the a priori images we have accumulated in our memory. We constantly seek to find, in the quality event, analogues to our previous experiences. If we didn't, we'd be unable to act. We build up our language in terms of these analogues… The reason people see Quality differently is because people come to it with different sets of analogues.[40]

Pirsig speculated that, if two people had identical a priori analogues, they would see quality identically every time. This still would not explain why listening to a new record over and over again can change the experience from being exciting to being boring. In his second book,[41] Pirsig modifies his previous division of quality (classical and romantic) to static and dynamic quality, in which "dynamic quality" represents both romantic and classical quality. The main advantage of this division is that it prevents the perception that quality consists of two fundamentally different types: classical and romantic. Furthermore, dynamic quality can more easily include mystical experiences which, according to Pirsig, are not well described by romantic quality. The division between dynamic and static quality can then easily explain the change of experience after listening to a record numerous times. It changes from a dynamic to a static quality pattern. This new division also provides a different way of looking at the disagreement on which poem is better. While dynamic quality is the same for everyone, and therefore generalizable, static quality patterns depend on the individual's prior experiences. When judging a poem, we use both dynamic quality and static quality, which results in some uniformity between individuals; but not complete uniformity.

What is not yet clear is the degree to which the classical scientific method can be used to investigate quality because it is based on the assumption that subjects and objects are not connected. The investigator is not supposed to influence the phenomenon under investigation. Quality is the source of subjects and objects, so a method that presupposes that they are not connected may be unsuitable for investigating it.

The main challenge for a design science is the definition of a method that may be capable of investigating quality, but at least

39 Robert M. Pirsig, *Zen and the Art of Motorcycle Maintenance: An Inquiry into Values.* (p. 224)

40 Ibid.

41 Robert M. Pirsig, *Lila: An Inquiry into Morals.*

some first attempts have been made. Nakashima et al.[42] attempted to make implicit quality knowledge of executing a task explicit in order to measure if this knowledge would help a second user improve his performance. Zimmerman et al.[43] emphasizes the benefit of creating artifacts for HCI research, and also propose four criteria for the evaluation of its success (process, invention, relevance, and extensibility).

Compared to this methodological challenge for design science, the popular separation of design and science into activities that transform the world into a desired state (design) versus activities that attempt to understand the world (science) can easily be overcome. The prime reason for the existence of science is the assumption that a state of knowing is better than a state of ignorance. By definition, this turns all scientific activities into design activities. It is unlikely that many scientists would feel comfortable with this classification of their work, but the fundamental argument remains.

Until considerable progress has been made in defining a suitable epistemology for design science, we shall have to take small steps forward using current methods and policies. Design has to acknowledge that the knowledge it produces is, from a scientific perspective, not very generalizable, and thus of lesser value. However, from a design perspective, it may very well be valuable since its concreteness makes it easy to use in everyday practice. Schön[44] even argued that "wicked design problems" may resist formalization, and hence cannot be approached with a pure scientific approach. The concrete design knowledge may then be the best approximation to scientific knowledge.

Design also has to acknowledge that its focus is on the social, and not on the intellectual, level. Scientists, on the other hand, need to acknowledge that the highly general knowledge they produce often is too abstract to improve society. It requires a skilled designer to translate this knowledge into a specific context of use.

The hierarchy levels of static quality patterns may even justify the division of the CHI proceedings into sections. However, it would be wise to follow Confucius' recommendation to "rectify the names." Labeling only one section "archival" when both sections will be stored in the ACM Digital Library is confusing. Also, the labels "main proceedings" and "extended abstracts" are ambiguous. Pirsig's quality patterns appear suitable for defining the sections, but the terms "intellectual" and "social" carry different meanings in the various sub-communities, and may cause misunderstandings. Maybe the sections could be called "Discovery" and "Invention." The latter would collect contributions that are aimed at improving society, and that operate on Pirsig's social level. The discovery section would gather contributions that present scientific insights, and operate at the intellectual level. Whatever principle is used to divide the proceedings, it should be made explicit.

The use of "best paper" awards is another ranking method.

42 Hideyuki Nakashima, Masaki Suwa, and Haruyuki Fujii, "Endo-System View as a Method for Constructive Science." Paper presented at the 5th International Conference of the Cognitive Science, Vancouver, BC, Canada, 2006.

43 John Zimmerman, Jodi Forlizzi, and Shelley Evenson, "Research through Design as a Method for Interaction Design Research in HCI." Paper presented at the SIGCHI Conference on Human Factors in Computing Systems (CHI), San Jose, CA, 2007.

44 Donald A. Schön, *The Reflective Practitioner: How Professionals Think in Action* (Aldershot, UK: Arena, 1991).

Excellence should be rewarded. However, rankings should not be used to discriminate between communities. Excellence can be found in design papers as well as in scientific papers. The factors that influence paper rankings should be made explicit. This would require the agreement of the community on the factors used. The CHI community is diverse, and it may be difficult to reach agreement. But nothing worthwhile is ever easy. As long as no shared quality criteria are defined for the community as a whole, it will remain a trans–disciplinary rather than a multidisciplinary community. We will continue to tolerate each other rather than contributing to each other's success. The sub-communities of design, education, engineering, management, research, and usability will coexist, but future shouting matches cannot be excluded.

Conclusion

The comparison of the quality criteria used in design and science hopefully creates a better mutual understanding between these two communities, and a guide towards a design science. The classical scientific method does not appear to be suitable for the investigation of the phenomenon of design science: quality. While this study is not able to propose a new investigation method, it at least pointed out one of its requirements. Based on the Metaphysics of Quality, it has been concluded that the method of design science must overcome the subject-object dichotomy. This ambitious goal may not be achieved quickly, and thus we also need to focus on the small steps to improve the HCI community. The observations and suggestions we made for the CHI conference may create a better and more equal framework in which the different sub-communities inspire each other.

Immediate and Remote Design of Complex Environments[1]

Turkka Keinonen

The Complexity and Scope of Design

Changes in technologies, innovation, business strategies, and consumer behavior, together with the returning concerns about the social responsibility of design, are challenging the established role and conception of design. For instance, a sample of interesting contributions to describing the recent evolution and increasing complexity of design include Richard Buchanan's model of the changing objects of design; John Thackara's presentation of new design frames (i.e., approaches for designing increasingly complicated human-technology systems); Anna Valtonen's doctoral thesis about the evolvements in the industrial design profession in Finland; and Nicola Morelli's article about a new kind of socially responsible, empowering design agenda.[2]

Buchanan has classified design objects into four categories which are related to corresponding design practices. The first two categories are symbols and objects designed according to graphic and industrial design traditions. In the design of the third category (i.e., actions), people, contexts, and the social setting of applying technologies are in focus and encompassed in the extended concept of a product. Thus, the object of design includes functions, services, and experiences, and the corresponding practice is interaction design. The fourth category, environmental design, deals with human systems of applying information, physical objects, and environments in work, play, leisure, and learning. These systems and environments are not directly perceivable, but intangible ideas, thoughts, or concepts that set frames to our practices. John Thackara's frames recommend situated and democratizing design strategies such as genuinely recognizing the insider's point of view, enabling people to create meaningful solutions for themselves, respecting the importance of comprehending local contexts, and exposure to the rich variety of influences in design. According to him, complicated systems should not be designed and left for people to cope with, but they should be gradually developed in context and in a case-sensitive manner in collaboration with the users. This should be done by building on available knowledge and experience, instead of starting from scratch as designers often prefer. Anna Valtonen studied the recent history of the industrial design profession in Finland. Her results show a deepening integration of industrial

1 This article is a revised version of a paper presented at the International Association of Societies of Design Research IASDR07 Conference in Hong Kong in November, 2007.

2 Richard Buchanan, "Design Research and the New Learning," *Design Issues* 17:4 (2001): 3–40; John Thackara, *In the Bubble: Design in Complex World* (Cambridge, MA: MIT Press, 2005); Anna Valtonen, *Redefining Industrial Design: Changes in the Design Practice in Finland* (Helsinki: University of Art and Design Helsinki, 2007); and Nicola Morelli, "Social Innovations and New Industrial Context: Can Designers 'Industrialize' Socially Responsible Solutions?" *Design Issues* 23:4 (2007): 3–21.

design with industry and society, and the increasing versatility of designers' competencies. She recognized several new tasks that designers have taken up in addition to the traditional core task of product design. These include design management, user-centered design, and design for end-user experience, driving innovations, and contributing to corporate strategies. While new tasks have been taken up, none of the previous has been replaced. As the two main trends within the industrial design profession, Valtonen recognized a shift from operative concrete design to more abstract strategic work, and an increase in specialization. Nicola Morelli proposes[3] a socially responsible design agenda where designers use their skills directly for the benefit of local communities, instead of working for product manufacturing industry. Relevant skills in the new kind of frame of utilization include human-centered design approaches, scenario-based design, and the creation of platform-level solutions allowing local modifications.

Even the few examples cited above are indicative of the design discipline's responses to the changes in its environment. The responses include future visions and alternative design agendas, as well as the factual development that has taken place in design practices. The authors' shared message is that the established conception of design as a product[4] creating, professionally conducted, activity supporting manufacturing industries, is becoming obsolete, or at least just one of the alternative interpretations. After Herbert Simon's and Victor Papanek's works,[5] one can hardly say that understanding design as an extremely broad and socially relevant concept would be a novel idea. However, the above-mentioned authors have a new message beyond that: the expansion of design, its growing social and business responsibility, and increasingly collaborative nature is not just a theoretical possibility or design ethical challenge, but a fact and necessity having a strong influence on the design practice.

Seeing the shaping of mass-manufactured products becoming outdated as the only dominant model for design is, however, much easier to notice and accept than to understand how design should be reconceptualized. The reconceptualization problem is not only bothering scholars trying to redefine design, but can blur the practitioners' views as well. Design directors and design school faculty members need to make concrete decisions on the future strategies and the next practical steps to be taken to develop future-proof design competencies. Each of the authors above provide answers which illuminate development trends and visions, but if we look at the topical pressures on design trying to formulate a holistic idea, it becomes difficult to describe major developmental trends that would not be challenged by opposite or diverging issues taking place in parallel. On the contrary, it seems that when a change trajectory is found and described, an opposite or conflicting one immediately can be identified, and the traditional design practices remain between

3 In line with the work of Victor Margolin and Sylvia Margolin, "A 'Social Model' of Design: Issues of Practice and Research," *Design Issues* 18:4 (Autumn 2002): 24–30; and Victor Margolin and Sylvia Margolin, "A 'Social Model' of Design: Issues of Practice and Research" (paper presented at the Common Ground, London, September 5–7, 2002).

4 "Product" is used here to refer to different categories of design objects when regarded as artifacts isolated from the larger contexts of production and use (i.e., including, for example, stand-alone software applications or products of graphic design).

5 Herbert A. Simon, *The Sciences of the Artificial* (Cambridge, MA: MIT Press, 3rd edition, 1996, first published 1969); and Victor Papanek, *Design for the Real World: Human Ecology and Social Change* (Frogmore, NF: Paladin, 1974).

the distancing extremes. In this situation, the tensions which the opposite challenges set on design can be seen as more descriptive than the coherent trends themselves. And perhaps the tensions could be applied to construct a picture of the future of the profession. Following this logic, a set of five design tensions—technology, innovation, competence, readiness, and generality tensions—will be presented below. On the basis of the tensions, a model of design including two emerging practices in addition to the traditional product design, namely, "immediate and remote design," will be suggested. In the next five sections, I will describe each of these tensions, explaining how design practitioners face strengthening demands to respond to new and conflicting challenges. Even though the tensions illuminate different angles of design, I will claim in the section "Immediate and Remote Design" that they share a common core, which is based on the temporal, physical, causal, and hierarchical distance of design activity from the users and their acute needs. The idea of distance will enable us to frame the two emerging design practices. Finally, in the section "Tensions to Opportunities," I will discuss some of the possible expansions of design practice alluded to by the ideas of immediate and remote design.

The tensions have been identified within a project developing design approaches for the ubiquitous information society,[6] and in the following discussion, they are framed accordingly. However, the technology basis should not be seen as too definitive, and it is the author's opinion that the increasing complexity of human-technology relationships; and the ubiquitous presence of any kind of advanced technology; may have effects similar to information and communication technologies (ICT) with respect to this discussion.

Technology Tension

The ubiquitous information society[7] can be seen as a technology trajectory characterized by comprehensive and widespread utilization of communication technologies, advanced interaction methods between humans and technology, and algorithmic intelligence. Connectivity becomes an increasingly universal feature of artifacts and, consequently, a standard phenomenon in our environment. Human-machine interaction is seen to develop towards so-called "natural interaction" including speech and gestures, and it enables control at high levels of abstraction. Algorithmic intelligence refers to a technical systems' ability to learn, to anticipate, and to take initiative in adapting to changes.

One of the most fascinating opportunities with ubiquitous technologies is to be able to hide the technology, make it invisible, and just to provide the services, utility, and experience that is valuable for the users when needed, in the exact amount and quality that is needed.[8] Ironically, working on the meaning and values of technology, and hiding the machine, may make the technologies peripheral or even completely unnecessary. This is indicated by

6 The article is based on a cross-disciplinary project, Ecological Design of Intelligent Environments (ÄES), conducted in Finland 2005–2006. The purpose of the project was to address future demands that ubiquitous computing and the information society will place on user-centered design. For a comprehensive report in Finnish, see: *Älykkäiden ympäristöjen suunnittelu – Kohti ekologista systeemiajattelua (Design of Intelligent Environments – Towards Ecological System Approach)*, Eija Kaasinen and Leena Norros, eds. (Helsinki: Teknologiainfo Teknova, 2007).

7 See E. Aarts, J. Korst, and W. Verhaegh, "Computational Intelligence" in *The New Everyday: Views on Ambient Intelligence*, E. Aarts and S. Marzano, eds. (010 Publishers, 2003), 120–125; ISTAG, *Shaping Europe's Future through ICT: Report of Information Society Technologies Advisory Group* (Luxemburg: Office for Official Publications of the European Communities, 2006); and *Älykkäiden ympäristöjen suunnittelu*, Eija Kaasinen and Leena Norros, eds.

8 See, e.g., M. Weiser, "Ubiquitous Computing," *IEEE Computer* (October 1993); and Donald Norman, *The Invisible Computer: Why Good Products Can Fail, The Personal Computer Is so Complex, and Information Appliances Are the Solution* (Cambridge, MA: MIT Press, 1998).

the human-centered definitions of intelligent environments, which define the intelligence of the environment via its capability to enable the intelligent behavior of humans.[9] John Thackara's example[10] about the "walking school bus" demonstrates this clearly. "Walking school bus" is an imaginary bus by which school children walk to school together, escorted by "a driver" who is an adult walking along. "The bus" provides an intelligent combination of safety and exercise that traditional methods of taking a bus or walking alone cannot offer. When genuinely paying attention to needs, meanings, and utility, just redesigning practices and improving the utilization of existing means can create the desired improvements. All of the clumsiness of immature technologies is avoided, because there are no novel technologies to be introduced.

An indication of the strong focusing on meaning and human practices in design instead of technologies, at the same time with a strong ICT push, is the spreading interest in design tools that address behaviors rather than products. These include, for instance, scenarios, acting-based design approaches, and design games.[11] Many of these methods have been developed to make sense of the possibilities of modern technologies but, while doing that, they direct attention away from the technology. Consequently, we can notice the development of advanced technologies including, or even creating, another trend towards the vanishing of the machine in design practice and users' everyday lives.

Innovation Tension

Creating completely new solutions from scratch is an ideal challenge loved and appreciated by designers. The emergence of new technologies enables and attracts designers to present disruptive innovations, and these are what the technology visions have promised: new technology does not only provide us with better tools and toys, but enables completely new kinds of behaviors and experiences. Radical innovations changing our perception of products also are what the innovation literature regards as the key business objective making the old competition obsolete.[12] Thus, changing the world in big style and scale is something that we have seen happen, and expect to keep on happening. However, existing structures impose restrictions and create unavoidable connections to the present and the past, and the connections keep on getting increasingly tight as the complexity of technologies increases. The designers of the ubiquitous information society in particular need to acknowledge this, because ubiquitous technology is by definition networked and, thus, compatibility becomes a major issue. Compatibility with other new technologies is not enough, and matching the novelties with traditional technologies such as housing solutions and human capabilities also is necessary. As information society penetrates all areas of human life, the interface between technology and the human domain becomes as

9 *Älykkäiden ympäristöjen suunnittelu*, Eija Kaasinen and Leena Norros, eds.

10 John Thackara, *In the Bubble*.

11 See, e.g., Dave Randall, Richard Harper, and Mark Rouncefield, *Fieldwork for Design: Theory and Practice* (London: Springer, 2007); Rachel Cooper and Martyn Evans, "Breaking from Tradition: Market Research, Consumer Needs and Design Futures," *Design Management Review* 17:1 (2006): 68–78; *Empathic Design: User Experience in Product Design*, Ilpo Koskinen, Katja Battarbee, and Tuuli Mattelmäki, eds. (IT Press, 2003); Patrick Jordan, *Designing Pleasurable Products: An Introduction to the New Human Factors* (London: Taylor & Francis, 2002).

12 See, e.g., W. Chan Kim and Renée Mauborgne, *Blue Ocean Strategy: How to Create Uncontested Market Space and Make Competition Irrelevant* (HBS Press, 2005).

multidimensional as the environment we live in, and thus radical innovations need to be linked to the innumerable historical layers of prevalent technologies and human practices.

The ubiquitous omnipresent nature of the information society makes it obvious that the designers in any given project will have only partial, often very incremental, control over the system as a whole. All designs will be a part of existing systems, just like any single new building will be a relatively small part of a city. No single actor—however big and powerful—has enough competence, resources, or insight to implement a complete solution. Shared initiative and responsibility become necessary preconditions for development, and development initiative spreads from industry leaders and their laboratories to suppliers, customer organizations, universities, and user communities.[13] The shared contribution of a large number of developers and users adopting the role of developer is possible only if there are universal development platforms. These need to be stable and accessible for a wide range of contributors to learn and use to explore, to allow time for design evolution, and to guarantee that the development efforts do not suddenly become obsolete.

Consequently, while flexible ubiquitous technology in principle enables radical innovations creating completely new kinds of human-technology designs, the development platforms enabling the change need to be stabilized. Mechanisms for updating infrastructures and facilitating the dialogue between social change and technical development need to be created to ensure the integration of technical and social development. Designers' reality in a world of ubiquitous technology which, at the first glance, may look like an adventure and exploration of the unknown, may turn out to be routine work, ensuring the compatibility of solutions that often will be launched as rather mundane updates.[14]

Competence Tension

Ecological approach to design[15] suitable for conceptualizing the complexity in human-technology systems underscores the importance of focusing on practices that include the technology and users both understood in a broad manner. This requires designers to be able to understand and influence complicated, intertwined, socio-technical phenomena. They need to apply research-based approaches, although perhaps these may not follow exactly the established models of academic research and knowledge creation. Research in the design context requires transdisciplinary concepts, and the agile crossing of the boundaries between technical sciences and the humanities. It links knowledge with practice and context where it is created; acknowledges the versatility of the knowledge creation processes and the versatility of participants; and believes in the reflective creation of knowledge, and emphasizes its social relevance.[16] And indeed, the design community is actively working

13 See Harri Kiljander and Johanna Järnström, "User Interface Styles" in *Mobile Usability: How Nokia Changed the Face of Mobile Phone*, Christian Lindholm, Turkka Keinonen, and Harri Kiljander, eds. (McGraw-Hill, 2003) for a discussion about development stability; H. Chesbrough, *Open Innovation: The New Imperative for Creating and Profiting from Technology* (Boston: Harvard Business School Press, 2006) for a discussion about sharing innovation responsibilities between companies and universities; and Eric Von Hippel, *Democratizing Innovation* (Cambridge, MA: MIT Press, 2005) for lead users developing new solutions for themselves.

14 Minna Isomursu, "Älykkään ympäristön iteratiivinen rakentuminen" ("Iterative Emergence of Ubiquitous Environments") in *Älykkäiden ympäristöjen suunnittelu*, Eija Kaasinen and Leena Norros, eds., 248–251.

15 See, e.g., *An Ecological Approach To Human Machine Systems I: A Global Perspective*, J. Flach, P. Hancock, J. Caird, and K. Vicente, eds. (Hillsdale, NJ: Lawrence Erlbaum, 1995); U. Bronfenbrenner, *The Ecology of Human Development* (Cambridge, MA: Harvard University Press, 1979); James Gibson, *The Ecological Approach to Visual Perception* (Boston: Houghton Mifflin, 1979); and *Älykkäiden ympäristöjen suunnittelu*, Eija Kaasinen and Leena Norros, eds.

16 M. Gibbons, C. Limoges, H. Nowotny, S. Schwartzmann, P. Scott, and M. Trow, *The New Production of Knowledge: The Dynamics of Science and Research in Contemporary Societies* (London: Sage Publications, 1994); Kari Kuutti, Turkka Keinonen, Leena Norros, and Eija Kaasinen, "Älykäs ympäristö suunnittelun haasteena" ("Ubiquitous Environment as a Design Challenge") in Eija Kaasinen and Leena Norros, eds., *Älykkäiden ympäristöjen suunnittelu*, 32–51.

to develop a more research-driven culture with research conferences, journals, textbooks, academic centers, institutions, and especially with designers with more advanced research competences and qualifications than ever before.

However, even with advanced design research approaches, the complexity of human-technology systems cannot be understood independent of the insiders' views. The major technical revolution of ubiquitous ICT technologies also is a big social change, and that is why the solutions concerning the future technologies may not be formulated only on a technical or economical basis. The development needs to be guided by shared values and principles of righteous social development. On the level of design methods, this primarily means increased transparency. When we pay attention to the competences that are required from the participants in this kind of democratic design dialogue, we realize that we have to look in two opposite directions. On the one hand, we see very well-trained design researchers who approach the design challenges with scientific concepts and the sophisticated methods that go beyond traditional design exploration. On the other hand, there are laymen with no formal design education whatsoever whose expertise is grounded in the specific practices they are involved in and self-learned design skills.[17] So the valuation of design skills is getting increasingly polarized between the professional, conceptual, and methodological "school design"; and the situated and practical "street design" by the laypersons.

Readiness Tension

The ubiquitous technology vision includes an idea about self-sufficient technologies that are prepared to serve users by taking the initiative for proactive action.[18] Also, increasingly fine-tuned segmentation of design solutions supported by mass customization technologies share the goal of making technologies that exactly match users' needs and wishes, without the users having to adjust, set, modify, or configure. The ecological approach to design, on the contrary, emphasizes that technology becomes complete and meaningful only through complex processes of adaptation.[19] The meaning and role of technology will depend on users' ability to combine it with other means and their everyday practices. Taken further, the adaptable nature of technology can be seen as challenging the traditional division between design, implementation, and use. It emphasizes the open, incomplete nature of technologies providing users with options to design for themselves and it makes developers design for flexible and smooth handover between design, production, and use.[20]

A well-designed product is considered to be a ready-made solution capable of serving the users and fulfilling their needs without too much maintenance or adjustments. The vision about ubiquitous intelligent environment stretches the requirement for readiness to proactive anticipation, technology initiated action,

17 Recent, well-known advocates of trusting ordinary people as innovators include, for instance, John Thackara, *In the Bubble*; Eric von Hippel, *Democratizing Innovation*; and C. Leadbeater and P. Miller, *The Pro-Am Revolution: How Enthusiasts Are Changing Our Economy and Society* (Demos, 2004).

18 D. Tennenhouse, "Proactive Computing," *Communications of the ACM* 43:5 (2000): 43–50.

19 See footnote 15. Sometimes also called "domestication" as in Roger Silverstone, Erich Hirsch, and David Morley, "Information and Communication Technologies and the Moral Economy of the Household" in *Consuming Technologies: Media and information in Domestic Spaces*, Roger Silverstone and Erich Hirsch, eds. (London: Routledge, 1999), 15–31.

20 G. Fischer, E. Giaccardi, Y. Ye, A. G. Sutcliffe, and N. Mehandjiev, "Meta-Design: A Manifesto for End-user Development," *Communications of the ACM* 47:9 (2004): 33–37.

without waiting for the users' decision. However, completely finalized solutions exclude the options for adjustments by users, and are in open conflict with the view that ideal design is permanently unfinished, stimulates new interpretations, provides opportunities for adjustments, and trusts users being able to make them.

Generality Tension

Design solutions become understandable and relevant only in specific practices and contexts, and the quality of the solutions can only be assessed within these practices, and from the point of view of those who are involved with their values and attitudes. This forces designers in the field to the immediate proximity of the users and practices, and it forces designers to be situation-specific with their solutions. The design of a piece of equipment for a complex environment; for example, an operation theater, without comprehensive understanding about users' collaboration, competences, stress levels, and newly changed treatment practices, as well as the other devices used simultaneously complementing each other would be very unwise. Indeed, we have witnessed good examples of such practice-bound projects and methods that are based on ethnographic approaches and collaborative design.[21] At the same time, however, designers' work is getting more abstract and conceptual. To create preconditions for the design of advanced technology products, companies utilize design on more strategic levels where, instead of working on products directly, designers influence product portfolios, stakeholders' attitudes, competences, tools, and regulations.[22] And it seems like these strategic challenges of design are getting more and more attention. Increasingly numerous designers work on creating prerequisites for design through research, education, administration, and strategic planning. Consequently, designers are simultaneously getting closer to the users to solve their specific local problems; and increasingly distant from them in order to anticipate and enable activities dealing with more and more abstract design questions.

Figure 1 summarizes the trends discussed above in the design of complicated systems, and the tensions they bring to the design discipline. It is worth noting that much of what is presented above as challenges for the future already exists and has influenced design for a long time in some form and to some degree, and that the flexibility of the design discipline has digested the changes.

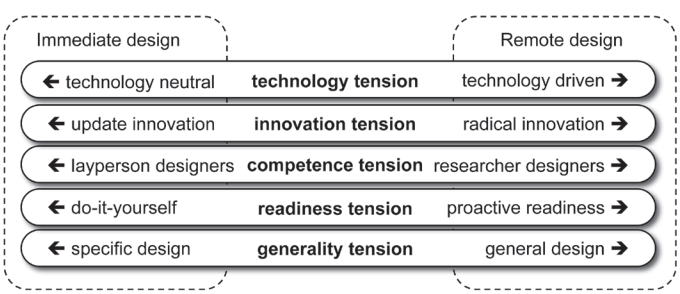


Figure 1
Technology, innovation, competence, readiness, and generality tensions stretching the design practices of complicated environments and systems between *immediate and remote design.*

21 See, e.g., D. Randall, R. Harper, and M. Rouncefield, *Fieldwork for Design.*

22 About the development in Finland, see Anna Valtonen, *Redefining Industrial Design.*

Immediate and Remote Design

A common feature of all of the tensions previously described is the existence of two, simultaneous main trends: one approaching users and specific local practices (the left side of Figure 1), and another distancing from them in order to shift to more generic questions about creating universal solutions or preconditions for design (the right side of Figure 1). The technology tension stretches design between immediately responding to human needs, and working on the possibilities of novel technologies often somewhat distant from laypersons' concerns. The innovation tension polarizes design between suggesting incremental innovations, which immediately create user value, to developing radical innovations having a potentially significant effect on more distant product generations. On the one hand, trusting and working with people to design or contribute to the design of their own near environments and, on the other hand, regarding design as an increasingly specialized and academic professional discipline; increases the competence tension of design. The readiness tension contrasts tendencies to design for flexible technologies to be adjusted locally, to technologies that are self-sufficient and ready to respond, in principle, to whatever is needed. Finally, the generality tension refers to the conflicting objectives of design to cater to case-specific needs and universal quality.

Even though, in some cases, achieving one pole of a tension requires going to the other (e.g., involving laypersons may require research on co-design methods); it is suggested that the opposite ends of the tensions are related to genuinely different design practices. Along with the recognition of the five tensions, it is suggested that two modes of design, "immediate" and "remote," could be conceptually separated from product design, or the equivalents such as information design, to describe the emerging fields of design activity. The concepts are proposed to give conceptual clarity in describing the future and presence of design competencies and practices, without completely diluting the meaning of product design.

Immediate design is suggested to refer to a mode of design characterized by responsiveness to users' current needs, intensive layperson participation, continuous incremental improvements, and the utilization of open do-it-yourself developmental platforms. It takes place where the activity and challenge are on the site, and aims at solving the problem directly without withdrawing to product development fortresses. In addition to being immediate time-and location-wise, it should be immediate when it comes to the causes of design and the interaction between the designers and the users: users' explicit and implicit needs are the immediate reasons to which the design responds, rather than a global trend, business strategy, or technical opportunity, which usually are the drivers of product design. In immediate design collaboration, the designer is one of the insiders fighting in the same trenches with the users, without hierarchical or value barriers separating design from use or maintenance.

Immediate design links the design activities directly to the practices, which makes it specific and context-dependent. Design to improve the environment, and normal work to complete tasks, can intertwine and merge in immediate design.

When design works in the immediate mode, it applies existing technologies and adjusts novel technical innovations to specific human-technology systems. Because it is based on available components, products, and platforms, it is relatively easy to experiment with, adjust, or reject options, and consequently design does not need to be seen as a series of projects, each ending when the product is ready for launch. Design can turn into a process of continuous flow of improvements and adjustments optimizing the human-technology match. An example of immediate design practices might be a project in which designers work for a central hospital, improving the personnel's working environments and the patients' experiences in an intensive collaboration with both constituencies.[23] This kind of immediate design combines the phenomena listed in the left column of Figure 1, including the technology-neutral pole of the technology tension; the incremental update innovation side of the innovation tension; the active layperson end of the competence tension; the do-it-yourself half of the readiness tension; and the context-specific end of the generality tension.

We can recognize several design practices that fall under the category of "immediate design." First, users (i.e., layperson designers) themselves are responsible for the majority of immediate designs. They decorate their homes and adjust their PCs, and sometimes continue to more demanding product development and innovation practices.[24] Second, innumerable activities at offices and factories, where experts in technical support and maintenance adjust tools and environments, represent another form of immediate design. Understanding the local requirements of work is so essential that these decisions cannot be made anywhere else but in the context. With the idea of design tensions, all these can be regarded as design activities, even though they remain outside of the prevailing conception of (product) design. Although laypersons have been able to cope with these domestic and occupational design challenges, the penetration of new complex technologies is complicating immediate design, and making professional contribution more relevant. Third, traditional design services falling close to immediate design include, for instance, interior design and tailored information systems because of their case-specific design objects. However, they do not necessarily incorporate many of the above-mentioned principles of good immediate design, such as respecting and building on insiders' point of view, and equal collaboration in the layman end of the competence tension. These kinds of context- and task-specific design services have been based on specialized skills such as the ability to code or develop insight in visual style typical for the professional end of competence tension. These skills have been applied in

23 Like the one IDEO completed with DePaul Health Center. See Tom Kelley and Jonathan Littman, *The Ten Faces of Innovation* (New York: Doubleday, 2005).

24 C. Leadbeater and P. Miller, *The Pro-Am Revolution*; and Eric von Hippel, *Democratizing Innovation*.

a generalized manner without necessarily being very sensitive to local practices.

Remote design is suggested to refer to design that aims at structural changes. Remote designers work for general solutions, principles, or understanding over individual contexts or implementations. They create conceptual, infrastructure, methodological, regulatory, competence, or resource-related foundations for others to develop products or local practices. When remote designers' conceptual work turns into more tangible design, the results are either concepts meant for decision-making, learning, or influencing; or they are models for generic design platforms that will be adjusted before becoming useful for end-users.[25] Remote designers' scope of interest in time and coverage is broader than that of immediate or product designers. Remote design is distant from users' immediate needs in terms of time, location, reason, and status because its impacts incarnate much later and in modified appearance. The designers work within industrial and administrative superstructures, which can be rather distant from the users' reality, and their actions are based on generic phenomena in society or business. Remote design practices can be positioned on the right-side ends of the five tensions in Figure 1; where design is driven by technical opportunities, radical innovations, specialized professionals and conceptually oriented designers, ideas about the self-sufficient readiness of design products, and the generality of solutions.

Strategic design is an expression sometimes used to refer to similar kinds of activities by remote design. These include design and innovation management, the design of development platforms and infrastructures, and design competence development in industry. Remote design, however, is proposed to be a broader category including design taking place in settings other than industrial organizations (i.e., within education, design research, design promotion and criticism in the media, design administration, and regulative activities related to products and environment).

Defining immediate and remote design as separate practices saves product design from fragmentation and some of the conflicting requirements that have been recognized. For product design, including the design of physical products, stand-alone software systems, and corresponding artifacts; it is enough to focus on its core processes, and specify the interfaces between immediate and remote design, to ensure adequate understanding about the practices, strategies, and platforms. On the five design tension continuums, product designers cannot reach for such extremes as immediate and remote designers. For instance, product designers working for mass-manufacturing industry can neither optimize their designs for a single context of use, nor create new, ubiquitous platforms. Instead, they need to adjust the generality of their contributions somewhere in between—into the middle of the scale—utilizing given platforms and aiming at serving relatively broad user segments.

25 For conceptual design supporting a range of corporate functions, see *Product Concept Design: A Review of the Conceptual Design of Products in Industry*, Turkka Keinonen and Roope Takala, eds. (London: Springer, 2006). Also Eija Kaasinen, "Teknisten perusrakenteiden ihmiskeskeinen suunnittely" ("Human-centered Design of Technical Infrastructure") in *Älykkäiden ympäristöjen suunnittelu*, Eija Kaasinen and Leena Norros, eds., 242–247.

If we focus on the organizational environments and practices to which the different modes of design belong, we can draw an image such as the one presented in Figure 2. While product design typically belongs in the contexts of product development and marketing in manufacturing organizations or their suppliers, immediate design can be seen as a function in these organizations that apply products and technologies. In these organizations, design is not driven by particular technologies, but by practical local needs. The compatibility of new solutions with legacy products and practices is more relevant than radical changes; practitioners' own contribution to design and their stakeholder views are more essential than generic design wisdom; and finalizing technologies to be ready for use through local adjustments is the core design, as characterized by the immediate design ends of the tension continuums. Positioning remote design into one particular kind of practice is more difficult because of the different roles it might take. But in all of these roles, it is linked to administration, enabling activities, and control on higher levels of abstraction than the two other modes.

Tensions to Opportunities

In addition to assisting in categorizing present design activities and development directions, the ideas of immediate and remote design can be deployed to continue conquering new ground for design. Design has traditionally worked in the context of production and marketing. The dominating business logic for designers' customers has been to sell design products for others to apply. The models of immediate and remote design enable designers to be prepared to also work in other organizational contexts. Engineers often are responsi-

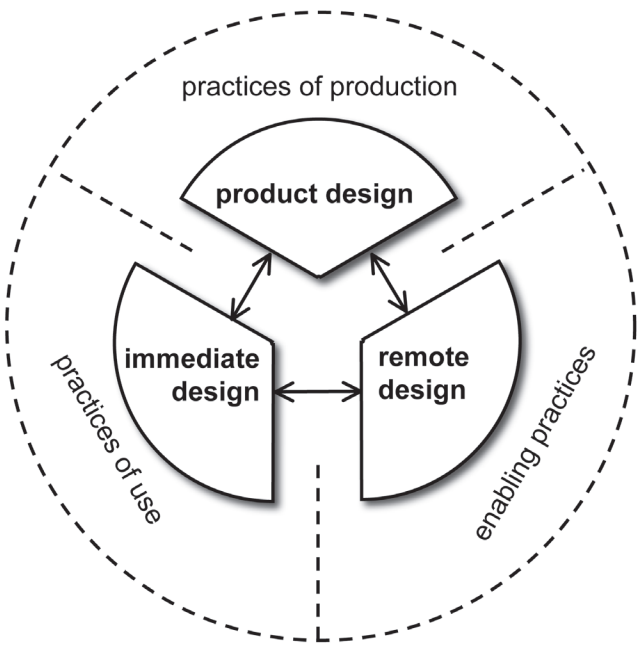


Figure 2
Immediate, product, and remote design within corresponding practices.

ble for running and developing factories, instead of just engineering production machines for sale to these organizations. Similarly, immediate designers' skills could be utilized in running and developing human-technology practices for and within organizations needing these themselves. Would an airport need continuous development of its technology and service practices? Would a police department have similar needs, or a day-care center or hospital, or the local communities of active people as discussed by Morelli? Immediate design in these kinds of contexts would not just be about changing the object of design from products to product-service systems, but the practices would shift towards the immediate poles of all the five tensions, and replace the usual "design for them" with "design for us." Remote design is close to business development, industry-level strategic planning, and society-level decision-making. In addition to manufacturing companies, remote designers could be affiliated with retail enterprises, business consulting, research institutions, civil administration, and the media. In these positions, designers would contribute to technology, industry, and society-level development of material culture on an essentially more abstract and generic level than in traditional design positions as characterized by (the right side of Figure 1) remote extremes of the tensions.

Examples of designers working in these kinds of organizations in immediate and remote design modes can be found, but such practices are not well-supported as long as design education is product-design dominated. Thus, adopting the idea of immediate and remote design would have several influences on designer education. User-centered design, collaborative design, and project and change management probably would be key issues for immediate designers to master. Because design solutions are created using ready-made objects and development platforms, as discussed under "technology tension" and "innovation tension" above, product design skills would not be needed to the same extent as traditionally, and thus omitting them would lighten the immediate design curriculum. To the contrary, deeper understanding about the domains of specialization and the technologies within would become new requirements for immediate designers. An immediate designer might, for instance, study industrial design and gerontology, and work for a nursing home developing care practices and environments without having to worry about being creative with radical novelties or solutions applicable beyond his or her particular organization. Or they might have expertise in paper manufacturing technology and interaction design, and work for a paper mill developing automation systems, interfaces, and working practices.

Remote designers approach design as a more conceptual issue. They need to understand about value creation through design, linking design with business management, innovation, and connections between culture and economy. Design, engineering, and business already have been recognized as related fields; and

cross-fertilization across faculties is a reality at several universities.[26] Also, other educational innovations to create competences for remote design can be imagined. Combining design and law studies would be an asset in working with standardization, product liability issues, and user-centered approach to legislation. Design, literature, and journalism studies would start raising the standard of design through public critical feedback.

We can assume that immediate designers could find collaborative partners through horizontal integration in several industries, applying design in complicated human-technology systems. Remote design orientation might integrate design activities vertically within traditional industries, but on higher levels of abstraction. In professional education, the integration could be facilitated by training designers specializing in other disciplines, or other professions including design in their curriculums. Design, especially immediate and remote, does not need to be done by designers, but design skills are necessary.

Technology, innovation, competence, readiness, and generality tensions appear to stretch design into an amorphous field the extremes of which pose incompatible competence development challenges. However, regarding the opposite poles of the tensions as emerging practices, immediate, and remote design, the competence development challenge becomes more manageable, and even suggests new opportunities.

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26 See, for instance, *Design Management Review* (Special Issue) 18:3 (Summer 2007).

The School of Applied Arts, University of Chile (1928–1968)

Eduardo Castillo Espinoza

Footnotes for this article begin on page 92.

Introduction

Any attempt to define an identity or direction for Chilean design should consider the debate originating in spaces such as the one we will discuss here, a debate that, far from settled, has acquired new relevance today, when the scenario advanced by new technologies and future international alliances for the country demand a redefinition of our professional and academic activity, defining with greater clarity the way in which, from its context, it is projected into the world.

School of Applied Arts

The activity of the School of Applied Arts (SAA), an offshoot of the Faculty of Fine Arts of the University of Chile, spanned the years 1928 to 1968, a period marked by local-level structural reforms of artistic university education. The foremost aim of the School, which garnered it permanent criticism from different sectors during its existence as an institution, was to channel artistic education towards practical ends. As a counterpart the SAA, perhaps without knowing it, laid the foundations for the later development of design in Chilean society, a role that came into focus during the University Reform of the late 1960s, when the curricular changes that put an end to the SAA also led to the validation of design as a professional career within the University of Chile.

The School of Applied Arts hosted a numerous and diverse group of teachers and students, distinguishing itself from traditional artistic education in that its main interest was the popular world, as much in terms of curricula as in the students who attended the School. This made it a space that, during four decades, combined a study plan based on European educational models with an emphasis on local culture, and artisanal and traditional crafts.

Both the administrative difficulties faced by the School of Applied Arts and the loss of valuable documentation after the University Reform and the military regime of Augusto Pinochet have hampered attempts to understand its true importance. Consequently, the School has been discussed up to now through partial or secondary references that have sparked, notwithstanding, an interest in design education over the last few years.

Reforms to Artistic Education in the Early Twentieth Century

The idea of linking artistic education to practical ends, a zeal that sparked harsh opposition among proponents of "pure" art, has an important precedent in the period in which sculptor Virginio Arias served as Director of the School of Fine Arts (1900–1911).[1] In 1904, the debate over the importance of associating artistic endeavor to the productive area reached the National Congress. An article published in Santiago's *El Mercurio* backed the government's proposal to assign an item within the Public Instruction budget for the establishment of a "school of decorative art and of art applied to industry":

> … Seldom in the Public Instruction budget had an item of more direct interest to workers, to laborers, to those that have a right to ask the State that their education be rectified to meet the needs and conveniences of the productive activity of the country, been added….

Regarding the aim of this education, some of the specified objectives for the institution were:

> ... to give the young person the necessary knowledge so that his product is more and more perfect, so that he adapts to public tastes, so that it may follow the transformations of the spirit of the consumer, so that it may cease to be the routine and vulgar work that is easily vanquished in competition by foreign labor….

Elsewhere, the text dealt with the dichotomy between art and industry, and the reason behind directing artistic education to practical ends:

> ... The School of Arts applied to industry would then be not only a powerful tool to elevate the general level of culture, tending to define tastes, but also to constitute the most practical and immediate way of fostering the industrial production of the country, bettering its results and, in consequence, making their worth increase....[2]

That very year, Emilio Rodríguez Mendoza alluded to the discussion in the *Annals of the University of Chile*:

> ... It is just and prudent to search for practical utility in knowledge imparted by the State… exists in Paris a school we must not lose sight of in our search for the healthy assimilations of progress for our artistic education: we are referring to the School of Decorative Arts… it can be said, succinctly, that all the French artistic industry derives from the admirable School of Decorative Arts, institution in which Mr. Arias pursued his studies….[3]

We can deduce from the previous lines that the experience of Virginio Arias as a student of the School of Decorative Arts in Paris[4] may have influenced the orientation he proposed to undertake during his years as Director of the School of Fine Arts in Santiago.

The School of Decorative Arts opened its courses in June of 1907 with a student body composed of ninety-seven men and sixty-seven women.[5] The journalist and art critic Manuel Rodríguez Mendoza, who previously had acted as Secretary of the Chilean Embassy in France and General Council in Spain, was assigned as Director. The academic body of the institution was made up of Chilean sculptor Simón González and a group of Catalan teachers who had been hired in Europe by the Government: Antonio Campins, Antonio Coll y Pí, Juan Plá, and Baldomero Cabré. The courses offered were sculpture: ornamental, decorative, and applied to architecture including woodwork and modeling in stone or marble; ornamental drawing and decorative painting, which encompassed the study of historical and ornamental styles; and artistic foundry, which encompassed metalwork with casts and foundry.

Following years in which it managed to function in a separate building, the School of Decorative Arts moved, along with the School of Fine Arts, to a new building built in the Forestal Park with its back to the Museum of Fine Arts; a space that was inaugurated in 1910 in celebration of the Centenary of the Republic:

> There existed, in the basement of the School of Fine Arts, a School of Applied Arts. It languished on the margins of the panorama of education. No importance whatsoever was assigned to it. It was the reign of Pure Art!… Its teaching, according to the aesthetic rhythm of the time, was limited to reproducing, invariably, the cold and insubstantial model of historical styles….[6]

In 1928, under the helm of painter and musician Carlos Isamitt, then Director of the School of Fine Arts, the School of Applied Arts—an entity that replaced a group of courses that constituted the School of Decorative Arts—was created, and this institution was relocated from the few rooms it occupied in Fine Arts to a large old house on Arturo Prat Street, in the southern sector of Santiago. This measure was contemplated as part of the reform of artistic education prompted by the Director, which set out: "To diffuse the aesthetic concepts that inspire the modern world; to contribute to the better understanding of archaic cultures and stimulate the formation of a national art based on its own elements."[7] "To this end," said Isamitt, "we have banished from the outset the servile copy of historical models that once constituted the fundamental basis of our teaching."[8]

Among the objectives of the School of Applied Arts was to "be the cornerstone on which shall be cemented numerous industries which, lacking a proper technical and artistic basis, to this day hadn't

managed to develop their potential."[9] In 1961, Isamitt remarked, regarding the difficulties of the time:

> There were many circumstances that smack to me of stinginess today, when I remember those years. The group of artists who constituted, shall we say, the conservative forces of art, were represented by the National Society of Fine Arts. They were the resistance to all innovation. In spite of this, I managed to create the section of evening courses of decorative arts, and it was the foundation of what later on Professor [José] Perotti was to turn into a separate school [Applied Arts]. It was my job to acquire it, and I preferred it in that neighborhood [Matta Avenue] because it was a popular quarter.[10]

The Ibáñez Dictatorship: Initial Scenario of the School

Following the efforts undertaken by Director Isamitt since 1927 to reorient the School of Fine Arts—on which Applied Arts depended—it was, paradoxically, shut down at the end of 1928, after

Figure 1 (top)
The founder of the School of Applied Arts, Carlos Isamitt, and to his left the sculptor José Perotti, first director of the school between 1933 and 1956, in the basement of the School of Fine Arts. The image corresponds to evening classes for workers' children, which were held in 1928 (Carlos Isamitt Archive).

Figure 2 (bottom)
Ventura Galván, design for tapestry, 1928. This work reflects the combined influence of abstract art and local pre-Columbian motifs, an local example of the Isamitt reform era. Galván then studied architecture, becoming Director of the School of Applied Arts from 1957 to 1963 (Carlos Isamitt Archive).

the Official Salon that had taken place in the month of October, and declared to be undergoing restructuring. This decision was taken by Finance Minister Pablo Ramírez[11]—who, at the time, also took up the post of Public Instruction—who resolved the temporary closure of the institution to allocate the annual budget of 1929 to the voyage of a group of teachers and students of Fine Arts to a perfection course in Europe.

From its beginnings as a Republic in the first decades of the nineteenth century through the scenario which the School of Applied Arts was born into, Chile had alternated between two options for steering of the country: one was the figure of a strong leader ("Presidentialism"); the other was the weight acquired by the political class from the National Congress ("Parliamentarianism"). The 1920s saw the emergence of a military leader who attempted to restore Presidentialism through a nationalist authoritarian regime: the Dictatorship of Carlos Ibáñez (1927–1931). Besides restricting the action of the entire political class, one of the main objectives of his government was the modernizing of the State and the fomentation of national industry.

A pivotal moment regarding the direction of Applied Arts in the country is the late 1920s. The contemporary view holds that the recipients of Minister Ramírez's scholarships had a parallel mission of perfecting their artistic careers, to absorb different applied arts techniques and ensure a practical knowledge they could apply upon their return.[12] Nevertheless, the travel and return of these artists coincided with the rise and fall of the dictatorship, a time of great political, economic, and social upheaval. Following the Minister's polemical intervention, the dictatorship met with an adverse factor: the Great Depression. After an energetic start, characterized by a vast renovation of state bureaucracy, the important development of public works, and promotion of industrialist and self-supplying ideals, the growth obtained on the basis of foreign debt (mainly to the United States) led the country to acute economic crisis, and consequently the motion of keeping the School of Fine Arts closed until 1931 didn't prosper. The majority of scholarship recipients had to return before completing their allotted period of studies in Europe.[13]

The reform that Ramírez carried out had, by Supreme Decree, absorbed the School of Fine Arts of the University of Chile, creating in 1929 the Faculty of Fine Arts to which the National Conservatory of Music, the Academy of Fine Arts and the School of Applied Arts also belonged. The Academy of Fine Arts resumed its activities in 1930, in the words of artist and student Carlos Hermosilla, under "the sign of the most decrepit academicism." In light of this situation, and in the twilight of the régime, "A group of artists supported by nonconformist students seized the window of opportunity at the fall of the regime (July 1931), took revolutionary control of the establishment, and forced the new authorities to make an important reform.[14] Thus, in 1932, the Faculty of Fine Arts was reorganized, and

to it belonged the National Conservatory, The Institute for Extension, and the School of Fine Arts; the latter composed of the Academy of Fine Arts and the School of Applied Arts.

Comparing the list of artists who left for Europe to those who, on their return, resumed their teaching posts at the School of Applied Arts[15] leads us to another set of questions. What was the real position of the scholarship recipients regarding Applied Arts? Had they shared Minister Ramírez's desire to give a utilitarian or practical sense to the presence of art in Chile?

Artisans, Artists, and Artificers

Regarding the path Applied Arts had taken, a 1933 brochure pointed out that, after several years of reforms, the aim of the institution was to shape "in the domain of crafts and professions, the artisans, artificers, and teachers in the subject of applied arts who must undertake effective and direct participation in our nascent artistic industries."[16] School activity was divided among the following workshops: Fire Arts, which involved ceramics and enamel work on metal or glass; Metal Arts, dedicated to foundry, forging, and repoussage; Textile Arts, which involved textile work in its different processes and applications; and finally Graphic Arts, which involved engraving, print work, poster art, and artistic bookbinding. In 1934, the Wood Arts workshop, dedicated to cabinetmaking and carving, was added.

According to regulations approved in 1936, Applied Arts issued a university degree to those who completed studies of artificer or professor in applied arts, while a General Artisanat Certificate was awarded after two years of study to artisans who attended the day course basic cycle, in addition to a mention according to the specialization workshop they had completed. Another important option for artisans was night courses which, upon completion of their three-year duration, offered the option of an Artisanat Certificate in specializations such as ceramics, stained glass, metal enameling, engraving, bookbinding, textiles, poster art, and cabinetmaking.

Figure 3
School of Applied Arts, Printmaking Workshop (Photo by Antonio Quintana, printed in a catalog of the School, 1933).

Fernando Marcos (1919), an artist and teacher who pursued studies at the institution during the 1930s, points out that Applied Arts was made up chiefly of students from popular urban quarters and from rural localities near Santiago. He also underlines the importance of the convergence that the School facilitated between workers or their offspring, and artists who frequented the establishment. This was outlined by a new brochure in 1934:

> … the School of Applied Arts fulfills a high social goal in that its daily and nightly courses are attended not only by artists who endeavor to solve artistic problems, but also by laborers and workers who aspire to master a technique or a craft that forces them to create new forms, to break the routine of imitation, and to develop their aesthetic expression.[17]

The "Inwards" Development Model

The great paradox that the development of the School represents for Chilean society could be that it was active during a period of national life known as the "inward" development model, which ranged from the early 1920s to the failure of democracy in 1973. This historical trajectory saw different governments representing a wide political spectrum, but sharing common objectives such as the strengthening of the State as articulator of national development, the fostering of local industry, and the promotion of technical training to incorporate productive activity to popular sectors.

Among the landmarks of the initial phase discussed above was the "Prefer Chilean products" promotional campaign, put in motion in the early 1930s by the Ibáñez Dictatorship to confront the Great Depression through production, installing slogans such as "Chilean Product," and "Made in Chile" that are in use to this day. At the end of the decade, the Popular Front Government, headed by radical politician Pedro Aguirre Cerda, pushed for the institutionalization of the developmental model through the creation of the Chilean Economic Development Agency (CORFO).[18]

Although it may appear that these decades were the best scenario for the School of Applied Arts, it also was managed by artists who maintained a difficult relationship with the Fine Arts faculty (on which they depended), and both the teacher corps and graduates of the establishment aspired more to recognition from the Chilean artistic milieu—which was hard to come by—than to the establishment of collaborative links with the productive sector, all of which may have contributed to a "do it yourself" form of legitimacy, but also, as the twentieth century progressed, to paving the way towards design. In short, the artists who had links to the School wanted, in their majority, to occupy the country's traditional art spaces (galleries, exhibitions, salons, and award shows) at a time when there was a vast space yet to be conquered in homes, public spaces, shop windows, and in the daily life of Chileans. The

opposing forces of an industrial mode of work or education, and the reluctance to lose the status of "unique work" in the institution's production, was an unsolved dilemma for this establishment.

It appears that the Applied Arts community took too long (three decades) to understand that the School was marching to (and should have aspired to) a progressive autonomy from the domain of art by virtue of its belonging to the main teaching center in the country, the University of Chile. Had this separation happened, in turn it may have brought about an approximation to other sectors of the University, such as the Physical and Mathematical Sciences Faculty or the Social Sciences Faculty, an alliance that also signified projection towards domains such as industry and communications.

In the opinion of Paulina Brugnoli, a teacher at Applied Arts during its final years, the social diversity of the institution was its greatest asset but, at the same time, its greatest weakness in that it made it difficult to reach a critical consensus on collective projects, or on changes that needed to be undertaken.

The School was a refuge that assigned value and a leading role to popular culture, but always looked for recognition in "high culture" (Fine Arts). From today's perspective, there is every indication that the future of the establishment was in mass culture rather than in high culture, or in the nexus between popular culture and mass culture; particularly in light of the period between the 1930s and 1960s, when Chilean society was transformed decisively into a mass culture, or a culture of mass consumption.

The Central Decades

The greatest difficulty for any investigative effort relating to Applied Arts lies in that the wealth of printed matter is to be found in the first and fourth decades of activity (the 1930s and 1960s), while in the central decades (the 1940s and 1950s) there is a dearth of documentation, visual records, and other sources. Furthermore, the present option of having access to a considerable number of oral histories is pending work that needs to be undertaken.

Far from assuming that the period we refer to was one of stability for the School, much less for the country—the Popular Front (1938–1941), the outlawing of the Communist Party (1948), the Second Presidency of Carlos Ibáñez (1952–1958), the election by a small margin of the rightist candidate Jorge Alessandri (1958), and the Christian Democratic government of Eduardo Frei Montalva (1964–1970)—it is easy to understand why Applied Arts didn't consolidate a long-term project if it existed during the period known as the "inwards" development model, where the desire for a national industry and slogans such as "Chilean Product" were part of the discourse of the political factions at the helm of the country for several decades.

We have referred to the problems that have afflicted this school, and from as early as the 1930s there are different testimonies

that corroborate this: "The state of the building in which the School operates is far from satisfactory…."[19] "… in spite of the austere material means with which the School operates, and that hinders its development…."[20] "… forged iron or foundry demand, with constant sacrifice on the part of the worker, tools, and elements the School almost entirely lacks…."[21] Adding to these difficulties was the dispute over the establishment's University status during the 1940s and 1950s. The late '60s ushered in the University Reform, a time in which the School "became a tangle of contrary positions. There were those that tackled student learning from a technical standpoint, and those that put emphasis on aesthetic elements. And, of course, there were also conflicts between renovators and conservatives."[22]

The true impact of this institution on the productive area between the early 1930s and late 1960s is the subject of a pending investigation, necessary for both history and studies in Chilean design. Precisely when the latter discipline began to have a more defined presence in the country, the School of Applied Arts was nearing the end of its life span. In a decade of great social upheaval—the 1960s—and under the influence of external factors such as the Cold War, the Cuban Revolution, and profound changes on a local level (industrial development, University Reform, Agrarian Reform, and the nationalization of copper and mining), the School seemed to be stranded in its founding ideas, ignoring the changes that had occurred in national and regional contexts. In a catalogue for a school exhibition, José Perotti, first director of the faculty between 1933 and 1956, dealt with the contradictions between Applied Arts teaching and an orientation towards industry:

> Regarding the School of Applied Arts's collaboration with the country's industrial activities, we can say that, although its teaching isn't specifically industrial because it lacks the equipment for it, and furthermore that teaching of this nature would stray from its main objective, the technical and artistic preparation which it undertakes and its production together with its graduates is destined to have a favorable influence on industrial development in the country, whether it be guiding the public's sense of appreciation or supplying artificers and artisans equipped with a solid conceptual foundation….[23]

At the dawn of the School's last decade of activity, the production of the documentary *Creative Hands* (Fernando Balmaceda, 16 mm, 1961) and an exhibition held at the Central House of the University of Chile were intended as promotional platforms for an institution whose permanence was in question. On the other hand, the "inwards" development model, which was to foster training and closer ties of less-privileged sectors to the University, ran into the necessity of validating Applied Arts within the university structure, thus progressively alienating those sectors who had initially consti-

Figure 4
School of Applied Arts, ceramics workshop, 1948. (The image corresponds to another catalogue published that year.)

tuted the bulk of its alumni: "… little by little, workers and their sons disappeared from the workshops."[24] Director Perotti himself warned "that he is losing ground in his educational orientation: his school is flooding with upper-class girls with bachelor's degrees in search of fashionable careers. It is no longer possible to recruit students and teachers from the dispossessed strata of society."[25]

While between the 1930s and 1950s those who advocated an "artistic" direction for the School—associated with crafts, manual skills, direct contact with materials, and an interest in traditional handiwork—openly resisted increasing ties with industrial production, from the 1960s onwards, this link became a necessity for an important part of teachers and students. It is worth revising, then, the path taken by a few graduates who contributed to the professional recognition of design in the country during Applied Arts' last years.

The Graduates' Path

Waldo González studied at the School between 1953 and 1957, the year in which he obtained the degree of Professor of Art, specializing in posters and propaganda. Upon completing his studies, he joined the faculty as a teacher, a post he held until the closure of the School following the University Reform.

This graphic artist would occupy an important place between the 1960s and the early 1970s thanks to his pedagogical work at the institution, and for his work in the local graphic milieu, which would achieve great visibility between 1971 and 1973. A main trait of his work was that, by virtue of its use of a mass communications media such as the poster, it managed to address the idea (stemming from Applied Arts) of linking propaganda and local graphic design to local culture. Although it is possible to recognize other influences of the period, such as Cuban graphic art, pop art, and some of the traits of hippie graphics, the images produced by González cited, for the most part, local expressions such as the mural, engraving, and traditional handicrafts.

There is a recognizable interest for the political mural—a considerable presence in Chilean streets at the time—in the campaign developed by Waldo González and the young designer Mario Quiroz for the Polla Chilena Charity Fund between 1971 and 1973. Given that the client for this project was a charity institution with a solid presence in the country, a strategy was devised to keep a distance from stereotypes of well-being as imposed through American advertisement, believing that "it was necessary to establish a dialogue between the ruling class and those they rule through an image that generated higher cordiality between the sender and the receivers of the message." The project was geared towards the more modest social strata, and that intention was confirmed on reaching the streets: "The first Polla poster disappeared everywhere, people took it to their home, and it was even necessary to triple the printing run."[26] The public repercussion of this campaign nevertheless had an unintended consequence after 1973. Although not necessarily close to the left or to political activity, González endowed these graphics with "the intention of meeting my people." His work was so strongly associated with the cultural codes of the Popular Unity period (the government of Salvador Allende, 1970–1973) that this association brought upon him difficulties during the military regime of Augusto Pinochet, reducing once numerous commissions to a trickle, and forcing him to focus his attention on teaching.[27]

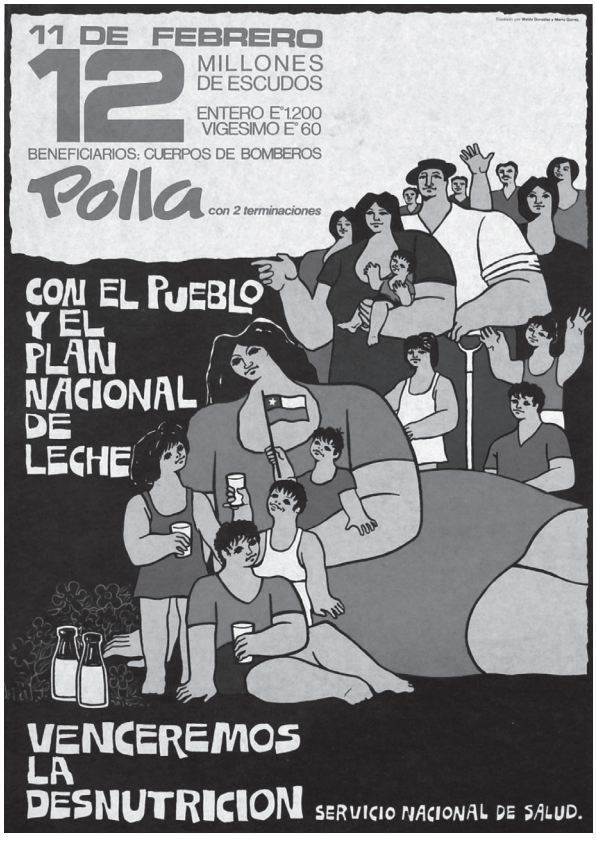

Figure 5
Waldo Gonzalez and Mario Quiroz, poster for the Polla Chilena de Beneficencia, 1973. This work is a combination of the imagery of the time. On the one hand, exaggeration of extremities (hands and feet) evoking Mexican muralism, and on the other, irregular black lines, uniform color and handwritten texts evoking the street propaganda of the Allende era; and finally, the ascending perspective and masses escaping the format, evoking socialist realism (Waldo Gonzalez/Mario Quiroz Archive).

Vicente Larrea studied at Applied Arts between 1961 and 1965 and began his graphic work at the Department of Cultural Extension of the University of Chile in 1963. He greatly values the teachings of Professor Waldo González, along with what he has learned from the self-taught Rafael Vega-Querat, who had vast professional experience and maintained close ties to the international design and typography world.

After four years at the Department of Cultural Extension, he set up a small studio in the center of Santiago, wanting to continue his work at a time when posters were widely in demand. Carlos Quezada, a student in ceramics at Applied Arts and close to Larrea, told him of the creation of a folk group—Quilapayún—and asked him to design the cover of their first album, *Folk Songs of America*, which the group had created with singer-songwriter Víctor Jara in 1967 for the Odeón label.

The following year, Larrea received another commission from the group: the cover of the album *Por Vietnam* (X Vietnam). This work also was one of the first for DICAP (Popular Song Discotheque), a label created that same year by the Communist Youth's Culture Commission to give groups and soloists a place for production and diffusion, an alternative to the greatly restrictive recording market and radio programming.

The musical movement known as the "Nueva Canción Chilena" ("New Chilean Song") represented a unique opportunity for the country's graphic designers, in which the close-knit relationship between musicians, producers, and designers facilitated the project's reach. On the heels of this album came Victor Jara's record *I Place in Your Open Hands*, released in June 1969. Vicente Larrea points out that, at the time, there was full awareness of the outreach of mass communications and "the intention of doing well the task we had undertaken." This last point demonstrates a different take on the profession as compared to that of most graphic artists trained in Applied Arts between the 1930s and 1950s, for whom graphic communication was merely a survival medium and a "transitory" activity on the path to an artistic recognition that, in most cases, never happened. "We are not artists," said Larrea in a 1971 interview.[28]

The numerous record covers—approximately one-hundred and twenty—and nearly three-hundred posters on which he worked alongside a team of siblings including Maricruz and Antonio Larrea, Luis Albornoz, Ximena del Campo, Hernán Venegas, and Mario Román, would make this body of work an obligatory reference point of the transition from the '60s to the '70s. That period saw Vicente Larrea's studio pioneer another important area: logotype design—a testimony to the work carried out for the musical groups Inti-Illimani, Illapu, and Quilapayún.

The closed form, high contrast, uniform inks, irregular contours, and hand-tracing of characters were traits derived from

other production systems such as serigraphy and offset printing. Regarding external influences, Larrea points to referents such as hippie graphics, Cuban poster art, the animated film *Yellow Submarine* and, especially, the work of Jewish-Lithuanuian illustrator Ben Shahn.

Like Waldo González, Vicente Larrea took up educational responsibilities on graduation, working as a teacher at the School of Applied Arts (1968–69) and at the School of Design of the University of Chile during its first years. Having witnessed firsthand the closing of the original faculty and the protracted debate during the time of the University Reform, he abandoned academic activity, disappointed by the individual and political machinations throughout the process.

Rodrigo Walker entered Applied Arts in 1967 with the intention of studying design. Nevertheless, shortly after entering, he faced—like many students—the uncertainty that his professional design title still existed. This situation led to widespread discontent in the student body, and the demand for a professional rank for design, which became one of the central motives behind the Reform which swept through Applied Arts, and led to the widely publicized occupation of the establishment in 1968.

That same year, within the context of the student movement, a group of dissident students took note of an academic event to be held in Argentina, the "Seminar of Industrial Design Education in Latin America," which brought to the neighboring country the former director of the Ulm School of Design (HfG Ulm), Tomás Maldonado.

A fraction of the dissident group, made up of Alfonso Gómez, Guillermo Capdevila, Fernando Schultz, and Walker himself, managed to attend the seminar, where they contacted Maldonado. He informed them of the imminent arrival in Chile of the German designer Gui Bonsiepe, the former leading professor of the HfG Ulm which, in the meantime, had closed its doors as a consequence of the worldwide student movements.

This last paradox should be noted in order to understand the development of design in Chile: while the Reform was seen as an opportunity for change and of recognition for local design, it also had brought about the end of a point of reference for its field (HfG Ulm). And, in part, the arrival of Bonsiepe brought the country the rationalist focus and design methodology of HfG Ulm.

Gui Bonsiepe arrived in the country in October 1968, hired by the International Labour Organization (ILO) at the request of the government of Eduardo Frei Montalva (1964–1970), to work as an advisor within the context of the program for the development of small- and medium-sized industry.[29]

In 1969, following the Reform, the Faculty of Fine Arts split into different departments: Fine Arts, Design, Public and Ornamental Art, Handicrafts, and Theory. The School of Design of the University

of Chile was officially recognized in August of the following year. A degree certificate in Design was issued on completion of studies, with specializations in Interior Design and Furniture, Textile Design, Advertisement Graphics, Landscaping, Fashion, and Industrial Design.[30] The faculty was incorporated into Campus Los Cerrillos of the University of Chile, a vast complex located in the western sector of Santiago, on land donated by Jewish businessman Salomón Sack.

The administrative denominations, though novel, did little to facilitate the path towards a renovation of teaching. There had been successive attempts since 1966 to renew the Applied Arts study plan, incorporating workshops dedicated to "industrial design" from 1967 onwards, but they were met with negative response from the student body on the grounds that working methods still were predominantly artisanal (ceramics, woodcarving, etc.). The crisis brought on by the scarcity of teachers capable of giving a new direction to the School was such that students themselves became involved in the search for new teachers for the faculty.[31]

The situation reached a critical moment in March 1968, when experiments to give impulse to industrial design produced a new study plan called "Crafts Design," which comprised subjects such as Form Studies, Composition, Drawing and Painting, Art History, and Drafting. The murky orientation of this new proposal and its similarity to the more traditional focus of the School gave way to a new crisis, and it was this very year that academic activities came to a halt as a result of the Reform.[32]

Although students had been actively involved in the search for new teachers for the School between 1967 and 1968, this failed to bring about a greater openness to incorporating new knowledge. This was confirmed again when the group of students who had contacted Maldonado tried to procure Bonsiepe for the new School of Design:

> We petitioned the School of Design of the (University of) Chile that he become our teacher. But the teachers in charge didn't like Bonsiepe. Why? Because Bonsiepe knew, unlike the teachers then in place. He knew about design, and also knew that they didn't know….[33]

Vicente Larrea, who sympathized with the Reform at its beginning, agrees with this vision, pointing out that most of the professorate saw only the opportunity to revalidate their posts or functions, and that the process had, in the end, not brought about the profound educational changes that had been sought.

Besides incorporating the word "design" institutionally, the most significant change was the schism within Applied Arts between those sectors which favored the formation already imparted by the School, and those that proposed a radical distancing from traditional artisanal, crafts, and the "popular" character of the faculty, instead

looking for a more effective tie with industry and technology. In this scenario, and in line with the polarization of the country at the time—equivalent to the periphery-center/local-global dichotomy—those in search of professional recognition for design emigrated to the new premises that had been built in the sector of Cerrillos,[34] while those that continued to defend Applied Arts remained at the old house on Arturo Prat until the closure of the faculty following the Reform.[35] Yet in the midst of these circumstances, the academic body of the brand new School of Design didn't sympathize with Bonsiepe's presence in Chile, either.

As a result of the visibility acquired by the student demands, the students (Schultz, Gómez, Capdevila, and Walker), motivated by the presence of the German designer and academic, managed to reach an agreement with the authorities of the School of Design to pursue their studies with Bonsiepe outside of the School, but recognizing its validity. Thus, the group developed a parallel formation devised by Bonsiepe which contemplated studies in other departments of the University of Chile, acquiring knowledge in economics and engineering. This group of students collaborated in SERCOTEC[36] prior to the reign of the Popular Unity government. Following the election of Salvador Allende as President in September 1970, they formed, together with Bonsiepe, the Industrial Design Group of the Institute for Technological Investigation (INTEC), a department of the Chilean Economic Development Agency (CORFO)—a group whose activity spanned from early 1971 to September 1973.

Although the majority of the projects that the Industrial Design Group carried out between 1971 and 1973 never made it to production due to a military coup (September 1973), the work done established a reference for the pedagogy of design that differed from what had been done thus far in the country, proposing a techno-scientific focus that distanced itself from an aesthetic and artisanal vision of everyday objects, instead proposing a programmatic vision of the relationships between industrial production and object usage, in line with the political framework that sustained this experience: the socialist government of Salvador Allende. After long years of scarce, vague, or biased recognition, today's perspective permits a broad view of this process which is, without a doubt, relevant to the development of local design.

Rodrigo Walker was a teacher at the School of Design of the University of Chile until 1980, when he was discharged from the faculty for political reasons. He then set up his own firm, Walker Design, that between the late 1970s and today has developed a large body of work in the field of industrial design, producing white goods and electrical appliances. At the dawn of the 1990s, he returned to academia as a professor and director of different schools. Currently, Walker is pursuing an independent teaching career, dedicated to promoting design management.

Like Walker, Alfonso Gómez was a teacher at the School of Design throughout the '70s, eventually leaving the faculty for political reasons. In 1980, following threats from military regime officials, he fled the country to establish himself in Paris, where he worked on educational schemes for the integration of the poor.[37] In 1997, upon returning to Chile, he combined business management with academic work in different schools.

Guillermo Capdevila was detained by the military in the days following the coup d'état. He fled the country in 1974 to pursue studies at the Royal College of Art (RCA) in London, obtaining a Master's degree in product design. He later established himself in Spain, where he set up his own studio and was recognized for his work as an industrial designer, as well as being one of the founders of the Design Center of Bilbao. He died in an automobile accident in 1999.

Fernando Schultz suffered a similar fate to Capdevila during the first days of the Chilean dictatorship, enduring a prolonged stay in detention and torture centers. After expulsion from the country, he also studied industrial design at the RCA in London. From then to the present, he has resided in Mexico, where he was invited to join the Azcapotzalco campus of the Metropolitan Autonomous University (UAM), working towards fostering small- and medium-sized industries, and developing ties between handicrafts and design.

It is precisely Schulz's activities from the second half of the 1970s on that reminds us of the evolution of design education in Latin America: "The only way to be global is to be local. In other words, to contribute personal knowledge...";[38] With regard to the rocky transition of Applied Arts to Design in the Chilean milieu, Germán Perotti, son of the first director of the School and former teacher at the faculty, says: "… handicrafts and design should be developed in parallel. Were this not to happen, we would be negating vital aspects of national culture, and hindering its economic development. This is a battle of epic proportions. But back then, the conditions to do it weren't in place."[39] Perhaps this is why the School of Applied Arts remains an active or latent testimony, in spite of its irregular memory. Of all the imported educational models that contributed to forging the teaching of art and design in the Chilean milieu, this was the space most permeable to local culture and to a wide social spectrum. The Ulm model, which so inconvenienced the professorate in the late 1960s, was just as foreign as the School of Decorative Arts of Paris, which had inspired the beginnings of the institution at the dawn of the twentieth century. Chilean design's pending challenges, whether or not it pleases local aficionados of terms such as "innovation" and "development," are to be found, at some point, in the school we have examined here.

Final Observations

This project was a unique educational model in its context, and to this day there have been no other institutions dedicated to imparting an aesthetic-functional education open to the whole of Chilean society, marked by the integration of knowledge, content, and practices derived from diverse social sectors. The latter is important in that Chilean design has a pending task in consolidating a firm standing on its own terrain, to have a true impact on national life, or to become, at last, a cultural expression of the country—something it is far from in the eyes of Chilean society today.

Although the School of Applied Arts failed to become, or was late in becoming, conscious of its role in Chilean design, the paradox of its falling out with the "inwards" development model is more critical. The Popular Unity government could have been the ideal platform for the principles of this school, insofar as it was a socialist regime whose cultural and productive focus resolutely undertook the aspirations of previous decades.[40] Nevertheless, Salvador Allende reached the presidency in 1970, as Applied Arts was falling apart, and the military dictatorship dealt a final blow by permanently shutting down the School in the last months of 1973, due to its perceived association with the Allende era of the Study Center's regionalist focus and interest in artisanal development. Additionally, the dictatorship also marked the end of the "inwards" development model; replacing the central role of the state with a neoliberal model (in place to this day) that gave protagonism to the private sector, promoted a free market and excessive imports and consumption, and eventually affected both large swathes of national industry and small producers and artisans.

In short, the challenges that propelled Applied Arts, such as the proper insertion of the local in the productive arena, the inclusion of popular sectors in the growth of the country, and the self-production of knowledge all are pending, and here Chilean design has a task to do. The study and profound understanding of this educational experience not only has testimonial or historical importance: it also may open new lines of work in the present.

When the School of Applied Arts disappeared from the educational landscape during the second half of the 1970s,[41] both the "popular-local" and the "technical" fell from favor within the new orientation adopted by design education in the country. The former was put into question given its connections with left-wing discourse, and was considered synonymous with underdevelopment, with which design was to sever ties in order to be in tune with the new internationalism advanced by the military regime that had removed the socialist President Salvador Allende. The latter was seen as a "doing" which didn't fit in with the favored new format for professional design education. University schools became a minor offshoot of architectural education, as well as forum for those that didn't manage to fit in that particular space or in the local art field.[42]

In conclusion, it is important to stress the popular character of the beginnings of design in Chile; as much in terms of the social strata to which the School of Applied Arts was geared, as in its contents and production. Although in its last years the School came under harsh criticism by the student body and some teachers for the its lack of definition in the face of the rise of design as a concept in the national arena, it also is true that a gradual transition between several decades of work and the professional recognition of design in Chile may have contributed to the rise of a discipline capable of making the transition between the local and the universal.[43]

1 An institution established in 1849, during the government of President Manuel Bulnes. In its beginnings, it was called "Academy of Fine Arts."

2 Uncredited; "Arte aplicado a la industria" ("Art Applied to Industry"), *El Mercurio* (Santiago: October 6, 1904): 3.

3 Emilio Rodríguez Mendoza, "La Escuela de Bellas Artes de Santiago" ("The School of Fine Arts of Santiago") *Anales de la Universidad de Chile* Tome CXIV, (Santiago: Imprenta Cervantes, 1904), 732.

4 Arias was a government envoy in Europe between 1882 and 1889.

5 Moisés Vargas, *Bosquejo de la Instrucción Pública en Chile* (*Outline of Public Teaching in Chile*) (Santiago: Imprenta Barcelona, 1908), 333.

6 José Perotti, "Las Artes Aplicadas en Chile" ("Applied Arts in Chile"), *Revista de Arte* I:4 (Santiago: Facultad de Bellas Artes de la Universidad de Chile, December 1934–March 1935): 7.

7 Unsigned; "Orientación" ("Orientation"), *Revista de Arte* 1:1 (Santiago: September 1928): 1.

8 Uncredited; "La Reforma en la Escuela de Bellas Artes" ("Reform at the School of Fine Arts"), *Revista de Arte* 1:1 (Santiago: September 1928): 5.

9 Ibid., 7.

10 In Alfredo Aliaga, "Breve Historia de la Plástica Chilena, XV. Carlos Isamitt" ("Brief History of Chilean Fine Arts, XV. Carlos Isamitt"), *En Viaje* 335:XXVIII (Santiago: September 1961): 33. Sculptor José Perotti was assigned Night Section Chief of Decorative Arts in 1928, and later acted as the first Director of the School of Applied Arts from 1933–1956.

11 See Gonzalo Vial, *Historia de Chile (1891–1973),* Vol. IV, *La Dictadura de Ibañez (1925–1931)* (*History of Chile [1891–1973],* Vol. IV, *The Ibañez Dictatorship [1925–1931]*) (Santiago: Editorial Fundación, 1996).

12 See: Patricio Lizama, "El cierre de la Escuela de Bellas Artes en 1929: Propuestas, querellas y paradojas de la vanguardia chilena" ("The Closing of the School of Fine Arts in 1929: Proposals, Conflicts, and Paradoxes of the Chilean Avant-Garde"), *Aisthesis* 34 (Santiago: Instituto de Estética PUC, 2001): 134 –152; Justo Pastor Mellado, "La política anti-oligárquica del Ministro Ramírez y sus efectos en la organización de la enseñanza de artes" ("The Anti-oligarchic Policy of Minister Ramírez and Its Effects on the Organization of Arts Education"). www.justopastormellado.cl (gabinete de trabajo [work cabinet], May 2003).

13 Patricio Lizama, "El cierre de la Escuela de Bellas Artes en 1929: Propuestas, querellas y paradojas de la vanguardia chilena"; 150.

14 In Antonio Romera, *Carlos Hermosilla* Colección artistas chilenos (Chilean Artists Collection) (Santiago: Instituto de Extensión de Artes Plásticas, Facultad de Bellas Artes Universidad de Chile, 1959), 17.

15 In 1934, out of twenty-six artists favored by Ramírez' measures, only five were teaching at the School of Applied Arts: Armando Lira (drawing), René Mesa-Campbell (ceramics, in charge of the Fire Arts Workshop), Héctor Banderas (ceramics), Oscar Millán (artistic bookbinding), and María Valencia (toymaking).

16 *Escuela de Artes Plásticas, Sección Artes Aplicadas* (School of Fine Arts, Applied Arts Section) (Santiago: Universidad de Chile, 1933), 7–8.

17 *Escuela de Artes Plásticas, Sección Artes Aplicadas* (School of Fine Arts, Applied Arts Section) (Santiago: Universidad de Chile, 1934), 6.

18 CORFO was a state institution dedicated to fostering and regulating the country's industrial development. It was created in the late-1930s under a mandate of President Aguirre Cerda, who was at the helm of the first center-left government in Chile's history: the Popular Front. This type of political coalition had come about worldwide during the inter-war period as a way of curbing the spread of fascism.

19 Ricardo Richón-Brunet, "La Escuela de Artes Aplicadas y su porvenir" ("The School of Applied Arts and Its Future"), *Revista de Arte* IV:19-20 (Santiago: Facultad de Bellas Artes Universidad de Chile, 1938): 20.

20 Jorge Letelier, "Artes Aplicadas" ("Applied Arts"), *Revista de Arte* III:14 (Santiago: Facultad de Bellas Artes Universidad de Chile, 1937): 19.

21 Jorge Letelier, "Exposición de la Escuela de Artes Aplicadas" ("Exhibition at the School of Applied Arts"), *Revista de Art* II:9 (Santiago: Facultad de Bellas Artes Universidad de Chile, 1936): 43.

22 Germán Perotti, "Perotti y la Escuela de Artes Aplicadas" ("Perotti and the School of Applied Arts") in *José Perotti*, catalogue of the exhibition at the National Museum of Fine Arts, Santiago, November 2003, 15.

23 Ibid., 19.

24 Ibíd., 16.

25 Ibíd., 19.

26 Mauricio Vico, "Waldo González y los carteles para la Polla Chilena de Beneficencia" ("Waldo González and the Polla Chilena Charity Fund Posters") in *Chilean Poster 1963–1973* (Santiago, Chile: Ediciones B, 2004), 9.

27 Ibíd.

28 Silvia León, "Los Larrea" ("The Larreas"), *Ritmo* 314 (Santiago, September 7, 1971): 20.

29 Hugo Palmarola, "Productos y socialismo: diseño industrial estatal en Chile" ("Products and Socialism: State Industrial Design in Chile") in *1973, Daily Life in a Crucial Year,* Claudio Rolle, ed. (Santiago: Editorial Planeta, 2003), 243.

30 Decree No. 10032, Santiago, August 26, 1970, which approves curriculum and corresponding titles for Design studies at the Fine Arts Faculty. This information was provided by the architect Fernando Caracci, Director of the School of Applied Arts from 1963-1968, and the Department of Design from 1968-1973.

31 Fernando Shultz, *Para una historiografía (no más) del diseño industrial en Chile* (*Towards a Historiography (No More) of Industrial Design in Chile*), Personal notes, unpublished.

32 Ibíd.

33 "Walker, Bonsiepe y la Guerra de las Galaxias" ("Walker, Bonsiepe and Star Wars"), Interview with designer Rodrigo Walker in *Revista Envidia* 1 (Santiago: Facultad de Arquitectura y Urbanismo, Universidad de Chile, 2000): 33.

34 Crucial to the origin of this space was the work of architect Ventura Galván, Director of Applied Arts between 1957 and 1963.

35 Strictly speaking, the School of Applied Arts ceased to exist in 1973.

36 The Technical Cooperation Service SERCOTEC, a department of the Chilean Economic Development Agency CORFO, was the first time Bonsiepe worked in Chile, between 1968 and 1970, as the result of an agreement between the International Labor Organization ILO, the Interamerican Bank of Development BID, the United Nations, and CORFO.

37 Hugo Palmarola, "Productos y socialismo: diseño industrial estatal en Chile"; 290.

38 Fernando Shultz, *Para una historiografía (no más) del diseño industrial en Chile* (*Towards a Historiography (No More) of Industrial Design in Chile*).

39 Germán Perotti, "Perotti y la Escuela de Artes Aplicadas" ("Perotti and the School of Applied Arts") in *José Perotti*, catalogue of the exhibition at the National Museum of Fine Arts, 19.

40 One of the main tasks of the Allendist program was to "solve the immediate problems of the great majorities. To this end, the productive capacity of the country will be shifted from expensive and superfluous items destined to satisfy the high-income sectors, to the production of inexpensive high-quality items for mass consumption." *Basic Program of the Popular Unity* (Santiago, 1970): 23.

41 A minimal portion of the School's written and visual documentation was dispersed among the University of Chile's different libraries and archives, while the bulk of the information was "trashed" (destroyed or met an uncertain fate).

42 The "younger sibling" relationship that had existed between Fine Arts and Applied Arts was, from the second half of the Seventies, displaced to the connection between architecture and design.

43 In 1994, in the context of the Second Biennale hosted by the School of Design of the Catholic University, international guest Alessandro Mendini criticized the organizing party in harsh terms for its lack of interest in the artisanal and traditional crafts of Chile.

Design in History

Victor Margolin

"What is the use of history?" one might ask, when attempting to make sense of contemporary life. What answers might we find in the past to questions about the present when the current configuration of actions and events seems so volatile and unstable? Simply trying to keep our balance demands so much energy and attention that looking beyond the moment for helpful explanations might seem like a useless distraction. However, history has always played a role in shaping contemporary thought, whether it was Herodotus's attempt to find patterns of human action to explain Athenian military might, the rediscovery of ancient philosophical and literary texts by Petrarch and other Renaissance scholars; or Karl Marx's teleological vision of a classless society that would dissolve the conflict between the wealthy and the working class.[1]

"In recent years, most historians have tended to carve the past into small pieces and focus on specialized topics. They have done this rather than pursue the larger spatial and temporal visions that have animated a few of the profession's most prominent figures including Eric Hobsbawm, the British historian who has written, among many books, an epochal four-volume history of Western politics and society that ranges from the French Revolution in 1789 to the collapse of the Soviet empire in 1991.

In a collection of his essays, published in 1997 as *On History*, Hobsbawm presented three papers which dealt, respectively, with the past, present, and future. In "The Sense of the Past," he affirmed the place of the past in the present. "To be a member of any human community," he wrote, "is to situate oneself with regard to one's (its) past, if only by rejecting it. The past, therefore, is a permanent dimension of the human consciousness, an inevitable component of the institutions, values, and other patterns of human society."[2] Hobsbawm combined a belief in "la longue durée" or "the long term" from the French *Annales* school, which he called the "formalized social past," with the recognition that this stable component of the social order is complemented by more flexible sectors of social change and innovation.[3] Recognizing the various components of society and their differing rates of change can be extremely helpful in contributing to a balanced process of social transformation that does not lead to social destabilization or collapse. Thus, for Hobsbawm, history in its best sense becomes "a process of directional change, of development or evolution."[4]

Nonetheless, there are forces that militate against learning from history. One that Hobsbawm identifies is the "a-historical,

The initial version of this essay was presented as the keynote address at the 17th Annual Symposium on the Decorative Arts and Design at Cooper-Hewitt, National Design Museum, New York City, Thursday, April 3, 2008.

1 For an excellent account of Western historiography, see *A Companion to Western Historical Thought*, Lloyd Kramer and Sara Mazda, eds. (Oxford: Blackwell, 2002).

2 Eric Hobsbawm, "The Sense of the Past" in Hobsbawm, *On History* (London; Weidenfeld & Nicholson, 1997), 10.

3 On the "longue durée," see Fernand Braudel, "History and the Social Sciences: The Long Term," *Social Science Information* 9 (February 1970): 145–175. The original French version of Braudel's essay, "La Longue Durée" was published in the *Annales* journal in 1958, and then republished numerous times. It appears in a collection of Braudel's writings, *Les Ambitions de l'Histoire* (Paris: Editions de Fallois, 1997), 149–178.

4 Hobsbawm, "The Sense of the Past," 18.

engineering, problem-solving approach by means of mechanical models and devices."[5] The other is its opposite, the distortion of history for ideological ends of which we see so much today. Hobsbawm's complaint about the former is that it lacks perspective, and cannot account for anything that is not fed into a theoretical model.[6] What he rejects is a technocratic way of addressing social problems that lacks the human experience for which history is the repository. As seers of the future, Hobsbawm states, "[historians] are by definition concerned with complex and changing ensembles, and even their most specific and narrowly defined questions make sense only within this context."[7] What the historian can contribute to imagining the future, he claims, is a vision of how different strands of social activity relate to each other. Historical forecasting, he states, provides "the general structure and texture which, at least potentially, includes the means of answering all the specific forecasting questions which people with special interests may wish to make—of course insofar as they are answerable at all."[8]

Hobsbawm's characterization of the historian as someone who can provide holistic frames for imagining future social actions and projects would not have been possible without the growing interest in the vast terrain of social history that embraces the full spectrum of human activities. This tendency was initially evident among historians of the French *Annales* school in the years between the two world wars, but it received an added impetus from the myriad social movements of the 1960s that brought politics to the grass roots, and identified a broad social agenda of human rights and environmental concerns.

As Hobsbawm notes, "Social history can never be another specialization like economic or other hyphenated histories, because its subject-matter cannot be isolated."[9] He insists that the social aspects of human life are not separate from other aspects, which include the material environment. Thus, available models of historical processes are not sufficient for the development of a history of society. New ones need to be invented. To achieve this, he believes, historians with different areas of expertise will have to establish a greater unity of now separate practices and theories.

I support Hobsbawm's call for greater collaboration among historians, but note that in his account of the most interesting work in social history he makes no mention of material culture, design, architecture, or any of the arts. Granted that the essay, "From Social History to the History of Society," where he outlines promising tendencies in social history research since the mid-1950s, was published in 1972, a few years before the Design History Society was founded in Britain and design history received its first strong impetus, his omission of material and cultural life as integral components of any social model is worth noting.[10]

Hobsbawm singles out classes and social groups, modernization and industrialization processes, social movements and other

5 Eric Hobsbawm, "What Can History Tell Us about Contemporary Society?" in Hobsbawm, *On History*, 35.

6 Hobsbawm cites one example of such a practice: the Delphi technique invented by the Rand Corporation. He describes it as a process of "asking selected groups of experts to consult their chicken's entrails, and then drawing conclusions from such consensus as may or may not emerge." Hobsbawm, "Looking Forward: History and the Future" in Hobsbawm, *On History*, 39.

7 Hobsbawm, "Looking Forward: History and the Future," 42.

8 Ibid.

9 Eric Hobsbawm, "From Social History to the History of Society" in Hobsbawm, *On History*, 75.

10 Since Hobsbawm wrote these words, a number of historians have paid considerable attention to artifacts; whether as ephemeral as fashion designs, or as enduring as civic architecture. I discuss some of this work later in my essay.

forms of social protest, demography, and "mentalities"—the French term for modes of thought—as key areas where social historians have been working.[11] His list consists of processes, practices, and ideas and omits material objects and images. And yet there is no human activity that is not embedded in material culture. To support this assertion, I introduced the term "product milieu" in 1990 to represent "the human-made material and immaterial objects, activities, and services; and complex systems or environments that constitute the domain of the artificial."[12] My argument was that human action takes place within this milieu, thus opening up the question of how important it is in contributing to action and, consequently, social processes, activities, and events. Until now, this question has remained within the design research community, and even there researchers find greater interest in analyzing design methods than in trying to understand design's part in the unfolding of social life. So where should we look for answers?

In his seminal, two-part survey of "The State of Design History," first published in *Design Issues* in 1984, Clive Dilnot discussed design's place in the social world, stating in part I of his essay his belief that design cannot be fully understood without considering its social dimension. "The conditions surrounding the emergence of a designed object or a particular kind of designing involve complex social relations," he wrote. "The fact that these relations are described *only* in design terms obscures their social or socioeconomic aspects."[13] He then went on to state in part II that "[t]he essential field of design's meaning and import, therefore, is *not* the internal world of the design profession, but the wider social world that produces the determining circumstances within which designers work, as well as the conditions that lead to the emergence of designers."[14] I agree with Dilnot's call to understand design in the widest possible framework, but I would expand it and urge design historians to bring what they have learned about design into a closer relation with the research that historians in other fields are doing.

As a community of design historians, we have accomplished a great deal since Dilnot's two-part article was published in 1984. There is now a cadre of researchers, representing multiple generations, who have brought the study of design's history to a respectable scholarly level. We have journals in which their research appears, and a growing collection of academic publications. Design historians now work in multiple languages around the globe, thus bringing a complexity of voices and viewpoints to the field. Yet despite these accomplishments, the community continues to operate within an intellectual framework that frequently isolates design from much of what other historians do. With the exception of occasional journal special issues or sessions at conferences, design history does not engage actively with related fields such as business history, labor history, and the history of technology, invention, and engineering, or the histories of economics or even material culture.[15]

11 Hobsbawm, "From Social History to the History of Society," 83.

12 Victor Margolin, "The Product Milieu and Social Action" in *Discovering Design: Explorations in Design Studies*, Richard Buchanan and Victor Margolin, eds. (Chicago: The University of Chicago Press, 1995), 122. The definition cited here is a condensed version of the one Richard Buchanan and I used in 1990 for the program statement of the "Discovering Design" conference we organized at the University of Illinois, Chicago, where the product milieu paper was presented.

13 Clive Dilnot, "The State of Design History. Part I: Mapping the Field" in *Design Discourse*, Victor Margolin, ed. (Chicago: The University of Chicago Press, 1989), 227.

14 Dilnot, "The State of Design History. Part II: Problems and Possibilities" in *Design Discourse,* 244.

15 A notable exception is the *Journal of Design History*'s special issue on design, commercial expansion, and business history; with an introduction by Jeffrey Meikle. See *Journal of Design History* 12:1 (1999).

This is partly the result of design history's stage of development. With a large number of teachers who come from practice and direct their teaching of design history to future practitioners, there is a strong emphasis on narratives that limit the field rather than broaden it. This focus has positive and negative consequences: it makes the history of a particular practice more engaging for future designers, but it simultaneously obscures the relation of that practice to other fields of design and to the wider history of society that Eric Hobsbawm envisioned. Such an approach also fails to engage historians in other fields because it speaks little or not at all to concerns of theirs that lie outside of the field of design.

The Relevance of Histories of Technology

"Technology historians have done considerably better than historians of design in relating the subjects of their inquiries to a wider social field. In *American Genesis: A Century of Invention and Technological Enthusiasm, 1870–1970*, Thomas Hughes moved well beyond a study of individual objects to link technology and invention to an explication of the American character. He located the most important technological developments at the level of systems rather than individual objects. "In popular accounts of technology," he wrote, "inventions of the late-nineteenth century, such as the incandescent light, the radio, the airplane, and the gasoline-driven automobile, occupy center stage, but these inventions were embedded within technological systems. Such systems involve far more than the so-called hardware, devices, machines and processes, and the transportation, communication and information networks that interconnect them. Such systems consist also of people and organization." As an example, he cited an electric light-and-power system that might incorporate "generators, motors, transmission lines, utility companies, manufacturing enterprises, and banks. Even a regulatory body may be co-opted into the system."[16]

"A central theme of Hughes's book is how the culture of invention shifted from the workshops of individual inventors and their staffs to large corporate laboratories, which were far more conservative even as they industrialized the process of inventing. At stake in Hughes's account of technology is how the United States organized itself as a nation to produce technological devices for peace and war. His attention to systems shows how social actors from many different backgrounds came together to accomplish common goals, and he also examines the complex relation between those goals and the technological systems he describes. Although he deals with large themes of government policy and corporate strategy, there is nothing in Hughes's narrative that lies outside of the history of design. Comparing Thomas Edison and Henry Ford as designers he writes:

> Designing a machine or a power-and-light system that functioned in an orderly, controllable, and predictable way

16 Thomas Hughes, *American Genesis: A Century of Invention and Technological Enthusiasm, 1870–1970* (New York: Viking, 1989), 3.

> delighted Edison the inventor: designing a technological system made up of machines, chemical and metallurgical processes, mines, manufacturing plants, railway lines, and sales organizations to function rationally and efficiently exhilarated Ford the system builder. The achievements of the system builders help us understand why their contemporaries believed not only that they could create a new world, but that they also knew how to order and control it.[17]

"Hughes refers here to Henry Ford's design for the extraordinary River Rouge plant, where the entire process of creating an automobile from the production of steel to the manufacture of parts, to the design of the auto bodies and the final assembly of the vehicle occurred. By characterizing Ford's conception and plan of River Rouge as design, Hughes enlarges the sphere of activity that can and should be addressed within design history, while also connecting design to a range of ambitious business practices whose study is currently missing from the field.

"Like Hughes, another historian of technology, David Noble, extends the idea of design in his book *America by Design: Science, Technology, and the Rise of Corporate Capitalism* to the invention of complex systems where business executives expropriated the workers' technical knowledge and reduced them to parts of a production process over which they had no control. What, one might ask, does this have to do with design? Why should it not be labor history? The answer is that the subject of Noble's investigation is not labor per se, but its place within the corporate organizations that managed technological innovation. And these were designed.[18] "For technology is not simply a driving force in human history," Noble writes. "It is something in itself human; it is not merely man-made, but made of men."[19]

Both Hughes and Noble as historians of technology owe a tremendous debt to Lewis Mumford, whose broad interests embraced technology, architecture, town planning, literature, and much more. Though Mumford had academic appointments at various universities during his career, he was primarily an activist and crusader for whom historical research was a strategy to examine large moral and ethical issues that related to the design of everything. His 1934 book *Technics and Civilization*, as rife with polemics as it is with facts, is hardly a model for the systematic historian. Nonetheless, it is the best account we have of how deeply technology is embedded in the conduct of social life. What drives Mumford's narrative is the way it has shaped human character. While he inserts himself and his values into the history of technology in a way that would cause dismay among professional historians, as a result he makes the bold claim that technology contributes to the mechanization of life and undermines the organic lifestyle he values.[20] Mumford also addresses the future as Hobsbawm urged historians to do, although he does

17 Hughes, *American Genesis* 8. See also Thomas Hughes, *Human-Built World: How to Think about Technology and Culture* (Chicago: The University of Chicago Press, 2004).

18 See the special number of *Design Issues* devoted to organizational design entitled "Design + Organizational Change," *Design Issues* 24:1 (Winter 2008).

19 David Noble, *America by Design: Science, Technology, and the Rise of Corporate Capitalism* (New York: Alfred A. Knopf, 1977), xxi–xxii.

20 Mumford continued to write about technology and its social consequences in his two-volume work *The Myth of the Machine*, published between 1967 and 1970.

it in a prescriptive rather than a predictive way.[21] "Hence we do not have to renounce the machine completely," he states, "and go back to handicraft in order to abolish a good deal of useless machinery and burdensome routine: we merely have to use imagination and intelligence and social discipline in our traffic with the machine itself."[22]

Why is it then that *Technics and Civilization* is hardly read or referred to by design historians, while it remains one of the founding texts for historians of technology? It is a natural complement to Siegfried Giedion's *Mechanization Takes Command*, which many design historians reference, but it devotes less attention to furniture and other domestic objects that continue to hold a central place in design history research. Feminist design historians such as Cheryl Buckley also ignored Mumford and the history of technology in general when they sought to identify the role women have played in the history of design. In a seminal essay, "Made in Patriarchy: Towards a Feminist Analysis of Women in Design," published in 1986, Buckley argued for a greater recognition of craft arts that had been overlooked by design historians, rather than considering the field of mechanical and technical invention where many examples of women's achievements are evident.[23] Even Isabelle Anscombe's survey *A Woman's Touch: Women in Design from 1860 to the Present Day* and Pat Kirkham's comprehensive, edited volume *Women Designers in the USA, 1900–2000*, both of which discuss women as industrial designers, make no mention of invention and the design of technology as activities that engaged women.[24]

Historians Writing Design History

"Among historians, the French *Annales* school has taken material culture most seriously as a consequence of its members' interest in geography, sociology, economics, and related disciplines. Henri Berr, founder of the *Revue de synthèse historique* at the end of the nineteenth century, provided an impetus for future *Annales* historians, but it was Marc Bloch's and Lucien Febvre's journal *Annales d'histoire économique et sociale*, which was founded in 1929, that became the principal focus for the group.[25] Of the *Annales* historians, Fernand Braudel paid the most attention to the material of daily life and included it as a vital component of his three-volume history *Civilization and Capitalism 15th–18th Century,* the French edition of which was published in 1979.[26] Braudel's aim was to expand the study of the European market economy by exposing a more complex structure than he believed other historians had recognized. Besides the mechanisms of production and exchange, he identified "another, shadowy zone, often hard to see for lack of adequate historical documents, lying beneath the market economy: this is that elementary basic activity which went on everywhere and the volume of which is truly fantastic."[27] Braudel called this zone "material life" or "material civilization."[28] Though he recognized the ambiguity of both terms,

21 I introduced the distinction between predictive and prescriptive future scenarios in my essay, "Design: The Future and the Human Spirit," *Design Issues* 23:3 (Summer, 2007): 5.

22 Lewis Mumford, *Technics and Civilization* (New York: Harcourt Brace & Co., 1963, c.1934), 426–427.

23 See Cheryl Buckley, "Made in Patriarchy: Toward a Feminist Analysis of Women and Design" in *Design Discourse*, Victor Margolin, ed. (Chicago: The University of Chicago Press, 1989), 251–264; *A View from the Interior: Feminism, Women and Design*, Judy Attfield and Pat Kirkham, eds.; and *A View from the Interior: Women & Design* (London: The Women's Press, 1989).

24 Ruth Schwartz Cowan, a prominent historian of technology has focused on women as consumers of technology rather than producers of it in her book, *A Social History of American Technology* (New York: Oxford University Press, 1997). For a history of women inventors, see Autumn Stanley, *Mothers and Daughters of Invention: Notes for a Revised History of Technology* (Metuchen, NJ: Scarecrow Press, 1993).

25 I have taken my account of the Annales school from Michael Bentley, *Modern Historiography: An Introduction* (New York: Routledge, 1999), 103–115.

26 Braudel's three-volume study was preceded by a shorter, single volume, *Civilization Matérielle et Capitalisme*, which was published by Librairie Armand Colin in 1967. An English translation, *Capitalism and Material Life 1400–1800* appeared in 1973.

27 Braudel, *Civilization and Capitalism 15th–18th Century, V. 1:The Structures of Everyday Life*, 23

28 Ibid.

he believed the sphere of activity for which they stood was essential to his account of how capitalism developed.

Braudel emphasized houses, furniture, and fashions as indicators of differences between the rich and the poor. "The poor in the towns and countryside of the West lived in a state of almost complete deprivation," he wrote. "Their furniture consisted of next to nothing, at least before the eighteenth century, when a rudimentary luxury began to spread…."[29] He briefly discussed furniture makers, but devoted considerably less attention to their craft than to a more anthropological account of where furniture was placed in homes and why. The design of interiors was, for Braudel, also an indicator of a society's stability. He noted that unchanging interiors were characteristic of traditional civilizations. "A Chinese interior of the fifteenth century," he stated, "could equally well date from the eighteenth, if one ignores certain variations—porcelains, paintings and bronzes."[30] By contrast, Braudel argued that "the characteristic of the West in matters of furniture and interior decoration was undoubtedly its taste for change, a relative rapidity of development which China never knew. In the West, everything was constantly changing… nothing escaped a complex evolution."[31] He treated fashion similarly, linking it to a broad array of customs that include gestures, greetings, and body care.

Braudel considered houses, interiors, and clothing components of material life, which he related to food, technology, money, and urbanism. Concluding the chapter in his first volume, where he discusses these, he affirmed the importance of considering material goods in an economic context and a social one as well. For Braudel, material goods are constituents of "a complex order, to which the assumptions, tendencies and unconscious pressures of economies, societies and civilizations all contribute."[32]

A principal and justified criticism of the *Annales* school is its emphasis on structures and processes rather than events. Nonetheless, Braudel's study of capitalism, which adopts methods from anthropology and sociology, can be useful to design historians both as a demonstration of scholarly ambition and a model of how the components of daily life relate to larger economic and social forces. Braudel did not write about design per se, but his inclusion of buildings, furniture, interiors, and clothing within his study of capitalism was exceptional among historians at the time, and continues to serve as an example of how material culture can be incorporated within a large, historical narrative.

Around the time Braudel published his study in France, historians elsewhere also had begun to consider design's relation to social and economic themes and issues; although more recent ones. One of the now classic texts adopted by design historians, although written by an historian outside of the field, is Jeffrey Meikle's *Twentieth Century Limited: Industrial Design in America, 1925–1939*. It was published in a Temple University Press series called *American*

29 Ibid., 283
30 Ibid., 285
31 Ibid., 293
32 Ibid., 333

Civilization, where it joined other volumes on revivalist religion, Social Darwinism, and radical feminism. Although Meikle, an American studies scholar, provides excellent formal analyses of various industrial products, he discusses them within a narrative that describes how America became a consumer society. Replete with documentation from many sources, the 1979 book successfully reveals the complex social relations that Dilnot later claimed were central to understanding design.

Since Meikle wrote from within American studies rather than design history, he had to make design relevant to the research of other scholars in his field; hence his framework is the economic and social transformation of the period between the two world wars to which a transformation in design practice contributed. Although *Twentieth Century Limited* has a more central place today in the canon of design history literature than in American studies, its importance for the latter field lies in the way Meikle demonstrated that design is crucial in gaining a full picture of the American economy during the late 1920s and the 1930s.[33] Some years later, another historian trained in American Studies, Regina Lee Blaszczyk, published a book that related design to the wider field of consumption. In *Imagining Consumers: Design and Innovation from Wedgwood to Corning*, Blaszczyk explored the ways that several American manufacturers of china, glass, and ceramic goods correlated their design and production strategies with an assessment of the markets they sought to reach.[34] A related book whose subject is British society in an earlier period, and which had some bearing on Blaszczyk's work, is *The Birth of a Consumer Society: The Commercialization of Eighteenth Century England* by Neil McKendrick, John Brewer, and J. H. Plumb in which the three historians show how designed objects contributed to a consumer revolution that paralleled manufacturing in making mass production a staple of the capitalist marketplace.

Looking at advertising and public relations rather than industrial design, Roland Marchand used advertisements and magazine covers instead of products to examine American business practices in the first half of the twentieth century, and their effect on the public. However, his book *Advertising the American Dream: Making Way for Modernism, 1920–1940* contributes as much to understanding the consumer as it does to explaining the workings of corporations and their advertising agencies. In a subsequent volume, *Creating the Corporate Soul: The Rise of Public Relations and Corporate Imagery in American Big Business*, Marchand made an important contribution to business history by examining the role of advertising agencies, designers, and public relations consultants in creating corporate images. Among the industrial designers who participated in this process were Walter Dorwin Teague and Norman Bel Geddes, about both of whom Marchand wrote extensively.[35] Advertising histories such as Jackson Lears's *Fables of Abundance: A Cultural History of Advertising in America* and Michele Bogart's *Artists, Advertising,*

33 Meikle has played a prominent role in the Anglo-American design history community, contributing articles to various journals and exhibition catalogues; and writing an important book on plastics. One of his doctoral students, Christina Cogdell, published a book on streamlining that related it to the American belief in eugenics. See Christina Cogdell, *Eugenic Design: Streamlining America in the 1930s* (Philadelphia: University of Pennsylvania Press, 2004).

34 Regina Lee Blaszczyk, *Imagining Consumers: Design and Innovation from Wedgwood to Corning* (Baltimore: The Johns Hopkins University Press, 2000). For a book that looks at consumption in a different industry, see Sally Clarke, *Trust and Power: Consumers, the Modern Corporation, and the Making of the United States Automobile Market* (Cambridge: Cambridge University Press, 2007). Before her book appeared, Clarke published an article based on her research in the *Journal of Design History*. See Sally Clarke, "Managing Design: the Art and Colour Section at General Motors, 1927, 1941," *Journal of Design History* 13:1 (1999) [Special Issue: Design, Commercial Expansion, and Business History]. A more polemical approach to the consumption of automobiles is David Gartman, *Auto Opium: A Social History of American Automobile Design* (New York: Routledge, 1994). On the consumption of refrigerators, see Shelley Nickles, "Preserving Women: Refrigerator Design as Social Process in the 1930s," *Technology and Culture* 43:4 (October 2002).

35 Marchand published articles on both Teague and Bel Geddes in *Design I.*

and the Borders of Art have also made important contributions to our understanding of how designers as well as art directors and illustrators worked within the larger advertising system, while Neil Harris included an essay on design and the modern corporation in his book *Cultural Excursions: Marketing Appetites and Cultural Tastes in Modern America*.

Other cultural historians besides Neil Harris have written about design; among them Deborah Silverman, a student of Carl Schorske. In his book *Fin-de-Siècle Vienna: Politics and Culture*, Schorske included a chapter on the Ringstrasse and its construction, which he related to discussions of intellectual and cultural figures including Gustav Klimt and Sigmund Freud. Silverman adopted Schorske's method of integrating material culture and intellectual history in her study *Art Nouveau in Fin-de-Siècle France*, where she looked at art nouveau from several new perspectives: its place in an evolving government policy discussion within the Central Union of the Decorative Arts, the Third Republic's embrace of eighteenth-century architecture and decorative arts as an act of self-glorification, and the movement's relation to the *psychologie nouvelle*.[36]

Of all the canonical figures in design history, William Morris has attracted the most interest from historians outside of the field. This interest has not ignored his design achievements, but has more emphatically emphasized his political views and his critique of industrial culture. An early book on Morris, and still the most substantial in regard to his political views, is E. P. Thompson's *William Morris: Romantic to Revolutionary.* In *Redesigning the World: William Morris, the 1880s, and the Arts and Crafts Movement*, Peter Stansky does attend to the artifacts that Morris and others produced, but he devotes considerable attention to the social relations that underlay the guilds and exhibiting societies of the movement, and addresses the question of their efficacy. Eileen Boris's *Art and Labor: Ruskin, Morris, and the Craftsman Ideal in America* appeared in the same American Civilization series as Jeffrey Meikle's *Twentieth Century Limited*. An American Studies scholar like Meikle, Boris examined how the craft values of Ruskin and Morris underlay a resistance to the dominant American processes of mechanized production. "By analyzing the ideas of the crafts movement in their social, economic, and cultural context," writes Boris, "this book attempts to examine the late-nineteenth and early-twentieth-century response to the developing corporate order."[37]

In citing a number of historians who have found in the study of design the means to deal with issues related to economics, labor, politics, and social movements, I don't wish to imply that scholars whose primary emphasis is design history have not engaged similarly with social concerns. One could mention various studies, for example, of how design and design policy have contributed to the development of national identity. David Crowley's *National Style and Nation-state: Design in Poland from the Vernacular Revival to*

36 See also Leora Auslander, *Taste and Power: Furnishing Modern France* (Berkeley: University of California Press, 1996); and Paul Betts, *The Authority of Everyday Objects: A Cultural History of West German Industrial Design* (Berkeley: University of California Press, 2004).

37 Eileen Boris, *Art and Labor: Ruskin, Morris, and the Craftsman Ideal in America* (Philadelphia: Temple University Press, 1986), xv.

the International Style is an excellent example, as are many of the essays in *Designing Modernity*, the catalogue edited by Wendy Kaplan that accompanied the first exhibition at the Wolfsonian in Miami, Florida. Jonathan Woodham has addressed this issue in a contemporary context through a number of articles on the British Council of Industrial Design[38]; and Adrian Forty in *Objects of Desire: Design & Society from Wedgwood to IBM* has a number of chapters that would be extremely useful to historians interested in aspects of social history such as labor, hygiene, technology, and business.[39]

What Is to Be Done?

The point to which I want to return in the concluding section of my essay is the paradox of design's pervasive presence in the social world and its marginality within the community of historians. Where then should we begin to seek an explanation for this curious situation? As I have shown, design has yielded valuable results for those historians outside of design history who have incorporated it into their research projects. Therefore, the fault does not lie with design's limitations as a subject.

Should we next look to the community of design historians to question whether they have done all they can to make the subject relevant to a broad audience? I want to acknowledge that an understanding of design and its history is what design historians bring to any discussions of broader topics, but I would argue that many design historians conceive design too narrowly. Although we have surpassed the narrative of Pevsner's *Pioneers of Modern Design* many times over, we still have not sufficiently changed his paradigm of what design is. We now write about stoves and automobiles, corporate identity and digital fonts, but we have little to say about design outside of the realm of consumption. How many design historians have written about the history of military hardware; street lamps, mailboxes, and other urban artifacts; surveillance technology, or interface design?[40] As technologies become more pervasive, design historians should be incorporating them into their narratives and through historical research, contributing to public debates about their value. How many design historians are familiar with the history of the Internet and the role played by DARPA, the Advanced Research Projects Agency of the United States Defense Department, in its founding? Could any design historian provide an analysis of how the ratio of spending in any given country on infrastructure, military hardware, and consumer goods has changed over the years? Or can anyone trace the history of proposals for automobiles that would consume less gasoline, and how automobile companies have resisted them?

Can anyone trace the history of industrial waste and chart the early trajectory of sustainable design practices?[41]

But even if design historians could do all these things, we nonetheless would have to acknowledge that many in the wider

38 See Jonathan Woodham, "An Episode in Post-Utility Design Management: The Council of Industrial Design and the Co-operative Wholesale Society" and "Design and the State: Post-war Horizons and Pre-Millennial Aspirations" in *Utility Re-Assessed: The Role of Ethics in the Practice of Design*, Judy Attfield, ed. (Manchester: Manchester University Press, 1999); along with Woodham, "Managing British Design Reform I: Fresh Perspectives on the Early Years of the Council of Industrial Design," *Journal of Design History* 9:1 (1996), and "Managing British Design Reform II: The Film—An Ill-fated Episode in the Politics of 'Good Taste,'" *Journal of Design History* 9:2 (1996).

39 Forty is an architectural historian who has also written about design.

40 Paul Atkinson is almost alone among design historians in writing about recent technology. See his articles "Computer Memories: The History of Computer Form," *History and Technology* 15:1-2 (1998): 89–120; "The (In)Difference Engine: Explaining the Disappearance of Diversity in the Design of the Personal Computer," *Journal of Design History* 13:1 (2000): 59–72; "Man in a Briefcase: The Social Construction of the Laptop Computer and the Emergence of a Type Form," *Journal of Design History* 18:2 (2005), 191–205; and "The Best Laid Plans of Mice and Men: The Role of the Computer Mouse in the History of Computing," *Design Issues* 23:3 (Summer 2007): 46–61. See also Loretta Staples, "Typography and the Screen: A Technical Chronology of Digital Typography 1984–1997," *Design Issues* 163 (Autumn 2000), 19–34.

41 A pioneering work in this broad area is Susan Strasser, *Waste and Want: A Social History Trash* (New York: Henry Holt & Co., 1999).

community of historians still might not be convinced of design's important role within the field of history. As a comparable example, the eminent historian of science Thomas Kuhn has described the difficulties of getting his colleagues to recognize the value of his own field. He writes:

> But men who consider socioeconomic development or who discuss changes in values, attitudes, and ideas have regularly adverted to the sciences and must presumably continue to do so. Even they, however, regularly observe science from afar, balking at the border, which would give access to the terrain and the natives they discuss. That resistance is damaging, both to their own work and to the development of history of science.[42]

A consequence of this separatism, Kuhn claims, is that historians have abdicated the responsibility to evaluate and portray the role of science in Western culture [much less world culture] since the end of the Middle Ages. He continues by observing that the historian of science, because of the primary commitment to his or her specialty, is no more capable of fulfilling this task. "What is needed," he concludes, "is a critical interpretation of the concerns and achievements of historians of science with those men [and women] tilling certain other historical fields, and such interpretation, if it has occurred at all, is not evident in the work of most current historians."[43]

Kuhn's words from the early 1970s could just as well represent design history's and the design historian's minimal connection to the wider field of history today. By contrast, however, Eric Hobsbawm provides some cause to be more optimistic about the possibilities for collaboration. For him, the motivation for cooperative work centers on a choice of topics that hold mutual interest for scholars from different disciplines. He cites, as an example, "the study of millennial phenomena" which has attracted "people coming from anthropology, sociology, political science, history, not to mention students of literature and religions…."[44] Design historians might consider the Cold War, for example, as a comparable topic to whose study they could make a valuable contribution. A good place to start the discussion would be the Victoria & Albert's exhibition "Cold War Modern: Design 1945–70," which opened in September 2008.[45]

If design historians are to present themselves as valuable contributors to such collective historical research, they have to make a persuasive case for the relevance of their knowledge to fora outside of their field. This is the challenge I put to the design history community. Can design historians contribute more significantly to understanding the past, present, and future as Eric Hobsbawm thought the historian ought to do? I believe so, but to make this possibility more probable will require a cultural shift within the design history community that includes all aspects of how the

42 Thomas S. Kuhn, "The Relations between History and History of Science" in *Historical Studies Today*, Felix Gilbert and Stephen R. Graubard, eds. (New York: W.W. Norton & Co., 1972), 160.

43 Ibid.

44 Eric Hobsbawm, "From Social History to the History of Society," 76.

45 See the catalogue *Cold War Modern: Design 1945–1970,* David Crowley and Jane Pavitt, eds. (London: Victoria & Albert Museum, 2008). An early contribution to Cold War cultural studies was Serge Guilbaut, *How New York Stole the Idea of Modern Art: Abstract Expressionism, Freedom, and the Cold War*. Translated from French by Arthur Goldhammer (Chicago: The University of Chicago Press, 1983). See also Robert H. Haddow, *Pavilions of Plenty: Exhibiting American Culture Abroad in the 1950s* (Washington and London: Smithsonian Institution Press, 1997); and *Cold War Hothouses: Inventing Postwar Culture, from Cockpit to Playboy*, Beatriz Colomina, Annmarie Brennan, and Jeannie Kim, eds. (New York: Princeton Architectural Press, 2004).

subject is taught and researched. Design historians have to broaden the understanding of design they communicate to their students, and they also need to pay closer attention to the ways that design researchers other than historians are thinking about the subject.[46] Is the design history community up to the task? I hope so.

46 In 1991, I raised the issue of design history's relation to a wider field of design research in a paper "Design History or Design Studies: Subject Matter and Methods," which was presented at a conference on design history in Milan. Afterwards, the paper was published in *Design Studies*, and then in *Design Issues*, where it was central to a debate on the subject. It was subsequently included in my book, *The Politics of the Artificial: Essays on Design and Design Studies* (Chicago: The University of Chicago Press, 2002).