**Discovering America**
**Reflections on Henry Dreyfuss, Designing for People**

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My grandfather would sometimes say, when I shared my newest brilliant thought, "Oh, so you discovered America!" This was his kind, sarcastic way of letting me know that my great new insight was already conventional wisdom.

I was reminded of this recently when, as part of creating a new interdisciplinary design program at Stanford (the "d.school" [Kelley]), I encountered for the first time Henry Dreyfuss' classic book on industrial design, *Designing for People* (Simon and Schuster, 1955). Right on the cover was a quote that captures the essence of what we have been developing as human-centered (or user-centered) design.

> *We bear in mind that the object being worked on is going to be ridden in, sat upon, looked at, talked into, activated, operated, or in some other way used by people individually or en masse. When the point of contact between the product and the people becomes a point of friction, then the industrial designer has failed. On the other hand, if people are made safer, more comfortable, more eager to purchase, more efficient,---or just plain happier---by contact with the product, then the designer has succeeded.*

As I read more, I found that Dreyfuss had eloquently laid out many of the aspects of design that have been rediscovered and reinterpreted in the development of human computer interaction design. Reading it from a half-century's hindsight, I saw the roots of many principles that we all now espouse, along with ideas that can be reinterpreted in light of today's technologies to guide us further. After all these years, *Designing for People* is still a timely and highly readable lesson in what it means to do design right.

Dreyfuss was one of a pioneering group of product designers who led the revolution of bringing modern design to everyday objects on a mass scale. Beginning in the 1920s, he engaged in a wide variety of projects, ranging from the classic Westclox "Big Ben" alarm clock to John Deere's farm equipment to the complete industrial design of the 20th Century Limited---known as the "world's greatest train" ---including the cars, locomotives, and passenger experience. In his long and productive association with the Bell system, he designed the telephones that Americans used for many decades, including the classic "500-series" dial phone, the Princess, the Trimline, and the modernist aluminum-and-glass telephone booths that dotted our countryside until the ascendance of the cell phone.

*Designing for People* is an engaging account of how product design has emerged in America. In simple language and personal stories, it gets conveys the deep essence of design thinking. As I read through the book, I mentally checked off the different sections

of my course (and the textbooks) on HCI design and looked at ways that my own thinking has evolved and could move further.

**Role of the designer**

Much of HCI has been shaped by the ongoing tension between designers and programmers. As interface design moved from the programmers to a new kind of interaction designer [Winograd97], there has been ongoing struggle about which concerns drive the process and how the designer should be involved. Dreyfuss worked with engineers in a similar way and fought the tendency to treat design as a cosmetic to be applied after the real work was done. In the late 1920's, just as he was beginning his career, he turned down a commission from Macy's:

> *A fundamental premise was involved in my refusal ---one from which I have never retreated. An honest job of design should flow from the inside out, not from the outside in ... Some manufacturers were reluctant to accept this point of view. They considered the industrial designer merely a decorator, to be called in when the product was finished.…In time manufacturers learned that good industrial design is a silent salesman, an unwritten advertisement, an unspoken radio or television commercial, contributing not merely increased efficiency and a more pleasing appearance to their products, but also assurance and confidence. 18-19*

In HCI we have developed a wide range of methods to produce efficiency, and we draw on graphic and industrial design to provide pleasing appearance. But what contributes "assurance and confidence?." In our recent design teaching at the d.school, we are focused on having students learn the essence of design thinking. This is not a specific technique or skill, but an approach to the people and design problems, as so well embodied by Dreyfuss.

**Affordances**

Although he didn't have the theoretical analysis of Gibson's ecological psychology [Gibson], Dreyfuss's designs emphasized the visibility of affordances:

> *We consciously avoid hidden controls or concealed handles on everything we do. If a door or a panel is supposed to open, we try to through design to show how it opens. If something is to be lifted or operated by a handle, we try to integrate the lifting device into the design, but never conceal it. At the expense of forfeiting originality…we try to make things obvious to operate... in everything we do. - 71*

In describing his experience as a stage scenery designer, Dreyfuss even uses Norman's [Norman] favorite example of affordances, the doorknob, in pointing out that function needs to be treated in conjunction with appearance. The creative challenge we face is how to achieve visibility while still applying originality. The photographs in the book show a wide range of designs by Dreyfuss in which he was able to achieve both.

**Human factors:**

The book devotes an entire chapter to "Joe and Josephine" who personified the human needs and capacities reflected in his designs.

> *If this book can have a hero and a heroine, they are a couple we call Joe and Josephine. …they occupy places of honor on the walls of our New York and California offices…They remind us that everything we design is used by people and that people come in many sizes and have varying physical attributes. ..Our job is to make Joe and Josephine compatible with their environment…. 26-27*

As a pioneer of ergonomics, much of his focus was on human physical measurements and capacities, as presented in his 1960 book *The Measure of Man*. [Dreyfuss60]. This approach led to "human factors" research, which in turn was the origin of HCI as it grew to cover cognitive factors as well.

The new challenge we face today is to keep visible reminders of the subtler and less easily depictable social and cultural differences that determine the compatibility of people with products and interfaces as they become global in their reach and cut across economic and social bounds.

**Contextual design**

Dreyfuss deeply understood that design grew from empathy with the people who would buy and use his clients' products. He was relentless at going out into the field and experiencing from the perspective of the "users" (though he didn't use that term).

> *I have washed clothes, cooked, driven a tractor, run a Diesel locomotive, spread manure, vacuumed rugs, and ridden in an armored tank. I have operated a sewing machine, a telephone switchboard, a corn picker, a lift truck, a turret lathe, and a linotype machine… I wore a hearing aid for a day and almost went deaf. – 64*

For every design, the starting place was the human experience. The skill he encouraged in his design staff was knowing how to see and to listen. This is at the heart of the teaching of design thinking in our program. I recently co-taught a course in which empathy with the user was the key focus, and we explored methods from cameras and probes to experience prototypes and bodystorming. No matter how many times we repeat the mantra "know your user," there is more that can be done, and Dreyfuss well understood this.

**Interface metaphors**

The adoption of the "desktop metaphor" that pervades today's interfaces reflected a sensibility that Dreyfuss called "survival form":

> *Almost without exception, our designs include an ingredient we call survival form. We deliberately incorporate into the product some remembered detail that will recall to the users a similar article put to a similar use. People will more readily accept something new, we feel, if they recognize something out of the past. – 59*

But he also recognized the need to move beyond survival form. In predicting (to an amazingly accurate degree) the airline seats of the future, he says:

> *We appear to be in a transitional period. Such earth-bound symbols as upholstered seats and carpets and little window curtains have given this pioneer generation of air travelers a security that as needed. Now that they have that security, passengers may anticipate interiors designed along functional lines. -133*

Dreyfuss was working at a time that electricity and engines were becoming common in America, and the designer was motivating and smoothing the transition so that these potentially intimidating technologies—motors, irons, refrigerators, telephones—became accepted and taken for granted. Today we are doing the equivalent for computing technologies. How do we give our users the security to let go of the "window curtains" in our interfaces?

**Iterative prototyping**

Dreyfuss' design methods rested on a cycle of sketching, prototyping, and getting feedback, both from users and experts.

> *We enter into close co-operation with the engineers... Our common denominators are the same---Joe and Josephine. We go over countless rough sketches...Three-dimensional clay, plaster, wood, or plastic models are developed...as soon as possible we get a form into clay and actually do our designing in this pliable material.  The final model---a working one, if possible—is presented to the entire client group.  –46-7*

He pioneered the use of what is now called "experience prototyping" in a series of projects ranging from trains and ocean liners to a futuristic "interactive workspace" designed for the Chiefs of Staff in WW2.

> *A highly practical form of research is possible when mock-ups of our designs are built.  When we worked on the designs of the interiors of six liners for American*

*Export, we rented an old stable…and built eight staterooms…The rooms were completely furnished and made livable in every detail, but were entirely different in size and type. We invited guinea-pig travelers who packed luggage as if they were going on an ocean voyage… - 69*

Although there has been much discussion of user experience in HCI, the move to explicit experience prototyping (rather than artifact-centered prototyping) has tremendous future potential.  It has been part of participatory design [Ehn] and more recent developments [Buchenau] have provided an exciting new avenue of exploration in our design courses.

**Emotional Design:**

As an industrial designer, Dreyfuss saw the emotional appeal of products in terms of their sales:

*Sales appeal is an elusive, psychological value. It is the subtle, silent selling the product must do, over and above its eye appeal. The product must express quality through the unity of design, though texture, through simplicity and forthrightness… an amalgam of how a product feels to the touch, how it operates, and the association of pleasant ideas it conjures up in the purchasers mind.*

He campaigned for clean functional design, in a world that was just emerging from the decorative excesses of Victorian tastes.  At the same time, he opposed the trendy use of "streamlining" for everything from toasters to pencil sharpeners, while appreciating the aesthetic drive behind it:

*The designer was in the right stable but on the wrong horse…out of the era of so-called streamlining, the designer learned a great deal about clean, graceful, unencumbered design.  Call it cleanlining instead of streamlining, and you have an ideal that the designer today still tries to achieve. - 77*

Have notable examples such as the Google interface and the iPod brought "cleanlining" to interaction design?  Is the proliferation of virtual 3D object interfaces our version of "everything streamlined?"

**Calm Technology:**

Dreyfuss saw his designs as meeting more than practical needs. He had a higher goal of bringing serenity to the life of the people who used his products. In a premonition of Weiser and Brown's later appeal to "calm technology," [Weiser]  Dreyfuss said:

*A person can aspire to live and work in an environment of meditative calm … I have the temerity to suggest that, by reducing objects to simple, unobtrusive forms, by relieving them of absurd and excessive decoration, by using appropriate colors and textures, and by avoiding obtrusive noises, we contribute to the serenity of those who use them. This is what we try to do. -  240*

As our profession has made the trip from "interface programming" to interaction design, we keep rediscovering parts of Dreyfuss' America. His focus on human factors created an intellectual strand still visible in the name of our major HCI conference. His model for industrial design was taken up as the core of the product design field, and is alive today in the major firms, such as IDEO, which cross over between traditional product design and interaction. His intellectual influence has become pervasive as people from the different provinces of the design world have brought the spirit of design to human-computer interaction [Winograd95].

The HCI world has come a long way in its thinking about design and there is still a long way to go. In our creating our interdisciplinary design courses at the d.school Dreyfuss has been an inspiration to keep a focus on the essence of design thinking – on empathizing deeply with the user, on relentless iterative prototyping, and on the power of design to affect people's lives. For Dreyfuss, the quest of the designer was to bring serenity to the Joes and Josephines of the world. In today's world of massively increased technological sophistication and complexity we should aim for no less.

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