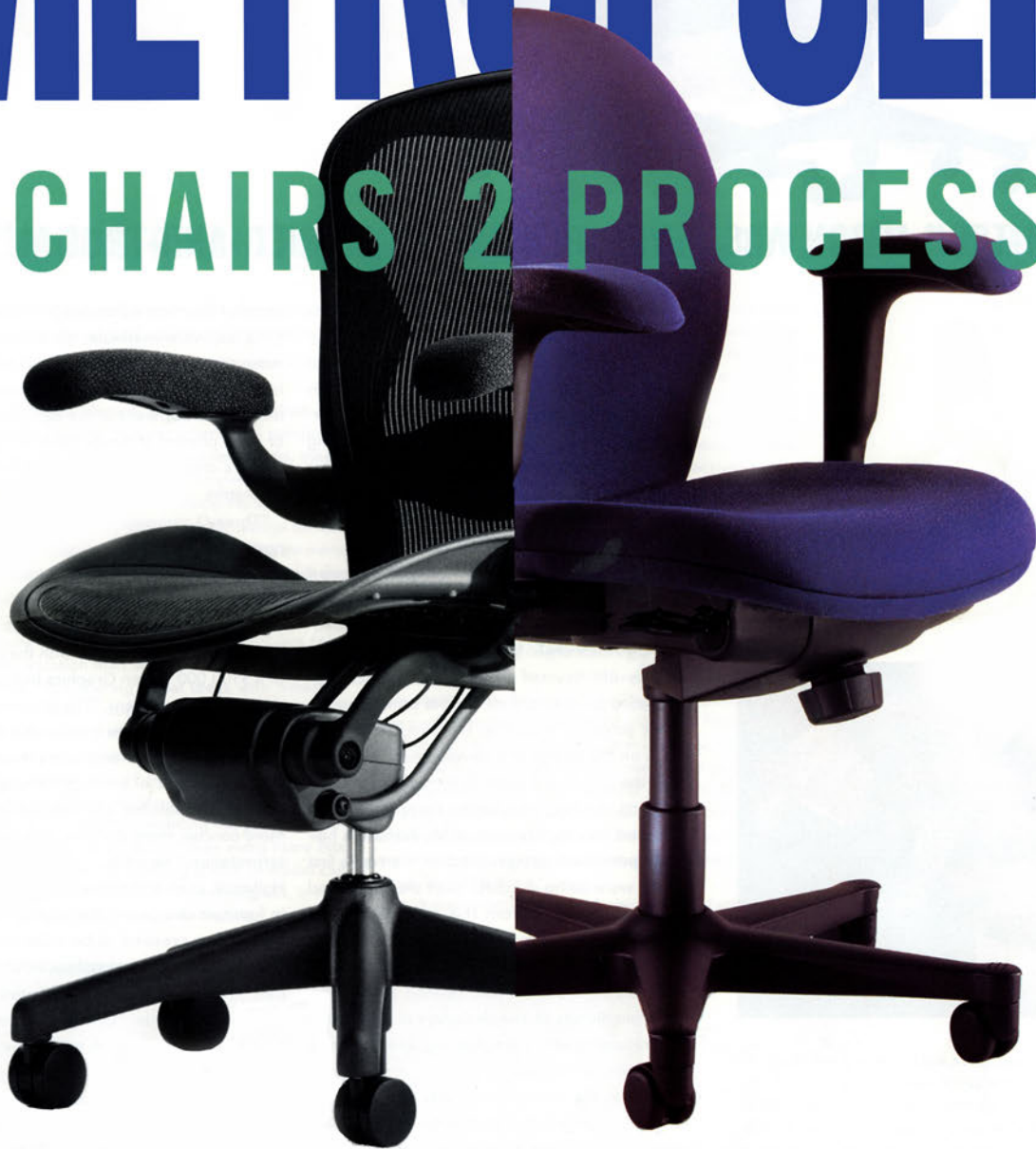# METROPOLIS

2 CHAIRS 2 PROCESSES

RICHARD HOLBROOK DID PRACTICALLY ALL OF HIS DESIGN WORK FOR HERMAN MILLER'S NEW AMBI CHAIR ON HIS POWER-BOOK, A FACT THAT VENERABLE DESIGNERS BILL STUMPF AND DON CHADWICK—COLLABORATORS ON HERMAN MILLER'S SUCCESSFUL EQUA AND GROUND-BREAK-ING AERON CHAIRS—CAN'T FATHOM.

Among the reasons designers like to work with Herman Miller Inc. is the contract furniture manu-facturer's reputation for flexibility. Since the days when people like Charles and Ray Eames and George Nelson were attracted to develop designs for the Zeeland, Michigan-based company,

BY BONNIE SCHWARTZ

THE HIGH-TECH AERON WAS DEVELOPED THROUGH TRIED-AND-TRUE METHODS;

Both Stumpf, above, and Chadwick prefer a hands-on approach to design, especially on a project like the Aeron, top, which required constant readjustments. Throughout the process, the pair built a number of sittable models. Neither disregards computer technology, however; they simply see it as one tool in a range of tools, which also includes the conventional hardware found in Stumpf's studio, below.

Herman Miller has proven again and again its longstanding commitment to work with strong-willed, independent-minded designers without infringing unduly on their individual processes and methodologies. But as generous as this corporate philosophy is, it can also be intimidating for designers, because it forces them to examine closely their own notions and principles about what they are doing and how they are doing it, rather than simply toeing the line.

Industrial designer Richard Holbrook designed one of Herman Miller's most recent entries in the task chair market, the 1995 Neocon Gold Award-winning Ambi chair. Veteran Herman Miller designers Bill Stumpf and Don Chadwick collaborated (as they did on several other Herman Miller projects, including the successful Equa chair) on the design and development of another of the company's recently introduced seating products, the highly acclaimed Aeron, which was admitted into the Museum of Modern Art's hallowed permanent design collection even as its first orders were being shipped. Both the Aeron and the Ambi emerged from the same division of Herman Miller and overlapped for a time in development, but each was brought to market in a markedly different fashion, related to the personal proclivities of the designers involved, the generations to which they belong, and the agenda specific to each project.

Whereas the Aeron, which lists in the $1,000 range, was targeted to design-savvy consumers interested in ground-breaking aesthetics, advanced ergonomics, and original forms and materials, the Ambi, which lists around $650, is more conservative, developed as a best-of-class product to compete with some of Herman Miller's more price-conscious rivals. The paradox is that the high-tech Aeron—a skeletal-looking construction that seems, at first glance, more like an X-ray of a chair than a chair itself (until one sits in it and experiences its contours and systems)—was developed through tried-and-true methods that included the standard iterations of full-scale mock-ups and conventional product testing. The more straightforward and traditional-looking Ambi, on the other hand, was developed with

some of the most advanced 3-D computer-modeling software available, its designer forgoing most standard design procedures in favor of the methodologies of the digital domain. Are these differences apparent in the designs themselves, or is the process of design confined more to a designer's creative dialogue with himself, his collaborators, and his clients?

"Three-D computer modeling is the most important innovation in design methodology since the invention of linear perspective," proclaims the Pasadena, California-based Holbrook, who in 1989 made a bold and early move from analog to digital design processes with the procurement of a $100,000 Silicon Graphics Indigo 1 workstation and Alias software. "The dramatic increase in accuracy of information transfer that digital design allows has helped to accelerate the creation and realization cycle of product development by as much as 50 percent. Communication is clearer, more concise, more decisive, and less open to interpretation," he adds.

Holbrook, in his mid-thirties and not as well known in furniture design as Chadwick (59) and Stumpf (60), feels a pressure to be more reactive to the needs of a difficult marketplace, which has, over the past few years, increasingly squeezed the product development cycle. "Companies are in the position more and more in which they are being forced to recoup their investments quickly," Holbrook explains, "as shareholders are demanding higher returns on their investments. Bringing products to market faster is one way to do this. It's hard to ask a design director why they would want to get their money back more quickly; the answer seems

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## THE MORE STRAIGHTFORWARD AMBI, THROUGH ADVANCED 3-D MODELING.

obvious. And new technologies have afforded designers and corporations the opportunity to implement much faster product turnaround, so everyone knows it's possible."

Holbrook, who's tall, elegant, and exceedingly clean-cut, became conversant with the expedience of computer modeling when one of his clients, Casablanca Fans, asked if he could help the company gain a competitive edge by compressing the time it took to develop his ideas. What he found was that not only did computer design enable him to get a truer sense of what he was working on more quickly, but that he was also able to communicate his design ideas better and, as a result, control more aspects of the design process.

"As a designer, what I do is more about problem solving and communication than about pure self-expression," Holbrook says. "But sharing visual ideas with others is problematic, because if communication isn't clear, the idea isn't fairly evaluated. Misinterpretation can also cause serious compromises and complications. I've always been frustrated by the variable of interpretation during the design process, and have wondered how to eliminate it." For Holbrook, 3-D computer modeling has provided him with this ability. Incorporating as it does many more bits of data in a single visual file than any sketch or model can hold or translate, the digital image allows designers, in Holbrook's view, to "play God" as never before.

Interestingly, although the easy transference of computer files via modem from one location to another would seem to reduce the need for on-site decision making, Holbrook and his memory-rich Powerbook actually lived at Herman Miller for several months during the two-and-a-half-year design process, whereas Stumpf and Chadwick spent most of their time designing in their studios (in Minneapolis and Santa Monica, California, respectively), talking to one another on the telephone and sending faxes back and forth to each other and to Herman Miller's core development team. "Richard was breaking a lot of new ground at the company in terms of computer technology," says Herman Miller's director of corporate relations, Mark Schurman, "so it seemed important, in terms of developing a comfort level with these new tools, that he be here a lot. Instead of building models in his studio, as Bill and Don were doing, he was working very closely with people in the engineering department to develop methods to produce parts directly from his computer files. Also, since it was Richard's first time working with the company, it took some time for him to get up to speed and to get to know the people who work here; whereas Don and Bill, having had a lot of experience with Herman Miller, didn't need to do that. Though even Don and Bill spent plenty of time here during the Aeron process, they never lived here for a time, as Richard did."

The design directive for the Ambi chair was fairly simple:

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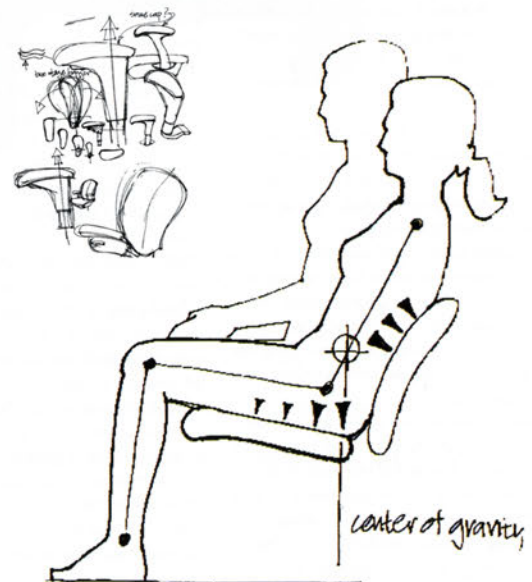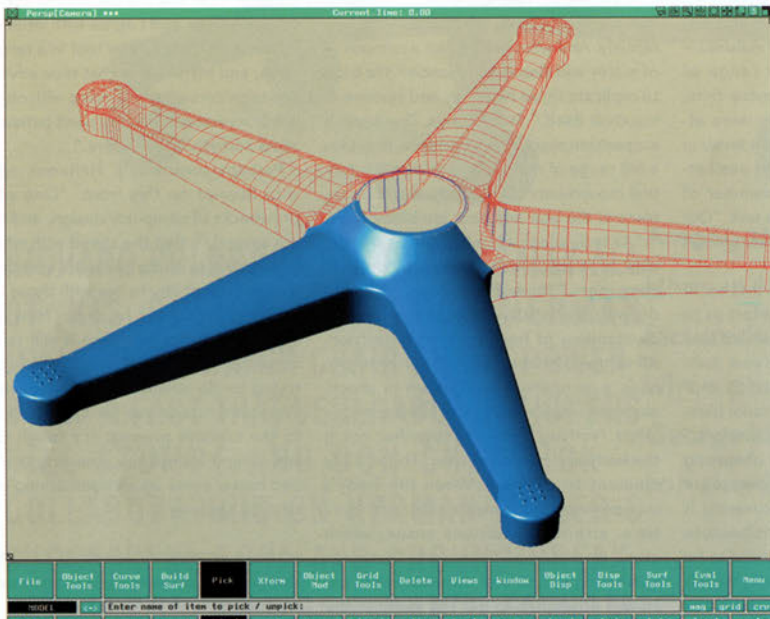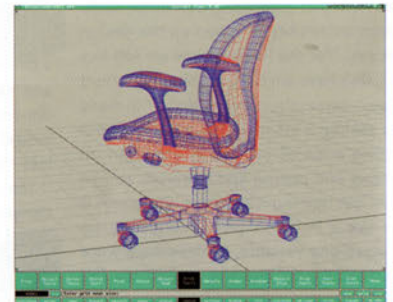
by design

Holbrook was asked to come up with a low-investment task chair that could be brought to market at a relatively low price, be available worldwide with short lead times, and perform beyond the level met by competitors' products in terms of comfort and adjustability. "At first, we wanted simply to meet the highest standards that existed in the market and bring the chair out at a competitive price," says project manager Tom Niergarth. "As the process evolved, however, we realized that we could create a best-of-class product, and so diverged from our initial impulse to use only off-the-shelf products and, with Richard, developed some proprietary mechanisms, such as the tilt device, which outperform those used on our competitors' products."

Instead of putting pen to paper (or cursor to screen), Holbrook's initial response was to gather as much information as possible from inside and outside of Herman Miller before he would ever start, in earnest, to design. "The nice thing about working with Herman Miller is that they really let you go your own way, but that can have the effect of giving you enough rope to hang yourself with. It took me a long time to get to a place where I felt comfortable showing visuals to the core team, because once you do that you get locked into a certain aesthetic, and I didn't want that to happen before I had as much data as I felt I needed to design a truly responsive product," he explains.

But gathering that research, engineering, and manufacturing data took the better part of a year, a process and time span that was beginning to wear on Herman Miller's design and development staff. Though Holbrook was employing computer technology ostensibly to speed up the design process, "for the longest time we felt like we didn't have anything substantial in front of us," remembers Niergarth. "Richard was asking a lot of good questions and getting a lot of precise information on comfort and pricing and materials and so forth, but nothing was falling into place. It was like a Rubic's Cube: Every time we changed one variable, all the others were affected. A year into the project we felt that we needed a visual reference point, an engineering envelope."

Finally, in a move that would mark a major tollgate in the progress of the project, Holbrook was asked to build a full-size model for a meeting of the company's board of directors. Though it frustrated the designer to be yanked out of design mode and thrust into model-building, the resultant model, produced via rapid 3-D prototyping—a process that, through computerized laser technology, produces parts and objects quickly and accurately directly from computer data files—energized the design and development team. "Having that hard model in front of us really rallied the troops," Niergarth says. "For the first time, we knew we were working on a viable product."

"Herman Miller had never worked with a designer before who had embraced these technologies to the extent that I have. Educating the people there to this new way of designing was an essentially paperless process," Holbrook explains. "I sculpted right on the computer and kept modifying constantly. Mock-ups are good design tools, but they are time and resource intensive. I can test out more experiments in form and surface texture and get faster and more accurate readings on them via computer modeling than I could if I tried to build all of my various explorations in a model shop. But there was no paper trail, no thumbnail sketches that we could look back on and see the evolution of the design. So it's hard, using this endlessly iterative process, to step back and evaluate where you are. I think the people inside the company were definitely feeling frustrated by that before we did the first appearance model, which I felt at the time was completely unnecessary," he admits.

"It's impossible to test people's reaction to a product without having them get involved with the visuals," he says, explaining his resistance to taking the time out to build a full-size model. "But while I think that building models to test functional issues is important at specific times during the development process, building appearance models is merely producing a rendering in 3-D. I believe that I can make decisions on form by looking at computer models, but not everyone has that comfort level with this technology."

As comfortable as Holbrook is evaluating his designs on-screen, older-guard designers Chadwick and Stumpf love the tactile nature of the design process and can't think of giving it up in favor of a more artificial process. For them, part of the process of design is its physicality, the ability to feel at the ends of their fingertips the forms and materials they're working with. "I'm always the one who wants to taste the stew while it's still cooking," concedes Stumpf, whose studio often resembles a gumbo of drafting paper and modeling materials. "My first instinct when I start on a new project is to get into the model shop and 'sketch' out some of my ideas in three dimensions. We built our first rough 3-D model of the Aeron less than six weeks into the project."

The design directive for the Aeron was completely different from the one established for the Ambi. While Holbrook was asked to assume an approach that involved limited risk for Herman Miller, Chadwick and Stumpf were charged with developing entirely new criteria for seating, not designing to criteria previously established—and offered a much greater range of resources, though not much more time, to do so. "With the Aeron, we were attempting to reach completely new levels in comfort, ergonomic design, and aesthetics," declares Bob Hieftje, a member of Herman Miller's seating business unit. "Our goal was to create a truly breakthrough product."

What resulted was a product that so alters notions of seating and comfort as to redefine the product class. Instead of covering the support substrate with seat cushions, for example, Chadwick and Stumpf left their so-called "pellicle" material bare. "That happened pretty much by accident," Stumpf remembers. "We were obsessing about the tensile qualities and the nature of that material but kept on covering it up with traditional seat cushions because that's how task chairs were supposed to be designed. By sheer chance one day we left them off and realized that, without the cushions, the chair expressed the celebration of hardware and functionality that we were trying to convey. The pellicle material itself contained everything we needed to realize the comfort levels we were trying to achieve: it admits light; it allows air to pass through so people don't get overheated when they're seated for long periods; it provides incredible support. Once it dawned on us that we didn't need the cushions, it entirely changed our notions about the chair and its aesthetic and performance capabilities."

Chadwick and Stumpf were the likely candidates to design such a breakthrough product for Herman Miller. Not only had they codesigned the company's best-selling Equa chair, which was first introduced in 1984 (a subsequent and refined version, the Equa 2, was released last year), but they had also done some extensive research on a seating product oriented to the health-care market for Herman Miller, which ended up never seeing production. That project, code-named "Sarah," ultimately informed the designers' working precepts for the Aeron to a great extent. "When we examined people in the workplace, we realized that a lot of issues raised by people who have limited mobility, and who therefore have to sit for long periods of time, are shared by office workers, who spend a lot of time in front of computers. So we used what we had learned on the Sarah project to develop some of our early concepts for the Aeron, which had to do with establishing comfortable hip pivot points for people of various sizes, developing a breathable material that allows for even distribution of weight and that never loses its form and support characteristics, and allowing for a certain amount of mobility even within a range of seated positions," Stumpf explains.

Though the design that emerged is fresh and unique, the modeling methods used to achieve it are age-old. "With the Aeron, we were trying to re-create nature," Stumpf explains. "We wanted to replicate the natural processes of the way the spine moves, how people sit. I believe in the possibilities of artificiality, but I like even my artificial experiences to be a tone closer to nature. So what I was in search of while developing the Aeron with Don was a tone parallel to nature: real comfort, reflecting outside of the body what is going on internally. And what are we but a composite of water and tissue and muscle? We tried to replicate those materials and systems in the chair itself," Stumpf says. The Aeron's suspension system, for example, provides a full range of motion that mimics the natural movements of the body, and the contours of the seat and back are biomorphic.

"As technologically advanced as this design is, it has really nothing to do with computers," Stumpf continues. "It has to do with the wisdom gained from an understanding of how the bones function. All of the joints in the chair, for example, have a dampening mechanism [a shock-absorption–like system], just like our body's joints. Nothing is planked together, not in the body and not in the chair. This is a key element to comfort. When the body's dampening mechanisms degrade over time, arthritic conditions ensue, which cause tremendous discomfort. That's not something a computer necessarily knows. How is it possible to get the sense of the ride of a chair by working on a computer model? You need the physical experience. There are many bits of information that can be imported onto a computer disk, but what isn't on a disk is us, in terms of hard data: how skin stretches on the buttocks when we sit, for example. We need to have people sitting on those chairs to determine stress."

Due to their interest in replicating natural forms and functions in the Aeron, Chadwick and Stumpf can't imagine having developed the chair any way other than the way they did—through an extensive sequence of built, sometimes fairly rough, sittable models. "I rely very much on the skills of my eyes and my hands," Chadwick reflects. "The tactile aspects of design are so important to me. The Aeron required a lot of sculpting and modeling. There was a constant readjustment of angles. Even when we were at the stage of digitizing the physical models for rapid prototyping, the computer could never really understand the forms we were trying to create because there are so many complicated 3-D transitions taking place in the design. It would have been a different chair if we had designed it on the computer, I'm sure of that. I think it would have been compromised. But perhaps I'm tainted by my methods of working. I like to resolve and refine things tactually."

Stumpf agrees. "We did a lot of physical tests that couldn't have been performed on a computer, and for those we needed iteration after iteration of full-scale, sittable models. Developing exactly the right ratio of tension for the pellicle material, for example, involved numerous rounds of physical testing. Since we were trying to do something so radically different with the design of this chair in terms of function and aesthetics, we needed to get constant feedback from people who would actually sit down and let us know how they felt in it. Then we'd go back to the shop and build the next model and test that one. It was a process of continual trial and error until we achieved something that met our criteria."

"The idea of trial and error in society is in danger," reflects Stumpf. "I fear that more widespread computer use will further endanger this basic process. I'm no Luddite, I can see the benefits of computer technology, and I agree with what's going on. But it's only one tool in a range of tools, and my belief is that true advances in design come from working with objects, not from automation. You need patience to allow something to evolve."

Perhaps surprisingly, Holbrook agrees with Stumpf on this front. "One of the drawbacks of computer design, and there are several, is that the speed with which it is possible to bring ideas to fruition endangers our ability to live with those ideas and react to them," he says. "How can a designer predict how long it will take to come up with a great idea? When you're trying to do something truly innovative, time compression can be a real hindrance to the creative process. It's tough to be watching the clock tick, knowing that you had better come up with something in the next 20 seconds."

BONNIE SCHWARTZ *wrote about lighting designer/artist Dawn Ladd in last month's Metropolis.*

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