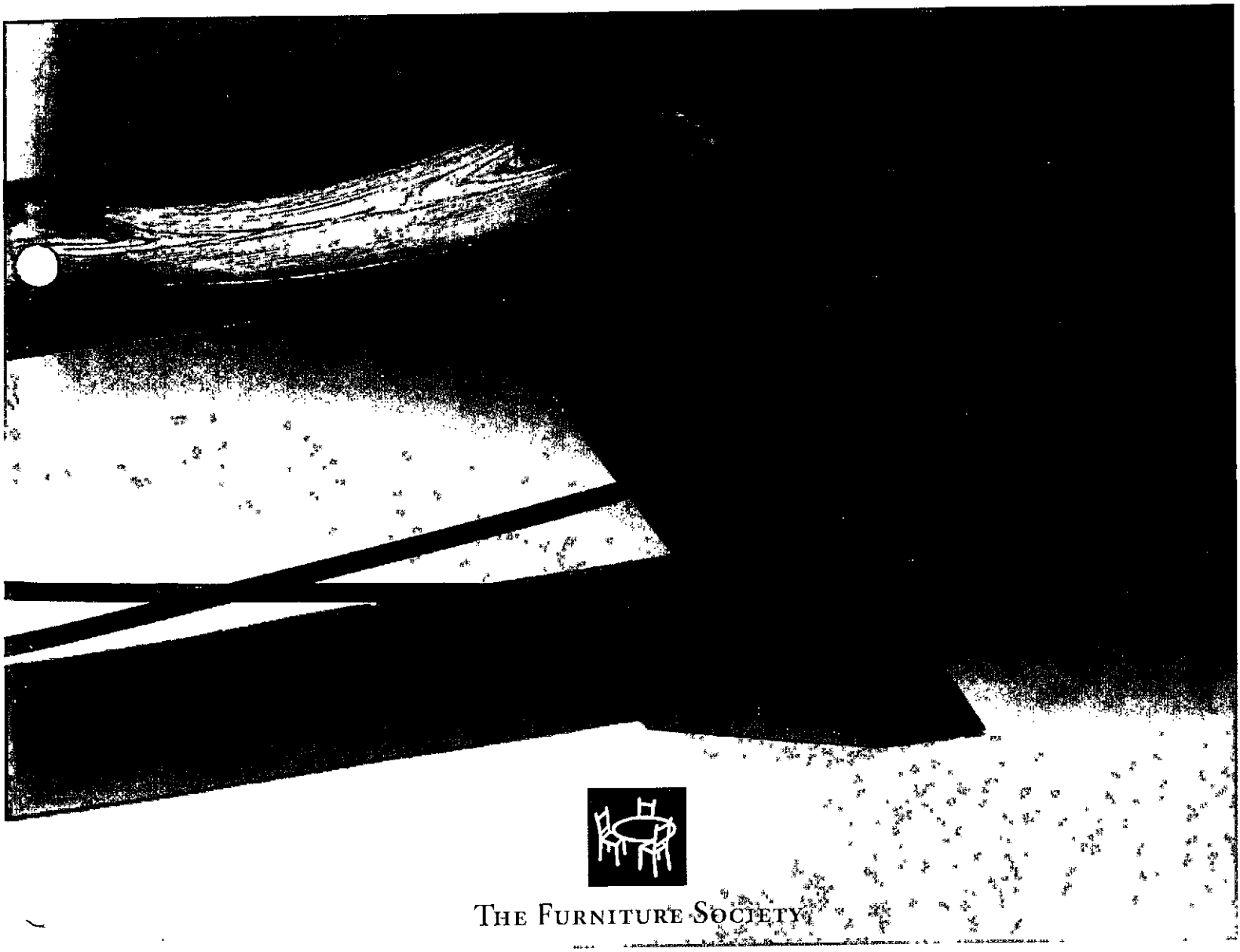
FURNITURE STUDIO 3

Furniture Makers Exploring Digital Technologies

ANNUAL JOURNAL OF THE FURNITURE SOCIETY



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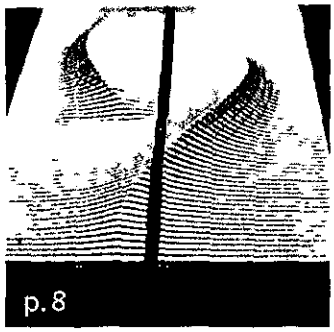

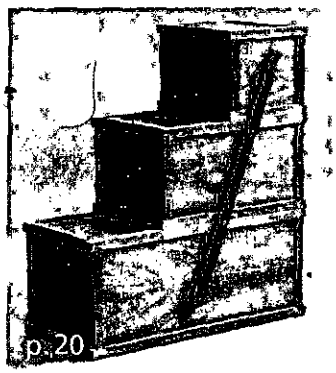

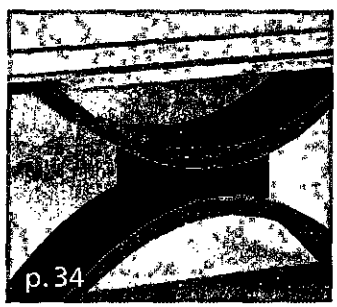

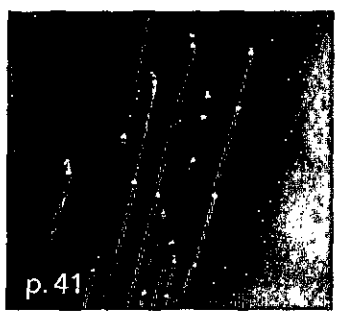

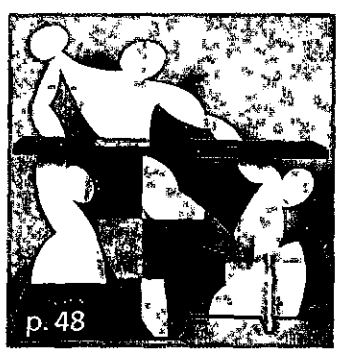

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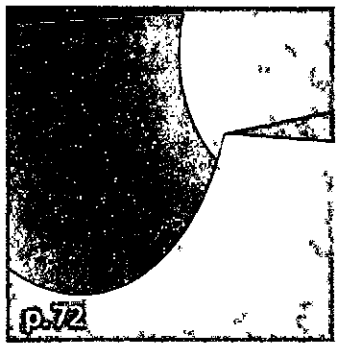
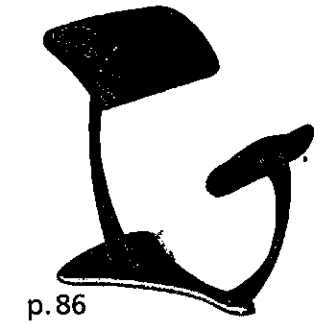
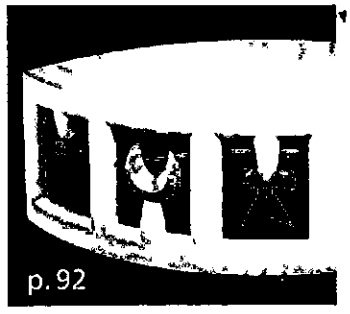
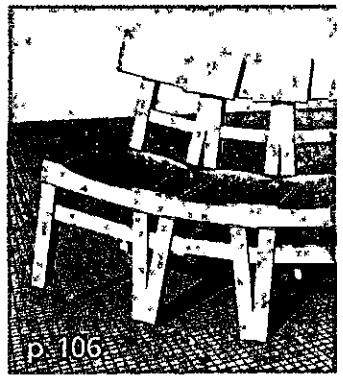
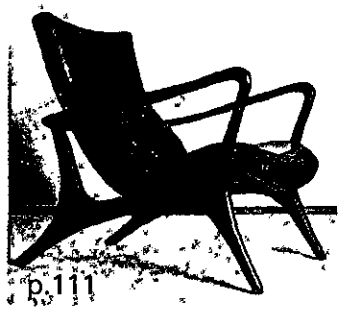
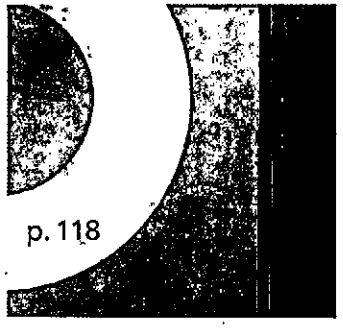


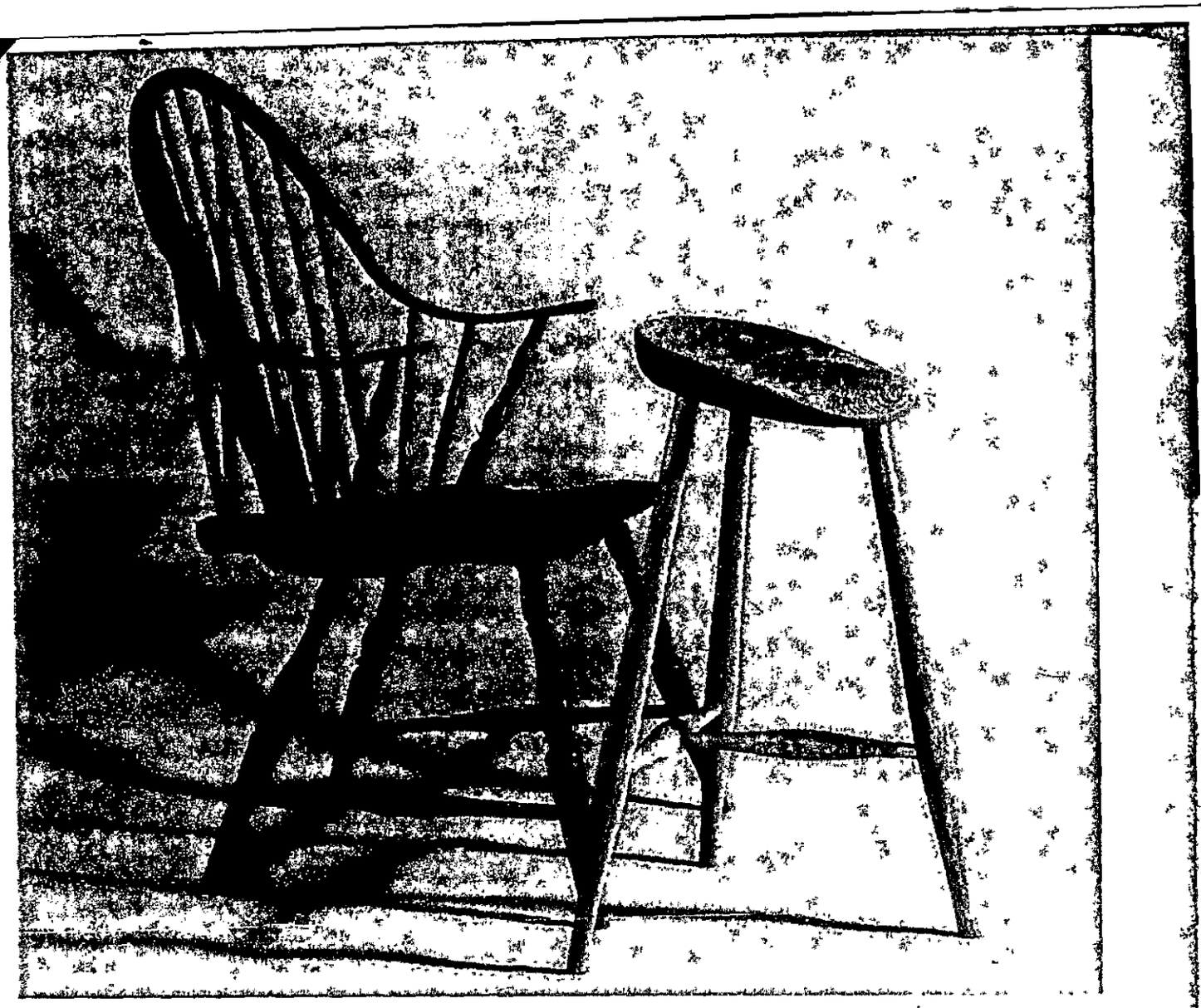












Reinterpreting the Windsor Chair

Traditional chair-making techniques prove surprisingly well-suited to body-conscious design

by Galen Cranz

On the basis of my having written an interdisciplinary book about chair design, I was invited to visit the Penland School of Crafts in the fall of 2002 where I was introduced to Curtis Buchanan, a chair-maker from Tennessee. After hearing his eloquent account of bringing a sustainable craft practice from Appalachia to Latin America, I was inspired to ask him if he would consider teaching a course with me at Penland about chair-making from a body-conscious point of view. In June 2004 we offered such a class, described as exploring the consequences of body-conscious design for traditional chair-making. This essay reports on this experience.

Body-conscious Design

The term body-conscious means the body and mind are related parts of a single system. By including the mind in our thinking about the body, we go beyond mere ergonomics (that is, the measuring of body parts) so that we can include educational and philosophical ideas about the body. Applied to design, body-consciousness means including

above: Right-angle seating produces a C-shaped spine. Perching is halfway between sitting and standing, but retains the postural advantage of standing—the S-shaped spine.

left: Peter Galbert made this Windsor-style perching stool following the design he developed along with the other two Penland instructors, Curtis Buchanan and Galen Cranz. It's shown against an ancestor, a classic American Windsor chair made by Michael Dunbar in 1985. Photo by John Kelsey.

ergonomic, psychological, and cultural perspectives all together. Body-conscious design is broader than ergonomics because it is not only focused on the biomechanics of the body, but also on the psychological and cultural feelings and beliefs that a person brings to understanding the body in relationship to the environment. This integrated perspective has been called the somatic perspective, which I came to through the Alexander Technique. It is what informed my thinking in my book *The Chair: Rethinking Culture, Body and Design* (New York: W. W. Norton & Co., 1998). Another movement educator, Paul Linden, defines "somatic" as involving "the whole human being, focusing in a practical way on the interactions of posture, movement, emotion, self-concept, and cultural values." (Paul Linden, "Somatic Literacy: Bringing Somatic Education into Physical Education," JOPERD September 1994, page 16.)

Galen Cranz, Ph.D., teaches body-conscious design in the Department of Architecture, University of California, Berkeley, and is the author of The Chair: Rethinking Culture, Body and Design *(New York: W. W. Norton & Co., 1998). Dr. Cranz presented a version of this paper at The Furniture Society's 2004 conference in Savannah, GA.*

Implications for Chair Design

Chair designers may be surprised or dismayed or even relieved to hear me say that the chair itself is the problem, not good chair design or bad chair design. The right-angle seated posture creates problems for our lower backs that cannot be designed away. The pelvis tends to roll backward, flattening the lumbar curve and creating problems for lumbar disks and distorting the spine all the way up to the head and neck. The sit-stand position halfway between sitting and standing, which I have called the "perch" position, is fundamentally better than the right-angle seated posture. That said, it is also true that some conventional chairs are better than others. Body-conscious requirements for chairs include the following:

- both feet should be flat on the floor;
- the legs should not be crossed;
- knees should be lower than hip sockets;
- pelvis should not be rolled backward;
- the spine should retain natural curves, appearing straight upright overall;
- the chest should be open rather than collapsed;
- the head should be balanced on top of the spine, not resting back and down on it;
- I should be able to look at work or at people within a fifteen degree cone from the eyebrows down, and I should not be forced to look too far up or down.

What does this unusual point of view mean for traditional chairs? Is body-conscious design too radical for a vernacular tradition in chair design like the Windsor?

The Windsor

For a two-week workshop at Penland a master teacher has an assistant. Curtis Buchanan chose chair-maker Pete Galbert, with whom he had worked previously. The two of them decided to use the Windsor as the starting point for all student projects because they wanted to narrow the range of techniques, in anticipation of putting their

far left, top: Here is the log from which the students split all their posts and rungs for the exercise in somatic chair making.

far left, bottom: Students used shave-horses and draw-knives to shape the riven legs and posts of their chairs. These techniques produce strong parts with no wood grain run-out.

left: Galen Cranz explains a biomechanical principle to Amelia Brooks. Cranz took measurements of each student's body in order to develop dimensions for the class exercise in somatic chair-making. Photo by Peter Galbert.

attention on the new and unpredictable influences of my theories about comfortable seating. The essential characteristic of the Windsor is that the seat is the anchor for both the legs and back, but the legs and the back nevertheless are structurally independent of one another.

Buchanan teaches green woodworking by starting with a log, which he selects from a local lumber mill and drives to the Penland campus where students help saw it into lengths and then hand-split it into billets. Students worked on shave-horses to create the legs and arms for their chairs. The seats were carved. Some students learned how to bend wood by steaming it for their chair backs or for unconventional supports. All the joints were fastened without glue, screws, or nails, using the traditional technique of inserting a dried tenon into a relatively moist mortise.

My contributions were to describe these new theoretical principles of body-conscious design, and to set up exercises for experiential learning. *The Chair* had been assigned in advance and I supplemented it with two slide lectures. I helped each student and the other instructors develop physical, experiential awareness of how these principles are at work in their own bodies. Finally, I measured each person bio-mechanically to help them make decisions about the sizes of their chair elements: leg length, seat depth, back length and angle.

Woodworking classes are limited to nine students, and due to a last-minute cancellation we worked with eight students, four men and four women; some of their work is shown in the snapshots. Four of the designs would be recognizable as traditional Windsor chairs. However, even these are unconventional in several different ways, as a result of new principles that we applied to this vernacular form.

An important principle is that there is a world of difference between enlarging the angle between the seat and the back by sending the back backward, versus enlarging it by canting the seat forward. Conventionally, designers slant the chair back backward between five and ten degrees, but this has the consequence of creating a C-shaped slump in the spine. When the spine follows the trajectory of the chair back in space, the head has to come forward, thereby distorting the relationship between neck, head, and spine into a C-shape. Our students kept the back spindles at close to a right angle to the seat, and tipped the seat forward—at an angle that I determined for each student individually by using a mock-up seat on a shave-horse.

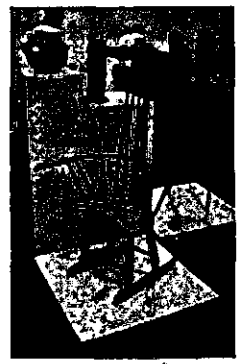
For people taller than 5 foot 6 inches, the forward cant of the seat usually meant that it had to be higher than the conventional seventeen to eighteen inches. For the tallest man in our class, the legs were twenty-one inches and they should have been even taller in order to get his knees significantly lower than his hip sockets, a convenient rule of thumb for maintaining the lumbar curve. Such a chair for him would be stool height for most people. However, he wanted this dining room chair not to be his exclusively, but rather something his petite wife could use occasionally. He could have proceeded to design a smaller chair for her, but perhaps he did not like the vision of different sized chairs around the table, either for reasons of convention or for more personal reasons of not wanting to call attention to his height. His situation underscores the importance of the somatic perspective because it takes into account people's beliefs and feelings as well as their ergonomic measurements.

Two other students also designed stationary Windsor chairs with appropriate modifications for their size and the principles I have described. One other did the same but as a rocker. In addition, she decided to make a radically short seat, partly because she herself is short, but primarily because weight should be transferred from the body to the seat through the sit bones, not through flesh, and *therefore, the seat need be only deep enough* to comfortably catch the sit bones.

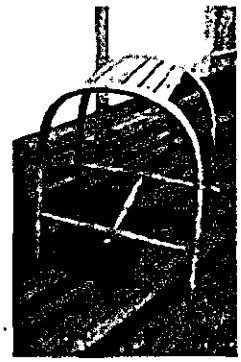
In all of these chairs the back spindles were set into the seat to be more upright than usual. Moreover, they were set far enough away from the pelvis to make room for the bulge of the buttocks. Alternatively, the back spindles could be steam-bent to make buttocks room. The purpose of doing this is to have back support where it is wanted—along the spine. If the spindles are too close to the buttocks, the spine reaches backward to find support, thereby flattening the lumbar curve, which in turn pushed the pelvis, neck, and head forward.

The remainder of the student designs departed from the conventional chair paradigm, producing

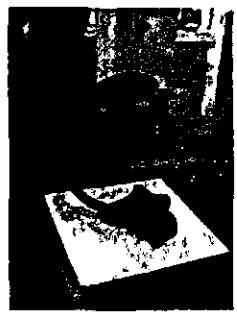
Joe McArdle created this taller-than-average dining table chair. Ideally his knees would be lower than his hips (in order to recreate the lumbar curve), but raising the seat would make it too high for his petite wife—a social constraint on body-conscious design.



Shannon Oesch created an unusually shallow seat, which frees the thighs from pressure, especially appreciated by short people, that is, most women.

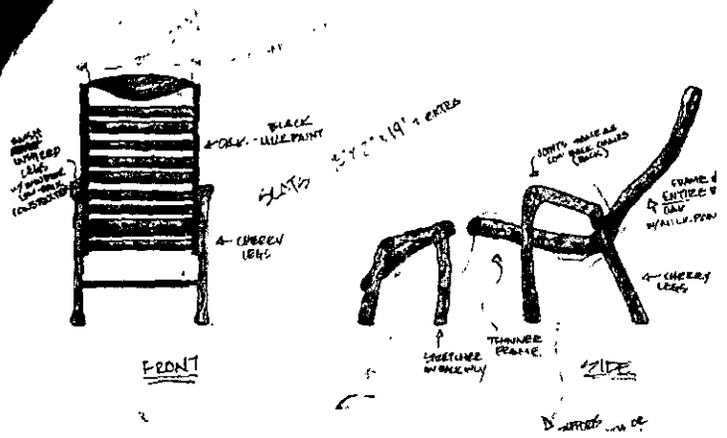


Brian McGee exploited steam-bending to create this perch. Because the sitter can sit at various points, the perch can accommodate taller and shorter people.



Heather Miller achieved the forward tilt by shaping the seat, and by the angle of attachment to its single curved pedestal.

Hannah Whitaker's stool creates a forward tilt by the way the seat is set, the way it is shaped, and the differential leg length. The finish is black *milk paint.*



Working sketch for a two-part lounge chair by Amelia Brooks.

instead perches, a lounge chair and stools such as the ones shown on the previous page. Three of these took advantage of the capacity of green woodworking technology to create pronounced curves. Brian McGee created two parallel curves joined by a ladder of perching "shelves." When the sit-stand position (knees at an oblique relation to the spine) is rotated in space, it produces a configuration that we would recognize as a lounge chair. One student decided to explore this option using large pieces of bent wood. Another used the steam box to create a single curved support for a shaped seat set at an angle appropriate for perching. This scheme required an unconventional flared foot, to ground and stabilize the pedestal, so she carved it as well as the seat. In some senses no more than a stool, this design looks somewhat like a tractor seat. It was still a "Windsor" in that the chair seat remained independent of its support.

Two stools were taller than conventional chairs, closer to the height of stools used at kitchen counters and bars. In addition to being tall to support the perch position, the seats were canted forward. One of these stools was produced by a student who painted it with black milk paint, and the other was produced as a collaboration between the three instructors, left a natural wood, and sold at the school auction.

In all cases the seats were carved to enhance a forward slope, but they also were carved shallowly from side to side so as to not inhibit movement. Traditional Windsor seats might be carved to hold the pelvis in place, but this is antithetical to another principle of body-conscious design, namely, that movement is more important than supporting any single position. Windsor green woodworking technology has the additional advantage of producing unpadded seating, so the weight transfers through bones. Padding presses the flesh around the sit bones so that flesh takes on a load-bearing function for which it is not designed, reducing circulation.

Summary and Conclusions

A summary of the somatic principles needed to modify the Windsor according to our experience might be useful.

Conventional chairs are too tall for most women and children and about half of the male population, so a conventional right-angle seated Windsor chair could be lower than seventeen or eighteen inches. However, the right-angle seated posture is detrimental to the lumbar spine. Therefore, the Windsor should approach a perch height with the pelvis rotated forward and the knees lower than the hip sockets. The conventional seventeen to eighteen inch height would work as a perch for the men, women, and children who currently suffer in conventional chairs. For others who are taller than average, greater height is needed, but only if accompanied by the forward slant of the seat and an upright, not backward-sloped, chair back. If the chair is high enough and the seat shaped and tilted correctly, the lumbar curve is automatically in place and it is easy to sit upright without any back support whatsoever. This argues for chairs without a back—in other words, perching stools.

At Penland we learned that traditional chair types can be modified to be more responsive to the body while remaining recognizable as part of a tradition in craft process as well as a visual look. Being recognizable is important so that people don't need to be told how to use the seating apparatus. If they recognize it as a seat, whether stool, chair, or lounge, they will not feel disoriented and will feel competent. If the seat is too unusual to be recognized, most people will avoid using it and any physiological benefits will be lost.

Chair Recommendations

Specifications

- For conventional right-angled sitting, seat height no greater than the top of your knee minus two inches.
- Forward-tilt the seat (the more the task takes you forward, the more the seat should tilt forward); you will also require a forward slope for the work surface, and a computer at eye level; the logic of forward-tilt seats argues for raising seat height significantly (four to six inches), which creates a perching chair rather than a conventional chair.
- Firm textured surface, upholstered but not more than one-half inch to one inch depth.
- Flat, uncontoured seat.
- Butt space between seat and backrest.
- Midback support or full back, neck, and head support excepting butt space.
- Flat, planar backrest.
- Armrests for support if reading, typing, keyboarding, painting, or other similar activities.

Use

- Both feet should be flat on floor (helps organize spine upward).
- Legs not crossed (helps protect pelvis).
- Knees should be lower than hip sockets (takes strain off lower back).
- Pelvis should not be rolled back.
- Spine should retain natural curves, but appear straight overall.
- Chest should be open rather than collapsed.
- Head should be balanced on top of spine, not resting back and down on it.
- Eyes should be able to look at work or people within a fifteen degree cone, not forced to look too far up or down.

What can everyone do?

- Practice autonomous sitting and perching, without chairbacks. One of the easiest ways to wean oneself from chairs is to start using stools more often.
- Use a variety of postures, including lying down, standing, squatting, and crawling.
- Rather than let the spine sag in a slump when tired, decide to rest it by lying down in the constructive rest position. Lie down on a firm surface so that the spine can extend itself and the rib cage can open out against this resistant plane. The surface should be firm enough to keep the body from sinking down, which means firmer than most beds. Avoid any surface that curves. At the same time, bring the knees up. Bend the elbows and bring both hands over the midriff in order to let the shoulders slide back and the joints open at the shoulder, elbows and wrists.
- For tasks that require bending over, use the position of mechanical advantage. The waist is not a hinge. When a person needs to bend over, he or she should instead flex the knees, ankles, and hip joints.
- Use reading and writing stands. The height of the work surface should be derived from the height of the seat surface.

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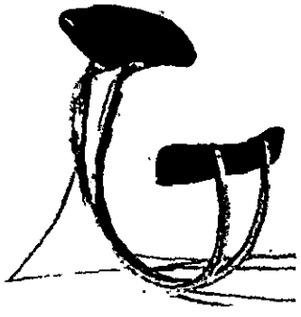
Furniture-maker Peter Handler of Philadelphia applied Galen Cranz's ideas in the design and construction of this upholstered perching stool, made of anodized aluminum.



Furniture-maker Michael Podmaniczy of Winterthur, DE, attempted to integrate somatic design principles with the eighteenth-century bent-laminated chair-making techniques devised by Samuel Gragg of Boston.

Furniture-maker Michael Puryear of New York City has experimented with this adjustable-height wobble stool, which incorporates some of the principles of somatic chair design.