



GREENWOOD

OLD-WORLD CRAFT, THIRD-WORLD DEVELOPMENT

Appropriate Technology in the Tropics

by Scott Landis

One of the first things the conquistadors shed when they reached the shores of Mexico and Central America was their armor. As effective as it was against the spears and arrows of their native adversaries, in the steamy forests of the Yucatan a full suit of steel was unbearably hot, heavy and hard to maintain. Modern woodworking machinery suits the tropics just about as well. In an environment that can receive a foot or more of rainfall during each month of the rainy season, rust blooms on steel almost before your eyes. Saw blades are quickly dulled by dense, resinous hardwoods, and power supplies in many developing countries are erratic, at best. Kiln-dried wood is, in much of Latin America, a lot harder to find than an ecotourist.

GreenWood takes a different approach to working wood. An experimental training program launched in Honduras in 1993, GreenWood applies old-world technology in the developing world, teaching artisans to build furniture with split and shaved green (wet) wood, worked entirely by hand or using foot-powered treadle lathes. The green-wood revival that has lately occurred in North America and Europe may be helping city dwellers and suburbanite woodworkers reestablish an emotional relationship with their work through the natural qualities of their material, but there's nothing nostalgic about the introduction of low-tech craft to Honduras. GreenWood's goals are straightforward and practical: 1) To promote responsible forest management by exploring uses and developing markets for lesser-known tree species; and 2) To provide rewarding, skilled employment as an alternative to shifting ("slash and burn") agriculture, cattle ranching, urban migration, and the environmental depredations that result from these conventional practices.

The vehicle for achieving these goals is "appropriate technology," an approach to woodworking production that is appropriate to all resources in a host community: natural, material and human. These include: tree and plant populations and the related forest ecology (natural resources); access to tools and machinery, hardware and glues, electricity, investment capital and markets (material



resources); and the training, experience and crafts heritage to be found among local artisans (human resources).

GreenWood was inspired by the experience of a Canadian furniture designer, Michael Fortune, who attempted to jump start a stalled furniture industry in the Yucatan Peninsula of Mexico in the early 1990s. Fortune encountered a craftsman's nightmare of decrepit sawmills, workshop machinery in disrepair and a host of problems inherent in working wet wood and irregular, small-diameter logs. "Inaccurate joinery accounts for a high failure rate," Fortune wrote, "and glue is not effective when wood exceeds eleven-percent moisture content." The disparity in moisture content between the tropics (16 percent in southern Mexico) and North America (6 percent in most of the U.S.), presented a further obstacle to any prospective export trade in furniture. Fortune considered using screws and bolts as an alternative to traditional joinery, but found a limited range of fastenings available locally.

After reading this lament, Tennessee chair maker Curtis Buchanan thought Fortune was barking up the wrong tree. "Why not try green woodworking?" Buchanan wondered. The oak spindles and bent bow of his Windsor chair backs and the turned maple undercarriage are made entirely of wet wood. The parts are split directly from the log with an ax and froe, shaved with a drawknife and selectively dried in his shop using a small, homemade kiln. The technology is ancient, but, at \$700, his bottom-of-the-line, bow-back Windsor is hardly rustic. Green-wood technology, Buchanan reasoned, might be ideally suited to the tropics, and it doesn't require a shop full of expensive machinery to get started.

Buchanan joined the first GreenWood exploration of the North Coast of Honduras, where traditional hand-tool technology appeared well suited to the full range of local resources. Specifically, he encountered:

1. A large variety of lesser-known tree species that might be incorporated in green wood furniture production. Few of these species were being harvested or processed and little was known about their working or finishing properties. There were no developed markets.
2. A lack of local capacity for secondary processing (sawmills) or drying (kilns), which are required for the production of quality woodworking by conventional, machine-tool methods. Many communities had no access to electricity and minimal experience in the use of machinery. There was little or no money available with which to invest in costly generators, fuel and other equipment.

For all of these reasons, GreenWood decided to focus its training and marketing initiatives on the ancient hand-tool technologies exemplified in the Appalachian-style furniture of Kentucky and Tennessee. We judged this technology could be easily and cheaply introduced in forest-based tropical communities and readily adapted to small-scale or cottage-industry production units. For less than one hundred dollars, an individual third-world artisan can purchase a complete kit of high-quality hand tools, with which he or she can produce salable furniture. Whereas conventional machine-tool technology tends to encourage debt and the centralization of manufacturing, simple hand-tool technology encourages independence and flexibility of production. No electricity is required and minimal additional investment is necessary for the establishment of a productive workshop. The quality and marketability of the finished product reflects an artisan's design and construction skills more strongly than his or her investment in expensive machinery. In combination, these factors might be expected to result in potentially greater sales and profit margins for rural artisans and a more sustainable long-term relationship with their source of materials.

There are several additional attributes of this style of furniture making. Its portability enables artisans to locate their workshops close to forest resources and to conduct at least some of their primary processing in the forest, thus reducing the need to transport heavy logs and allowing for the return to the forest of an abundance of wood-waste nutrients. The inherent safety of hand-tool technology reduces the likelihood of serious accidents and debilitating injuries in societies that provide little or no safety net for injured workers, while promoting active participation by women, girls and boys of all ages and technical ability. Whereas conventional machinery typically leads to a reliance on a few heavily exploited commercial species--mahogany (*Swietenia macrophylla*) and Spanish cedar (*Cedrela odorata*) on the North Coast of Honduras--green-wood technology lends itself to experimentation with smaller trees and lesser-known species. Last, but not least, the unique

nature of green-wood design and production distinguishes GreenWood products from those of other conventional woodworking manufacturers and helps to establish a clear identity for the project.

Several questions have been raised about these objectives and about GreenWood's application of the principles of appropriate technology. Skeptics wonder whether, in our adherence to traditional (some would say "old-fashioned") practices, we are holding our artisans back, preventing them from pursuing their own interests and realizing their natural growth and potential earning capacity. Some observers suggest that access to more sophisticated technology is inevitable and that it offers an important incentive for struggling third-world artisans, who will otherwise lose interest and drift back to less productive activities.

In response, it is important to note that GreenWood does not restrain artisans from moving on to other methods of production. Indeed, we assume that only a portion of the people we train will continue to become professional furniture makers and that many of these artisans might eventually find work in other shops or related lines of work. Although, in Honduras, we have devoted most of our attention to teaching green-wood chairmaking and we are known by many locals as a "chair" project, GreenWood principles can be effectively applied to the manufacture of many different wood products and, indeed, can be readily adapted to different kinds of technology. To that end, our instructors have taught bowl turning on electric lathes in Mexico and have worked with Honduran communities in the chainsaw milling of ship's knees and guitar parts. As of this writing, GreenWood is exploring the more efficient production of guitar parts using a bandsaw mill and other dedicated woodworking machinery. These activities are not only consistent with our original principles, they provide excellent examples of how appropriate technology might be applied to a range of materials and products.



Technology does not follow a linear progression--from crude hand tools to sophisticated machinery. In fact, much hand work is exceedingly sophisticated and machine production is often quite crude. For the former, we need only consider Curtis Buchanan's Windsor chairs, which are produced essentially by hand, using no mechanical fastenings. The relatively high price Buchanan is able to get for his chairs reflects the excellence of his design and construction, not the fact that he happens to use an electric lathe to turn legs or a light bulb to heat his kiln. The source of power is incidental in both cases.

For an example of crude machine construction, we can turn to the legion of small workshops throughout Latin America that flood local markets with mediocre furniture, windows and doors. GreenWood cannot prevent artisans it has trained from joining the culture of mediocrity that persists in the craft production of the region, but it is not our role--or in anybody's interest--to perpetuate it. If GreenWood artisans abandon hand-tool technology for machinery without having first mastered basic skills and an appreciation for good workmanship, they are likely to succumb to the illusion that the quality of production (and the size of their income) hinges on their acquisition of newer and more expensive equipment.

An evolutionary approach to the introduction of new tools would be more consistent with an understanding of appropriate technology. One might begin, for example, by modifying the motive

force for a traditional piece of equipment such as the lathe, attaching a bicycle-drive or, perhaps, an electric motor. These incremental measures would enable a skilled artisan to accomplish the same work more quickly and more effectively. They do not reflect a revolutionary change in the nature of the artisan's materials or working method, as would the introduction of a tablesaw, power planer and other conventional machinery.

Ironically, one of the largest stumbling blocks to implementing appropriate technology is the very fact that it is labor--not capital--intensive and it requires a highly qualified, decentralized approach to instruction. Culture at the turn of the Millennium is enamored of money, new technology and speed. Despite the inherent logic and grassroots appeal of the GreenWood approach, the international aid agencies that finance most third-world development tend to favor large expenditures on heavily capitalized projects. From a bureaucratic perspective, such investments are considered easier to promote and administer. However well intentioned these massive expenditures may be, they rarely address the root causes of poverty and they often carry destructive environmental consequences that will eventually exacerbate the very conditions they are meant to improve.

In Jared Diamond's ambitious historiography of civilization, *Guns, Germs and Steel*, the author explores the circumstances and events that led to the establishment of powerful "haves" in the Northern Hemisphere and relatively impotent "have nots" in the South. In the process, Diamond makes a strong case for the crucial role of technology in selecting the winners and losers of modern culture. Long before computer chips, aviation or the cotton gin, he argues, developments in agriculture and warfare (along with fortuitous environmental and geographical conditions) placed European societies on a path to dominance.

Ironically, "appropriate" technology may yet have an important role to play in addressing the inequities we have inherited. Sustainable economic development is, after all, about providing access to the tools that control human lives. But it will only succeed where those tools are well matched to the people who will use them and the resources that will be consumed in their application. "Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime." So goes the ancient Chinese proverb. If we are serious about teaching third-world artisans to fish, we need to begin with a hook and a line. ▼

Scott Landis is the founder and president of GreenWood.



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