ANTHROPOLOGY

Food for the Gods

Pamela Ronald

Oh sacred padi,
You the opulent, you the distinguished,
Our padi of highest rank;
Oh sacred padi,
Here I am planting you:
Keep watch o'er your children,
Keep watch o'er your people,
Over the little ones, over the young ones,
Oh do not be laggard, do not be lazy,
Lest there be sickness, lest there be ailing;
You must visit your people, visit your children.
You who have been treated by Pulang Gana;
Oh do not neglect to give succour,
Oh do not tire, do not fail in your duty.
(*1*, p. 154)

With this special prayer, Iban farmers of Borneo addressed the rice (*padi*) spirits to assure that their community's crop would thrive and resist ever-present diseases. Roy Hamilton presents it at the beginning of the introductory chapter of his fabulous book, *The Art of Rice: Spirit and Sustenance in Asia*. The volume—which was prepared to accompany an exhibition of the same name that recently closed at the Fowler Museum of Cultural History at the University of California, Los Angeles (*2*), where Hamilton is the curator of Asian and Pacific collections—explores aspects of rice expressed through the arts and material objects of linguistically and culturally diverse areas of Asia. Hamilton presents 35 essays, contributed by himself and 26 scholars and experts from ten countries and a variety of disciplines. Their perspectives and the abundant revealing photographs bring to life rice as the focal point of interrelated beliefs and practices that sustain the populous region spanning India, Indonesia, and Japan.

Although the origins of domesticated rice are disputed, the most recent evidence suggests that it was first cultivated in the middle Yangtze River valley about 8000 years ago. Hamilton notes that since then, more than 120,000 varieties of rice have been developed. Today, rice provides more of the calories consumed by humans than any other food, and more land is devoted to it than to any other crop. And many believe that rice supports more than metabolism: A tenet shared by many Asian cultures is that the grain is a sacred food given to humans, one which sustains our bodies in a way no other food can. Among the reflections of this spiritual importance is the fact that one-third of all Shinto shrines in Japan are dedicated to Inari, the deity for rice.

The Art of Rice
Spirit and Sustenance in Asia
by Roy W. Hamilton [with 26 Contributors]
UCLA Fowler Museum of Cultural History, Los Angeles, 2004. 562 pp. Paper, $60. ISBN 0-930741-98-6.

Through eight sections—ranging from "Labor, Ritual, and the Cycle of Time" to "The Future of Rice"—the contributors chronicle a wide range of the many ways in which the cultivation and consumption of rice have become intertwined with elements of personal identities; ideas of family, community, and state; and religious beliefs and activities. Each section features an astonishing variety of material goods, photographs, poetry, and essays. The mix of objects includes fine art, agricultural tools, popular religious images intended as souvenirs, and ephemeral goods crafted from rice straw. Rice plants produce approximately equal masses of grain and straw, and most Asian cultures have developed artful and practical means for using the latter. A chapter on Japanese straw goods displays several beautifully woven examples, including a rain cape, a basket that serves as a small playpen for infants, and several pairs of snowshoes. Among the volume's many other striking photographs are elaborate rice-flour drawings created for the Tamil festival of Pongal, kimono patterns from Japan's Edo period, pathways made of rice for deities to follow, ghost masks, lacquered food carriers for transporting picnic ingredients, mallets for making *mochi* (pounded glutinous rice cakes) to welcome the Japanese New Year, bronze ritual food vessels from the early Tang dynasty in China, and brightly colored rice dough figures and flowers from Bali. The book and exhibition include items borrowed from 26 institutions and 21 private collectors on four continents. In addition, the organizers commissioned a number of works in order to present rice cultures as living traditions.

The importance of the seasonal agricultural cycle in determining the timing and organization of human labor and ritual is reflected in the fact that in many cultures the months are named according to activity in the rice fields. Hamilton describes Balinese calendars calculated according to the growth cycle of the rice crop and decorated with representations of the Hindu gods of the cosmic directions. He also discusses finger knives used to cut stalks of rice one at a time, a practice popularly held not to "hurt" the rice (and thus not offensive to its spirits) that allows harvesting of rice varieties that ripen unevenly.

Hamilton and Francesca Bray both mention an early green revolution: During the Song dynasty (early 11th century), new varieties of faster ripening rice plants imported from the kingdom of Champa (located in what is today Vietnam) allowed double cropping in the fertile Yangtze delta. This change finalized the transfer of the economic center of China from the north to the south, where it has remained ever since. The green revolution of the 1960s and 1970s brought the introduction of high-yield and short-maturation varieties that dramatically increased per-acre output (and in places allowed three crops per year). Currently, 90% of the Asian harvest comes from these modern varieties. In the last of his chapters, Hamilton reminds us of the severe cultural costs that have accompanied the transformation of rice growing from subsistence farming to commodity production.

Floating puppet. In the Red River delta, harvest barges offer the easiest means of moving rice from the fields to the villages. The depiction of such vignettes from rural life is the mainstay of Vietnamese water puppetry.

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The reviewer is in the Department of Plant Pathology, One Shields Avenue, 228 Robbins Hall, Davis, CA 95616, USA. E-mail: pcronald@ucdavis.edu

Many consider rice to be the ideal crop plant for research, and the impacts of several genome-sequencing projects are now rapidly advancing our understanding of rice genetics. Thus we are gaining tools to develop improved varieties to feed Asia's vast population in the future, and we are gaining new respect for this sacred plant. Michael Pollan has aptly described the relation between crops and people as "a dance of human and plant desire that has left neither the plants nor the people taking part in it unchanged" (*3*). Through both its text and its profuse illustrations, *The Art of Rice* offers an informative survey of the cultural context of a plant that continues to shape our lives.

References and Notes

1. D. Freeman, *Report on the Iban* (Athlone, London, 1970).
2. The exhibition will travel to Copia: The American Center for Wine, Food, and the Arts, Napa, CA (3 September to 29 November 2004) and the Honolulu Academy of Arts, Honolulu, HI (16 February to 24 April 2005).
3. M. Pollan, *The Botany of Desire: A Plant's-Eye View of the World* (Random House, New York, 2001).

INVERTEBRATE ZOOLOGY

An Ancient Lineage Worth Saving

Mark S. Garland

There's no denying that the American horseshoe crab, *Limulus polyphemus*, is a fascinating creature. Its biology and natural history interest an unusually wide variety of people. The lineage of this marine chelicerate arthropod is ancient, with fossils of close relatives dating back 450 million years. Ecologically, the horseshoe crab is a keystone species; in Delaware Bay, over a million migrant shorebirds depend on its eggs to fuel their northbound flights each spring. The editors of *The American Horseshoe Crab* describe their subject as "the most researched of all marine arthropods." Basic research using the animal has had wide-reaching implications, especially in the study of vision. The horseshoe crab's ommatidia (light sensors) are the largest known from animals, and studies of its visual systems led H. Keffer Hartline and George Wald to shares of the 1967 Nobel Prize in Physiology and Medicine. Horseshoe crabs have been harvested for fertilizer and bait, and the clotting substance (Limulus amebocyte lysate) extracted from their blood is an extremely valuable agent for testing pharmaceuticals and surgical instruments for contamination by bacterial endotoxins.

The American Horseshoe Crab
by Carl N. Shuster Jr., Robert B. Barlow, and H. Jane Brockmann, Eds.
Harvard University Press, Cambridge, MA, 2003. 439 pp. $95, £61.95, €87.50. ISBN 0-674-01159-7.

The horseshoe crab is also a species whose population may be in the midst of a major collapse. Unregulated harvest of American horseshoe crabs was permitted until just a few years ago, and the efficacy of current harvest limits is the subject of considerable controversy. In the preface to this timely volume, the editors comment that "writing a treatise on *Limulus* was clearly a worthwhile goal; but everyone agreed that an even more useful pursuit, though perhaps a greater challenge, would be to write a book that would introduce horseshoe crabs to a wide audience." Although the ensuing book comes closer to the former than the latter, it offers an impressively detailed look into many aspects of horseshoe crab biology. The contributors summarize important findings from studies of the ecology, physiology, and anatomy of *Limulus polyphemus*; the evolutionary history of all Xiphosura; and the past and present uses of the species by humans.

Recreational visitors to beaches along much of the Atlantic coast of the United States cannot help but notice horseshoe crabs—especially around Delaware Bay, where population densities are greatest. Every year, the spring tides of May and June bring thousands of mating horseshoe crabs to mass on suitable beaches in a great, synchronous mating event. Birdwatchers and other amateur naturalists make annual pilgrimages to favorite beaches to witness this phenomenon and to see the immense flocks of shorebirds and gulls that feast on the horseshoe crab eggs. Many people who are fascinated by horseshoe crabs lack strong backgrounds in science, and the goal of producing a scientifically accurate, comprehensive account for them is a worthy one.

Unfortunately, the volume does not contain much that will hold the interest of such individuals, and thus it seems unlikely to succeed at reaching the wide audience the contributors may be seeking. A glaring omission is the absence of an initial overview, a chapter to introduce lay readers to the organism and to the organization of the book. The closest thing to such an introduction to horseshoe crab biology is buried halfway through the book, where Lyall Anderson and Carl Shuster present background information for their discussions of the distributions of extant and fossil species. The penultimate chapter is the only one that could have mass appeal. In that entertaining, well-written account, Shuster covers the history of the once-thriving industry based on harvesting horseshoe crabs for commercial fertilizer. As is often the case when chapters are written by different authors, the style and level of scientific detail vary dramatically within the volume. Nevertheless, most of the contents require considerable scientific literacy to be enjoyed and understood.

For those who possess such a background, especially those with an interest in marine biology, the volume is filled with treasures. Realistically, they are its true audience. Collectively, the chapters provide a comprehensive account of the lives of horseshoe crabs, from embryonic development to responses to predators and pathogens. The authors' discussions of the study of vision and the development of the Limulus amebocyte lysate tool—the two lines of horseshoe crab research that have been most important beyond the realm of marine biology—offer particularly fascinating reading. The volume's final chapter, on horseshoe crab conservation, sounds a persuasive alarm for the need to reduce harvests and protect habitats if *Limulus polyphemus* is to continue in its role as an organism of great ecological significance through much of its range.

Overall, *The American Horseshoe Crab* is a fine compendium of information, one I will refer to frequently. The volume also provides an essential tool for anyone involved with developing the regulations that will be required to protect this intriguing species in perpetuity.

The reviewer is at the New Jersey Audubon Society's Cape May Bird Observatory, 701 East Lake Drive, Post Office Box 3, Cape May Point, NJ 08212, USA. E-mail: mark@njaudubon.org

Image not available for online use.

Shoreline spawning. On an early June high tide along Delaware Bay, a few female horseshoe crabs are buried beneath many males.

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