

Where Have All the Tigers Gone?

Know also that the Great Khan has many leopards which are good for hunting and the taking of beasts. . . . He has several great lions, larger than those of Babylonia. They have very handsome, richly colored fur, with longitudinal stripes of black, orange, and white. They are trained to hunt wild boars and bulls, bears, wild asses, stags, roebuck, and other game.

Marco Polo, 1298

Around AD 70, in his *Historia Naturalis*, the Roman writer Gaius Plinius Secundus, known as Pliny the Elder, wrote this about the tiger (translation by Philemon Holland, 1601):

TYGERS are bred in Hircania [that part of Iran on the coast of the Caspian Sea] and India: this beast is most dreadfull for incomparable swiftnesse, and most of all seen it is in the taking of her young: for her litter (whereof there is a great number) by the hunters is stolen and carried away at once, upon a most swift horse for the purpose. . . . But when the Tigresse commeth and finds her nest and den emptie (for the male Tigre hath no care nor regard at all of the young) she runnes on end after her young ones, and followeth those that carried them away, by the scent of their horse footing. They perceiving the Tigresse to approach by the noise that shee maketh, let fall or cast from them one of her whelpes: up shee taketh it in her mouth, and away shee runneth toward her den swifter, for the burden that shee carrieth: and presently she setteth out againe, followeth

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the quest after her fawnes; and overtaketh the hunter that had them away. Thus runneth shee too and fro, untill shee see that they be embarked and gone, and then for anger that shee hath not sped of her purpose, shee rageth upon the shore and the sands, for the losse of her fawnes.

Tigers probably became known to the ancient Greeks through Alexander the Great's campaigns in India and Persia, and they were occasionally used in Roman arenas. "By far the greatest number ever seen at one and the same time," wrote C. A. W. Guggisberg (1975), "were fifty-one, all of them massacred in the course of the games Heliogabalus arranged to celebrate his marriage. The same emperor is said to have harnessed tigers to a chariot on which he himself posed in the guise of Bacchus." After the heady days of the Romans, tigers seemed to have disappeared from European consciousness until the reappearance of Pliny's texts in the form of the *Physiologus*. "After the disintegration of the Roman empire, no tigers were seen in Europe for a very long time," Guggisberg tells us, "and the memory of the creature faded away so completely that Marco Polo was greatly puzzled by the 'lions' he saw at the court of Kublai Kahn. . . . The first tiger seen in Europe since Roman times seems to have been a specimen obtained by Yolanda, Duchess of Savoy, in 1748, and kept at her castle in Turin."

A half a world away, tigers had been an integral part of life (and death) for centuries. In India and Southeast Asia, they roamed the forests and woodlands, often preying on livestock and occasionally attacking and eating people. Sealstones from the five-thousand-year-old ancient civilizations at Mohenjo Daro and Harappa depict tigers, sometimes in captivity. In Hindu mythology, Durga is a fierce form of Devi, the Mother Goddess, depicted as extremely beautiful and full of rage, almost always shown riding a tiger. Shiva, the god of destruction, was once attacked by a tiger, but he caught the animal with one hand, peeled off its skin, and slung it over his shoulder like a shawl. At a more mundane level, Indian princes regarded tigers as fitting subjects for royal hunts, and often the great cats were herded by hundreds of beaters who crashed noisily through the brush until they drove the tigers into rifle

range of maharajas, perched safely on the backs of elephants. Vast tracts of Mughal India were reserved as hunting preserves for royal tiger hunts. Of the hunts of Maharaja Ramsinghji of Kotah in 1771, Kailash Sankhala (1977) has written: "Every tiger hunt of that time was celebrated with feasting, dancing, and music; even the royal horses were included in the lavish feast given by the Maharajah celebrating the killing of a tiger." The record for tigers killed by one man in that era belongs to the Maharaja of Surguja, who claimed to have killed 1,150.

Tipu (also "Tippoo") Sultan, known as "The Tiger of India"—who was defeated at Seringapatam in 1792 by Lord Cornwallis (the general who had surrendered to George Washington in 1781) and then again in 1799 by Richard Wellesley, the brother of Arthur Wellesley, the future Duke of Wellington—was particularly obsessed with the tiger image. Stylized tiger stripes (*bubri*) are everywhere present—embroidered, quilted, painted, incised, and even forged into the watered steel of sword blades, while his banner was emblazoned with the words, "Tiger is God." His dreadful toy, the tiger organ, which showed a model tiger mauling a British soldier, is now in London's Victoria and Albert Museum. At the fall of Seringapatam, the British issued a commemorative medal showing the British lion overpowering the Indian tiger. (In later years, British sportsmen would further overpower Indian tigers by shooting them.)

Not as large as the rhino, but much more beautiful and also in a precipitous decline, the tiger represents the quintessence of raw energy and power. It was these qualities that made the tiger the object of centuries of "big game hunting," and now, not only can these qualities not protect it, but they are the very attributes that make parts of the tiger—almost any parts—highly desirable to human beings who believe they can acquire the tiger's wild energy by consuming the essence of the great cat.

Venerated for their strength, grace, and above all their beauty, tigers are celebrated in the art of every nation, especially those countries where tigers formed part of the landscape and history. Uncountable are the representations of the tiger in the arts of India, Pakistan, Nepal, Myanmar, Laos, Thailand, Cambodia, and Indonesia. There are few tigers left in China today, but they have appeared regularly throughout the three-thousand-year art history of that country, and every twelve years in the Chinese calendar is the "Year of the Tiger," a fact not left

unnoticed by the forty-five countries and regions that issued "Year of the Tiger" stamps in 1998, including, of course, China itself. Beyond China, tiger images are everywhere, from the names of sports teams and nicknames of golfers to petroleum company slogans. The Tamil rebels in Sri Lanka call themselves the Tigers, and, at least in English, a person of high sexual energy is a tiger. Former United States Secretary of State George P. Schultz is said to have a tattoo of a tiger on his derriere in tribute to Princeton, his alma mater. The dragon and the tiger share equally important positions in the mysterious pseudoscience known as *feng shui*, and it was convenient for pharmacological purposes that at least one of these animals was available.

In late 2004, the satellite television channel Animal Planet conducted a two-month survey in seventy-three countries to identify the world's most popular animal. Viewers were offered a short list of ten animals. After more than fifty-two thousand votes were counted, the tiger



This life-sized hand organ, operated by turning a handle on the tiger's left side, was made for Tipu Sultan in France. Air is pumped into the bellows within the tiger's body and expelled as a shriek and a loud roar. As the tiger "kills" the British soldier, the victim's hand moves up and down, and tunes could be played on the button keys in the tiger's side.

was declared the world's favorite animal. (The dog was second, then the dolphin, horse, and lion, followed by the snake, elephant, chimpanzee, orangutan, and whale.)

In a 1999 essay entitled "The Tiger in Human Consciousness and Its Significance in Crafting Solutions for Tiger Conservation," Peter Jackson explains the importance of tiger symbolism in many Asian countries:

At the advent of the Year of the Tiger these markings are painted on the foreheads of children to promote vigour and health. The children also wear tiger caps and tiger slippers for the occasion. In Korea, the tiger became the symbol of the Mountain Spirit, and the White Tiger the Guardian of the West. In modern times, South Korea chose the tiger as the symbol of the 1988 Olympic Games in Seoul. Malaysia has two tigers supporting its National Crest. . . . India, home of half the world's surviving tigers, replaced the lion with the tiger as its national animal when conservation started in the early 1970s. In Pakistan, where no tigers are now found, the political party which fought for independence from British rule, the Muslim League, still has the tiger as its election symbol and displayed it during its victorious campaign in 1997. Bangladesh has the image of the tiger on its banknotes. Because the tiger is the symbol of power, Hong Kong, Malaysia, Singapore, South Korea, and Thailand have been dubbed "Asian tigers" because of their rapid economic advance.

In the movies, the tiger is always portrayed as a powerful, dangerous creature, usually a man-eater. In the 1942 adaptation of Kipling's *Jungle Book*, Shere Khan the tiger is described as "villain, killer, man-eater, assassin," and establishes his bona fides early in the film when he attacks and kills a poor villager. Later, Mowgli is told (by Kaa, the python) to lure Shere Khan into the water so he can kill him "because tigers, like all cats, fear water," and he does just that. (Tigers do not fear water, but the producers' understanding of natural history was a little shaky, anyway, for among the monkeys shown in the Indian "jungle" are spider monkeys, found only in South America; and when Mowgli is shown in the den of

the wolves that raised him, the "wolf pups" are little Labrador retrievers.) Tigers also appear as roaring, dangerous killers in the 2000 film *Gladiator*, where they are released into the Coliseum to attack the eponymous fighters, but a mere tiger—especially one on a chain—is no match for the ex-general Maximus, and he handily kills one with his sword. (How the heavy-coated Siberian tigers were supposed to have been brought to ancient Rome is not explained.) The *Last Samurai*, made in 2003, begins with a montage showing how the Japanese warriors trained: they practiced their swordsmanship on a snarling white tiger.

There are no tigers in Japan now, and there have not been since the late Pleistocene, according to Andrew Kitchener (1999), but their absence from the landscape has not precluded their appearance in Japanese art. There are many examples of tigers carved as netsukes, miniature sculptures that are now highly desirable collector's items. Carved of ivory, wood, or semiprecious stones, they represent a unique form of sculpture that can be held in the palm of the hand. Traditionally, women kept small objects in their sleeves, but because kimonos had no pockets, men carried *sagemono*, silk bags that were used to hold tobacco pouches, pipes, purses, or writing implements. The *sagemono* was hung from the kimono sash (*obi*) by a silken cord, and the netsuke served as the toggle that kept the cord from sliding through the sash.

Valmik Thapar, one of the world's leading tiger conservationists and author of many books and papers on tigers, presents in *The Tiger's Destiny* (1992) a fine discussion of the tiger's place in Taoism and Chinese culture:

Taoism believes everything has a soul, be it animate or inanimate. When it is good, it is controlled by yang or the green dragon; when evil by yin or the white tiger. The breath of the tiger creates the wind, the breath of the dragon the clouds, and together they produce torrents of rain which regenerate the earth and provide vital food for man. In times of severe drought, real tiger bones would be dropped into a "dragon well," apparently causing such havoc for the reigning dragon that a vast storm would engulf the land, bringing endless rain and relieving the drought.

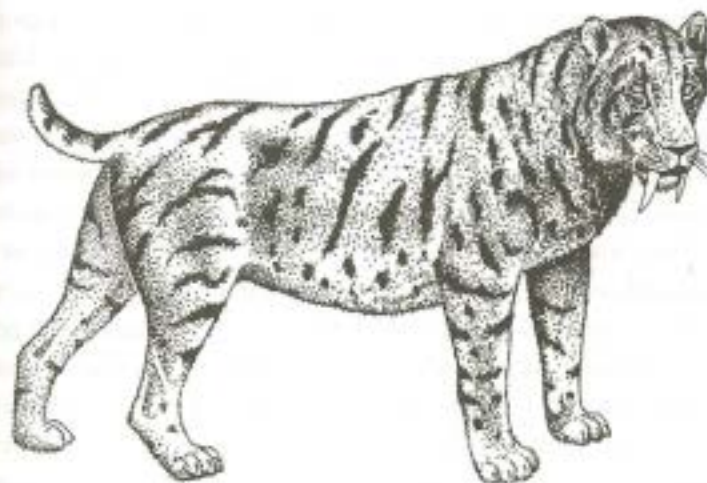
The founder of Taoism, Chang Tao-Ling, was dedicated to the search for a dragon-tiger elixir which would grant eternal life. . . . His recipe for immortality is secret and exists only in a few mysterious writings. But it is significant that Chang is always depicted riding a tiger.

More than 2 million years ago, *Felis paleosinensis*—"ancient cat from China"—roamed the forests of central Asia, spreading westward to the shores of Caspian Sea and the Caucasus and into Persia and Afghanistan; early tigers also spread eastward into Manchuria and Korea. For the most part, tigers from northern climes grew larger than those from farther south. (In modern times, the largest tigers are the "Siberian" forms; the smallest were the extinct Balinese tigers.) From Southeast Asia and India they reached the islands of Sumatra, Java, and Bali. Curiously, although tigers are excellent swimmers and must have colonized the Indonesian islands by swimming there, they never managed to cross the Palk Strait from southern India, and there are not now, nor have there ever been, tigers in Sri Lanka.

Saber-toothed "tigers," the large cats that lived in Europe and North America during the Pleistocene, some one hundred thousand years ago, are not included in the ancestry of modern tigers. In *The Big Cats and Their Fossil Relatives* (1997), Alan Turner explains:

While the term "saber-tooth" (from *saber*, a curved sword often used by mounted cavalry) describes some features of the dentition of these cats well enough, there is simply no basis for calling them tigers; they are not closely related to the true tiger and are certainly not an ancestor of that species, and there is no evident reason to assume that they had striped coats.

There were many species of early cats, some of which were as large or larger than modern tigers, and many of which had characteristically enlarged canine teeth. Because of small but significant differences between many of the earlier species and modern cats (Felidae), they have been classified separately as Nimravidae. Some nimravids, such as the leopard-sized *Hoplophoneus occidentalis*, had canines that were only moderately enlarged, but *Barboarafelis fricki*, which was larger than a modern lion, had huge stab-



The saber-toothed "tiger", unrelated to today's tigers, became extinct about fifteen thousand years ago.

bing teeth that fit into a flange on the lower mandible. Of the many bones of large cats that have been recovered from the La Brea Tar Pits of Southern California—according to Christopher Shaw (1992), the number exceeds 160,000—probably the best known are those of the saber-toothed cat called *Smilodon fatalis*, described by Shaw as

about the same size as an African lion; however the body proportions were different from those of any large living cat. Its robust front limbs indicate that it sought prey that greatly exceeded its own weight, but its skeletal structure suggests that it did not chase its prey extensively. This animal was an active predator that relied on stealth and ambush rather than speed, using surprise and a short, rapid pursuit, followed by a violent impact and a lethal bite.

This is essentially a description of the modern tiger's hunting technique, but while its forelegs are powerful enough to break the neck of a deer with a single blow, they are not proportionally as long as those of

Smilodon. Tigers are unmitigated carnivores; they prefer large prey to smaller but will hunt the smaller if necessary. According to John Seidensticker, in his 1996 book *Tiger*, "Tigers specialize in killing large deer, wild cattle, and wild pigs. . . . Tigers can kill prey ranging in size from the large males of the wild cattle species, which top the scales at 1,000 kg (about 2,200 lb), to the diminutive muntjacs weighing just 15 kg (33 lb)." They stalk their prey, usually in thick cover, keeping low to the ground and inching forward until they are in range, then charging with astonishing speed. The tiger's preferred method of killing is a powerful bite to the throat, but struggling deer or buffalo do not always cooperate, and often the tiger has to wrestle the animal to the ground before administering the windpipe-crushing bite. Smaller deer, such as the chital, may be killed with a single forearm blow to the head, but tigers have to puncture the throat of the larger, heavier sambars. Many times the tiger is spotted before its charge, or the charge spooks the animal, or even when contact is made, the prey animal gets away. The general wariness of tigers and the deep cover in which they live has made it almost impossible to observe the tiger's hunt, but it has been estimated that only 10 percent of the charges are successful.

With the exception of lions, which live in communal groups known as prides, and cheetahs, where adult females stick with their dependent cubs, all other wild cats are loners, none more so than the tiger. Male and female must come together for mating, but when that has been accomplished, the male moves off and may never see his offspring again. The female remains a solo act until her cubs are born, and after nursing them for six to eight weeks, she hunts for solid food for herself and for them. By the age of six months, the cubs are completely weaned, and males—which grow larger and faster than females—will weigh about 100 pounds, while the females will be about 30 pounds lighter. At the age of about eighteen months the cubs get their permanent canine teeth and are ready to make their own kills. At this age, males begin to wander off in preparation for establishing their own territory. Males and females stake out their own territories, but that of the male covers much more acreage. Tigers are so dedicated to the concept of territoriality that even when baits are regularly put out at particular locations, the tigers

continue to make their regular rounds, as Charles McDougal, the chief naturalist at Tiger Tops in Chitwan, points out in *The Face of the Tiger*.

Because tigers rarely see others of their species, they rely on scent marking to keep aware of other tigers. With skin glands around their cheeks, toes, tail, and anogenital areas, they leave scent marks by rubbing these parts on trees and bushes, and also leave "signatures" in their urine and feces. As tiger researcher K. Ullas Karanth (2001) has written, "When we see a tiger, we may think it is walking alone, although it is leaving scent messages for other tigers almost continuously. The tiger may be solitary, but it is not alone." In *The Secret Life of the Tigers*, Valmik Thapar, writing of the tigers of Ranthambhore, also suggests that tigers are not always as solitary as sometimes portrayed. He tells of a male tiger who remained and provided food for his cubs and their mother. And he "observed instances of communal feeding, where nine tigers shared a carcass, controlled by the tigress Padmini. In fact, six of these tigers were cubs of Padmini's litters . . . the first sign that tigers might sustain kin links throughout their lives." He even found a situation where a male tiger—probably the father—remains with the tigress and the cubs: "There was no question then, of the male tiger practicing infanticide . . . we now have evidence that in the course of the next few months the male took an active role in providing food for the cubs and their mother, and therefore had a vital role to play in raising the family."

Tigers are generally nocturnal but have been observed hunting in the cool of the morning and evening as well. Like all cats, tigers see well in limited light, and, like lions, leopards, and jaguars, in bright sunlight their pupils contract into small round shapes, not the vertical slits of the smaller cats. Roaring is most often associated with lions, but tigers, jaguars, and leopards (but not snow leopards) also produce these hollow, guttural sounds. It is believed that roaring functions as some sort of long-range communication for tigers, but its actual purpose—unless it is merely to advertise the cat's presence—is not fully understood. It is a sound to be reckoned with, as Richard Perry noted: "The full-throated roaring of a tigress, or tiger, rolling along the earth in deep and thrilling gusts of sound to a distance of two miles or more on still nights, upsets all the jungle . . . as that solemn and vibrating *aa-oo-umgh!*, as if from the

depths of a great organ, reverberates down the aisles of the valleys and over the jungle; terminating after a brief pause in a series of explosive booming oo-oo-ooonghs!"

A recent research project by acoustician Edward Walsh and his colleagues at the Developmental Auditory Physiology Laboratory in Omaha, Nebraska, suggests that tigers use low-frequency sounds—some so low as to be inaudible to humans—to communicate with one another. Working with tigers at the city's zoo, the researchers found that some of the tigers' sounds "stretched down into the infrasound range, below 20 hertz" (Anon. 2003a).

Although their eyesight and hearing are incredibly keen, tigers are said to have a very poor sense of smell. In his 1967 landmark study, *The Deer and the Tiger*, George Schaller wrote, "The role of olfaction in the communication between tigers provides an interesting sidelight on a hotly debated issue among hunters. The tiger's sense of smell is usually said to be either poor or practically absent. . . . [But] the fact that the tiger uses scent as a means of signaling certainly indicates that its powers of olfaction are good." Given the acuity of its other senses, it would give the tiger an unfair advantage if it had a sense of smell that was equal to its sight or hearing. If the tiger's olfactory ability is controversial, there is no question about the sense of the prey animals. To detect and avoid predators such as the tiger, hoofed animals usually have well-developed eyesight, hearing, and a sense of smell. As Peter Matthiessen wrote, tigers "have never adapted to their own strong smell by learning to hunt upwind when stalking—one reason they miss at least nine kills out of ten."

Although tigers are hard to find and therefore notoriously difficult to count, the worldwide total of all species and subspecies in the wild is generally thought to range between 2,500 and 4,000. There is no way of telling how accurate these numbers are, and it is possible that the number is even lower than the low estimate. In his 1996 book *Of Tigers and Men*, Richard Ives claimed that only 700 tigers of any species were left in the world, but hardly anyone—no matter where they stand on the issue of tiger conservation—agrees with him.

Although they are all classified as *Panthera tigris*, two forms are usually recognized: the larger, lighter-colored, heavier-coated "Amur" tiger (known by the subspecies name of *Panthera tigris altaica*) and the somewhat

smaller, darker, and slenderer "Bengal" tiger. All wild tigers are threatened by traditional Chinese medicine, and of the eight recognized tiger subspecies, three have already been exterminated. The living five are the Amur (Siberian) tiger (*Panthera tigris altaica*), the Bengal tiger (*P. t. tigris*), the Indochinese tiger (*P. t. corbetti*), the South China tiger (*P. t. amoyensis*), and the Sumatran tiger (*P. t. sumatrae*). The Bali tiger (*P. t. balica*) was the first to go—the last confirmed sighting was in 1939—followed by the Caspian tiger (*P. t. virgata*), last seen alive in 1968, and then the Javan tiger (*P. t. sondaica*), which has not been spotted since 1976.

For convenience, *Panthera tigris* has been divided into eight subspecies, but the distinctions are often variable and there are many biologists who regard them as being arbitrary and meaningless. Some distinctions are based on size, some on the ground color of the coat, and some on stripe color and striping patterns, but these may vary widely within a given population and within a given geographical area. In his 1999 chapter, "Tiger Distribution, Phenotypic Variation and Conservation Issues," Andrew Kitchener pointed out that "striping patterns and coloration attributed typically to Javan and Bali tigers were also found in animals from Sumatra, Burma, and South India." And in coloration, "variation within the putative subspecies may be greater than variation between them." After careful consideration of the variables, Kitchener concluded that there are only two subspecies: *P. tigris tigris*, of mainland Asia, and *P. t. sondaica* of the Sunda Islands and possibly peninsular Malaysia. But even if these two are the only valid subspecies, so much has been written as if there were eight that in this discussion I will recognize the eight nominal subspecies especially when quoting authors who believed they were writing about a subspecific population or individual.

Neither a species nor a subspecies, white tigers have always been considered very special. Probably based on an occasional sighting in the wild, they were regarded as particularly sacred and therefore formed an integral part of Chinese ritual. The white tiger (*Pai Hu*) was believed to control wind and the water, and its image was often placed on tombs and temples. White tigers may make for spectacular zoo or circus exhibits—for their Las Vegas act, Siegfried and Roy have fifty-eight—but because they are both crossbred and inbred, they have no conservation significance and some regard them as an aberration of nature. At a

1986 tiger symposium held at the Minneapolis Zoo, an entire session was devoted to white tigers, and Edward Maruska of the Cincinnati Zoo presented a paper he called "White Tiger: Phantom or Freak?" Maruska identified our fascination with "strikingly colored black and white animals," such as the giant panda, killer whale, zebra, colobus monkey, and ruffed lemur, but then quotes William Conway of what was then called the New York Zoological Society (now the Wildlife Conservation Society) as saying, "White tigers are freaks. It's not the job of a zoo to show two-headed calves or white tigers." Lee Simmons of the Henry Doorly Zoo in Omaha, Nebraska, wrote that "you justify white tigers in the same way as you justify traveling giant pandas or koalas or any other high-visibility animals, which, through the ability to catch the public fancy, significantly enhances public support and therefore the financial well-being of your institution." In other words, your zoo needs money to carry on its good works, so you do whatever is necessary to keep the money coming in—even exhibiting two-headed calves.

We don't know how frequently white tigers appear in nature, but we do know that in the last one hundred years, only about a dozen have been seen in India. (White forms have never been reported for any of the other subspecies.) The precursor to all captive white tigers is believed to be a nine-month old cub that was trapped by hunters in the forests of Madhya Pradesh in 1951 and taken to the palace zoo of the Maharaja of Rewa at Govindgarh. Named Mohan, the cub was later mated to a normal-colored captive tigress who produced three litters with normal coloring. A few years later, Mohan mated with one of the offspring, producing the first litter of white cubs in captivity; they are the ancestors of others now in zoos the world over. White tigers in zoos today are inbred and crossbred mixtures of Bengal and Siberian tigers. They are neither albinos (in which case they would have pink eyes) nor a separate species; they have chocolate stripes and blue eyes, although several variations in eye and stripe color have been seen. White tigers are only born to parents that both carry the recessive gene for white coloring.

With the obvious exception of the white ones, all tigers are orange with black stripes and white undersides. This coloring makes the tiger stand out dramatically in a zoo environment, but in the wild, the vertical

striping provides surprisingly good camouflage. (An orange and black animal in the snow, however, is hard to miss.) While the various subspecies differ slightly from one another, they all conform to the same general color scheme. Whether found in snowy forests or in steaming jungles, every species of tiger is being hunted down and killed for Chinese medicine.

The Siberian (Amur) Tiger

As David Prynne points out in the introduction to his 2004 book, *Amur Tiger*, "This book is about the Amur, Ussuri, or so-called Siberian tiger. The Amur and Ussuri rivers are within the tiger's historical range, [and] so are acceptable names; 'Siberian' is not recommended, because the tiger has probably never occurred in Siberia as normally understood in Russia."

The largest of the tigers—and the largest of all living cats—the Siberian (Amur) tiger, *Panthera tigris altaica*, is found primarily in the coniferous, scrub oak, and birch woodlands, not of Siberia, but of far-eastern Russia (Ussuriland and Khabarovsk Province in particular), with a few remaining in northeastern China. Because of its heavier coat, the Amur tiger appears much larger than the Indian and Southeast Asian races, but as Peter Matthiessen noted in *Tigers in the Snow*, "it is only two to four inches taller at the shoulder than those mighty Bengal tigers."

The Amur tiger needs large prey, such as boar and red deer, to survive and there are known cases of tigers killing and eating adult brown bears. The largest Amur tiger reliably recorded was a male shot in the basin of the upper course of the Sungari River in Manchuria in 1943. He was 3,507 millimeters (11 feet, 6 inches) in length, including tail. Males can weigh up to 660 pounds, though David Macdonald's *Encyclopedia of Mammals* suggests that one was found that weighed 384 kilograms (845 pounds). Females, in any case, are smaller, measuring about 8½ feet from head to tail and weighing 200 to 370 pounds. The individual territory of Amur tigers is also quite large, ranging from 39 to 154 square miles for females to an astounding 309 to 390 square miles for males.

In his 1994 history of the Russian Far East, John Stephan gives us a basic overview of the Amur tiger situation at that time:



Amur tiger at rest in Primorski Krai, in the Russian Far East.

Ginseng and tigers thrive in the Sikhote Alin Range. The former attracted people; the latter ate them, if one is to believe lore about peasants being pulled through izba windows and soldiers being snatched from marching columns. In point of fact, tigers disconcerted rather than devoured nineteenth-century settlers. Unaccustomed to sharing space with humans, they prowled around farms and occasionally made themselves at home in outdoor privies and bathhouses. Although buttons and a butterfly net were all that was left of an unlucky German lepidopterist in 1914, the fang-toothed felines were more partial to puppies. Dogs vanished from the streets of Vladivostok in the 1860s, guaranteeing a niche for their predators in municipal nomenclature (Tiger Street, Tiger Hill, etc.). Hunted to the verge of extinction by the 1950s, Ussuri tigers rebounded as a protected species, confirmed by paw prints and telltale canine remains in Vladivostok as late as 1986. In the early 1990s, however, their numbers again fell as poachers catered to the Chinese market for tiger skins.

When the Soviet Union collapsed in 1991, law and order collapsed with it. In a land where hunting was, and still is, a way of life, the value of tiger skin and bones for sale to China, the Koreas, Japan, and Taiwan had become an incentive to kill tigers. It was feared that the tiger would be eliminated in a few years. An extensive survey of Amur tigers conducted in 1995-96 (Matyushkin et al. 1997) found that, as expected, the great majority lived in the Russian Far East, that perhaps 20 lived in adjacent regions of northwest China, and that there were only unconfirmed reports that Amur tigers remain on the Korean peninsula. More than 650 field workers conducted the survey over approximately 120,000 square miles, an area the size of Norway, mostly encompassing the Sikhote-Alin mountain range. In this vast area (and in winter weather) they found approximately 450 adults, subadults, and cubs. Expanding ties within China provided an easy avenue for moving tiger products through Vladivostok and Khabarovsk. Peter Matthiessen, in *Tigers in the Snow*, provides a complementary perspective:

The depletion of China's hoard of tiger bones explains the upsurge of the trade in the late 1980s, when poaching intensified in India, Bhutan, Indochina, Indonesia and the Russian Far East. Many of the golden hides eventually made their way to the Arab states, while the bones went to dealers in China and Hong Kong, Taiwan and Korea, Singapore, Japan, and the large Asian communities abroad . . . Tonics and potions brewed from genitalia were much in favor among rich, flagging Asians, and a dried penis (which resembles a coiled eel) could command up to \$2,500 in Singapore or Taiwan, where bowls of nice hot penis soup, \$300 each, were consumed for their restorative properties in man's struggle against such dire afflictions as impotence and death.*

In an effort to develop stronger conservation measures for Siberian tigers, Wildlife Conservation Society tiger specialist John Goodrich, in

* In his 1987 article "Deadly Love Potions" (deadly to the animals that provide the material for the potions), Esmond Bradley Martin tells us: "Elderly Chinese men regard the male sex organ as the best virility prescription of all. They place a dried tiger penis, with testicles still attached, into a bottle of French cognac or Chinese wine and let it soak for weeks, or even months. Then they take a few sips of the liquor every night."

a joint program with the Society's Hornocker Institute and the Sikhote-Alin State Biosphere Zapovednik, radio-collared more than thirty tigers and followed their movements year after year. Ten years on, Goodrich and his colleagues reported in the February 2002 issue of *Wildlife Conservation* that four of the five tigresses collared in the region of Koonalayka Creek had been killed by poachers and ten of twelve cubs died. Where there were no logging roads that allowed poachers easy access to the tigers' remote habitats, the tigers fared much better. Therefore, Goodrich and his colleagues suggested that roads no longer in use be destroyed or made impassable, which would restrict access for poachers and provide no easy way for them to get the carcasses out, especially if the region was then guarded.

In preparing *Monster of God*, his 2003 study of man-eating predators, David Quammen also traveled to the Sikhote-Alin mountains to talk to the people whose daily lives include occasional contact with the animal they call *amba*, the Amur tiger. Quammen hooked up with biologist Dimitri Pikunov ("a burly, impetuous man of vehement moods and quiet charms") and learned the complex history of the snow tigers in Russia. Until the end of the nineteenth century, some 150 were killed annually, mostly for the pelts, but also because they posed a threat to hunters and trappers. When the Politburo decided that the Russian Far East should be colonized around 1930, tigers presented a risk to the "colonists" (often forced laborers) and were eradicated. Tiger hunting was prohibited in 1947, but the live capture of cubs continued. When a census was conducted in 1969-70, some 250 tigers remained in the Russian Far East. Then the Chinese market for tiger parts opened up. Quammen estimated that at a rate of about sixty tiger deaths per year (the rate in 1993), the Amur tiger would last only a decade. For the Far East as a whole, timber sales could be worth far more economically, but for local villages in the short term, the difference that the money a tiger sale could make was huge.

In the *New York Times* on January 16, 2005, James Brooke described his visit with Dimitri Pikunov in Nezhino, near Vladivostok, and wrote about a new survey of Russian tigers to be conducted in February, 2005. As in the 1995-96 attempt, volunteers will fan out along 600 known tiger routes, checking for the distinctive paw prints in the snow. The

1995-96 count estimated 450 tigers, down from the 600 that had been estimated in a 1990 survey. "Since then," wrote Brooke:

"there have been fears that the population has been diminished further. With the fall of Communism, tigers, along with other wildlife here, have been hurt by the collapse of Soviet controls on hunting and trade and an explosion in Chinese demand for wildlife delicacies and traditional medicines. Chinese buy frogs, bear paws, wild ginseng, deer antlers, and deer penises. . . . As evidenced by the dead tigress found in a Chinese snare near here [Nezhino] in November, the top cat regularly loses out to the top primate."

Pulling triggers, setting snares, rigging electrical wires, or poisoning water holes, poachers are also laying waste to the diminishing populations of tigers in India and Southeast Asia. In countries where tigers have been symbolically dominant for ages, the ultimate source of the symbol is fading.

The Tigers of Indonesia

There are always a few tigers roaming about Singapore, and they kill on an average of a Chinaman every day. . . . We heard a tiger roar once or twice in the evening and it was rather nervous work hunting for insects among the fallen trunks and old sawpits, when one of the savage animals might be lurking close by, waiting an opportunity to spring upon us.

Alfred Russel Wallace, The Malay Archipelago, 1869

South of Borneo, Java is only the fifth largest of the Indonesian islands but it contains two-thirds of the country's population. Indeed, it is one of the most densely populated areas in the world, with more than 100 million people living in an area the size of Alabama. Jakarta (formerly known as Batavia), the capital of Indonesia, is located there, with a population of 8.25 million. After 1619, the Dutch East India Company's settlement at Batavia became the trading and shipping center for the "East Indies." Because of the importance of the center, the colonial government was particularly interested in ridding the region of dangerous animals.

Tigers troubled the people of Batavia from the very beginning of the Dutch presence, wrote Peter Boomgaard (in *Frontiers of Fear: Tigers and People in the Malay World, 1600–1950*); and although the governors themselves were rarely active in tiger hunting, fairly soon their role seems to have evolved to giving money to people who presented them with captured or killed tigers. Sometimes the rewards were equal to a man's rice ration for an entire year, so it is understandable that people would seek out tigers to kill, even if they weren't threatening anyone. Hunters either surrounded the animals and dispatched them with spears or dug pitfalls lined with sharpened bamboo stakes. They also employed "tiger-traps," which consisted of a wooden cage that contained a live goat, and a trapdoor that could be triggered when the tiger entered. "According to the Hungarian hunter Count Andrasy, who traveled over Java in 1849–50," wrote Boomgaard, "some 400 tigers annually were captured in these traps." Meanwhile, the sultans and rulers of various kingdoms on Java were hunting tigers—somewhat ineffectually, as elephants were not available to offer them protection—both to rid the countryside of these dangerous animals and to enable the aristocracy to demonstrate its prowess. And the Tuwa Buru people of Java paid taxes to their rulers in live tigers and deer. Thus the Javan royalty, Javan native peoples, and Dutch colonials in effect conspired to rid the island of tigers, and their efforts, not altogether successful in their lifetimes, certainly contributed to the downfall of *Panthera tigris sondaica*, the Javan tiger.

Java was also the scene of rituals, recorded as early as 1605, that were not specifically designed to reduce tiger populations but because the tigers died in the process, the end results were the same. One such ritual, reminiscent of the Roman stadium, involved placing a tiger and a "buffalo" (usually the wild ox known as the banteng) in an arena for a fight to the death. Contrary to popular opinion, tigers do not attack anything within range, and in most instances, the tiger had to be prodded to leave its cage, and the panicked "buffalo," which might have outweighed the tiger by a thousand pounds, often managed to kill the tiger. In the ritual known as *rampogan sima* ("tiger sticking"), caged tigers were released into an arena where they were surrounded by ranks of spearmen and desperately trying to find an escape route, were stabbed to death. According to Boomgaard, "such traditional rituals in which tigers were killed were strongly supported

by the colonial state and even 'invented' in areas where they had not been carried out before. Together, the colonial state and the European hunter were making the Orient safe for the Empire." The ritual practices faded from view around 1900, probably because tigers were becoming too scarce.

As forested areas, alluvial plains, and river basins were converted to agriculture, the Javan tiger's habitat was concurrently constricted, and because the agriculturalists regarded tigers as a dangerous nuisance, many were poisoned. By 1970, Java's last tigers were confined to the wild southeast coast known as Meru-Betiri, but because their prey—the small sambar deer known as the rusa (*Cervus timorensis*)—had been decimated by disease, there was nothing for the remaining tigers to eat. In a paper poignantly titled "Bearing Witness: Observations on the Extinction of *Panthera tigris balica* and *Panthera tigris sondaica*," John Seidensticker reported that in 1976 he and his colleagues had found tracks of three animals in the Meru-Betiri National Park, but after 1979 they found no evidence to indicate that any tigers were still alive in the region.

Throughout history, Javan tigers have been killed by royalty, native peoples, and then Dutch colonials, but during the nineteenth century, big game hunters took up the slaughter. According to Andries Hoogerwerf, author of *Udjung Kulon: The Land of the Last Javan Rhinoceros*, hunters competed to see who could kill the most: "The fanatical tiger hunter, A. J. M. Ledebouer, was out to beat the record of the Sumatran tiger hunter Hofman, who is said to have killed over 100 of these animals in Sumatra. Ledebouer succeeded in this sinister purpose as far back as 1933." Javan tigers were more often killed by eating poisoned wild boar, though. Hoogerwerf suggests, "The poisoning en masse of the wild boar, whose flesh may not be eaten by the mainly Moslem population of Java on the strength of religious considerations, has been going on for almost half a century and to an ever increasing extent, even being encouraged by the Government. It was perhaps the most important direct cause of the rapidly shrinking stock of the Javan tiger."

The hunt for tigers in Bali reached its height later, but was no less conclusive. Bali, Indonesia's prime tourist destination, is a much smaller island than Java, covering only 2,200 square miles. It is largely mountainous and now mostly under cultivation for rice, vegetables, fruits, and

coconuts. Before rice and tourists, however, Bali was heavily forested and was home to a variety of wildlife, including deer, leopards, and tigers—the smallest and darkest tigers known. Bali is only a mile across the Bali Strait from Java, and because tigers are such good swimmers, it is likely that tigers occasionally crossed from one island to the other. Calculating one adult per 40 square kilometers, Seidensticker estimated that at most there were 125 tigers living on the island. Overwhelmed by human activities, the Bali tiger never had a chance and had disappeared by 1960 (Seidensticker, Christie, and Jackson 1999b).

After Borneo, which in square miles is a little smaller than Spain, Sumatra is the second-largest of the Indonesian islands. Most of the eastern half of the island is swampland, and much of the interior is impenetrable jungle. Like other islands nearby, Sumatra was long a part of the Dutch East Indies and was ruled by colonial governors from 1602 until 1798. Tigers represented a nuisance to the Dutch spice planters there, and beginning as early as 1838, bounties were offered for each tiger captured or killed.

From 1972 to 1975, Markus Borner traveled throughout the island of Sumatra, spending roughly two months in each of the eight provinces, trying to assess the size of the surviving tiger population. On behalf of the World Wildlife Fund's "Operation Tiger," Borner conducted numerous interviews, and based on the information he received, he selected promising survey areas and made expeditions to search for evidence—"scratching and pug marks, feces, remains of kills, and so on" (Borner 1978). He managed to find tigers in all eight provinces, but was the first to admit that his figures could only be an approximation, given the difficulties of surveying such an elusive animal in such rough terrain. Nevertheless, he published this summary:

<i>Province</i>	<i>Approximate Number of Tigers</i>
Aceh	100
North Sumatra	50
Riau	300
West Sumatra	50
Jambi	200
South Sumatra	100

Bengkulu	100
<i>Province</i>	<i>Approximate Number of Tigers</i>
Lampung	50
Total	1,000*

* Borner's numbers actually add up to 950, but in his paper the total is shown as 1,000. Others who refer to Borner's table also use his total of 1,000, so I have used Borner's original total, even though it is obviously incorrect.

Borner recognized habitat destruction and hunting as the major threats to Sumatran tigers. A law protecting tigers seemed to have little effect, perhaps in part because there was continued killing of Sumatran people by Sumatran tigers. Borner wrote:

Many horror stories circulate among the people of Sumatra describing tigers who have killed dozens of people. Villagers claim that in 1972 a tiger killed 30 people in a rubber plantation near Batu Radja (South Sumatra) . . . but I myself could confirm only three cases of human beings being killed by tigers.

Sumatran tigers are predominantly hunted today using wire snares, which are designed either to catch the tiger's leg or encircle the animal's neck. Poison, the Dutch colonial government's method of choice in the early 1900s, is still being used in limited quantities, and occasionally armed policemen or soldiers will shoot at a tiger when one appears. Even where they are supposedly protected, the remaining Sumatran tigers are poached for body parts, poisoned by villagers who consider the big cats a menace, and forced onto ever-smaller tracts of habitat due to logging in the forests. On May 19, 2002, the tables were turned, but not in a way that was likely to ensure the tigers' protection. A tiger (or tigers) killed two loggers in the forest of Jambi province.

Sumatran tigers now live in scattered populations in the island's deep forests, and the tiger's secretive nature means that few are ever seen. The forests that provide sanctuary for the tigers may eventually prove their undoing, for it is the clearing of these very forests at a very high rate that is the greatest threat. Since Borner's survey, the population of Sumatran tigers has continued to fall, standing at five hundred



Tiger shot in 1935 by hunters in Alahan Panjang, Sumatra. The population of Sumatran tigers was in decline even before the escalation of killing for the parts to be used in traditional Chinese medicine.

in 2003, according to Matthew Linkie. From 1996 to 2001, Linkie and his colleagues conducted field surveys in the 824-square-mile Kerinci Seblat National Park in Sumatra, recording tiger signs (pugmarks, scats, sightings) in 126 locations. For 5,500 photo-trapping events (in which an automatic camera had been set along known tiger paths), they recorded only thirteen adult tigers—seven males and six females. The tigers of Sumatra, whether you call them *Panthera tigris sumatrae* or *Panthera tigris tigris*, are critically endangered.

In the comprehensive 2004 TRAFFIC East Asia report *Nowhere to Hide: The Trade in Sumatran Tiger*, authors Chris R. Shepherd and Nolan Magnus estimated the number of wild tigers on Sumatra as probably fewer than 400, living in six protected areas. Another 100 or fewer tigers

outside the protected areas probably will not last long. The six protected areas are the national parks Gunung Leuser (with an estimated 110–180 tigers), Kerinci Seblat (76–170), Bukit Tigapuluh (36), Berbak (50), Bukit Barisan Selatan (40–43), and Way Kambas (36). Factoring in the high estimates, that is a total of only 479 Sumatran tigers. In other words, more than half the number of Sumatran tigers that Borner estimated in 1978 were gone by 2004.

Indonesia passed a Conservation Act in 1990 designed to protect the tigers of Sumatra, but still the killing continues, for trophy hunting, protection of farmers and herdsmen, and, of course, for the needs of TCM. Campbell Plowden and David Bowles (1997) investigated the sale of tiger products in northern Sumatra, particularly around the city of Medan, because a large Chinese population resides there and also because of the proximity of Gunung Leuser National Park, with its relatively large population of tigers. (Gunung Leuser also has—or had—a large population of orangutans and is one of the last strongholds of the Sumatran rhino.) The investigators visited eighty-eight shops in and around Medan and found ten that offered verified tiger products for sale, but they also saw many bones, teeth, pelts, and skeletons. They did not find “evidence showing that there is organized poaching for tigers for trophy mounts or for the international trade in bones used in oriental medicine.” But, they wrote, “it is apparent that many tigers that are killed opportunistically or deliberately by farmers are being fed into a commercial domestic market for tiger bones, teeth, claws and skins.” To complete the circle, in her 2000 TRAFFIC report, Kristin Nowell wrote, “Investigation of Customs records in South Korea revealed that hundreds of kilograms of Tiger bones had been illegally imported in the years leading up to 1993. Countries of origin for the bones were listed, indicating that Sumatra was the major source.”

Until around 1990, the most valued part of the Sumatran tiger was the skin. In 1985, according to Charles Santiapillai and Widodo Ramono, the retail price of a Sumatran tiger skin was US\$3,000. But when the medicinal demand for tiger bone began to rise, the skins, while still valuable, were no longer the primary reason for tiger poaching. Indonesia became a primary exporter of tiger bone and tiger bone products, and while the primary recipient of these exports was South Korea, sizable exports were also

recorded to Singapore and Taiwan. In Sumatra, tiger teeth, claws, whiskers, tail, pieces of skin, fat, and dung are also believed to have medicinal properties, while the penis and bone are believed to be aphrodisiacs. The TRAFFIC report concludes:

Data collected by this survey indicates that Sumatran tigers are being killed and removed at an average rate of at least 51 tigers per year over the past five years. With a total population estimated at 400-500 tigers, this implies that at least 10% are being lost every year . . . for many reasons, it is likely to be an undercount, and annual losses are likely to be greater. . . . The survey indicates that poaching for trade is responsible for the vast majority (over 78%) of estimated tiger deaths.

The Tigers of China

In the past, wild tigers ranged throughout most areas of China and Manchuria that were not desert or high mountains, but for the most part, they are now gone. Tigers are an important element in Chinese iconography and, as we shall see, an even more important element in Chinese medicine. It was convenient to have tigers available in China, but this very convenience was responsible for the Chinese tiger's downfall and the subsequent need to seek tiger parts elsewhere.

The South China tiger (*P. t. amoyensis*), found in central and eastern China, is one of the smallest tiger subspecies. Males measure only about 8 feet from head to tail and weigh approximately 330 pounds. Females are even smaller, measuring about 7½ feet long, and when full grown weigh approximately 240 pounds, about the weight of a large jaguar. The short, broad stripes of the Chinese tiger are spaced far apart compared with those of Bengal and Amur tigers. During the 1950s and 1960s, the government of the People's Republic of China declared tigers a nuisance and sponsored a program designed to eradicate them in the country, rather like the campaign to eradicate flies in Beijing. Under this program, thousands of tigers were shot, bringing the South China tiger close to the brink of extinction.

In 1977 the Chinese government belatedly awoke to the fact that the tiger population was decreasing alarmingly, and in an effort to stop the decline, a law was passed forbidding the hunting of all tigers. Unfortunately, this law could not be strictly enforced and hunting continued. Now poaching is the principal cause of the tigers' decline. Poachers have stalked the animal so mercilessly that it has retreated deep into its natural habitat, and the black market continues to thrive.

At the 1986 Minneapolis Zoo tiger conference, Chinese zoo directors Xiang Peilon (Chongqing Zoo), Tan Bangjie (Beijing Zoo), and Jia Xianggang of the Division of Nature Conservations summarized the gravity of the situation at the time:

Before the 1950s, the range of the South China tiger had been widespread throughout the vast territory south of the Changjiang (Yangtze) Valley; historically the provinces of Hunan and Jiangxi had been the centers of its distribution. . . . Later on, owing to the higher density of human population, more extensive and economic and agricultural exploitation, continued reduction of the forested area, and belated natural conservation, there was a sharp decline of population and a great reduction in range since the end of the 1950s. The present population of South China tigers, according to our preliminary estimate, is approximately 40.

The directors identified three ways of rescuing the South China tiger: (1) introduce new conservation laws, (2) protect the known wild tigers and their habitat, and (3) create new reserves. But, they said, "the most urgent, as well as effective, measure at the present time is to set up as quickly as possible a world central captive breeding group for the South China tiger." This was presented in 1986 and published the following year, just about the time the hunting of tigers for traditional Chinese medicine was beginning. The authors may not have been aware of the increase in poaching in China, India, and wherever tigers could be found, but as Chinese zoologists, they could not avoid the knowledge that tiger parts had been used for pharmacological applications for thousands of years. They might have considered adding a recommendation that tigers—Chinese and others—should not be recklessly slaughtered for medical purposes.

The *International Tiger Studbook*⁸ reports that there were fifty-three South China tigers in captive facilities in 1999, but no figures are available for this species in the wild. In a report submitted to *Cat News* in 2003, the IUCN Cat Specialist Group wrote that "an eight-month field survey organized by China's State Forestry Administration in 2001–2002 failed to find any of this race of tiger in the wild. But it is thought that there might be some individuals surviving in the wild, although not forming a viable population with a long-term future." This suggests that the South China tiger, like the Bali tiger, the Caspian tiger, and the Javan tiger, is close to extinction, if it has not already arrived at that dark and irreversible destination.

As of 1997, the status of the South Chinese tiger in the wild could only be described as "vague," a term that was used in an article in *Oryx* entitled "The Decline and Possible Extinction of the South China Tiger" by Ronald Tilson and his colleagues. They wrote, "No wild South-China tigers have been seen by officials for 25 years and one was last brought into captivity 27 years ago. . . . Over the last 40 years wild populations have declined from thousands to a scattered few." In 2002, an article in *Cat News* asked, "Is the South China tiger extinct in the wild?" and cited a survey of the Chinese Forestry Administration that declared there was some evidence of tigers in the mountains of South China. But Ronald Tilson, who participated in the survey, said, "By the end of the year, we had seen no tigers, not one. More surprising, we uncovered no recent physical evidence that provided incontrovertible proof of tigers. With only a few exceptions, we found little in the way of animals that tigers could eat." It would be impossible to say that every single South China tiger is gone, but when dedicated searchers spent seven months in eight of the most likely areas and failed to find even a pugmark, the message seems unequivocal: there are no more wild South China tigers.

⁸ Figures from the *International Tiger Studbook* appeared in Vol. 32, p. 24 of *Cat News*, the newsletter of the Cat Specialist Group of the IUCN (the World Conservation Union), edited by Peter Jackson, Chairman of the IUCN/SSC Cat Specialist Group. Many of the articles are unsigned and are taken from news reports or studies published under other auspices. Attributions to articles that appeared in *Cat News* will be cited simply as "Cat News, Vol. #."

Killing tigers as pests and eliminating habitat certainly contributed to the downfall of this subspecies, but the Chinese tiger had the additional misfortune of living in the very country where its parts were among the most desirable components of traditional medicine. Not content to use their native tigers for local medications, China also became one of the largest importers of tiger products from Southeast Asian countries, and then turned around and exported the medicines: "CITES data for 1990–1992 show that China exported 27 million units of tiger products to 26 countries and territories" (Mills and Jackson 1994). The decline of wild tigers in China encouraged the establishment of "tiger farms" about which Tilson and his colleagues say, "It is reported that these tigers are being bred and maintained for eventual reintroduction efforts in northern China," but the high prices of tiger products—as contrasted with the nonremunerative nature of reintroducing tigers to the wild—causes one to wonder about the real purpose of these "farms."

One breeding center set up in 1986 at Hengdaohezi in northeast China was the subject of a 2000 report by Kristen Conrad. "The original objectives of the Center were twofold: preserve the species, while, in parallel, raise tigers for use in traditional Chinese medicine," she said. The tigers were ostensibly the "Siberian" variety (*Panthera tigris altaica*), which had been requisitioned from various Chinese zoos. By 1989, thirty-seven cubs had been born in the facility, of which twenty-eight survived. The plan was to release some into the wild to replenish the dwindling number of wild tigers in China. (In the zoos from which the tigers came, they might have been crossbred with other tiger subspecies, so these may not be pure "Siberian" tigers.) The second part of the plan was negated by China's compliance with the 1999 CITES treaty, which forbade the sale, purchase, transport, or pharmaceutical use of tiger products. With its main source of revenue thus lost, the center was unable to repay its loans and had to cut back on expenses. The breeding program was curtailed, and several tigers died of exposure and malnutrition.

As of a 1991 visit of E. B. Martin, L. X. Chen, and C. K. Lin (which they described in an article later that year in *International Zoo News*), the Hengdaohezi tiger center was already in financial straits, and "because [tiger] products have great value in Chinese medicine . . . the center would like to obtain permission from CITES to sell overseas some of the

captive bred tiger products from animals which die of natural causes or disease." This plan seemed to the observers to be fraught with problems; there would be no way of identifying the products as having come from captive-bred tigers, and parts from wild-killed (poached) animals could be passed off as having come from those that died of "natural causes." CITES turned down the request. Under the terms of the Pelly Amendment, China was certified (charged for possible trade sanctions), and upon certification, China banned the sale of tiger (and rhino) parts. In 1996, wrote Conrad, the Chinese government argued that sustainable use to TCM is not incompatible with CITES regulations, but because allowing a legal market for tiger bones would have increased consumer demand, which in turn would encourage even more poaching of wild tigers, CITES again refused China's petition.

Somehow, the Hengdaohezi Center survived its financial problems, and, as of October 1999, Conrad continued in her report, "there were 147 live tigers associated with the Center, and an additional 46 preserved in storage." In 1996, 60 tigers were transferred to a new "Siberian Tiger Park" at Harbin, which (in 2004) its Web site declared, is "the largest wild natural park in the world for the northeast tiger; it is located on the northern bank of the Songhua River. A special tour car allows you to linger through groups of tigers and appreciate the adventurous and exciting scene." (At the 2004 IUCN World Conservation Congress, held in Bangkok, a resolution in support of Hengdaohezi was proposed, but it was withdrawn because of strong opposition from much of the conservation community.)

There are now a number of tiger farms/parks in China, and in December 2002, one hundred tigers (and two thousand crocodiles) were shipped from the Si Racha Tiger Zoo in Thailand* to the city of Sanya,

* According to the Thailand zoo's Web site: "At the Si Racha Tiger Zoo, 8 km east of town, you can hold a baby tiger in your arms, or have your picture taken with a tame crocodile. The Zoo covers more than 40 hectares and teems with wildlife, including more than 100,000 crocodiles and one of the world's largest groups of Bengal tigers, more than 130 of them. The Zoo maintains that it is the most successful program for breeding tigers in captivity anywhere in the world. Circus shows include pig racing, ostrich racing, and female performers who wrestle with crocodiles or cover themselves with scorpions. Try the crocodile satay or crocodile soup at the restaurant. Open daily from 9:00 am to 6:00 pm."

on China's Hainan Island, for a theme park known as "Love World." At a press conference held on December 26, 2002, the day after the tigers arrived in Sanya, a spokesperson for Sanya Maidu Ltd., a Sino-Thai joint venture, was quoted as saying, "After we have bred tigers for a few years, we might have over 1,000 of them. Tourists are likely to eat tiger meat at Sanya." This announcement caused such an uproar in the press that theme park officials quickly denied that such a statement had ever been made and claimed that the tigers were being held only for research and the edification of the public. Chinese State Forestry Administration officials promised to look into the matter, and Sanya Maidu threatened to sue the media for publishing the "fabricated story."

As of late 2003, the designation of worst abuser of endangered species seems to have shifted from Taiwan to Thailand. In a report published in the *Washington Post* for December 10, Ellen Nakashima described raids on private homes and zoos during the previous fall that revealed Thailand as "a major gateway for a thriving international trade in endangered species." More than *thirty-three thousand animals*, including tigers, bears, orangutans, and birds, have been recovered, and animal smuggling has been shown to be second only to drug trafficking in profitability. In October 2003, a house was found crammed with tiger carcasses quartered and on ice and six more starving tigers in cages, twenty-one severed bear paws ready for the pot, five live bears, and many other kinds of starving mammals and birds, all evidently destined for restaurants in Bangkok, where tourists are promised exotic dishes. Among the carcasses was a saola, a newly discovered deerlike animal, and a baby orangutan in a freezer. In a raid on Safari World, a park in southern Thailand, police found 144 orangutans, although the zoo had registered only 44. At the Si Racha Tiger Farm, officials found several hundred animals that the owners could not account for. Thailand's Queen Sirikit and Prime Minister Thaksin Shinawatra said that they deplored the illegal wildlife trade but did not offer suggestions on how to patrol the country's 1,800 miles of porous borders with Myanmar, Cambodia, Laos, Vietnam, Malaysia, and Indonesia.

Reported by the journal *Science* for October 29, 2004 (Anon. 2004a) and the Environmental News Service is the story of one hun-

dred tigers that died of avian flu at the Si Racha Tiger Zoo, and the thirty more that were to be killed because they are showing symptoms. Dr. Charal Trinwuthipong, director of the Thai government's bird flu center, said that the tigers might have picked up the disease from infected raw chicken meat. Tigers and chickens, however, are not the only creatures to be affected by the strain of avian flu known as H5N1: from October 2003 to October 2004, this strain killed thirty-one people in several Asian countries, eleven of whom were in Thailand. The Si Racha Tiger Zoo was temporarily closed to the public on October 19, 2004. (Given the zoo's previous history, it has been suggested that there was no compelling reason to destroy thirty more tigers—unless their parts were destined to be sold as medicine.)

There is a substantial difference between "tiger farms" and tigers in captivity in Chinese zoos. The former are ostensibly being held for reintroduction into the wild but may also be used to supply illegal tiger parts, whereas the latter are for display and to save the subspecies from extinction. But even in zoos, the population of South China tigers is in decline, and because so many of the fifty captive tigers trace their ancestry to a single breeding pair, genetic diversity has been severely compromised. The wild population may already be functionally extinct, and the captive population, for better or worse, may be all that is left as a barrier against total extinction of this subspecies. Their extinction would certainly be hastened if their "parts" were made available for sale.

In *How the Tiger Lost Its Stripes*, a discussion of the politics of tiger conservation by journalist Cory Meacham, we read of Sam LaBudde (who posed as a cook on a Panamanian fishing boat in 1987 and videotaped the slaughter of dolphins in the tuna nets), who shot film in Taiwan that "showed flagrant violations of Taiwan's domestic wildlife trade laws, including shots of live tigers—which do not occur naturally on the island—pacing in cages at what LaBudde identified as a breeding farm." Subsequent evidence suggested that the animals were being butchered for sale, a practice that had been both legal and open in Taiwan until the 1980s but that was incontestably forbidden by the time LaBudde claimed the videos had been shot. A December 1997 article by Geoffrey Ward in *National Geographic*, a magazine

known for its careful fact-checking, contained a double-page spread showing LaBudde holding up a photograph taken in Taiwan that showed a tiger in a cage "just before [it] was cut up for food and medicine, a practice that has declined there."

The Tigers of India

There are 827 million Hindus in India, more than 80 percent of the population, and the Hindu ethic is strongly respectful of animals. The attempt to protect tigers by establishing a network of preserves throughout the country has worked moderately well, but the runaway population explosion has overwhelmed the tigers. There are approximately five tigers for every 100 million people, and as the people's need for land and food increase, tigers are being crowded out of their ancestral homeland. As we've seen, it is not only the need for land that results in the displacement of tigers; it is also the need for tiger "products" that has made the tiger the prime target for poachers, and the great cats are being trapped, shot, poisoned, and electrocuted out of India—and out of existence. But before they disappear completely from the Indian subcontinent, the animals that Hindus call *bagh* have one last card to play: they bite back.

Throughout their range and throughout their history, tigers have been known to attack people and often eat them, which has resulted in the appellation "man-eaters." Nowhere has this problem been manifest more than in India, where overcrowding and competition for land use often bring tigers and humans into close proximity. In such an encounter it is the men (or women, or children) who suffer first, but the tiger usually loses in the end—except in India's Sundarbans region, where, as we'll see, man-eaters seem to be the rule rather than the exception and where retaliation is almost impossible.

From the earliest days of the British East India Company, the profusion of wild game in India amazed and delighted would-be hunters. British sportsmen killed deer of many species and wild boar, which they speared from horseback in the sport known as "pig-sticking." Tigers were the main attraction, however, because they (sometimes) attacked people and the hunt could therefore be justified as self-defense, but more often because

they made wonderful trophies. The maharajas demonstrated their omnipotence by hunting tigers from the backs of elephants; beaters, sometimes numbering in the hundreds, drove the tiger into rifle range and the Indian prince shot it from the howdah. In *The Deer and the Tiger* (1967), George Schaller gave some of the more egregious examples:

Gordon-Cumming (1872) shot 73 tigers in one district along the Narmada River in 1863 and 1864, and he once shot 10 tigers in 5 days along the Tapti River; Forsyth (1911) shot 21 tigers in 31 days in Uttar Pradesh; George V and his party shot 39 tigers in 11 days in Nepal in 1911-12; Rice (1857) shot or wounded 158 tigers, including 31 cubs, in Rajasthan between 1850 and 1854; the Maharaja of Nepal and his guests shot 433 tigers, as well as 53 Indian rhinoceros, between 1933 and 1940; Colonel Nightingale shot over 300 tigers in the former Hyderabad State; the Maharaja of Udaipur shot at least 1,000 tigers during his lifetime; the Maharajkumar of Vijayanagar . . . has shot 323 tigers to date (letter, April 5, 1965); and the Maharaja of Surguja wrote to me in a letter dated April 6, 1965: "My total bag of Tigers is 1,150 (one thousand one hundred and fifty only.)"

During the long British occupation of India, sportsmen of one kind or another killed tigers for no reason other than that they were there. Of course, it was beneficial to the community to kill those tigers that were killing livestock, and even more accommodating to kill man-eaters, so the slaughter could be comfortably rationalized. Besides, the skin made a splendid trophy. As told in his 1946 *Man-Eaters of Kumaon*, the renowned Jim Corbett was invited in the first decades of the century to the Kumaon Hills, in the foothills of the Himalayas, to dispatch the man-eaters that were killing and eating the villagers. Corbett's first conquest was the "Champawat Man-Eater," a tigress that was said to have killed 434 people over a four-year period; then he got the "Chowgarh Tigers," a mother-daughter pair that had killed 64 people. He went on to kill many more, including the "Bachelor of Powalgarh," perhaps the largest Indian tiger ever measured, which does not appear to have killed anybody but because of his size, was "the most sought-after big-game tro-



The Prince of Wales on a tiger hunt in India, as drawn for the *Illustrated London News*, April 1, 1876.

phy in the province." In the 1930s, Corbett's publicized exploits encouraged Indian and European sportsmen to follow his example, and they killed so many tigers that the Indian government finally banned the killing of tigers for sport, but not before hundreds more had been shot. (Ironically, the 570-square mile Corbett National Park, located near the western border of Nepal, was established in 1936 as India's first national park, and in 1973, it would become the first reserve to be incorporated into Project Tiger.) Peter Hathaway Capstick, author of *Maneaters* (1981), believes that killing tigers was necessary to protect people from the vicious beasts of his eponymous title:

Between the Brits and the Maharajahs there's pretty good reason to believe that at least 100,000 tigers got the deep six over the past hundred years. (Personally, since this is only 1,000 per year, I can't see the harm.) Some researchers will tell you that this number was killed since the beginning of the 20th century alone, and when we look at the number of survivors through the haze of now-settling dust of the

great Terai [an area that formerly extended over the foothills of India and Nepal], they may be right. Through the incredibly expensive machine that was the Indian tiger hunting establishment, official guesstimates (now a couple of years old) are that, in India, of the some 40,000 left around 1930, less than 2,000 may yet exist.

In India, the human population is now well over a billion, and despite a vast migration into the cities, millions still live in or near undeveloped forests or grasslands, where there are wild animals to prey on them. And it has always been so in India: "In the past four centuries," wrote Peter Matthiessen, "tigers are thought to have killed 1,000,000 Asians, or about 2,500 people annually, or twenty-five people per 1,000 tigers—not an unreasonable figure when one considers that a man-eater of yore would often kill that many and more all by itself. In the past century, of course, human mortalities have declined for want of tigers, despite the increase in density of this form of prey."

The tiger's inclination to attack and sometimes eat people has been shown to be an impediment to its protection in India and Nepal, and throughout its range, though the Amur tigers of the Russian Far East do not seem to have much of a history of man-eating. In *Conservation Biology* (1997), Vansant Saberwal pointed out that "problem tigers that become habitual man-eaters . . . [are] one of the most basic causes of local animosity toward tiger conservation." People might be more inclined to save animals if the animals didn't sneak up on them in the dead of night and kill them. In 1998, Ronald Tilson and Philip Nyhus reported on the situation in Sumatra, where "in 3 months, four villagers were killed and five villagers were attacked by tigers in one multiple-use protected forest. In 1996 and 1997 more than a dozen deaths were allegedly caused by tigers in Sumatra, far above the average of two per year cited by Indonesian authorities."

Neither big game hunting nor self-defense can account for the recent decline in tiger numbers throughout India and Southeast Asia, although they certainly contributed to it. The increased demand by TCM for tiger parts is now the main cause of the destruction of tigers, and there is a direct and unfortunate correlation between the increase of poaching and the decrease of tigers. This correlation can be seen even in those areas where the tigers are (supposed to be) protected by law.

The upsurge in poaching tigers for TCM can be attributed to several factors, which came together around 1985. Because Asians have been using tiger-bone medicines for thousands of years, it was not the promise of a new cure for disease that encouraged the poachers, but more likely it was the knowledge that tigers, hunted as trophy animals for centuries, seemed to be disappearing at an alarming rate. And as tigers became scarcer, the possibility of enormous profits increased. Those who would use TCM were increasing even faster than the tiger populations were decreasing: the human population of just China had risen to 1.2 billion. A resurgent interest in TCM and the concurrent decrease in the effectiveness of patrols of some Indian tiger preserves after the death of Indira Gandhi in 1984 combined to pose a terrible threat to the tigers of India. In her 2000 TRAFFIC report, Kristin Nowell characterizes the recent history:

It is reasonable to say that, by the mid-1980s, China's bone bank was running low and, with a few Tigers left in the wild in China, demand for bones for the neighboring Tiger countries increased, perhaps explaining the poaching of tigers from Dudhwa [a preserve in India] in 1986. In 1992, Ranthambhore [another preserve] sprang into the headlines. Well-known tigers were no longer being seen. A member of a traditional hunting tribe was caught with a Tiger skin and skull. He disclosed that he took bones to a butcher in a nearby town, who was found to be in contact with illegal traders. Not long afterwards, in September 1993, investigations by TRAFFIC India led to seizures of caches amounting to 400 kg [880 pounds] of Tiger bones in the Tibetan quarter of Delhi, apparently bound for China across the Himalayan passes.

With the increase in poaching and the long history of killing tigers for sport or protection, how many tigers are actually left in India? According to India's Ministry of Environment and Forests' *Annual Report for 2002-3*, "In Project Tiger at present there are 27 tiger reserves covering an area of 37,761 sq. km, with a population of about 1,498 tigers. This amounts to almost 1.14 % of the total geographic area of the country." There may be another 2,000 tigers in various national parks and wild areas throughout India, for a grand total of 3,498. Because

tigers are so difficult to count, however, the number in the parks and preserves (and the total for all of India) is really only an estimate—and a problematic one at that.

For the past thirty years, tiger population estimates were based on a method invented in 1966 by S. R. Choudhury. This required thousands of forestry department personnel to fan out across India annually, searching for tiger tracks and then making plaster casts of the tracks. These “pugmarks” were then compared and individuals were identified and counted. Led by K. Ullas Karanth, an international team of tiger



Antoine-Louis Barye was famous for his bronze animal sculptures, particularly of the big cats. Here a tiger attacks an elephant carrying tiger hunters. The fearlessness of the tiger was recognized even in parts of the world such as Paris, where tigers could only be seen in zoos.

researchers examined this methodology for counting tigers and concluded that using footprints (pugmarks) to identify individual tigers (and then add up the totals) was essentially useless.

The potential tiger habitat in India extends over more than 300,000 square kilometers (186,000 square miles), an area approximately the size of Spain, and it is difficult to imagine any group of researchers carefully examining an area of that size—especially since much of it is densely overgrown, tall grass, or rocks that hold no tracks. “Unless clear impressions of all four paws on the right substrate are detected for each individual tiger,” wrote the authors, “it is impossible to pick the same hind pugmark of each individual for comparisons as prescribed by the pugmark method. In reality, census personnel often do not find clear prints of all four paws, and consequently lift prints of the different paws of the same animal from different localities.” In other words, it is possible to identify pugmarks from the same animal as having come from different animals, inadvertently increasing the number of tigers.

Pugmarks cannot be used effectively to differentiate individual tigers either, it seems. In one Karanth study (1987), when researchers were shown tracings of tracks, some identified them as having been made by twenty-four different tigers. In fact, they were made by only four tigers. In an interview with Seema Singh in late 2003 for *New Scientist*, Karanth said the pugmark method of counting tigers was not scientifically defensible: “Although an elaborate record-keeping protocol has been prescribed for the pugmark censuses, this protocol essentially ignores the fundamental need for mapping and geo-referencing the tiger signs that are detected by field workers. As a result, even after 30 years of pugmark censuses, large scale, country-wide maps of tiger distribution are not yet available. . . . So three decades of tiger monitoring have basically failed in India, despite being backed by massive investments.” When asked where all the money went, Karanth replied: “On corrupting the whole system.” Did his paper have much impact? According to Karanth, “The Ministries of Forest and Environment have shown no interest,” and the government’s response has been “to do nothing.”

The preserves established by the Indian government and Project Tiger were designed to provide a haven for tigers, a place where hunt-

ing would be prohibited and where human activity—with the possible exception of tiger watching—would be discouraged. Unfortunately, India's burgeoning population, deprived of room to expand, often invaded the preserves, and at the same time, usually for political reasons having little to do with tigers, guards and patrols were reduced. For many Indians, whose average annual income is around \$400, an animal worth thousands of dollars on the TCM black market, passing within rifle range, would be all but impossible to pass up, regardless of the laws or guards. And the national publicity afforded the tiger preserves told the poachers exactly where to go. The situations differed from park to park, but many of them headed straight for Ranthambhore, probably India's best-known tiger preserve.

Once the private hunting preserve of the Maharajas of Jaipur and now one of the most famous of India's national parks, Ranthambhore includes some 250 square miles of low rolling hills and grasslands in southwestern Rajasthan. High on one of the hills is the thousand-year-old fortress that gives the reserve its name—a now-overgrown edifice that often provides a spectacular setting for the park's population of tigers. It has become the special province of tiger conservationist Valmik Thapar, who has already written two books about the tigers of Ranthambhore and produced a BBC special there, called "Land of the Tiger."

Ranthambhore was one of the jewels in the crown of Project Tiger; in the early 1970s, all the villagers inside the park's boundaries were moved out. In *The Wild Tigers of Ranthambhore*, Thapar wrote, "Tigers and human beings cannot share the same tract of forest. One of them had to go. Fortunately in Ranthambhore, the humans agreed to relocate." In 1974, there were only twelve to fifteen tigers in the park; by 1989 there were fifty. In the 1980s, the tigers of Ranthambhore became more visible—the nine feeding tigers and the interactions of Padmini and her mate, described earlier in the chapter, were observed in daylight in 1982; and the huge male known as Genghis was observed to have developed a unique method of hunting: he would charge right into the lake where sambar deer were resting and attack them in the water.

The tigers of Ranthambhore flourished briefly, but then the truce between tigers and men was broken in September 1988 when a young

tiger killed and partially ate a seven-year-old boy on the fringes of the forest. And if this wasn't enough to rekindle antagonism toward the tigers, the poachers arrived. "Poaching, and the horrors of it," wrote Thapar in 1999, already "had percolated through the park and only in 1992, with the arrest of a poacher with a tiger skin, did I realize that at least 15–20 tigers had been poached over the last two years." The Spring 2003 issue of the IUCN's *Cat News* put the number of tigers surviving in Ranthambhore at thirty-two and described an additional threat to the remaining population: a significant increase in human visitors to the region, which increased the possibilities of poaching.

The Sariska reserve borders on the Jamwa Ramargh Wildlife Sanctuary in Rajasthan. According to a June 2003 report by Antony Barnett in the *Guardian Weekly*, Unilever and other firms have been mining talc (a magnesium silicate) in the sanctuary. Used extensively in the manufacture of soap, eye shadow, deodorant, body lotion, and baby powder, talc is produced by crushing giant soapstone boulders that have been extracted from the earth by the use of dynamite. Inhalation of the fine-powdered talc has proven to be a major health hazard to the workers, and also a major health hazard to the twenty-two tigers identified there in the spring 2003 issue of *Cat News*. By 2004, there were seventeen tigers remaining in the 300-square-mile reserve. A year later, there were none. According to a March 2005 Reuters report by David Friel, Indian Prime Minister Manmohan Singh convened a meeting of forest officials, wildlife experts, and community leaders to investigate reports that Sariska's tiger population had been completely wiped out by poachers. Four visits by the Committee for Forests and Wildlife failed to find a single tiger in Sariska.

Located due east of Ranthambhore and Sariska, Sundarbans is a unique and very special tiger habitat. Sundarbans covers some 10,000 square kilometers (6,200 square miles) of mangrove forest and water, 60 percent of which is in Bangladesh and the rest in India. The Ganges, Brahmaputra, and Meghna rivers converge on the Bengal Basin to create the world's largest delta. The entire Sundarbans area is intersected by an intricate network of interconnecting waterways of which the larger channels are often a mile or more in width and run in a north-south direction.

Rainfall is heavy and the humidity averages 80 percent because of the proximity of the Bay of Bengal. It is called Sundarbans because of the dominance of the tree *Heritiera fomes*, locally known as *sundari*. Sundarbans is the only remaining habitat in the lower Bengal Basin for a great variety of animal species. The region once boasted the Javan rhinoceros (*Rhinoceros sondaicus*) and the wild water buffalo (*Bubalus bubalis*), which were last recorded in 1870 and 1885, respectively, and are now considered extinct in the region. The swamp deer (*Cervus duvauceli*) existed in good numbers until early in the twentieth century, and the Indian muntjac (*Muntiacus muntjak*) was last reported on Halliday Island in the late 1970s. The tiger population in the Indian side, estimated at 270 in 1997, is the largest in that nation. The relatively high frequency of encounters with local people within the boundaries of the tiger reserve is probably largely responsible for the notorious man-eating reputation of the Sundarbans tiger. In an unusually poetic style for a scientific presentation, John Seidensticker (1987b) wrote of Sundarbans:

When the water drains off the higher ground with the ebb and steel-gray mudbanks are exposed and shimmering under a scorching mid-day sun, the place to look for a tiger is in the shade at the mouth of small, side khals. And if you are truly fortunate you see it: head raised, lying half-submerged, intently watching as you slip by in a launch—a classic Sundarbans tiger.

The tigers of this region are the most dangerous in India. Sy Montgomery, who journeyed to that great delta and came back to New Hampshire to write *Spell of the Tiger: The Man-Eaters of Sundarbans*, gives a vivid description of these animals:

And here, the tigers do not obey the same rules by which tigers elsewhere govern their lives. They hunt people. They take their prey often in broad daylight. They will even swim out into the Bay of Bengal, where the waves may be more than two feet high. They often swim from India to Bangladesh. The tigers here are bound by neither day nor night, land nor water; these tigers, some say, are creatures of neither heaven nor earth.

Their proclivity to enter and remain in the water distinguishes Sundarbans tigers from all others. While other tigers scent-mark their territories by spraying or scratching trees along well-worn paths, the marsh tigers' territory is largely under water, so how they mark their territory—or if they have defined territories at all—is unknown. And where other Indian tigers prey on deer, wild pigs, lizards, and birds, the tigers of Sundarbans seem to have a penchant for eating people. "In the old days," wrote Richard Perry in 1965, "it was the salt boilers, working on long sand-spits projecting from the jungles, who were the chief victims, despite the look-out posted to watch for tigers; and one tigress, who was determined enough to leap an eight-foot stockade for her victims, seized sixty men in the space of three months." Currently, the "official" number of attacks in Sundarbans is thought to be around thirty or forty per year, but, as Montgomery points out, some unofficial totals for the whole Sundarbans region run as high as 300 per year. She writes:

No one except the Forest Department officials are allowed inside Sundarbans Tiger Reserve's 514-square-mile core area, which is set aside for wildlife alone. Ringing the core is a buffer zone of 562 square miles, where people may fish, collect honey, and cut wood, but they must have a permit to do so. If a permit holder is killed inside the buffer zone, the government compensates the family for the loss, and the death is officially tallied. But families of tiger victims who are illegally inside restricted areas receive no compensation, so there is no reason for them to inform the authorities; in fact, these families fear they might be prosecuted.

As for why Sundarbans tigers are more likely to attack people than tigers elsewhere in India, nobody really knows. In his 1987 discussion of man-eaters, Charles McDougal cited a 1975 study by Hubert Hendrichs that suggested drinking salt water—there is hardly any fresh water in Sundarbans—might make the tigers more ferocious and more likely to attack humans. Others have suggested that because the tigers often eat fish from the nets of fishermen, perhaps they might associate people with food, or that in the difficult hunting conditions of the region, humans

were an especially inviting and available target. Peter Matthiessen, in *Tigers in the Snow*, gives us something else to consider as well:

A paradox still poorly understood is not why tigers attack human beings but why they do not attack more often, all the more so now that the senses and agility of *Homo sapiens*—always rudimentary when compared to those of other mammals—have been further dulled and softened by modern life. No matter how athletic and alert, a man or a woman inevitably presents a large, slow, easy prey to a hunting tiger.

Although there are no settlements within the boundaries of Sundarbans, people still risk their lives to cut wood, catch fish, or gather honey there. Protection from killer tigers often takes the form of prayers, but in addition, pigs have been released to keep the tigers well fed, freshwater ditches have been dug for the tigers to drink from, and dummies that are wired to shock an attacking tiger (the fuse immediately blows so that the cat will not be electrocuted) have been deployed. Face masks have also been provided for people to wear on the backs of their heads while working in the forest, because it is believed that tigers will only attack people from the rear. These worked, wrote Peter Jackson (1990), "as long as the tigers believed in them." He quotes a researcher who said, "After five or six months, they were finding out that this was not the front of the human being. . . . They know what a human being looks like. They know here is a back and a front. They are finding out that this is not a good front." Montgomery comments: "Nothing—neither laws nor permits nor patrols—stops men from illegally crossing into the reserve's forest core; and nothing—neither offerings nor armor nor trickery—stops the tigers who come to meet them."

The estimated 270 tigers in the Indian Sundarbans cover only the 40 percent of the delta that is in India; the remainder is in Bangladesh, where there are no current figures for tigers. Estimating tigers anywhere is fraught with difficulty as we've seen, but in Sundarbans it is made even more complex by the difficulty of tracking tiger movements through tidal waters. Even if the pugmark method of counting tigers worked, it would be useless in Sundarbans, where the tigers swim from place to place, and even if they were to walk along the mudbanks, their tracks would quickly

be obliterated by the surging tides. On July 31, 2003, on the BBC News Web site (<http://newsvote.bbc.co.uk>) there appeared an announcement of a joint tiger census to be taken in the more than 10,000 square kilometers that make up the Indian and Bangladeshi Sundarbans, but how they were actually going to count the tigers was not explained.

Kaziranga, in the northeastern state of Assam, is a national park and therefore a de facto tiger reserve. It is also the home of the world's largest remaining population of one-horned rhinos, as well as wild buffaloes, wild boars, elephants, swamp and hog deer, leopards, hoolock gibbons, capped langurs, rock pythons, monitor lizards, various species of eagles, partridge, storks, herons, and assorted waterfowl. The riverine habitat consists primarily of tall, dense grasslands interspersed with open forests, interconnecting streams, and numerous small lakes or *bheels*. Three-quarters or more of the area is submerged annually by the flood waters of the Brahmaputra. In Kaziranga's 266 square miles there may be as many as eighty-five tigers. Without a buffer zone, and with many impoverished people on its border, the temptation to poach tigers in the park is particularly great.

The overall situation for tigers in India has become critical, in no small part because of habitat loss. In an essay in the 1999 compendium *Riding the Tiger: Tiger Conservation in Human-Dominated Landscapes*, Valmik Thapar warns:

Fragmented and deeply scarred, this is the land of the tiger and is home to 50% of the world's wild tiger population. Comparing past and present forest maps of India, one can see that large chunks of forest have now ceased to exist in the west and north. We are ending up with little islands that may or may not survive the pressures of time. Whether it is the great floodplains of Kaziranga, the monsoon and rainforests of peninsular India, the mangrove swamps of the Sundarbans, the lower Himalaya in Manas or Corbett, the problems of these areas mount and we enter an area where the tragedy of the tiger overwhelms. It is time to start from scratch.

His conservation suggestions involve "emergency action, reform and a total change in the system of wildlife governance" and require identifying fifty tiger sites in India, completely revising the administration of the protected areas, training forest guards, creating educational pro-

grams and community-based activities to encourage local people to protect their natural heritage, and careful monitoring of all these activities. In 2003, Thapar concisely described the shifting statistics for tigers, reserves, and humans in India: "The year 2003 is the 30th anniversary of Project Tiger. When Project Tiger started in 1973 the population of India was about 780 million—today it is nearly 1.1 billion. There were nine tiger reserves in 1973 and 29 in 2002. There were an estimated 1,800 wild tigers. I believe that today, 30 years later, there are about the same number alive—maybe a few hundred more." As increased poaching reduces the number of tigers, the total population will be gradually reduced until the big cats approach extinction. True enough, wrote John Kenney and his colleagues in 1995, but the decline may not be gradual. As the numbers continue to fall, "the probability of population extinction increases [because] a critical zone exists in which a small, incremental increase in poaching greatly increases the probability of extinction. The implication is that poaching may not at first be a threat but could suddenly become one." Using sophisticated modeling techniques ("individually based stochastic spatial simulations"), the authors examined a numbers of variables, including large and small population sizes, known breeding rates, long-term and short-term poaching, and the cessation of poaching altogether, and found—not particularly surprisingly—that "poaching reduces genetic variability, which could further reduce population viability due to inbreeding depression, [and] the longer poaching is allowed to continue, the more vulnerable a population will be."

Nagarahole was where I saw my first wild tiger in 1997. In May 2003, it was announced that the government of the state of Karnataka intends to abolish the post of field director of the Bandipur-Nagarahole Tiger Reserve and place the reserve under the control of the adjoining territorial administrators. This means that the reserve will virtually cease to exist and the forest will be managed by officers from the territorial department, instead of having a dedicated field director whose main responsibility is the health of the park. Project Tiger has warned the Karnataka government that such a move would mean that the park would lose out on financial and technical expertise from the center.

Originally established in 1931 as a sanctuary of 90 square kilometers, the land became Bandipur National Park in 1973, one of the original tiger reserves. The following year, Nagarahole was enlarged and upgraded to the status of national park, and as many as one thousand squatters were voluntarily resettled. Bandipur-Nagarahole is also part of the Nilgiri Biosphere Reserve, the first biosphere reserve in India. According to the Indian conservation magazine *Sanctuary*, the change in administration "will have the disastrous effect of virtually closing down the Bandipur Tiger Reserve, one of India's oldest and finest Protected Areas. . . . The park is home to a population of more than 80 tigers and is part of a globally-significant tiger belt that includes the Nagarahole National Park in Karnataka and the Mudumalai forest in Tamil Nadu."

The recent downgrade of Nagarahole suggests that the government of India, rather than encouraging tiger protection, seems prepared to discourage it. Revising the status of this preserve signals a new era in India's conservation politics—one that bodes ill for its tigers. Poachers killed eighty-one tigers across India in 1999, fifty-three in 2000, seventy-two in 2001, and forty-three in 2002. If the countrywide population estimates are wrong because the methodology of counting was inadequate, it appears that the only available accurate figures are for the number of tigers killed every year—and these numbers might be wrong too. In the Spring 2001 issue of *Cat News*, Valmik Thapar said in response to news of annual deaths from poaching: "The figures are terrible, but the ground realities are worse because a number of deaths still remain unrecorded." He added as a benchmark that the country had about 3,000 tigers at the start of the year 2000. Project Tiger Director P. K. Sen said that tiger numbers were declining because of "ever-growing habitat vandalism, depletion of the tiger's prey base, illicit trade in tiger parts, lack of infrastructure facilities, staff and money to effectively protect the tiger."

All the world's wild tigers are in considerable peril. In 1986, when several tigers were poached in the northern Indian preserve of Dudhwa, there was speculation that they might have been killed for their bones. In the same year, it was reported in Chinese newspapers that the authorities were establishing a tiger farm to provide bones for medicines. When the Chinese Communist Party gained power in 1949, the South

China tiger was seen as a threat to agricultural development. It was declared a pest and teams were appointed to hunt it down. According to Chinese scientists, more than three thousand skins were handed in during the 1950s and 1960s. A few tigers remained and were given legal protection, but the population had been virtually exterminated. Although China had a massive stock of bones, by the mid-1980s, the bone bank was running low, and, with few tigers left in the wild in China, the demand for bones from neighboring tiger countries increased. In 1992, Ranthambhore sprang into the headlines when well-known tigers were no longer being seen. In September 1993, investigations by TRAFFIC India led to seizures of caches amounting to 400 kilograms of tiger bones in the Tibetan quarter of Delhi, apparently bound for China across the Himalayan passes. Meanwhile, the Soviet Union had collapsed and with it law and order in the Russian Far East. In this remote outpost, the remaining tigers, which were few and far between, were hunted for their bones, to be sold to commercial dealers who would in turn sell them to "pharmacists." Investigation of customs records in South Korea revealed that hundreds of kilograms of tiger bones had been legally imported in the years leading up to 1993, all in the name of Chinese medicine.

The Tiger in Medicine

The demand for medicines delineated in ancient Chinese traditions is the engine that drives today's insatiable commercial market for tiger bones and other tiger parts, but the Chinese are not alone in using parts of tigers as medicine. In the *Indian Materia Medica*, which includes Ayurvedic, Unani, and Indian home remedies, tiger fat is listed as a treatment for leprosy and rheumatism; tiger claws can be used as a sedative, tiger teeth for fever, and tiger nose leather for dog bites. Tiger bone is used in Vietnam to make a balm that is said to help assorted ailments, including rheumatism and general weakness.

Here is the basic description of the tiger in Bernard Read's (1931) translation of Li Shih-chen's sixteenth-century materia medica *Pen Ts'ao Kang Mu*:

It is the king of the mountain animals. It is shaped like a cat and is the size of a cow. Sharp bristle-like whiskers. The tongue is large and broad and full of spikes. Short-necked and squat-nosed. At night one eye is phosphorescent and provides light while the other eye is used for observation. It roars like thunder and causes the wind to rise. It enters the rutting season in the first week of November, others say it comes when the moon is cloudy and that they only copulate once in a lifetime. Gestation is seven months. The tiger has the power of divination and can sense direction, mark the ground and find food thereby. Men have learnt their ways. In their diet they follow the lunar calendar. During the first half of the month they eat the head end of an animal, during the latter half of the month they eat the tail end. . . . Pai Pu Tzu said that after 50 years tigers turn white. Old stories often tell of tigers turning into men and vice versa.

Tiger parts were prescribed for everything, but the most potent parts were the bones. Li lists every part that could possibly be utilized and specifies its applications:

TIGER BONES. The yellow ones from the males are best. Animals shot with arrows should not be used because poison enters the bones and blood and is harmful to people. . . . The bones should be broken open and the marrow removed. Butter or urine or vinegar is applied, according to the type of prescription, and they are browned over a charcoal fire. Acid, slightly warming, nonpoisonous. For removing all kinds of evil influences and calming fright. For curing bad ulcers and rat-bit sores. For rheumatic pain the joints and muscles, and muscle cramps. For abdominal pain, typhoid fever, malaria, and hydrophobia. Placed on the roof it can keep devils away and so cure nightmares. A bath in tiger bone broth is good for rheumatic swellings of the bones and joints. The shin bones are excellent for treating painful swollen feet. It is applied with vinegar to the knees. New born children should be bathed in it to prevent infection, convulsions, devil possession, scabies and boils, it will then grow up without any sickness. It strengthens the bones, cures chronic dysentery, prolapse of the anus, and is taken to dislodge bones which have

become stuck in the gullet. The powdered bone is applied to burns and to eruptions under the toenail.

TIGER FLESH. Said to be bad for the teeth. It should not be eaten in the first lunar month. For nausea, improves the vitality, and stops excessive salivation. For malaria. A talisman against 36 kinds of diseases. A tonic to the stomach and spleen.

TIGER FAT. For all kinds of vomiting. For dog bite wounds. Applied in the rectum for bleeding hemorrhoids. Melted and applied to scabby and bald-headed conditions in children.

TIGER BLOOD. It builds up the constitution and strengthens the willpower.

BILE OF THE TIGER. For convulsions in children.

EYEBALL OF THE TIGER. Eyeballs are not used from animals that have died of sickness. The ball is macerated overnight in fresh sheep's blood, and then separated and dried over a low flame, and powdered. For epilepsy, malaria, fevers in children, and convulsions. For quieting nervous children. It clarifies the vision and removes membranes over the eye. It stops crying.

THE NOSE OF THE TIGER. For epilepsy and convulsions in children. Hung on the roof it will induce the birth of boys.

TIGER TEETH. Applied to sores on the penis and running sores. Taken for hydrophobia and phthisis [wasting disease or tuberculosis].

TIGER CLAWS. With the bones and hair of the paw of the male animal tied on a baby's arm as a talisman.

TIGER'S WHISKERS. Given for toothache.

Bensky and Gamble's 1993 *Chinese Herbal Medicine* lists only tiger bone (*Ox Tigris*) in the category of "Herbs That Dispel Wind-Dampness" and say that tiger bone can be used for "stiffness and migratory pain in the joints. [It] disperses wind-cold and strengthens the sinews and bones: for paralysis, weak knees and legs, spasms, stiffness and pain in the lower back, and cold pain in the bones." There is no mention of impotence. In *Of Tigers and Men*, Richard Ives gave this summary of the use of tigers in Chinese medicine:

Since 1990, nearly half the surviving tigers in Siberia have been slaughtered, poached for their body parts, and sold to Chinese merchants who turn virtually every square inch of the tiger carcass into "medicines" that can be bought over the counter in Chinatowns in cities the world over. A compelling fund of evidence now suggests that most of the tigers killed in the wilds of Asia eventually end up in Chinese hands. Though it may seem like science fiction, the Chinese lust for tiger parts is so acute that with the extinction of wild tigers now in view, farms designed to raise tigers for slaughter are already operating in Taiwan. The discovery of such farms on the Chinese mainland itself would come as a surprise to no one.

There are certainly tiger farms in northern China, as we've seen, ostensibly to ensure the survival of the Chinese subspecies, and there may be (or may have been) tiger farms in Taiwan for less-commendable reasons. "Public slaughters in the mid-eighties were common throughout Taiwan," wrote Keith Highley in 1993. "In a four-month period in 1984, seven tigers were slaughtered, their parts auctioned off to the public. The slaughters were well-advertised in advance: ads were taken in local newspapers, men paraded through the village banging drums, and on one occasion a tiger slated for slaughter was paraded through villages in the bed of a pick-up truck." The most desirable of tiger parts is the penis, soaked in brandy for six months and then served as a tonic guaranteed to enhance a man's sexual prowess. Just as Taiwan was the center of the trade in rhino horn, as we saw in the discussion of rhino medicine, a decade ago, it was also the epicenter of the Asian trade in tiger bones. In 1993, Keith Highley visited 115 shops on Taipei's Di Hua Street and



These tiger-bone and sea horse pills were made in Japan, showing the appeal of TCM medications in other parts of Asia.

found that "68 shops (59.13%) were either in possession of tiger bone or offered to purchase it for investigators." The following year Keith and Suzie Chang Highley produced a further report:

In the last decade, newly wealthy Taiwan has emerged as a leading consumer of endangered species products. By 1989 the country had

been dubbed the "greatest threat to the survival of Africa's rhino." Taiwanese pirate whaling vessels killed whales and shipped substantial quantities of meat to Japan, laundering the contraband by way of transshipments through the Philippines and South Korea. A turnaround industry for ivory thrived; substantial amounts were imported (legally and illegally), worked in-country, and sold domestically or re-exported. Taiwanese drift net vessels frequently violated other nations' exclusive economic zones to poach salmon and other fish and, on occasion, capture penguins, seals, and other wildlife. Even the giant tridacnid clam was not exempt from the feeding frenzy; it was reportedly pushed to near extinction in Micronesia and other parts of the Pacific by Taiwanese poachers.

In Cambodia, a desperately poor country, the remaining tigers are being hunted almost out of existence mainly for sale of animal parts. Tigers shot by Cambodian and Vietnamese soldiers find their way to the marketplace at Phnom Penh. In December 1993, an entire carcass was sold in the market for US\$1,500, and the buyer then sold the claws, skin, and bones separately for a handsome profit. An article in the Spring 1999 issue of *Cat News* tells of the use in northeastern Cambodia of homemade land mines to kill tigers for sale of their parts on the black market. Along a trail with recent tiger tracks, a fence is built with two entrances and a dead sambar deer placed between the entrances. At either end, a trip wire is attached to a mine, to be tripped by the tiger as it approaches the bait. "The threat of damaging the pelt—worth US\$100 or more to the poachers—does not worry them. It is the bones that matter. Vietnamese traders across the border sell tiger bones for up to US\$350 a kilogram, for consumption in Vietnam, China, and other international markets."

Of conservation efforts in Cambodia, Antony Lynam (2004) wrote that hunting is the single greatest threat. During the civil conflict of the 1970s and 1980s, there was a massive influx of weapons, and guns were easy for rural Cambodians to acquire. Populations of tigers, elephants, deer, and wild cattle were decimated for local consumption and the wildlife markets in Vietnam and China. Tracts are still littered with wire snares and traps set for killing animals, and illegal loggers, who hunt as they fell timber, are as dangerous to wildlife as poachers.

The Leopards

As the tiger populations are reduced, poachers and suppliers of material for TCM are forced to look elsewhere for the animal parts they require for their business. In the forests of southern Asia and Africa, and also in the snow-clad mountain ranges that form the spine of central Asia, there are other large cats whose spotted coats are even more desirable than the tiger's stripes and whose bones are now being incorporated into the TCM pharmacopoeia. Leopard skins have always been desirable commodities because of their spectacular spotted patterns. A recent survey published in the IUCN's *Cat News* (Spring 2003) gives the quotas for leopard skins legally exported from various African countries: Tanzania, Ethiopia, and Zimbabwe each have quotas of 500, while the total for all countries in Africa in 2002 was 2,335. Skinning 2,335 leopards leaves a lot of meat and bones behind, and it is not surprising to learn that the bones have become valuable trade items as well. Leopards (*Panthera pardus*) are being killed legally and illegally throughout their range, but the decline of tigers throughout Asia has recently encouraged the hunting of leopards specifically for their parts.

Curiously, there are very few uses listed for leopard parts described in manuals of traditional Chinese medicine: eating the flesh "keeps away evil diseases and benefits the kidneys"; the fat can be used to promote the growth of hair; if you boil the leopard's nose with that of a fox, you will expel fox-devils; the cranium can be used as a pillow to keep away evil spirits; but the skin may not be used as a sleeping mat because it "causes fear to enter one's soul, and the hair if it enters open wounds is poisonous, but it has been known to keep away ghosts" (Read's translation of *Pen Ts'ao Kang Mu*). In Bensky and Gamble's *Chinese Herbal Medicine* (1993), we read: "The bone of the leopard, *Os Leopardis*, can be used as a substitute for *Os Tigris*. It is acrid and warm and strengthens the sinews and bones, expels wind-dampness, and alleviates pain. It is not as potent as *Os tigris*. Dog bone, *Os Canis*, is also sometimes used, but it is considered excessively hot."

Evidence for the illegal leopard trade has appeared from Calcutta to London. On May 12, 2002, in London's *Observer* it was reported that an



Woman selling tiger bones. Vietnam, 1994.

illegal trade in leopard parts was uncovered by police. They found arthritis medicines derived from leopard bones and twenty-five packets of medicated plasters made of ground leopard bones in an Asian supermarket in Hackney, East London, which is becoming a notorious center for the illegal international trade in endangered animals. And in India, on May 30, 2003, forest officials, assisted by the Wildlife Protection Society of India, seized two tiger skeletons, a leopard skeleton, and a leopard skin, in a series of raids carried out in Maharashtra in central India. Six kilograms of tiger bone were seized in one village, and one leopard skin, 6 kilograms of leopard bones, and 8 kilograms of tiger bone were found in two others.

At a maximum weight of about 150 pounds, leopards (and their bones) are considerably smaller than tigers, and now that leopards are being poached, they are becoming rare everywhere in Asia except perhaps India. These beautifully spotted cats occupy a much broader range than tigers; they are found throughout central and southern Africa and in Asia from Arabia to India, Southeast Asia, and China. As with the tiger, there are several recognized subspecies, and although no black tigers have ever been recorded, melanistic leopards (sometimes known as "black panthers") are not uncommon, particularly in Asian forest habitats.

The snow leopard is a large, ghostly gray cat that lives in the high mountain ranges of central Asia from northwestern China to Tibet and the Himalayas. It has been placed in a separate genus (*Uncia*) from the lion, tiger, leopard, and jaguar, all of which are classified as *Panthera*.⁹ The largest population—perhaps two thousand—is found in China (mostly in the Tibetan region), but snow leopards are also found in the mountains of Afghanistan, Bhutan, India, Kazakhstan, Kyrgyzstan, Mongolia, Nepal, Russia, Tajikistan, and Uzbekistan. The world population of snow leopards has been estimated at somewhere between 4,500

⁹ On the IUCN's Red List of Endangered Species, only one cat—the Iberian lynx—is "critically endangered," but four other felids are "endangered," where the remaining number is less than 2,500 and the population is "declining and fragmented." They are the Andean mountain cat, the Borneo bay cat, the snow leopard, and the tiger.



Women of fashion have always been partial to coats made from the skins of spotted cats. As she prepared to depart for a trip to India and Pakistan in 1962, Jackie Kennedy wore this leopard-skin coat.

and 7,000 animals, but in their high-mountain fastness, they are extraordinarily difficult to find, let alone count. The evidence suggests that China is also the biggest market for the snow leopard bones that are used in TCM, for skins, and probably live specimens. Even the consumption and trade of snow leopard meat has been reported. Pelts, bones, and live animals on the Chinese market originate not only from China, though, but also from the neighboring central Asian countries of Nepal, India, and Pakistan (Dexel 2002).

Trade in snow leopards extended to Kyrgyzstan and Tajikistan as well, at least after the breakup of the Soviet Union in 1991, and inter-



Snow Leopard (*Uncia uncia*).

est in these thick-furred ghost cats was anything but academic. Evgeniy Koshkarev and Vitaly Vyrypaev (2001) explain:

Snow leopards were killed even in zoos, announcements about the sale of pelts and live animals were published in newspapers, and at the Kyrgyz Academy of Sciences a story circulated that a pregnant female snow leopard had been offered for sale by telephone. It was corruption and unemployment that turned the country into one huge black market, and made poaching and mediation in the sale of goods the only source of income for many of the inhabitants, urban as well as rural. There is no other way to explain the appearance of 200 snow leopard pelts in the Manas holidays of 1995, the massive sale to the Chinese market of medical raw materials made from the snow leopard in the 1990s and the absence in 1999 of snow leopards from the best habitat areas of Kyrgyzstan and Kazakhstan.

When Koshkarev and Vyrypaev conducted a survey of the five best-known snow leopard habitats in Kyrgyzstan, they found fresh tracks in only one. "If the situation in other Central Asia republics is close to that

observed in Kyrgyzstan," they concluded, "then we are talking about the destruction of no less than half of the population."

All may not be lost in Kyrgyzstan, however, as a 2003 *Wildlife Conservation* article by Christopher Pala points out. The German conservation organization Naturschutzbund (NABU) funds the snow leopard conservation group known as Grappa Bars, which is trying to curtail snow leopard poaching by turning poachers over to the local police and confiscating pelts that would otherwise be for sale. Under Birga Drexel, NABU's snow leopard project director in Germany, Grappa Bars has opened a snow leopard compound at Lake Issyk Kul, where live leopards, illegally captured for zoos, can be rehabilitated.

The snow leopard's prey includes wild sheep, wild boar, hares, deer, marmots, mice, and other small mammals. There seems to be no record of snow leopards attacking people, but these cats also prey on domestic livestock, and the retaliation of herders endangers them. But nothing threatens the snow leopard more than hunters who kill them for their luxurious coats. Black market pelts are easily found in central Asian bazaars, and a full-length coat, consisting of six to ten full skins, can command as much as \$60,000. The luxuriously thick, smoky gray coat of the snow leopard is quite different from the short-haired coat of the "ordinary" leopard, but with the exception of the skull, which is quite different, the bones of both kinds of leopards are remarkably similar, so the bones of snow leopards are now in demand as substitutes for tiger bone in Chinese medicine. Traders will pay up to \$190 for a snow leopard skeleton in Tibet, and in northern Nepal—where the daily wage for sherpas is about \$10—people have been seen to trade snow leopard bones for sheep along the border with Tibet.

A TRAFFIC report entitled "Fading Footprints: The Killing and Trade of Snow Leopards" (Theile 2003) reviews the history of these high-mountain cats and their new popularity in the TCM pharmacopoeia:

Leopard bones, including Snow Leopard bones, have been used in traditional Asian medicines for centuries for a variety of treatments, including rheumatism, tendonitis and bone fractures. They are con-

sidered to have acrid and warm properties and to have anti-inflammatory and pain-relieving effects. In the Chinese materia medica they are referred to as *Bao Gu* or *Os leopardi* and their properties are distinguished from those of Tiger bones, although they can be used as a substitute for the latter. The skulls of Snow Leopards have also been used in ritual ceremonies in parts of China and in Nepal and body parts other than bones, including the sexual organs, teeth, claws and meat appear in trade, for medicine and shamanistic practices.

Even the lonely mountains of the Himalayas offer no sanctuary for the snow leopards whose bones are eagerly sought for Chinese medicine. Poaching for their coats and bones has greatly reduced the populations of the great spotted cats of Africa and Asia. The very existence of the world's five rhino species is threatened by the insatiable demand for their nose-horns, some for dagger handles, but now mostly to be ground into medicinal powders that are believed to cure a variety of ailments. Where once there were eight subspecies of tigers in Asia, there are now five, and three of these are close to extinction. They are being hunted because traditional Chinese medicine needs the bones, flesh, fat, eyeballs, teeth, and claws, and fashion needs the pelts. Chinese medicine also decrees a need for selected products from certain bears, but unlike rhinos and tigers, the bears do not have to be killed—at least not immediately. Instead, they are put into such dreadful situations that shooting them would be a blessing.

The Bad News for Bears

Along with all species of rhinos and tigers, the world's wild bears are threatened by traditional Chinese medicine's demand for parts of animals. There are eight species of bears: the polar bear (*Ursus maritimus*), brown bear (*Ursus arctos*), black bear (*Ursus americanus*), spectacled bear (*Tremarctos ornatus*), sun bear (*Helarctos malayanus*), sloth bear (*Melursus ursinus*), Asiatic black bear (*Ursus thibetanus*), and giant panda (*Ailuropoda melanoleuca*). (For many years, the giant panda was classified with the raccoons, but comparative DNA analysis shows that it is indeed a true bear, and therefore its common appellation, "Panda Bear," is actually correct.) With the exception of the panda, all bear species are in danger in the wild because of the growing demand for bear gall bladder and bile, but none more so than the species that have the misfortune to reside in the very countries where their parts are so highly valued.

Sloth bears are found throughout India and Sri Lanka, and in Bangladesh, Nepal, and Bhutan. In northern India and Nepal they are called *bhahu*, undoubtedly the source of the name "Baloo," the bear in Kipling's *Jungle Book*. They have a long shaggy coat, usually black, but sometimes with enough brown or gray hairs to give them a tawny or grizzled appearance. They usually have thick ruff around the neck and a light-colored U- or Y-shaped patch on the chest. The muzzle is lighter in color. Sloth bears can be 6 feet in length, stand about 3 feet high at the shoulder, and weigh up to 300 pounds. They feed extensively on termites, and to accomplish this, they are able to protrude their naked lips, form them into a tube, and then suck in the termites through the gap made by a missing pair of upper incisors. Sloth bears also eat other insects, eggs, honeycombs, carrion, and various kinds of vegetation. In Nepal, they eat fruits extensively when in season, from March to June.

Throughout India, an itinerant people known as Qalandars train and exhibit "dancing" sloth bears as a way of life. The bears are captured as cubs, their teeth and claws extracted, and a rope or ring put through their nose. More than one thousand dancing bears are trained to entertain urban and tourist audiences in India, according to David Macdonald (2001). If dancing was all that was required, the sloth bear would be uncomfortable, but not in peril. Along with the Asiatic black bear, this species is so extensively collected throughout its range for its gall bladder and the bile therefrom for use in traditional Chinese medicine that it is considered an endangered species and classified by the IUCN as "vulnerable, close to extinction."

The Asiatic black bear (*Ursus thibetanus*) is black with a light muzzle and a distinctive chevron on the chest, often in the shape of a crescent moon, which gives this species its other name, "moon bear." The chevron can range in color from creamy white through lemon yellow, and in width from pencil-line thin to a boomerang-thick crescent moon.



Asiatic black bear (*Ursus thibetanus*).

These bears, which are frequently represented in Japanese art, have particularly large ears. The moon bear inhabits a considerable portion of Southeast and eastern Asia from Afghanistan and Pakistan and northern India through Nepal, Sikkim, and Bhutan, and into southern China, Thailand, Laos, and Vietnam; isolated populations are found on the northern Japanese islands of Honshu and Shikoku, and in the Russian Far East. Their range in these regions now typically comprises highly isolated and noncontiguous areas of land, all subject to human encroachment. An unanswered—perhaps unanswerable—question is why an animal with a coat better suited for cold, mountainous terrain should also inhabit dense jungles in Southeast Asia. Their large ears might be useful for dissipating heat, though that doesn't seem a strong explanation. The moon bear, in any case, has the unfortunate distinction of being the species most favored by the Asian medicinal market for its organs' potency. It has been devastated by poachers and is at risk of extinction in the near future throughout most of its range.

While it has been bears in Asia that have traditionally been hunted for their gall bladders, now, as their numbers have been reduced, bear species from all over the world—including polar bears, American black bears, and grizzly bears—are being killed to feed the needs of traditional Chinese medicine for bear parts. "Forty thousand black bears are killed legally in North America each year. An unknown portion of these animals parts are illegally traded on international markets," wrote Keith and Suzie Chang Highley in 1994. "Whole bear carcasses are now being found in the forests of Canada and the Soviet Union, with nothing but their gallbladders cut out," Judy Mills and Christopher Servheen tell us in their 1991 report on bear farming. In a 1994 Earthtrust report, "Bear Farming and Trade in China and Taiwan," Highley and Highley documented several instances of hunters and "businessmen" arrested for bear hunting in California and possession of bear parts, such as paws and gall bladders. In one such case, a California businessman was caught buying 164 bear gall bladders from undercover fish and game agents, and boasted that he had purchased on occasion three times that number. By 1998, in California alone, the illegal trade in bear parts was estimated to be worth millions of dollars a year (Phillips and Wilson 2002), and the problem extends way beyond California. As Judy Mills, Simba Chan,

and Akahiro Ishihara wrote in their 1995 TRAFFIC report *The Bear Facts*:

Today's market for bear gall bladders seems to be growing more prevalent outside Asia wherever there are bears. This trend is illustrated by reports from Ecuador, where Korean businessmen are said to be contracting *campesinos* to kill the relatively rare spectacled bear for its gall bladder. Sold at US\$150, each gall bladder is worth five times the minimum monthly wage in Ecuador. Before development of this Asian market in South America, the spectacled bear already faced tremendous pressure from shrinking habitat and nuisance animal control.

In 1999, Sy Montgomery traveled to Southeast Asia to search for the golden moon bear, which she thought might be a species distinct from the ordinary black version of *Ursus thibetanus*, and later wrote of her investigation in *Search for the Golden Moon Bear: Science and Adventure in Pursuit of a New Species*. With zoologist Gary Galbreath (who had seen one in a cage in Yunnan, China, eleven years earlier), and a colorful cadre of local naturalists, drivers, and guides, she traveled through the zoos and jungles of Thailand, Cambodia, Laos, and Vietnam, seeking the golden bear. The group found many black bears in various captive situations, and on several occasions found themselves in the company of caged golden or light-colored bears. (In all the time they spent in the jungle, they never saw a wild bear.) They found bears in cages, parts of bears in markets, and stories confusing enough to raise their hopes that there might actually be a species of moon bear that had not yet been described by science. The book contains a collection of color photographs of light-colored and even lion-colored moon bears, and on the dust jacket, the author is shown with a living golden bear. Ever hopeful, Montgomery never actually relegates the idea of discovering the golden moon bear to the category of myth, but Galbreath, whom she often refers to as "the scientist," does not go beyond acknowledging the existence of a color difference.

Although lion-colored moon bears are indeed spectacular and worthy of a trip to Southeast Asia to investigate their evolution, other bear species are known to occur in assorted colors. The best known of these



When Sy Montgomery went looking for "golden moon bears" in Thailand, she found this spectacular lion-colored creature; alas, it was just a color phase, not a distinct species.

is the familiar American black bear, which comes in cinnamon, dark brown, grayish blue, silvery gray, reddish yellow, blond, and even white; there are sometimes different-colored cubs in the same litter. Brown bears, once separated into various species and subspecies, including grizzlies, Kodiak bears, and Eurasian bears, have now been lumped into one species—*Ursus arctos*—regardless of habitat or appearance. (Grizzlies get their name from their “grizzled” coat, which is often several shades of brown and silver.) The spectacled bear, sun bear, and sloth bear are usually black, but other color phases are occasionally seen. Polar bears, whose lives depend on being white, do not occur in other color phases, and giant pandas are always black and white. It’s probably just as well that there isn’t a separate species of golden moon bear; imagine how valuable its gall bladder would be in a Hong Kong pharmacy.

The use of bear parts in Chinese medicine dates back thousands of years. In the section on animal drugs from Li Shih-chen’s 1597 materia medica *Pen Ts’ao Kang Mu*, we read that the Himalayan black bear (the moon bear) is

as large as a boar, eyes vertical, humanlike feet, black, very fat in spring and summer, thick-skinned with tendons that stand out. It likes dropping down from trees. Traveling several thousand li it sleeps in caves and hollow trees which are commonly known as “bear’s hotels.” The gall is said to move to the head, belly and paws according to the season; similar to the elephant.

BEAR’S GREASE. Sweet, slightly cooling, nonpoisonous. Used in lamps the smoke is weakening to the eyes, making them lose their lustre. Prolonged use as a food strengthens the mind, prevents hunger, lightens the body, gives longevity. To remove numbness and total loss of sensation. For feverish colds. Applied to blacken the hair, and promote its growth. . . . To cure baldness and ringworm. To remove pimples and blackheads from the face. A tonic and a cure for “wind” diseases, rheumatism.

BEAR MEAT. Sweet, bland, nonpoisonous. Should not be taken if patient has a chronic disease. For rheumatism and weakness. The uses are the same as for bear’s grease. For beri-beri with paralysis.

BEAR’S PAW. When eaten it keeps off colds and benefits the vitality.

BEAR’S GALL. The air-dried material is used. It is so commonly adulterated that one should test it in water. One drop of the genuine article will give a line in the water which does not spread. [The line is often called the “thread of gold.”] Drawn across a pool of ink, the ink should retreat from the tract. Bitter, cooling, nonpoisonous. For epidemic fevers, jaundice, chronic summer dysentery. For angina pectoris, ear and nose ulcers, and all evil sores. Anthelmintic [anti-parasitic, e.g., worms]. Infantile convulsions. Antipyretic [fever-reducing]. It clears the mind, quietens the liver, and clears the sight. To remove pterygium [tissue growing over the eye]. For conjunctivitis, blindness in the newborn and various eye troubles. For caries.

SPINAL CORD OF THE BEAR. For deafness and giddiness. Rubbed on the scalp to promote the growth of hair and remove dandruff.

BLOOD OF THE BEAR. For nervousness in children.

BONES OF THE BEAR. For rheumatism of the joints and nervousness in children.

Offering cures for almost everything, the bears didn’t stand a chance. When Zhang Enquin published the English-Chinese *Rare Chinese Materia Medica* in 1989, he wrote:

If adulterated with yak biles there is a smell of seafood; if with sheep biles, there is a smell of mutton. . . . The bear bile (or kernel) tastes bitter first, sweet thereafter. There is a prolonged, cool, refreshing and tingling sensation on the tongue. It dissolves rapidly in the mouth, and gives a cool, refreshing sensation down the throat. It does not stick to the teeth when chewed. The counterfeits and adulterations have no fragrant smell, cool, refreshing sweet and tingling sensations to the tongue, but only bitter and fish-stench taste.

Once you are sure you have the genuine item with no fish-stench taste, you can use bear gall to “remove heat from the liver to relieve convulsion and spasm, treat infantile convulsion, epilepsy, hyperspasmia

and eclampsia gravidarum [hypertension in pregnancy] caused by strong liver wind and extreme heat. It also improves vision and improves nebula, treats conjunctival congestion, swelling and pain in the eyes, photophobia and nebula caused by flaming up of liver-fire. It is efficacious in treating sores, furuncle [hair follicle infection], carbuncles, hemorrhoids, and sore throat." Some practitioners do not believe that the most effective medications have to come from endangered species. As Bensky and Gamble (1993) comment, "because of the high price of *Vesica Fellea Ursi* [bear gall bladder], often the gallbladder of the cow, *Vesica Fellea Bovus*, is substituted at a higher dosage. This practice is recommended because of the endangered status of many bear species."

Bear gall, like rhino horn, is not used as a love potion, although many in the West think it is. It may, in fact, be self-prescribed by some users for this purpose, but traditional medicine physicians consider bear gall to be one of the most powerful of all general medicines. It is most often prescribed for chronic illnesses of the liver, gall bladder, spleen, and stomach, but normally only after other gentler, less expensive herbal remedies in the "cold" category have failed to cool the "heat" of the disease (Mills and Servheen 1991). Its purposes are legion. In Wiseman and Ellis's 1996 *Fundamentals of Traditional Chinese Medicine* (the textbook used in some Chinese medical schools today), for example, bear's gall (*Ursi Fel*) is included in the category of "Heat-clearing, toxin-resolving medicinals" and is described as

cold; bitter; nontoxic. Enters the liver, spleen, stomach and gall bladder channels. Clears heat, settles tetany, brightens the eyes and kills worms. Treats heat jaundice; summerheat diarrhea; child fright epilepsy; organ disease, hookworm infestation; eye screens; throat impediment; clove and malign sores; hemorrhoids. Directions: Oral: use in pills and powders. Topical: grind and apply mixed; use as eye medication.

Until 1984, bile for use in TCM was only obtained from wild bears killed for the purpose, but with bear populations tumbling, North Koreans developed the concept of extracting bile from living animals. The practice rapidly spread to China, and by mid-1992 there were reportedly 200 operating bile farms in China with about 4,000 bears. Later the farms were consolidated—often under government control—and by

1998 there were 247 farms holding 7,002 bears (Phillips and Wilson 2002). By 2003, the Vietnamese government acknowledged 2,000 wild-caught bears on farms in that country, but the total is probably higher.

The farm operation is typically set up in this way: Bears are caught in the wild and kept in squeeze cages so small they cannot stand and can barely move. Steel catheters are inserted into their gall bladders to drain the bile continuously into a plastic sac or a bowl, to be collected at regular intervals. The liquid bile is then oven dried to form crystals, which are used to manufacture various commercial products that range from powders, capsules, tonics, salves, and eyedrops, to teas, wines, and shampoos. When bears can no longer produce sufficient bile, they are usually put into another cage where they wait to die, or are killed for their paws and the gall bladder itself.

According to Dr. Gail Cochrane, a veterinarian with the Animals Asia Foundation, there are three methods of extracting bear bile:

1. The original technique employed latex catheters in which one end of a latex tube was surgically placed in the gall bladder. A



A moon bear in a squeeze cage at a Chinese "bear farm." The bear's gall bladder has been surgically exposed for catheterization.

metal tube with a plastic disk at one end was tied on and the structure held in the gall bladder with a purse-string suture. The other end of the latex was then threaded out through the abdominal muscle incision and passed up and over the flank under the skin to exit over the hip area. On exiting the skin, the latex tube was tied in a knot. To extract the bile, the knot was untied and a syringe was inserted into the tube and negative pressure applied.

2. A variation on this technique has the catheter threaded through the abdominal muscle and exiting in the abdominal area. The end of the catheter is then attached to an empty intravenous fluid bag, into which the bile will constantly drip. The bear is fitted with a metal corset and the fluid bag sits in a small metal box within the corset. To extract bile the bear must be anaesthetized, the metal box flapped open and the fluid bag changed. The "bile bags" are changed every one to two weeks.
3. Stainless steel catheters have replaced the latex catheters in most cases. A steel tube between 10 and 20 centimeters long, with a metal disk on one end (either cup shaped or flat), is equipped with a plastic tube. The disk end is surgically inserted into the gall bladder and secured with a purse string suture. The second disk generally lies just within the abdominal cavity, against the abdominal muscle. The remaining part of the catheter projects out of the bear's abdomen. Metal projections on the end of the catheter prevent the catheter from slipping inside the abdomen and deter the bear from chewing on the end. Frequently a piece of cotton wool or lint is inserted into the end of the catheter to prevent the bile from leaking out between extractions. Prior to extraction, the farmer removes this "bung" and either collects the bile by placing a dish underneath the catheter or, if the bile is not draining or draining slowly, the farmer will insert another thin tube through the catheter into the gall bladder to facilitate drainage.

The "Free-Dripping Technique" is the only extraction method allowed under the recent rulings from the Chinese Ministry of Forestry, which has jurisdiction over bear farms. A tube (technically a *fistula*) is

created between the gall bladder and the abdominal wall, which involves either opening the gall bladder and stitching it directly to a corresponding hole in the abdominal wall or opening the gall bladder and creating a tube between this organ and the abdominal wall. The farmer inserts a catheter (either a rubber feeding tube or a stainless steel hollow probe) into the fistula once or twice per day to extract bile. If he does not do this regularly the fistula may heal over.

Among the first Westerners to visit Chinese bear farms were TRAFFIC investigator Judy Mills and her husband, bear biologist Chris Servheen. In 1990, they went to a farm in Sichuan, where they saw many bears in squeeze cages, but were not allowed to witness the "milking" process. In a 1991 article in *International Wildlife*, Mills observed that "some of the caged bears were so large they could sit up only in a slouched position. Other bears rocked their heads back and forth, or repeatedly threw their bodies against the bars of their cages. A two-year-old jumped up and down, banging its head." The investigators also went to a bear farm in Harbin, northern China, where once again, they were denied access to the extraction process. As they were leaving China and heading for South Korea, Mills observed:

We saw bears in trouble; our hosts saw only dollars. We wanted conservation, they wanted medicine and profits as well as conservation, but the last only as a fringe benefit . . . black marketers in China offered to sell us bear gallbladders by the kilo or even wild bears whole . . . Clearly, bear farming does not prevent poaching of bears or trafficking in their parts. In fact, we found, farming bears for bile promotes the use of bears as a commodity and makes bear bile available to more people at lower prices.

Appalled at what they had seen, Mills and Servheen left China and headed for South Korea, because Mills said she was "determined to witness bear milking so [she] could tell the world what it looked like." In their 1991 TRAFFIC report, Mills and Servheen described the milking process on a farm outside Taegu in South Korea:

Using a metal pole [the owner] prodded the bear into a narrow portion of its cage. As his wife distracted the bear with a pan of sweets, the door of the squeeze cage was lowered and metal rods inserted to

confine the bear and keep its legs from interfering with its abdominal area. The owner reached in, unlocked the metal panel, and a plastic bag attached to a catheter dropped down. The bag was half full of a greenish brown liquid. The bear scraped and clawed wildly at the cage while the owner then extracted the liquid from the bag with an oversized hypodermic needle, withdrawing two full syringes. The process took approximately five minutes, after which the bear's tap was again locked behind the metal abdominal plate. The syringes were emptied into three plastic bottles, which were immediately packed in ice. A small amount was left so [the owner] squirted the contents into the client's mouths. The buyers paid about \$1,700 per bottle, each of which probably held no more than 10 or 20 milliliters.

However awful it is for the bear, it is a boon to bear farmers; one couple running a farm in southern Guangdong said they made more than 300,000 yuan (US\$51,600) in 1992. Advocates of bear farming argue that the practice helps to reduce pressure on wild bear populations, claiming that the gall produced by a single caged bear in a year is equivalent to the amount that could be harvested from forty wild bears which would have to be killed. Thus, the farmers argue, the benefits of bear farming are threefold: it protects bears in the wild, it produces revenue, and it provides valuable medicine for the treatment of human ailments.

Although the farmers' future looked bright, the same could not be said for the future of the bears. According to the World Society for the Protection of Animals, Chinese medicinal use of bear bile in the 1980s was 500 kilograms per year, but today consumption has escalated to around 7,000 kilograms per year for consumer products in China and abroad. It is estimated that there are no more than twenty thousand moon bears in China (Ma and Li 1999), and given the profits to be made by the capture and farming of bears, this species is profoundly endangered. Medicine shops in Japan, Indonesia, Malaysia, the Philippines, Korea, Hong Kong, Taiwan, Singapore, and Australia sell bear bile as well as other Chinese pharmaceuticals, as do shops in Montreal, Toronto, Vancouver, San Francisco, Chicago, Washington, D.C., and New York. In South Korea, bear gall bladders were fetching almost twenty times the

price of gold (which was \$11.53 per gram, or \$326.29 an ounce) according to Mills and Servheen at the time of their 1991 report.

While traditional Chinese medicine is widespread in China, it is also popular in other Asian countries and elsewhere around the world. All eight species of bears are listed as endangered under CITES (Convention on International Trade in Endangered Species), and the Asian species are included in Appendix 1, which specifies that international trade in specimens of these species is, with few exceptions, not permitted. Because Taiwan is not recognized as a separate nation, trade between Taiwan and China is seen as a domestic issue and therefore does not technically fall within the purview of CITES. (Bhutan, Myanmar, Cambodia, North Korea, and Vietnam are also not CITES signatories.) Elsewhere, the export of bear bile products is illegal, but the ease with which the products can be smuggled or disguised has made it virtually impossible to curtail the trade, and dealers in "traditional" medicines around the world continue to sell bear products. For example, 681 kilograms of gall bladders, reportedly from sloth bears (*Melursus ursinus*), were exported from India to Japan between 1978 and 1988; because the average gall bladder can range in size from 50 grams to 125 grams (1.75 ounces to 4.37 ounces), this could represent the death of as many as ten thousand bears.

In many countries, however, bear parts are not exported at all, but used to satisfy a domestic demand. In his 1999 report on the status of black bears in India, Sathyakumar wrote:

Black bear populations in India are largely threatened due to poaching for gall bladder and skin. While the former is believed to be of medicinal value, the latter is for trophy or ornamental purposes. The medicinal value of gall bladder is yet to be scientifically established, but tribes and local villagers strongly believe in its medicinal properties.

Wherever Asiatic black bears are found, people manage to find a rationale for killing them. In Japan, a country with no wildlife protection laws at all, wild bears are regarded as threats to crops, apiaries, fish farms, and livestock and may be shot, snared, or trapped with impunity. In Viet-

nam, on the other hand, the rationale is straightforwardly medicinal: "the bear's bile is the most appreciated because it cures many diseases, effectively treats the accumulation of blood flow below the skin, and counters toxic effects. Bear bone glue is used as a tonic, and bear fat is also a medicine and tonic" (Sam 1999). Mills and Servheen also documented the sale of bear gall and gall bladders in Malaysia, India, Nepal, Bangladesh, Indonesia, and Sri Lanka, which are CITES signatories, and Bhutan, Myanmar, Cambodia, North Korea, and Vietnam, which are not.

In 2001, the Animal Concerns Research and Education Society commissioned researchers to investigate the trade in bear gall bladder and bile products in Singapore. The researchers visited sixty-eight TCM shops out of a known eight hundred such establishments in the nation and found that fifty were selling bear bile products: pills, intact gall bladders, crystals, powder, and ointment. The price of an entire gall bladder ranged from 15 to 800 Singapore dollars (US\$8.50–\$440). It appears that Singapore, a nation famed for its strict laws and draconian punishments, is prepared to ignore malfeasance where traditional medicine is concerned. Vietnam has also been found to be a major offender.

Along with neighboring Cambodia and Laos, Vietnam once provided major habitat areas for both the Malayan sun bear and the Asiatic black bear. Illegal poaching has caused the numbers of both species to decline dramatically. The Vietnamese government responded by listing both species of bears as "rare and precious animals," protected by law from being poached, exploited, and utilized. Despite this legislative protection, both bear species are now facing total decimation as a result of the establishment of hundreds of illegal facilities throughout the country that keep bears for the extraction of bile. In Hanoi alone, at least seven hundred bears are kept in tiny cages in backyards of homes. Most have lost paws through being caught in snares crudely made from motorcycle brake cables. Trussed up with wire, these bears pour into the cities smuggled in the backs of vans to begin their lives of misery. Sources estimate that at least two thousand bears are being kept for bile extraction throughout the country—and the industry is still expanding.

Adult bears in Vietnam are dying slowly from bile extraction, while cubs too small to produce adequate quantities of bile are slaughtered for their whole gall bladders and paws. Animals Asia investigators have

revealed two methods of bile extraction in Vietnam. In the first, bears undergo major abdominal surgery to remove bile from their gall bladders every three months. The surgery is crude and unhygienic and, according to the Vietnam government, the bears usually suffer four such operations before dying from the infection and pain. Another method entails the extraction of bile with the assistance of an ultrasound machine, catheter, and medicinal pump. The bears are drugged, restrained with ropes, and their abdomens are repeatedly jabbed with 4-inch needles until the gall bladder is found. One operator was even witnessed licking the needle between numerous insertions in an attempt to locate the bile. The process often leads to dangerous leakage of bile into the body and a slow and agonizing death from peritonitis. Despite the laws, newspapers in Vietnam openly advertise bear bile, while restaurants and cafes throughout the country freely serve bear bile wine, bear paws, and bear meat. Animals Asia investigators have witnessed the carcasses of whole bears floating in glass tanks filled with fermenting wine and have filmed cages in restaurants containing distressed and dying adults and cubs awaiting their fate.

While bear bile has been used in traditional medicine for millennia, many Asian doctors agree that it can be replaced with herbal and synthetic alternatives. However, the Vietnamese community has fallen victim to a public misinformation and marketing campaign that promotes expensive bear bile as "the people's medicine"—a cure for cancer, impotency, and even hangovers. Under the direction of Jill Robinson, Animals Asia, which provided much of the basis for this account of the bear bile situation in Vietnam, has been working in that country since 1998, encouraging the Vietnamese government to enact comprehensive legislation to protect both wild-caught and captive-bred bears from the practice of bile farming. In 1999 the organization submitted a written proposal to the Vietnamese government offering to assist in finding solutions for bears currently held in illegal facilities. After two years of lobbying embassies and nongovernmental organizations in Vietnam for support, Animals Asia submitted official letters to Prime Minister Phan Van Khai and other government officials, encouraging them to act to end the illegal bear bile industry. In September 2002, a historic ruling by the prime minister and the government of Vietnam granted Asiatic

black bears the country's highest level of protection, thus making the hunting, keeping, and exploitation of all bear species for the bile industry illegal under all circumstances. This marks a victory for Animals Asia—as long as the bear farmers respect the new legislation.

The Bear Bile Business, published by the World Society for the Protection of Animals (Phillips and Wilson 2002), is a 248-page document that contains detailed information on every aspect of the "business," from its history and profiles of Chinese bear farms to assessments of individual markets in various countries, including Canada, the United States, Indonesia, Japan, Malaysia, Singapore, Taiwan, and Australia. The section on Japan, written by Kumi Togawa, Masayuki Sakamoto, and assisted by Chie Iijima, begins:

Japan is one of the biggest consumer countries of bear gall and bile—there is virtually no regulation in the current Japanese legislation to restrict domestic trade in bear gall bladders. There are 2,000–3,000 brown bears in Hokkaido, the northern Japanese island, and about 7,000 black bears in the other areas of Japan. Populations of both species are declining as their habitats are destroyed and fragmented. In Japan, over a thousand bears are killed annually for sport hunting and pest control, without the implementation of proper conservation control measures. In bear parks, bears are kept in inappropriate conditions, and some parks sell bear products, including gall bladders.

From 1979 to 1988, TRAFFIC Japan estimated that China exported between 11,000 and 59,000 gall bladders to Japan, and another 1,051 kilograms of gall bladders were exported from China to Japan between 1988 and 1990 (Phillips and Wilson 2002). Togawa, Sakamoto, and Iijima reported that "the demand for bear bile in Japan is still continuing at a level of at least 200 kg [440 pounds] per year. If we assume 20 g of dried bear gall is obtained from one bear, then in theory 10,000 bears must be killed to satisfy the demand. Even the farmed bears in China don't live very long, and the captive stock needs to be supplemented with wild caught bears."

"Japanese medicine"—which is not the same as medicine in Japan—is known as *kanpo*, which literally means "Chinese method." It is a

somewhat altered version of TCM, and its pharmacopoeia includes bear gall, known locally as *yu-tan*. According to Mills and Servheen's 1991 overview, "bear gall is used in Japan for abdominal pain, fever, liver detoxification, dyspepsia, nausea, poor appetite, skin burns, weakened heart, infant colic, every kind of intestinal disease and more." The collecting of bear gall and bear parts—including gall bladders—is legal in Japan, and Japanese pharmaceutical companies are able to sell bear gall as a legitimate medicine.

Despite the exploitation of the animals for bile, bears remain popular subjects in Japanese art, and some bears, particularly moon bears, are still to be found wild on the islands of Honshu and Shikoku. Live specimens can be seen in zoos and in "bear parks," popular attractions that feature only bears. As of 2000, there were eight bear parks in Japan and two more under construction. Some feature all species of bears except the giant panda. The bears ride bicycles, jump through flaming hoops, roller-skate, play basketball, and dance, and they are often dressed in funny costumes. When the bears outlive their usefulness as performers or when they die of natural causes, the parts are sold, with a gall bladder bringing as much as \$4,000 from pharmaceutical houses. "In early 1991," wrote Mills and Servheen, "more than 100 bears from one Japanese bear park were selected for slaughter. After the bears were rendered at a wildlife-meat packing plant, all of their gall bladders were sold to a South Korean broker. To date, more than 1,000 bears have died or been slaughtered in this park."

Once upon a time, the forests of Korea were home to Asiatic black bears, called *Pandalgom* by Koreans, but hunting, deforestation, and wars have taken their toll. Korea's wild bear populations, at best, have been reduced to single-digit figures. Some *Pandalgom* are exhibited in zoos, but when they become too old to entertain visitors, they are sold at public auction for their much-sought-after gall bladders. According to Mills and Servheen (1991), in 1990, the going rate for a bear was about \$7,100. "Koreans are perhaps the most dedicated of all Asians to the use of bear gall bladder as medicine—more so than the Chinese, who originated the practice. Some Koreans are willing to pay more for bear gall and go to greater lengths to get it than people of any other nationality." Like traditional Japanese medicine, Korean medicine is based on

centuries-old Chinese precepts and is said to have arrived in Korea at the time of the Han Dynasty, which dates from 206 BC to AD 221. By official decree, Western medicine was kept out of Korea until 1884, but under Japanese colonial rule (1910-45), it was reintroduced and soon became the dominant practice. After the Korean War (1950-53), there was a resurgence of traditional Korean medicine and even as South Korea was becoming highly industrialized, there was a flowering of interest in ancient traditions such as ancestor worship, filial piety, tonic foods, and herbal medicine (Mills and Servheen 1991). Of traditional Korean medicines, bear gall (*ungdam*) is considered the most powerful, able to purge all toxins, cure liver ailments, and treat diabetes, high blood pressure, palsy, fever, and hemorrhoids.

In South Korea, street peddlers of Chinese medicines were ubiquitous; Mills and Servheen found that "medicines such as bear gall can sell in the streets of Seoul for 10 times their price in China. . . . Among the ethnic Koreans' offerings we counted 136 bear gallbladders, several Asiatic black bear paws, vials of bear bile crystals, and numerous medicines containing bear gall. One vendor offered to trade a bear gall for our Nikon camera . . . we were offered two bear gallbladders for \$2,861 by one vendor. Another wanted \$700 for a single gall and \$60 for a one- to two-gram vial of bear bile crystals. Yet another vendor showed us a very large bear gall for which he wanted \$3,292." Where did the bear gall come from? Korea itself was no small supplier: As of 1990, there were fourteen bear farms in South Korea holding a total of 655 bears.

Relation to CITES regulations, as noted above, is different for the island of Taiwan than it is for other areas of Asia. As recently as 1949, the island of Taiwan (then known as Formosa) was considered part of China, but after Mao Zedong took control of the mainland, the Nationalist Party led by Chang Kai-shek broke away and set up its own Republic of China on Taiwan. There can only be one "China" in the United Nations, and most countries recognize the huge People's Republic on the mainland. Taiwan, therefore, is not eligible to join the United Nations, and it is a pariah nation as far as international treaties such as CITES are concerned. While many nations circumvent CITES restrictions on importing or trading in endangered species, Taiwan ignores

them completely. Although there are government restrictions in Taiwan on hunting moon bears, these too are ignored, and gall bladders, bile, and bear paws are easily found in "game shops" and pharmacies. In the capital city of Taipei, TRAFFIC investigators Mills and Servheen found gall bladders selling for anywhere from \$363 to \$1,454, bear meat for \$34 per kilogram, and paws for \$181 to \$363. The average price for a whole bear was \$2,713.

Taiwanese medicine is little different from traditional Chinese medicine, although Western practices are said to be less integrated than they are on the mainland. This places an even greater emphasis on tonics and herbal cures, and topping the list are bile and other bear gall products. In their report on bear markets in Taiwan, Chen, Wu, Bhiksu, and Fisher estimated that there were ten thousand TCM shops on the island. Taipei's Di Hua Street is notorious for its profusion of Chinese apothecaries, and of the thirty-four medicine shops they investigated, Mills and Servheen found that thirty sold bear gall bladders, one with as many as twenty-five in a single tray. Those shopkeepers willing to talk said that most of their material came from the bear farms of mainland China. If that is true, political differences between China and Taiwan clearly do not interfere with the lucrative bear bile business. Often mixed with ground pearls, cow gallstones, musk, and amber, bear gall is a popular and powerful tonic for the heart, lungs, stomach, and kidneys among Taiwan's population of 22 million and is considered good for the skin as well. All shopkeepers said that bear bile was used in a rite for newborn babies, where a fraction of a gram is placed on the baby's tongue to cleanse the blood of poison passed by the mother to the child in the womb. "Sometimes," Mills and Servheen noted, "rhino horn, gazelle horn, saiga horn, coral, dried palm ginseng, dried insects, stalactites, oxidized mercury, and even gold are added for a more expensive and powerful tonic." The United States invoked the Pelly Amendment to impose trade sanctions on Taiwan in April 1994, and went on to announce a ban on imports of wildlife and wildlife products from Taiwan, effective August 19, 1994. Two years later, on September 11, 1996, recognizing Taiwan's attempts to control the illicit trade in bear products, the United States announced that Taiwan was being removed from the Pelly Amendment's "Watch List."

Beginning with the promulgation of the *Wildlife Conservation Law* in 1989 and continuing through 1995 with the formation of a task force designed to investigate and supervise wildlife conservation and crack down on the smuggling of wildlife products, Taiwan began to demonstrate a commitment to domestic conservation and support for global wildlife protection efforts. In the 1999 IUCN report *Bears: Status Survey and Conservation Action Plan* (Servheen, Herrero, and Peyton, eds.), there were indications that Taiwan was working to overturn its reputation as a primary consumer of illegal bear parts, but as Ying Wang, a bear biologist at Taiwan Normal University, suggested in that volume, "Though the sale of bear parts and meat has been ended officially, it still exists on the black market."

TCM has long depended on drinks, pills, ointments, and powders that can be varied according to the diagnosis of the individual. New to Taiwan is scientific Chinese medicine (SCM), which resembles Western medicine in that the ratio of ingredients in a particular potion or ointment is fixed, and one product—such as aspirin or ibuprofen—fits all diagnoses. SCM is less expensive than TCM because it does not require that a potion be mixed but rather can be bought right off the shelf. Unregulated SCM can, of course, use genuine bear bile, but it is easier for unscrupulous dealers to substitute cow or pig bile—or use no bile at all.

Laos is not a signatory to CITES and, like Taiwan, overtly flaunts endangered species strictures. The former director of the Forest Resources Conservation Project served time in prison for trafficking in Laotian and Thai wildlife, according to Mills and Servheen's 1991 report. After the fall of Saigon in 1975, Laos fell into the hands of Communists, who proclaimed it the Lao People's Democratic Republic. That the heavy-coated *Ursus thibetanus* can still be found in Laotian jungles is more a testimony to the density of the underbrush than to any desire on the part of Laotian authorities to protect the bears. Her quest for golden moon bears took Sy Montgomery to Laos, and she found several bears (and a young tiger) that had been caged in private homes and in the zoo at Vientiane.

"It seemed no species in Laos was exempt from human hunger for food or for money," Montgomery notes. The Laotian people use bear gall

bladder as medicine, Mills and Servheen tell us, and "they also use bear fat to treat rheumatism and eat bear meat for energy. Medicinal use of bear parts is illegal, but enforcement in this regard is mostly nonexistent." Although undocumented, it has been said that a large proportion of bear parts that end up in Korea originate in Laos. Because the Mekong River forms the border between Laos on one bank and Thailand and China on the other, smuggling and illegal trade are rampant. Today, Laos is one of the ten poorest countries in the world, and valuable bear parts can take the place of worthless currency.

Montgomery also saw captive moon bears in Thailand, at the Banglamung Wildlife Breeding Center outside Pattaya, at the Lop Buri Zoo, and at the Million Year Stone Park outside Pattaya. Compared with other Thai bears, these were the lucky ones. "So prized are bear parts," Montgomery wrote, "that forty live sun and moon bears were smuggled out of Thailand into South Korea, where their meat, blood, and gallbladders were used to fortify the Korean 1988 Olympic team. So effective are bear remedies thought that Hyundai Corporation's elderly ex-president, Jung Ju Young, publicly credits his excellent health to regular supplements of bear bile."

Thailand became a CITES signatory in 1983, but to date, there is no national legislation in place to enforce the regulations. In Bangkok's Chinatown, Mills and Servheen readily found bear gall bladders for sale and learned that there were restaurants that specialized in serving bear meat and bear paws. In 1991, the new government decided to put an end to the enormous trade in flora and fauna that had made Bangkok the epicenter of smuggling activities in Southeast Asia. Bear farms and restaurants were shut down and their proprietors arrested, but with the high prices bear parts in Korea, China, and Japan command, it is highly unlikely that the bears of Thailand will be granted a reprieve.

But it is not only Asian countries that import and use bear bile medicines; any country with a substantial population of Asians (often congregating in "Chinatowns") will manifest an interest in TCM. For the *Bear Bile Business*, the World Society for the Protection of Animals sent investigators to three cities in Canada (Vancouver, Toronto, and Montreal) and to four cities in the United States (San Francisco, Washing-

ton, D.C., Chicago, and New York), where a total of sixty-five TCM shops were examined. Fully 78 percent (fifty-one out of sixty-five) sold bear gall bladder or bile products. Bile medicines, usually containing bear bile combined with other herbal medications, were found in the form of oils, ointments, pills, and plasters and are usually used for rheumatism, hemorrhoids, and sprains. Bile powder, made from bile collected on Chinese bear farms, is sold as flakes and packaged in vials. Seventeen intact gall bladders were found in five shops, collected from Chinese, Russian, and North American bears. One gall bladder in a Toronto shop was priced at \$650.

Researchers in Australia, where there are a substantial number of people of Asian descent, had similar experiences in the Chinatowns of Sydney, Melbourne, and Brisbane. Pei-Feng Su, Janey Wong, and Yi Chiao surveyed thirty-five shops and found that seventeen (49 percent) sold bear bile products (the most popular of which was *Fel Ursi Hemorrhoid Ointment*); one shop in Sydney had six gall bladders for sale. There are no bears in Australia (koalas are marsupials, not bears), so all bear products must be imported and are often smuggled in by individuals and then sold commercially.

The active ingredient in bear bile is ursodeoxycholic acid (UDCA). A Google search for "Ursodeoxycholic acid" produced forty thousand hits and revealed that it is actually used in Western medicine in an attempt to cure some medical problems, usually liver- or gall bladder-related: UDCA is a naturally occurring bile acid found in small quantities in normal human bile and in large quantities in the bile of certain species of bears (not including the giant panda, which has enough troubles of its own). It is a bitter-tasting, white powder freely soluble in ethanol and in glacial acetic acid, slightly soluble in chloroform, sparingly soluble in ether, and practically insoluble in water. With trade names such as Actigall, Arscacol, Cholit-Ursan, Destolit, Deursil, Litanin, Ursodiol, Ursochol, Ursofalk, Ursolvan, and Ursotan, it is prescribed for the dissolution of gallstones, but the treatment requires months of therapy; complete dissolution does not occur in all patients and recurrence of stones within five years has been observed in up to 50 percent of patients. UDCA is also prescribed for treatment of cirrhosis of the liver, and, according to results of a follow-up study of a random-

ized trial published in the April 2003 issue of *Gastroenterology*, it protects against colon cancer in patients with ulcerative colitis and primary sclerosing cholangitis (where the bile ducts inside and outside the liver become inflamed and scarred, and the ducts become blocked). UDCA can be synthesized for about 16 cents per pill, but practitioners of TCM prefer to obtain it from bear gall bladders.

Does bear bile, as prescribed in TCM, actually do what it's said to do? Despite the fact that bear bile does, in fact, contain a significant amount of ursodeoxycholic acid, which, when synthesized from cow bile, is used to break down gallstones, John Seller of CITES points out that fakes in the market raise the question as to whether bear products themselves are efficacious. One study of samples of supposed bear bile turned out to be domestic pig bile. Dr. Lee Hagey of the Department of Medicine at the University of California observed that "pig is an effective substitute to bear bile as the crystals mimic bear crystals and the gall bladders look the same. I believe that probably many people in Asia have been taking pig bile and not bear bile. I also believe that before the current fad of bear bile, Asians used pig bile labeled bear bile. So we can say that they have always used pig bile with good effect."

By 1991, Judy Mills had published her exposé of Chinese bear farms in *International Wildlife*, in which she observed that "more bears live on bile farms than probably remain in all of China's forests. Yet the Chinese government has asked its wildlife specialists to concentrate their energies on boosting farmed bear birth rates, bile outputs, and profits." It was during the search for additional information on bear farming that I came across the work of Animals Asia. I was astonished to find an organization in China (Hong Kong, actually) doing so much to improve the terrible plight of farmed bears in China. Jill Robinson, the organization's founder, describes her introduction to bear farms in China:

Sometimes we receive a message in life which is hard to ignore. For me, that message came in 1993 when I walked onto a bear farm in China for the very first time. Nothing prepared me for that moment and it was with utter disbelief that I witnessed a scene which would subsequently change my life and which would start the dream of the China Bear Rescue. . . . Bear farming was virtually unknown in the

West and it was only when I heard rumors of a bear farm operation across the border in southern China, that I joined a tour group from Hong Kong to witness the practice at first hand. Whilst the bear farmer and his wife proudly demonstrated their bile preparations, I stole away from the group and found some stairs leading to a room below. As my eyes became accustomed to the darkness, it was as if a horror story was unfolding itself frame by frame. Row after row of tiny wire cages held living, breathing bears as prisoners—bears, I was later to discover, which had spent 13 years of their life behind bars. Resembling victims of medieval torture, these pitiful animals turned around to reveal infected, gaping wounds in their stomachs, from which protruded rusting, metal catheters. . . . At one point I felt a gentle tap on my shoulder and turned around to see a female moon bear reaching out through the cage. Without thinking, I took her paw and, whilst gazing into sad, dark, unblinking eyes, made a pledge that one day I'd be back to set her free. (Animals Asia 2003)

Born in the United Kingdom, Robinson arrived in Hong Kong in 1985 and spent the next twelve years working in Asia as a consultant for the International Fund for Animal Welfare (IFAW). In 1998 she founded the Animals Asia Foundation and focused on the practice of bear farming. To date, Animal Asia's China Bear Rescue has rescued 185 bears in China and is working to end the practice of bear farming by the 2008 Beijing Olympic Games. In 1995, Robinson was presented with the Readers Digest "Hero for Today" award and in June 1998 she was a recipient of the Member of the British Empire award, presented by Queen Elizabeth on the Birthday Honors List in recognition of her services to animal welfare in Asia.

In 1993, after her visit to two bear farms, one near Hong Kong, Robinson launched a wave of media articles condemning the farms and the treatment of an estimated ten thousand or more bears for the bile business. The organization was able to force the closure of the two farms and to rescue and provide medical care for nine bears from one of the farms. Animals Asia Foundation assumed responsibility for the bears' rescue and subsequently began a dialogue about bear treatment with Chinese authorities. David Chu Yu-lin, a prominent Hong Kong busi-

nessman and politician, and a hunter until his children persuaded him otherwise, played a crucial role in this campaign. Making use of his contacts as an advisor on Hong Kong affairs to China's State Council, Chu Yu-lin took the cause to high levels in the Chinese government, where the plight of the bears was officially acknowledged.

In November 1994, the China Wildlife Conservation Association, the IFAW, and two Hong Kong based groups—Earthcare and the Chinese Association of Medicine and Philosophy—signed an agreement to work together to end bear farming. The immediate goal was rapid closure of the most abusive farms and the long-term goal the total elimination of bear farming, providing alternative medicines could be found.

Most bear farms are located in Sichuan Province in south-central China. In 2000, an agreement between Animals Asia and China Wildlife Conservation Association and the Sichuan Forestry Department was reached that would close the worst farms, release five hundred bears into sanctuaries, and begin the process of eliminating bear farming



Signing the historic agreement to release five hundred moon bears into the care of Jill Robinson, who is shown with officials of the China Wildlife Conservation Society and the Sichuan Forestry Department in 2000.

in that region. Completely. The agreement was sanctioned by the Central Government of China, and Animals Asia agreed to pay each farmer a sum of money for each bear released into its care. It costs about \$600 per year to feed each bear in the sanctuary and another \$2,000 per bear per year to cover the costs of workers' salaries, medical and surgical supplies, and construction costs at the sanctuary. Donations to Animals Asia are not only necessary—they are critical to the care of bears.

In October 2000, Animals Asia received the first group of pitiful bears. Since that time, thirty-eight farms have closed and as of January 2005, Animals Asia has received 185 moon bears. The bears typically arrived bone thin, desperately ill, and terrified, the victims of catheter implantation or the newer "free-dripping" technique that creates a permanent hole in the gall bladder—an open wound responsible for the high mortality rate on the farms. Many of the bears are missing limbs from being caught in traps in the wild, while others have had teeth, claws, and paw tips hacked away to make the bears easier to handle. Animals Asia veterinarian Gail Cochran euthanized several bears as a result of peritonitis, septicemia, and massive abdominal or facial cancers. However, 120 bears are now enjoying their freedom in the "China Bear Rescue" forest sanctuary in Chengdu in central China.

Shortly before the bears were scheduled to move to the sanctuary, the IFAW gave US\$75,000 to China's State Administration for Traditional Chinese Medicine (SATCM) to support research to develop a single herbal alternative to bear bile. Like many others in the traditional Chinese medicine community, SATCM staff were unhappy that Chinese medicine was blamed for the endangered status and cruel treatment of some wildlife species. They argued strongly for legitimate medical use of bear bile and other animal products while acknowledging that much of the international trade in animal parts resulted in unconscionable profits to unscrupulous middlemen. To He Huiyu, deputy director of SATCM's Department of Science, Technology, and Education, the grant award signaled that the end of bear farming was near. He anticipated that acceptable alternatives would be ready in about four years. In a 2002 article, Dr. Peter Li of the University of Houston wrote, "International efforts to end bear farming have unavoidably touched two most sacred objectives of contemporary

China: modernization and cultural revival. The Animals Asia's experience has shown that these two issues do not constitute insurmountable obstacles to international efforts to create positive change in mainland China."

In September 2003, an article about Jill Robinson's campaign appeared in the *National Enquirer*, a well-known American celebrity gossip tabloid. Sandwiched between stories about Ben Affleck and Jennifer Lopez's failed attempt at nuptials and George Clooney's shopping habits is a full-page story entitled "Woman Helps Bears Claw Their Way to Freedom." It begins, "Horrific cruelties inflicted on captive bears was more than Jill Robinson could bear—so she's started a miraculous sanctuary that's saving hundreds of these tortured animals." The article, which is unsigned, includes photographs of caged bears as well as pictures of the rescued bears at Chengdu. When I asked Annie Mather, media director for Animals Asia, about the choice of *National Enquirer* as a place to publicize the bear rescue, she said, "Yes, indeed, I am well aware that the *Enquirer* is the most notorious of tabloids (with a huge circulation)—however, because it is a nice article and lists our Web site, we don't believe the article is giving the



Members of the Animals Asia staff sitting atop some of the cages from which the bears were released.

wrong impression of our work—so far, we are getting supportive e-mails from people who have never heard of our rescue before.”

Traditional medicine practitioners are beginning to recognize the problems inherent in the international trade in animal parts, and in response, some are adopting different approaches to treatment, including herbal alternatives. In a 1993 paper, for example, representatives from the Chinese Association of Medicine and Philosophy presented a list of herbal substitutes for rhino horn, bear gall, and antelope horn. For rhino horn they recommended herbs by the name of *Rehmannia glutinosa* and *Captis chinensis*, which demonstrated significant antipyretic activity during a test conducted by Professor Paul But of the Chinese University of Hong Kong. For antelope horn they recommended *Tian Ma* (gastrodia root), *Gou Teng* (uncaria), and *Ju hua* (chrysanthemum), all of which are identified by Wiseman and Ellis as “yang-subduing wind-extinguishing agents.” In 1994, the Chinese Association of Medicine and Philosophy joined with Earthcare to produce a report entitled



Some of the bears lost limbs in the traps that were used to capture them. Here “Three-Legged Andrew” recuperates at the sanctuary established by Animals Asia after having been released from his cage.

“Herbal Alternatives to Bear Bile.” For every ailment currently treated with bear bile, they argue, there is a combination of plant-derived, nonendangered alternatives that are cheaper, more readily available, and just as effective.

According to Animals Asia’s 2002 newsletter, UDCA was first synthesized in 1954 from chickens and has proven to be efficacious in treating liver disease. Ironically, far more synthetic bile is consumed in Asia than bear bile—Japan, Korea, and China consume 100 tons of synthetic bile annually. Synthesized UDCA (using cow or pig bile—or even no animal products) is a medicine that seems to have been successfully used worldwide to treat gallstones, primary cirrhosis, autoimmune hepatitis, and colon cancer. Research in the United States in 2002 has shown that bile acid is able to cross the blood-brain barrier and may be beneficial in treating Parkinson’s, Huntington’s, and Alzheimer’s diseases. Researchers stress that this bile acid can be produced synthetically, but for some, artificially produced substitutes may not be satisfactory.

Though suitable herbal and synthetic alternatives exist, the problem of bear exploitation is far from solved. Human greed, difficult to legislate against, is still powering the bear farming industry. CITES restrictions in some cases only force the industry underground and encourage the growth of a black market. Groups like the World Society for the Protection of Animals, however, have mounted campaigns in Hong Kong, Singapore, and Japan to bring the issues before the public and to show that there are viable alternatives to keeping catheterized bears in tiny cages. According to Duncan Graham-Rowe (2004), “Customs officers will soon be armed with bear detection kits in a bid to halt the burgeoning illegal trade in bear parts such as gall bladders and bear bile.” Developed by the World Society for the Protection of Animals, the kit is based on the principle of home pregnancy kits; it uses antibodies to detect proteins that are specific to each bear species. Instead of the lengthy laboratory testing process, the kit will identify bear products immediately, and while it will obviously not eradicate the trade, it will be a deterrent to smugglers.

The publicized efforts of people like Jill Robinson to free caged bears bring to the attention of the world the inhumanity of bear farming. More than winning the release of five hundred bears from their torture



Portrait of a happy bear, "Jasper" at the Chengdu sanctuary.

chambers, Robinson's efforts serve to show that tigers, rhinos, sea horses, sea lions, and other species endangered by the needs of TCM don't need to be. Herbal or other remedies can be substituted; public education can alert potential consumers that the production of such medicines contributes to the extinction of rare and endangered species.

Tigers, Rhinos, and Bears—Oh My!

In 1993, the Chinese government published a "Notice Promulgated by the State Council on the Prohibition of Trade in Rhinoceros Horn and Tiger Bone," which banned the import and export of these substances in China. The notice included this wording:

It is forbidden to sell, purchase, carry or mail rhinoceros horn or Tiger bone. The rhinoceros horn and Tiger bone, presently kept in stocks shall be examined, re-registered, sealed up and properly kept, and the owners shall declare their stocks accurately to forest departments at provincial levels The forestry departments at provincial level or the agencies designated by them shall prepare documentation of their stock of rhinoceros horn and Tiger bone and submit the documentation to the Office of the People's Republic of China for the Administration of the Import and Export of Endangered Species.

An enormous country with an enormous population, China alone can make a mockery of such "notices" if they're not adhered to. Besides, no notice by itself—no matter how repressive the government that issues it—can possibly squelch a people's belief in the efficacy of centuries-old miracle cures. It is clear that there are still many, many people, in China and elsewhere, who believe that tiger bone, rhino horn, and bear bile can cure everything from hemorrhoids and gallstones to cancer and impotence.

In 1997, TRAFFIC commissioned Judy Mills to learn what had resulted from the 1993 ban, and from 1994 to 1996, she sent Mandarin-speaking investigators to pose as customers at various medicine markets

and pharmacies in China to see if there were any discernible trends in the tiger-bone and rhino-horn trade. Sales were down, but far from eliminated:

Taken together, the results of these surveys could indicate that China has been highly successful in implementing the domestic ban on trade in rhinoceros horn, Tiger bone and their medicinal derivatives. Lack of pre-ban surveys of the trade prevent this or any other conclusions about availability before versus after the ban. What is more important, and of immediate conservation concern, is the fact that even a low level of availability exists in the world's most populous country—a country that depends, at least in part, on TCM to provide health care to 1.3 billion people. If poaching stands behind the source of rhinoceros horn and Tiger bone in China, the world's remaining rhinoceros and Tiger populations could not supply even a small residual demand in that country for long. (Mills 1997)

A TRAFFIC survey, conducted in 1996, found that about 7 percent of Hong Kong's adult population used TCM regularly and that users are more likely to be women than men. Most users of TCM were not particularly interested in the ingredients contained in the medications prescribed, but a significant proportion of those who knew they were using rhino horn or tiger bone said that they would continue to do so even if it was against the law. As one might expect, those who used TCM medications that contained wild animal parts were less inclined to support conservation measures, while those who didn't use animal-based TCM medications were more in favor of protecting wildlife. One-third of Hong Kong's adult population reported that they had consumed exotic animals (by our standards, anyway), with snake being the most popular exotic food item, and more than half of the population said they used tonics containing wild animal derivatives. A majority of Hong Kong Chinese, and especially those who did not use TCM, expressed concern about wildlife conservation and indicated they would voice support if they were informed of the relevant issues. Like most people, users of TCM medications in Hong Kong believe that their own health takes precedence over the health of an endangered species.

Some of the animals whose parts are used for TCM—particularly rhinos and tigers—qualify as endangered species. If a species is sufficiently endangered, there is a distinct possibility that it might become extinct. With regard to rhinos and tigers, we must therefore ask if stockpiling horn or bones might be financially advantageous—at least in the short term—if the animals themselves actually became extinct. The hoarders of horn and bone could then demand astronomical prices for what remains—as Will Rogers answered when asked how to make money: “Buy land, they ain't making any more of it.” The idea that anybody would be pro-extinction is painful, but when Cory Meacham was writing *How the Tiger Lost His Stripes*, he interviewed Paul Goddard, director of the National Fish and Wildlife forensic laboratory in Ashland, Oregon, who indicated how plausible the idea must be. Speaking of confiscated tiger bones, Goddard said: “If I were doing this and had no scruples and I liked money a lot, I would, at whatever price necessary, buy up the bones of tigers and then pay poachers to kill the rest.” Says Meacham, “This may sound like a far-fetched plot in a spy novel, but evidence of exactly such commodification is readily available for other endangered species. Massive stockpiles of rhino horn have been discovered, along with anecdotal reports from poachers claiming to have been instructed to kill rhinos in the wild whether they have valuable horns or not.”

The slaughter of rhinos and tigers for the questionable needs of TCM is terrible enough, but it would require a view of humanity far more cynical than mine to see those who would encourage poachers as actually wanting to bring about the extinction of the species. I know of two instances, that of the quelili and that of the Tasmanian tiger, in which a species was made extinct by hunters when extinction itself was not the goal. Endemic to Guadalupe, an island 140 miles west of Baja California and 180 miles south of San Diego, was the quelili (*Polyborus lutosus*), a large bird of prey which was believed by the islanders to be taking young goats. The quelili was a species of caracara, a hawklike bird that looks more formidable than it is. The introduction of goats was probably beneficial to the carrion-eating quelilis, and in 1876 the birds were said to be abundant on every part of the island. By 1906, however, the birds had

been so efficiently eradicated by the goatherds that not one remained alive. The Tasmanian tiger, or thylacine (*Thylacinus cynocephalus*), was a German shepherd-sized marsupial carnivore, striped on its hindquarters and tail, that was believed by Australians to be a sheep killer. Under a government-sponsored bounty system, they were relentlessly slaughtered; by the 1930s, they were all gone. Although both the queli and the thylacine are extinct, it is unlikely that the men who killed them had this goal explicitly in mind; they just wanted to reduce the numbers of predators and protect their valuable livestock.

As with Jill Robinson's attempts to rescue bears in Asia and seek herbal alternatives for bear bile, there is a modicum of good news for the rhinos and tigers, as well as other species endangered by traditional Chinese medicine's demand for animal parts. The American College of Traditional Chinese Medicine and the World Wildlife Fund have formed a dynamic partnership to build public support for the conservation of tigers, rhinos, and other endangered species by reducing reliance on endangered species parts. In 2003, the World Wildlife Fund developed a Web site (www.tcmwildlife.org) that specifically emphasizes the plight of rhinos, tigers, and bears:

Although tiger bone, rhino horn, and bear gallbladder use goes back at least a thousand years, illegal trade and poaching of these endangered and threatened species have increased significantly in the last two decades. The booming economies and growing wealth in parts of Asia have caused demand and prices to rise for many wildlife products. A major cause contributing to the ongoing depletion of tigers, rhinos, and bears is the use of their parts for traditional medicinal purposes.

In 2004, TRAFFIC North America published a study that demonstrated that increased awareness of animal endangerment could play a significant role in sales of TCM products. In a comparative study of traditional medicine markets in San Francisco and New York, investigator Leigh Henry found that New York far outstripped San Francisco in the availability of medicines containing tiger bone, leopard bone, rhino horn, musk, and bear bile:

The differences in availability of medicines labeled as containing protected or regulated species in the San Francisco and New York City areas are alarming. Only 3% of San Francisco stores offered any medicines labeled as containing tiger, while 41% of New York City shops did. Rhino horn medicines were not found for sale in San Francisco, while they are available in 7% of New York City shops. Musk medicines were offered for sale in 58% of San Francisco stores and all New York City stores; and bear bile medicines were found in 24% of San Francisco shops and 70% of New York City shops.

The investigators found that San Francisco shopkeepers were "acutely aware of the laws regulating these species, and many also demonstrated that they were aware of the reasons behind these regulations—that an important factor in their endangerment is the unsustainable use of their parts in traditional medicines." In New York City, however, no shopkeepers mentioned the illegality of these products, much less the conservation status of the species used in their manufacture.

If progress consists of an awareness of the problems caused by using parts of endangered animals, some TCM practitioners in China itself may be moving towards a resolution. In 1995, Beijing's Institute of Materia Medica, Chinese Academy of Medicinal Science produced artificial musk exclusively from synthetic and purified compounds—with no animal components. When tested on one thousand patients as an anti-inflammatory agent, the artificial musk showed the same results as natural musk. Similarly, the Guangdong Provincial Hospital of Traditional Chinese Medicine in China demonstrates a unique combination of TCM and Western medicine and is seen as the leading regional and national authority in medical education, research, treatment, and surgery. The hospital has strict controls regarding the use of animals and now uses cow gall to replace bear bile, buffalo horn to replace rhino horn, and cow bone to replace tiger bone. In a 2003 paper presented at a bear symposium in South Korea, Scarlett Pong, president of the Practicing Pharmacists Association in Hong Kong, stated that many practitioners do not stock or use products from endangered species because,

amongst other reasons, "they are morally offensive and there are plenty of perfectly acceptable herbal alternatives."

Perhaps not in New York, but in some Asian countries people who rely on traditional Chinese medicine are sometimes willing to give up the use of animal parts if it can be shown that medications containing them don't work or that the animals providing the parts are in danger of extinction. Because Western medicine often provides cheaper, more efficacious products, Asians in America are much less likely to purchase rhino-horn medications, tiger-bone soup, or bear-balm ointment. These views raise the interesting question of whether various animal-based TCM remedies work. Tiger bone (and other tiger parts) have not been shown to have medicinal value (except perhaps to those who already believe they do); but many people believe that rhino horn, so long a standard in the Chinese medicine pharmacopoeia, actually works to reduce fevers, and they point to some studies to back up their claims.

The primary ingredients of rhino horn are keratin and eukeratin. The horn also contains other proteins, peptides, free amino acids, and cholesterol. Most researchers believe, based on current data, that rhino horn and the horn of the water buffalo have basically similar properties, but in Chinese medicine only rhino horn has been valued for centuries as a medicine used to reduce fevers, calm convulsions, stop nosebleeds, and prevent strokes. Research has demonstrated that using powdered rhino horn is ineffective as a sexual stimulant, and to date there is no conclusive research to demonstrate that the horn has any value when used by traditional herbalists to treat particular life-threatening fevers. After a series of controlled tests, the Swiss pharmaceutical firm Hoffman-La Roche declared that rhino horn has no effect whatsoever on the human body. Scientists in Hong Kong, however, found that rhino horn did have a cooling effect on fever in laboratory rats, but only when used in large doses; humans were not used in the study. Western and TCM practitioners tend to focus on the research results that are supported by their world views; TCM relies upon thousands of years of tradition, whereas Western medicine, for the most part, is a function of replicable scientific research.

At one time, there may have been as many as one hundred thousand wild tigers in India. Because they are largely secretive animals, one could never see large numbers of tigers at any given time, but their occasional propensity to eat livestock—or, more to the point, people—made humans inescapably aware of their presence. In a densely populated country like India, even if only a small percentage turn to man-eating, one hundred thousand tigers is far too many. "At a conservative estimate tigers have consumed well over half a million Indians in the past four centuries," comments James Clarke in *Man Is the Prey*. "In the whole of Asia the figure for the same period cannot be less than a million. Entire districts have been depopulated and villages abandoned, sometimes for years, because of man-eaters." Because tigers have killed so many people, it is not surprising that people would vengefully kill the tigers. As David Quammen put it simply, "Man-eating is the most fatal of indiscretions, in that it often provokes retaliatory eradication."

The world's tiger populations have not primarily been decimated because of their occasional anthropophagous inclinations, of course. Even if tigers, like rhinos, were no threat to humans, I suspect we would have invented reasons to kill them anyway, because their beauty and power makes them one of the world's most desirable "big game animals." We long to believe that in shooting such an animal, these attributes might pass on to us and that in the act of killing we will have surpassed its power and will reign supreme over the animal kingdom.

Indeed, such was the human compulsion to kill tigers that, as we have seen, India's royalty had tigers driven toward their guns as they perched safely atop elephants, and when their primacy was superseded by British occupying forces, the British did likewise, shooting the tigers not only from elephant-back but also on foot, tracking them through the jungle and shooting them from platforms in trees, luring the tiger with a tethered bait animal. The only trophy more spectacular than the orange and black striped skin, often with the snarling, glassy-eyed head attached, was the entire body of the tiger, rearing in a menacing pose, wild-eyed, teeth bared, and claws unsheathed. Man the hunter was so dominant over nature that he could bring a man-eating tiger that he'd rendered harmless into his own living room.

Around the world, the trade in tiger parts continues and not just for TCM. In June 2002, a Rochester, New York, man named Theodore Musson was arrested for selling a snow leopard blanket and a tiger-skin rug over the Internet. Musson also advertised a clouded leopard rug, a jaguar rug, a cheetah head, and a mounted baby tiger for sale. An undercover agent from the U.S. Fish and Wildlife Service arranged to purchase the snow leopard blanket and the tiger-skin rug for \$25,000, and Musson was arrested for trafficking in the interstate sale of protected wildlife (McGlynn 2003).

In *The Tiger Skin Trail*, a report compiled by the international Environmental Investigation Agency (EIA) in 2004, Debbie Banks and Julian Newman observe that "while great effort has gone into addressing the demand for tiger bone used in traditional medicines, far less attention has been devoted to the international illegal trade in tiger and leopard skins." Because the trade in skins is dishonest and illegal, there are no easily available records, and the evidence consists largely of contraband shipments seized by customs officers. In August 2003, "the seizure that woke up the world to the bone trade" took place in Delhi: 287 kilograms (630 pounds) of tiger bone, eight tiger skins, and forty-three leopard skins. One of the arrested individuals confessed that the shipment was to be smuggled into China via Ladakh in northern India.

The beautifully marked tiger and leopard skins are made into coats and rugs. In October 2003, the magnitude of the skin trade was revealed when a consignment consisting of 31 tiger skins, 581 leopard skins, and 778 otter skins was found in a truck headed for China from Nepal. A Chinese official was quoted as saying that it was the largest such seizure since 1951. "Though the skin trade is poorly understood and the end markets quite diffuse," wrote Banks and Newman, "it is clear that China is the primary destination for tiger and leopard skins from India. Traders in Tibet have told the EIA that they sell tiger and leopard skins to wealthy Chinese and Europeans, while skin is also used locally as trim on traditional costumes." It is painfully obvious that in the minds of hunters operating in the mountainous hinterlands of the Himalayas, the money that can be earned by poaching and selling endangered cat products far surpasses any puny conservationist ethic.

Thousands of miles from the Himalayas, Australia's not-insignificant population of southern Asian immigrants has made the land down under a mecca for distributors of traditional Chinese medicaments. Since 1999, the Australian government has seized more than twenty-nine thousand illegal imports of TCM products, mostly brought in by travelers for personal use. In August 2004, the customs service announced another seizure of rhino, tiger, and bear products, part of the A\$1.5 billion (US\$1.15 billion) yearly trade in what Aussies call "complementary medicine." The seizures followed raids on five alternative medicine stores in Brisbane, Sydney, and Melbourne where customs officers and federal police also netted boiled-down monkeys, deer musk, and squashed gecko.

As people occupy more and more of the world's wild areas, they must perforce remove the competition, and no animal was ever more accomplished at competing with man for territory than the tiger. If you place tiger food in front of a hungry tiger, chances are the tiger will take advantage of your generosity and eat the food. People who maintain livestock in areas inhabited by tigers find that the tigers occasionally take a cow, a goat, or a buffalo, and because people cannot tolerate wild animals that threaten their livestock, they feel that they must eliminate the carnivores. Think of the near-total elimination of wolves or the destruction of eagle and mountain lion populations in North America, where there is simply no place for large-prey predators near human settlements. Livestock predation is maddening, but the possibility that humans themselves are potential prey will never be tolerated.

But it is not their beauty, their livestock predation, or even their occasional predation on humans that most threatens tigers today. Rather, their biggest threat is our human desire to transfer the essence of the tiger's strength and virility to our own bodies. Until recently there was little evidence that tigers themselves were hunted for food. But even this practice is apparently on the rise. For instance, a 2003 report published by the Wildlife Protection Society of India described an adult male tiger electrocuted in a trap set by villagers on the outskirts of the Bandhavgarh Tiger Reserve, apparently for use as "bushmeat"—wildlife that is caught and consumed by local inhabitants when their other food sources are exhausted. Examination of the trap suggested that it had

been used numerous times in the past, so "bushmeat hunting"—a major problem in central Africa—may have arrived in India as another threat to the tigers. Along with five known instances of tiger electrocution, elephants, rhinos, and leopards have also been killed by poachers in this manner. Further, we learn in *Tiger Skin Trail* (Banks and Newman 2004), a recent report documenting illicit trade in tiger skins, that eating tiger meat is not only for the poor but also for the mainstream and the fashionable: "In late 2003 a series of raids by the Thai Royal Forest Police uncovered a gruesome trade in the meat of captive bred tigers. In one incident in Nonthaburi Province, six live tigers, 22kg of tiger meat and 48kg of tiger bones were recovered from a house along with other specimens of wildlife. Reports suggest that the contraband was destined for restaurants in China, while others suggested the destination was Chinatown in Bangkok." These relatively small-scale trends aside, it is the pharmaceutical demands, tiger essence delivered in the form of pills, tonics, or plasters, that have brought tiger populations to a low from which they may never recover. We are eliminating the tiger in order to manufacture medications of dubious usefulness—even though the pharmacopoeia of Western medicine offers cheaper and readily available substitutes for most of the maladies for which tiger bone is claimed to be useful.

Recent advances in modern medicine might possibly reduce the demand for tiger bone and related substances believed to enhance sexual potency. Viagra is the trade name of a little blue pill used to treat erectile dysfunction in men. Since it first became available in 1998, Viagra (sildenafil citrate) and similar drugs have been recommended by thousands of doctors as therapy for millions of men. Not a hormone or an aphrodisiac, it works by increasing blood flow to the penis. Although the similarity is likely a coincidence, the term *vyaghra* is Sanskrit for "tiger" and thus "Viagra" is a particularly clever name for a medication to cure what is sometimes called "impotence." It can be bought online easily (but not particularly cheaply) and is available in China, South Korea, Taiwan, Singapore, and other countries where tiger bone is the medication of choice for impotence. On the black market, one (genuine) pill can sell for \$36. (In the United States, it costs about \$8 a

tablet.) Compared to the \$350 or more that men will pay for a bowl of tiger penis-bone soup, Viagra is a bargain. Because tiger penis-bone soup works no better than fake Viagra tablets, genuine Viagra (or one or another of its competitors) is not only a bargain, but it might actually achieve the desired results for men and at the same time save the lives of tigers. As always, though, the question remains: will users of traditional Chinese medicine forsake millennia of natural cures for the artificial ones of Western medicine? Viagra was approved for use in China in mid-2000, but within six months, counterfeits of the blue pills were appearing in pharmacies around the country. The state-run *China Daily* reported that police arrested two people for running a factory in Shanghai that produced 455,000 counterfeit Viagra tablets.

As with tiger bone, when the real thing is not available, people go to great lengths to fake it. For example, a "substantial amount" of fake tiger parts was brought into Sarawak, Malaysia, from Bangalore, India, and seized by customs officials (Azlan 2004). The haul consisted of 28 fake tiger skins, 1 fake leopard skin, 6 packets of teeth, 56 pairs of "tiger paws," 1,026 pairs of claws, 30 tails, and 45 organ pieces. The skins were painted sheepskins; the teeth and nails were carved from buffalo horn. Malaysia became a signatory to CITES in 1997, which proscribes penalties for the possession or sale of endangered species, but no penalties could be imposed because the "tiger parts" were not from endangered species at all, but from sheep, cattle, and buffalos.

As the world's wild tiger population continued to fall, there were some strange solutions proposed to rescue some of them. In autumn 2002, the Chinese Forestry Administration and the Save China's Tigers Trust of South Africa reached an agreement to send several Chinese tiger cubs to South Africa in August 2003, "where they will undergo a rewilding programme to be reintroduced into the wild. . . . The Chinese tigers that will successfully regain hunting skills and are able to survive independently in the wild will be returned to a Pilot Reserve in China" (*Cat News*, Autumn 2004). A *Cat News* editorial a year later (Autumn 2003) concluded that several IUCN groups, along with a number of scientists and prominent South African conservationist groups, had many reservations about the plan: "They do not think that it is the most effec-

tive plan for the conservation of the tiger in China. We further submit that the release of free-ranging tigers in South Africa is not in the best interests of biodiversity conservation in South Africa."

In another misguided effort to "rescue" endangered wild tigers, South African filmmaker John Varty and Dave Salmoni, a Canadian zoologist, took two young tigers born in a Cincinnati zoo and brought them to South Africa, with the idea of introducing them into the "wild." That tigers are not now and never have been in Africa did not deter them; their plan was to teach the pair of tigers—a brother and sister named Ron and Julie—to hunt wild prey in a large fenced enclosure, in preparation for releasing them into a larger enclosure where they would hunt and kill on their own. From 1999 to 2002, John filmed Dave's efforts on behalf of "tiger conservation," but the whole enterprise looked like nothing more than a stunt. The full-page ad announcing this Discovery Channel special on September 14, 2003, blared, "Stalked to the Edge of Extinction. There's One Last Hope." Tigers are indeed scarce in India—the current best guess is that there are 3,500—but introducing zoo-raised tigers that have been trained to hunt wildebeest in Africa will do nothing for the depleted Indian tiger population.

To its credit, the Discovery Channel asked various tiger experts, including Dr. John Seidensticker, a senior scientist at the Smithsonian's National Zoological Park, to comment on the program. The responses were posted on the Discovery Channel's Web site. Seidensticker succinctly summed up his opposition to the project: "I've heard many justifications for this project. . . . but the conservation community is pretty much opposed to it. . . . Our definition of conservation is securing a place for wild tigers where they live, not a place in Texas or South Africa. There are a lot of people who spent their lives, sometimes at great risk to themselves, to work on tiger conservation. It's going to be a story, this whole thing, about how *not* to do conservation."

"The tiger," wrote IUCN cat specialist Peter Jackson in 1997, "has always been regarded by humans with awe. Admiration for its beauty has been combined with underlying fear of its massive power." Some perversion of this attitude has led to the bizarre idea of keeping these giant, dangerous animals as pets. Celebrities Michael Jackson and Mike Tyson

each have one; Siegfried and Roy have an actful in Las Vegas; Internet and specialty trade magazines advertise exotic-animal auctions and "jungle-cat reduction sales." The prices are not particularly prohibitive: \$500 for a tiger cub; \$5,000 for a pair of Bengal tigers; up to \$15,000 for a more fashionable white tiger. Tigers, which adapt well to captivity, are also well represented in zoos because they are among nature's most glorious creatures and people like to look at them. Today in Texas there are said to be four thousand pet tigers, more perhaps than the number that roam free in India, and because captive tigers are just as fertile as domestic cats, the numbers are likely to grow. There are said to be four hundred to five hundred lions and tigers in the Houston area alone (Handwerk 2003).

On October 3, 2003, one of the white tigers used in the Las Vegas act of Siegfried and Roy attacked Roy by grabbing his arm, and when the tiger wouldn't release him, Roy hit him on the head with the microphone. This evidently angered the tiger to the point where it bit Roy on the neck and nearly killed him, picking him up and dragging him off, just as it would do with a prey animal. On October 30, 2003, Roy was taken off the critical list in a Las Vegas hospital; the tiger was in isolation, and Siegfried and Roy's shows were cancelled indefinitely. The following day, there was another story about a tiger, this one that lived in a New York City apartment. It seems that Mr. Antoine Yates had a 400-pound tiger named "Ming" in his fifth-floor apartment in Harlem, and some of the neighbors were complaining about the smell. Ming apparently had become dangerous, even to Yates, and he moved into an adjacent apartment and fed the tiger by throwing raw chickens through the narrowly opened door (Polgreen and George 2003). The police went to Yates's apartment, drilled a small hole through the door, and were more than a little surprised at the sight of a full-grown tiger crouching inside. The tiger was shot through the window with a tranquilizing dart and removed from the apartment.

The attack on Roy, coming as it did almost simultaneously with the discovery of Yates's home-raised tiger, suddenly raised America's consciousness about tigers, at least for the moment. New York tabloids splashed dramatic photographs on their front pages (remember, tigers



Tigers are the most popular animals in the world, but sometimes things go wrong. In October 2003 in Las Vegas, one of Siegfried and Roy's white tigers attacked Roy and nearly killed him.

sell), and almost everybody had something to say about tigers in show business, tigers in the home, and even tigers in the wild. Two weeks after the tiger news broke, novelist Charles Siebert wrote this in the *New York Times Magazine*:

"We can judge the heart of man," wrote Immanuel Kant, "by his treatment of animals." It may be, in the end, fear above all other emotions that moves us to want to kidnap them and keep them close by, living emissaries of a primal world and self that we've long left behind. They are, in a sense, all that we have left of that world, just as we are becoming their only keepers in this one.

Rhinos don't make very good pets, nor are they particularly dangerous, so we must look elsewhere for the reason for their impending extinction:

in nearly all cases, they are killed solely for their horns, a staple of TCM. In the not-so-distant past, people like Ernest Hemingway hunted them for the thrill of shooting a very large animal with a very powerful gun from a very great distance. Their taxidermied heads were hung on the wall and their feet were turned into umbrella stands, but overall demand for such trophies was modest. In reality, the majority of rhinos dying at the hand of *Homo sapiens* during the past century were killed to meet medicinal demand for their horns, with a substantial number being killed for jambiya handles. The three Asian rhino species—Indian, Javan, and Sumatran—were the first to go, hunted almost to extinction, but the horn of the African black rhino, highly prized for carving dagger handles, is also actively sought. The seemingly innocuous pursuit of carving dagger handles has brought the black rhino to such low levels that its very existence is threatened. A century ago, there were an estimated 1 million black rhinos in Africa. There are now perhaps 3,600, and the numbers are falling. White rhinos, Africa's other representative of the nose-horned ones, have also been hunted for medicine and jambiyas, but, more tractable than their somewhat smaller "black" cousins, they have been successfully transplanted to reserves where they may survive unmolested.

Unlike tiger bone or rhino horn, bear bile can be legally prescribed in many countries, and, despite the CITES listing of the moon bear as an endangered species, bear products from gall bladders to paws still appear in pharmacies and on menus. It now appears that Chinese practitioners were not altogether wrong about the usefulness of bile acid and even underestimated the variety of conditions it could treat.

With his colleagues at the University of Minnesota's departments of medicine and neurosurgery, Clifford Steer has discovered that bile acid (ursodeoxycholic acid) can reduce brain damage by more than 50 percent in stroke-impaired laboratory rats, for instance (Rodrigues et al. 2002). Steer discovered that bile acid is a potent antiapoptotic agent (apoptosis is the death of cells). Specifically, ursodeoxycholic acid (from *urso* = "bear") has been used as a therapeutic agent to treat models of Huntington's disease, head trauma, and acute stroke, as well as Parkinson's disease (Keene et al. 2002). One common characteristic of these disorders as well as some others is the role that apoptosis plays, as found on Steer's University of Minnesota faculty Web page:

Bile acid has been determined as a potent antiapoptotic agent, significantly improving neurologic status in these models. In the basic science studies, the lab has delineated the molecular mechanism by which ursodeoxycholic acid acts to preserve cell survival and cell function. As a therapeutic agent, ursodeoxycholic acid is unique in that it is a natural bile acid with no significant toxicity, crosses the blood-brain barrier, and can be delivered easily to patients. There are, in fact, many disease states that could potentially benefit, including myocardial infarction, autoimmune diseases, and the many acute and chronic neurodegenerative disorders for which there is little available treatment.

After a stroke had been mechanically induced in rats, researchers injected some of the rats with ursodeoxycholic acid and some with a neutral substance. When the rats were tested two days later, those that had been injected with ursodeoxycholic acid were found to have suffered considerably less neurological damage than those in the control group. In human stroke, a 50 percent destruction of brain cells almost completely disables the victim, and "a 10–20 percent reduction in damage could be the difference between a patient walking out of the hospital or being pushed out in a wheelchair," Steer said in a March 2002 interview with the *St. Paul Pioneer Press*, a Minnesota newspaper (Majeski 2002). For his research, Steer orders ursodeoxycholic acid from American chemical supply houses. When he queried several of the commercial vendors as to where they had obtained the substance, he was told that the information regarding sources is proprietary. When I spoke to Steer in February of 2004, I asked if it was possible that the American chemical supply houses were getting bear bile from Chinese or other Asian bear farms. He said he didn't know and they wouldn't tell him. But in a 2005 article in *Wildlife Tracks*, the newsletter of the Humane Society of the United States, Adam Roberts, Executive Director of the Animal Welfare Institute, noted that a sting operation in Virginia had "uncovered evidence that whole bears, bear gallbladders, bear paws, and other bear parts originating in Virginia are being trafficked to Washington, D.C., North Carolina, New Jersey, New York, and California, as

well as overseas." He concluded that "on the black market, bear parts, particularly the gallbladder and bile, literally are worth their weight in gold, and can fetch more than gems or drugs. The illicit international trade in bear parts not only puts endangered Asiatic bear species in further danger, but it has put a price on the head of every black bear in America."

It is possible, then, that while a program is under way to protect and free the bears on Chinese farms, the gall bladders are becoming even more valuable because of the recent discovery that bear bile, which is substantially richer in ursodeoxycholic acid than cow or pig bile, does actually work to ameliorate some diseases in humans. (Steer's work has so far been conducted mostly on laboratory rats and mice, but he indicated that human clinical trials are scheduled to begin in mid-2005 for certain neurodegenerative diseases.) It is conceivable, therefore, that even as synthetic bear bile is being developed, bears will continue to be killed for their gall bladders by unscrupulous collectors.

Too many animals, from sea horses to rhinoceroses, are endangered by the demands of traditional Chinese medicine. Of course, TCM is not the only factor in the endangerment of these animals, but it plays an enormous part. If present trends continue, tigers and rhinos will become extinct in the wild, perhaps in our lifetime and almost certainly in the lifetime of our children's children. Our offspring will know what a tiger is—we live in an age of eternally preserved and eternally available video images—and captive tigers in homes, cages, zoos, and circuses will ensure that these powerful cats will not disappear entirely, like the dodo or the passenger pigeon. For the time being, it is enough to know that the tiger still prowls the dark jungles of Asia and the darker jungles of our consciousness. But when the last wild tiger is gone, a bit of every one of us will go with it not because it is big, beautiful, or dangerous, but because it awakens in us the sense of what it means to be a human being, alive in the world at this time. Invoking the sort of mysticism that does not involve the death of animals, but rather its opposite, author Henry Beston wrote, "We need another and a wiser and perhaps a more mystical concept of animals. Remote from universal nature, and living by complicated artifice, man in civilization surveys the creature through

Tiger Bone & Rhino Horn

the glass of his knowledge and sees thereby a feather magnified and the whole image in distortion."

Surely the most distorted image we can conjure is that animals were put here for our use. Domestication for food is easy to rationalize—it will be a long time before people stop eating cows, pigs, or chickens (not to mention dogs, banded civets, pangolins, or snakes)—and the use of oxen, camels, and water buffalos as beasts of burden is not likely to cease until third-world agriculturalists obtain inexpensive engines. Because we shared our early caves and campfires with proto-dogs, we will probably continue to do so. But enlightened humans (*Homo sapiens*, remember)—even those who have used animal parts for medicine for thousands of years—should recognize that the animals that provide these pharmaceuticals, whether sometimes useful or not, are becoming extinct. This equation is painfully obvious: No more tigers or rhinos means no more tiger bone or rhino horn. It is critically important to develop substitutes for animal substances and just as important to develop a heightened awareness of the precarious status of some of the hunted animals. Beston's quote concludes thus: "For the animal shall not be measured by man. In a world older and more complex than ours they move finished and complete, gifted with extensions of the senses we have lost or never attained, living by voices we shall never hear. They are not brethren, they are not underlings; they are other nations, caught with ourselves in the net of life and time, fellow prisoners of the splendour and travail of the earth."



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