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KILLED FOR A CURE:

A REVIEW OF THE WORLDWIDE TRADE IN TIGER BONE

JUDY A. MILLS and PETER JACKSON

A TRAFFIC NETWORK REPORT

TRAFFIC
INTERNATIONAL

SPECIES SURVIVAL COMMISSION

This report was published with the kind support of

WWF

IUCN0007

Published by TRAFFIC International,
Cambridge, United Kingdom.

With financial support from WWF UK
(World Wide Fund For Nature).

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The *Species in Danger* series is edited by Julie Gray, TRAFFIC International.

ISBN 1 85850 049 4

Front cover photograph: Bengal Tiger
Panthera tigris tigris.

Photo credit: WWF/Martin Harvey.

Printed on recycled paper.

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A REVIEW OF THE WORLDWIDE TRADE IN TIGER BONE

Judy A. Mills and Peter Jackson[1]

CONTENTS

ACKNOWLEDGEMENTS

The authors wish to thank members of the TRAFFIC Network, the IUCN/SSC Cat Specialist Group, WWF and the World Conservation Monitoring Centre, who provided information for this review. The staff of TRAFFIC India, TRAFFIC Japan, TRAFFIC Taipei and TRAFFIC International deserve special thanks for their exceptional efforts to help gather and interpret data. The authors also wish to express their gratitude to the various government officials who assisted, especially those in China, Hong Kong and South Korea. Much is owed to the reviewers, Mr Steven Broad, Dr Joshua Ginsberg, Mr Lu Dau-Jye and Mr Tom Milliken, whose prompt and attentive consideration made this a more substantive document.

INTRODUCTION

As recently as 1900, eight subspecies of the Tiger *Panthera tigris* were found from the Caspian Sea to Bali. Today, the Bali Tiger *P.t. balica* and Caspian Tiger *P.t. virgata* are extinct, while the Javan Tiger *P.t. sondaica* is classified as probably extinct. Three of the five remaining Tiger subspecies (the Bengal *P.t. tigris*, Indo-Chinese *P.t. corbetti*, Siberian *P.t. altaica*, South China *P.t. amoyensis*, and Sumatran *P.t. sumatrae* Tigers) are threatened with extinction in the wild, while the species as a whole is in danger in the long term. In biological terms, Tiger populations have been fragmented into genetically isolated "islands", many of which are vulnerable to poachers, disease and inbreeding. Only one remaining Tiger population of the Bengal subspecies, in the Sundarbans of India and Bangladesh, is thought to be of adequate size, demographic composition and genetic diversity to be robust (Jackson, 1990; Anon., 1993).

The most serious threat presently to Tigers' survival is the use of their bones in Oriental medicine. This fact came as a surprise to many wildlife biologists, who had previously considered habitat loss as the chief factor limiting the long-term survival of Tiger populations (S.D. Roy, *in litt.*, 23 September 1993; C. McDougal, *in litt.*, 21 October 1993). In fact, it was not until the late 1980s that many Tiger experts became alarmed at the threat posed by the Asian medicinal use of Tiger products (S.D. Roy, *in litt.*, 23 September 1993). It now appears as though prime Tiger habitat may remain (in the Russian Far East, for example) long after the last Tiger has been poached to supply the bone trade.

However, the commercial demand for Tiger-bone medicine is far from a new phenomenon: Asians have been using it for more than 1000 years. The first published reference in China to Tiger bone as medicine appeared in 500 AD, in a text entitled *Collection of Commentaries on the Classic of the Materia Medica* (Bensky and Gamble, 1993). Since that time, the practice of Chinese medicine — and hence the use of Tiger bone as a medicine — has spread from China to Korea, Japan and throughout the world, wherever there are Asian populations (Pang, 1984; Hong, 1989; Pan, 1990).

In recent times, a combination of factors has contributed to accelerated consumption of Tigers for their alleged medicinal properties. As wild Tiger populations have declined owing to trophy hunting, pest control and habitat loss, human populations in East Asia have increased dramatically while their per capita expendable income has risen at record rates (Jackson, 1990; Anon., 1994a; Anon. 1994b). While the number of wild Tigers remaining is estimated at between 5000 to 7400 (Jackson, 1993), the human population of the People's Republic of China — only one of several key consumer countries for Tiger bone as medicine — is approaching 1.2 billion. At the same time, there has been a resurgence of interest in traditional Asian cures such as Tiger bone, the use of which is seen as a status symbol, as a way to retain old customs in the face of rapid change, and as an alternative to the fallibilities of Western medicine (Ohnuki-Tierney, 1984; Hong, 1989; Jackson, 1993; Mills, 1993a).

In 1987, *Cat News*, the newsletter of the IUCN/SSC Cat Specialist Group, published a report of a letter from Xu Zuben of the Hunan Pharmaceutical Company in China's *People's Daily*, referring to 116 factories producing medicinal liquor in China. If producing at full capacity, Xu wrote, these factories would require more bones than China's entire wild Tiger population could supply. By the Chinese Government's own admission, the 73 captive Tigers at its Tiger breeding centre in Heilongjiang Province outnumber the wild Tigers remaining in China (Liu, 1993). This fact makes a Chinese quest for Tiger bones abroad a logical progression.

Tiger-bone medicines are also manufactured in South Korea (Republic of Korea) (Mills, 1993b) and Japan (A. Kumar, *in litt.*, 2 March 1994), but trade data collected under the auspices of the Convention on

International Trade in Endangered Species of Wild Fauna and Flora (CITES), and South Korea's Customs statistics document that China has been the world's largest exporter of manufactured Tiger-bone derivatives and the second-largest exporter of raw Tiger bone, after Indonesia (Mulliken and Haywood, 1994).

The purpose of this review is to compile in one document what is known of the status of the five remaining wild Tiger subspecies, the global trade in Tiger bone, available information on the uses of Tiger bone as medicine, as well as the volumes and value of international Tiger-bone trade, and to make recommendations for conserving wild Tiger populations in the face of the current commercial demand for their parts. It is hoped that by enhancing awareness of the forces at work in this trade a greater appreciation of the necessary strategies for future Tiger conservation may be gained. Based on the findings of this report, the recommendations of the final chapter, it is hoped, may assist in this respect.

THE STATUS OF THE WORLD'S WILD TIGERS

Seven of the eight Tiger subspecies were classed as threatened by IUCN by 1966, the eighth subspecies, the Bengal Tiger, being similarly categorized in 1972 (Simon, N., 1966; Goodwin and Holloway, 1978). While the decline of the Tiger is not well documented, what is known is that three of the eight subspecies are now extinct. The Bali Tiger became extinct in the 1940s, and the Caspian Tiger is thought to have become extinct in the 1970s. The Javan Tiger is considered to have disappeared during the 1980s but, following persistent reports of Tiger signs, such as pugmarks (footprints) and scratch marks on trees, an intensive effort is being made to establish whether some individuals survive.

Tigers have been extirpated from much of their former range. Where the mountains of the Korean Peninsula once "swarmed with the beasts" (Thapar, 1992), South Korea no longer has wild Tigers and North Korea (the Democratic People's Republic of Korea) has fewer than 10 (Jackson, 1993). Some Chinese officials believe that no Tigers of either the Siberian or South China subspecies remain in China, though a census conducted from 1988 to 1992 found evidence of about 12 Siberian Tigers remaining in China's northeastern Heilongjiang Province (Y. Liu, pers. comm., 1993; Wu, *et al.*, 1994). The latter estimate offers sharp contrast to reports of 60 Tigers being killed in one day in the mountains of Liaotung during 1682 (Read, 1982).

The five remaining Tiger subspecies — the Bengal, Indo-Chinese, Siberian, South China and Sumatran — persist in the wild in 14 range states: Bangladesh, Bhutan, Cambodia, China, India, Indonesia, the Lao PDR (the Lao People's Democratic Republic), Malaysia, Myanmar, Nepal, North Korea, Russia, Thailand and Viet Nam (Table 1).

Table 1

Status of the Tiger *Panthera tigris* species, 1994

Tiger sub-species	Minimum	Maximum	Authority
Bengal (Indian) Tiger			
P.t. tigris (total)	3250	4700	
Bangladesh	300	460	Khan/Choudhury, Forest Dept., 1994
Bhutan	50	240	Forest Dept./WWF report, 1993; Dorji, 1994
India	2750	3750	Project Tiger/IN experts, 1994
Nepal	150	250	Wildlife Dept./IUCN report, 1993
Caspian (Hyrcanian/Turan) Tiger			
P.t. virgata (total)	extinct in 1970s		
Formerly Afghanistan, Iran, Chinese and Russian Turkestan, Turkey			
Siberian (Amur/Ussuri/ North-east China/ Manchurian Tiger)			
P.t. altaica (total)	150	200	
China	species present		Tan, 1992
North Korea	<10	<10	Pak U Il, 1994
Russia	150	200	Amirkhanov, 1994
Javan Tiger			
P.t. sondaica (total)	extinct in 1980s?		reports of signs being checked
Indonesia			
South China (Amoy) Tiger			
P.t. amoyensis (total)			
China	30	80	Tan/Lu/Shen, 1986
Bali Tiger			
P.t. balica (total)	extinct in 1940s		
Sumatran Tiger			
P.t. sumatrae (total)	600	650	Tilson, 1993
Indonesia			
Indo-chinese Tiger			
P.t. corbetti (total)	1050	1750	
Cambodia	100	200	Chhim Somean, 1994
Lao PDR	species present		Salter, 1993
Malaysia	600	650	Elugapillai, 1994
Myanmar	species present		Forest Dept., 1993
Thailand	150	600	Rabinowitz, 1993 Schwann, 1994
Viet Nam	200	300	Nguyen, 1994
Species totals	**5080**	**7380**	
Rounded totals	**5000**	**7400**	

Notes: Estimates for *P.t. corbetti* in Myanmar also include *P.t. tigris*. Estimates for 1993 combined with those given at the Global Tiger Forum, New Delhi, 1994.

Source: Jackson, P. 1993.

Establishing the exact number of Tigers in the wild is impossible, especially given their secretive nature and their forest habitats, which range over large tracts of rugged terrain. India and Malaysia are the only range states to have attempted to establish a reasonably exact population count by means of a series of censuses.

The first pugmark census in India took place in 1971. Though officially acknowledged as biased by incomplete and double counting, the census produced a baseline population estimate of 1800 Tigers. In the same year, alarm over an obvious decline in numbers of Bengal Tigers, resulting from hunting for sport and skins, led WWF to launch Operation Tiger, from which was raised US$1 million to support Tiger conservation in India and another US$800 000 for Tiger conservation in Indonesia, Nepal and Thailand. In 1973, the Government of India initiated a comprehensive Tiger conservation programme called Project Tiger, which placed the Tiger in India under total protection and set aside tracts of habitat as reserves to be managed primarily for Tigers. By 1989, official figures suggested that the Indian Tiger population had increased to 4334 animals, but Indian Tiger experts now feel that the latter number was exaggerated. Results from an all-India census in 1993 yielded a population total of 3750 Tigers (V. Thapar, pers. comm., 1994). An analysis of the 1993 Tiger census, combined with records of seizures of various Tiger parts, suggests a loss of at least 500 to 600 Tigers in India since 1989 (V. Thapar, pers. comm., 1994).

Malaysia's census was based on surveys, sightings and confirmed reports and is regarded as no more than an estimate (Elagupillay, 1994).

Elsewhere, estimates of Tiger populations have been derived by extrapolating population density from the amount of known Tiger range. Other estimates are based on anecdotal reports by forest guards and local people. All estimates show that more than half of the world's Tigers live in India, which is also home to the last contiguous wild Tiger population of at least 500 (Anon., 1993). The result is an overall estimate for the total world population of wild Tigers, ranging from a low of 5000 to a maximum of 7400.

There is little doubt that Tiger numbers have declined in the past 50 years, but the lack of trustworthy population estimates precludes any calculation of the rate of decline.

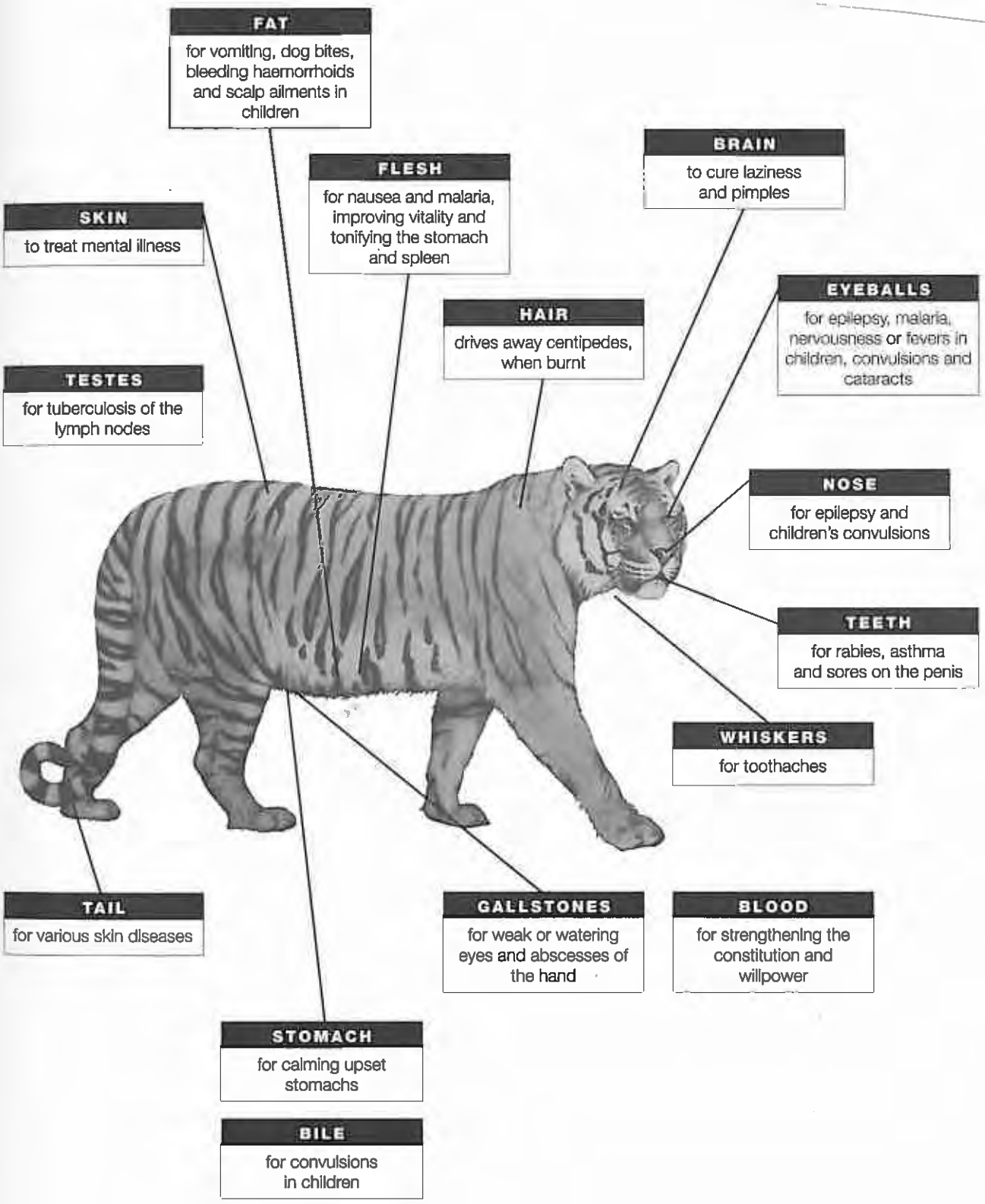
THE HISTORY OF TIGERS IN MEDICINE

Chinese, Koreans and Japanese 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 (Nadkarni, 1993). In the Lao PDR, Tiger claws are used as a sedative, Tiger teeth for fever and Tiger nose leather for dog bites (Martin, 1992a). Tiger bone is used in Viet Nam to make a balm, which is said to help assorted ailments, including rheumatism and general weakness (S. Nash, *in litt.*, 15 February 1994). However, it is the demand for medicines derived from the ancient Chinese traditions which drives today's commercial market for Tiger bones and other Tiger parts.

Nearly every "part" of a Tiger, including its faeces (for boils and piles), has a prescribed benefit according to the tenets of Chinese medicine and/or folklore (Figure 1).

Figure 1

Parts of a Tiger used in Chinese medicine and home remedies



The milk and vagina of female Tigers, the penis of male Tigers and the claws of both sexes are also used as Asian home remedies. Bones found in Tiger faeces are said to soothe burns, cure tetanus and treat alcoholism (Thapar, 1992).

Among all the parts of a Tiger used for medicine, the bones are the most valued. And among all the bones in a Tiger's skeleton, none is so coveted as the humerus, which is the upper bone of the front legs. In Taiwan, the humerus is said to contain the strongest healing powers (Nowell, 1993). It is also the only bone in a Tiger's skeleton that can be readily identified as being from the cat family because of a hole — which the Chinese call the "phoenix eye" — at the distal end (Zhang, 1988a). However, only a skilled scientist can distinguish a Tiger humerus from that of another large cat and it may be impossible even then to differentiate between that of a Tiger and a Lion *Panthera leo* (British Natural History Museum staff, pers. comm., 1993). Apart from the humerus, Tiger bones are remarkably similar in appearance to bones of other mammals of similar size (Figure 2). As a consequence, counterfeit Tiger bones often come from bears, wild boars, Lynxes, Lions and even domestic cattle (Zhang, 1988a).

Figure 2

Tiger humerus alongside bear humerus

© Allan / TRAFFIC

Tiger bone is known in the Oriental-medicine and pharmaceutical industry by the name *Os tigris*. It is called *hu gu* in Mandarin Chinese, *hogul* in Korean and *kokotsu* in Japanese (Bensky and Gamble, 1993). Tiger bone is said to have — in the clinical terms of Chinese medicine — a "warm" effect (Zhang, 1988a), which eases "cold" conditions such as body pain (Reid, 1993). The "cold" condition for which Tiger bone is most often prescribed is rheumatism (Bensky and Gamble, 1993; H.G. Cho, pers. comm., 1993; Zhang, 1988a). Other indications include weakness, stiffness or paralysis of muscles and bones, especially in the lower back and legs (Bensky and Gamble, 1993; Zhang, 1988a).

For preparation as medicine, Tiger bone is usually cleaned of any flesh and toasted in oil or vinegar before use. It is ground into powder before being made into pills, plasters and decoctions containing other herbs, or cut into short segments and soaked in wine (Bensky and Gamble, 1993). Tiger-bone plaster, made with musk and often camphor or menthol, is recommended for rheumatism and lower back pain. Plasters are

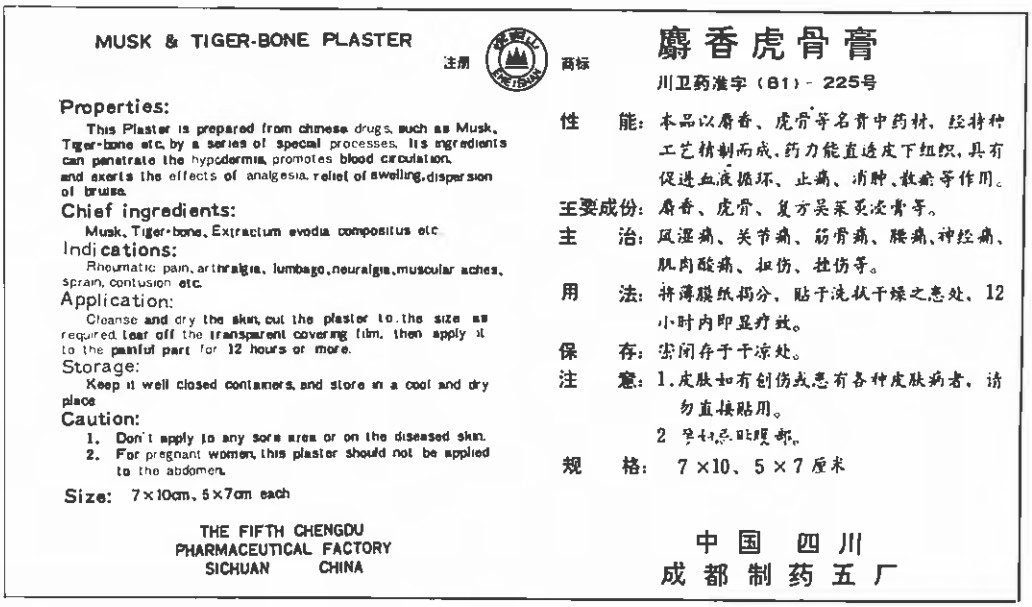
generally made by mixing ground ingredients into a soapy substance which is then spread on a piece of cloth and placed on the skin. This method of application is especially popular for treating rheumatic pain (Zhang, 1988c). Tiger bones used to make wine can be used repeatedly (C.L. Chen, pers. comm., 1993). The ingestion of 10ml of wine twice daily is said to relieve "wind" ailments, for example, headaches, and "cold" ailments, such as rheumatism. It also stimulates the flow of blood and *qi*, the latter meaning life force in Mandarin (Zhang, 1988b; Reid, 1993). Tiger-bone balm, popular in Southeast Asia, is a brown paste made by cooking bones for several days, to treat bone ailments such as rheumatism (S. Nash, *in litt.*, 15 February 1994).

The active ingredients in Tiger bone, according to Chinese texts, are calcium and protein. Clinical research has shown that Tiger bone produces an anti-inflammatory effect in animals with induced arthritis, an analgesic effect in rats, and a calming effect in mice (Bensky and Gamble, 1993). Research is currently underway at The Chinese University of Hong Kong to further document any medical efficacy unique to Tiger bone as compared to the bones of other mammals (P. But, pers. comm., 1994). Meanwhile, specialists in Chinese medicine recommend Leopard *Panthera pardus* bones as legitimate and effective substitutes for those of Tigers, with the caveat that they are not as strong in medicinal properties as Tiger bones. Dog bones may also be substituted, though they can be excessive in their desired effect (Bensky and Gamble, 1993). Chinese researchers have recently begun promoting pika (a burrowing lagomorph of the family Ochotonidae) bones as another effective substitute for Tiger bones (W. Sung, pers. comm., 1993).

The standard dosage for Tiger bone taken orally to treat rheumatic pain is three to six grams per day (Bensky and Gamble, 1993; Zhang, 1988a). At this rate, a daily user of Tiger bone would consume between one and two kilogrammes of bone per year. Extrapolated further, the world's last remaining wild Tigers would provide, at most, a year's supply of medicine to 125 800 daily users, equivalent to far less than even one percent of China's present human population.

Figure 3

Tiger medicine labels



MUSK & TIGER-BONE PLASTER

注册 商标

麝香虎骨膏

川卫药准字（81）- 225号

Properties:

This Plaster is prepared from chinese drugs, such as Musk, Tiger-bone etc, by a series of special processes. Its ingredients can penetrate the hypodermis, promotes blood circulation, and exerts the effects of analgesia, relief of swelling, dispersion of bruise.

Chief ingredients:

Musk, Tiger-bone, Extractum evodia compositus etc.

Indications:

Rheumatic pain, arthralgia, lumbago, neuralgia, muscular aches, sprain, contusion etc.

Application:

Cleanse and dry the skin, cut the plaster to the size as required, tear off the transparent covering film, then apply it to the painful part for 12 hours or more.

Storage:

Keep it well closed containers, and store in a cool and dry place.

Caution:

1. Don't apply to any sore area or on the diseased skin.
2. For pregnant women, this plaster should not be applied to the abdomen.

Size: 7×10cm, 5×7cm each

THE FIFTH CHENGDU PHARMACEUTICAL FACTORY SICHUAN CHINA

性　能：本品以麝香、虎骨等名贵中药材，经特种工艺精制而成，药力能直透皮下组织，具有促进血液循环、止痛、消肿、散瘀等作用。

主要成份：麝香、虎骨、复方吴茱萸浸膏等。

主　治：风湿痛、关节痛、筋骨痛、腰痛、神经痛、肌肉酸痛、扭伤、挫伤等。

用　法：将薄膜纸揭分，贴于洗抹干燥之患处，12小时内即显疗效。

保　存：密闭存于干凉处。

注　意：1.皮肤如有创伤或患有各种皮肤病者，请勿直接贴用。

2 孕妇忌贴腹部。

规　格：7×10、5×7厘米

中国 四川
成都制药五厂

虎骨酒

注册 同仁堂 商标

HU KU CHIEW

(TIGER'S BONE TINCTURE)

功效：舒通血脉、止痛。

主治：风寒湿痹，四肢拘挛。半身动作不灵，腰腿疼痛年老体虚，关节疼痛 行步艰难、跌打损伤 淤血作痛。

服法：日服二次，每服三钱。（10cc 相当于二茶匙）

禁忌：孕妇忌服。

注意：切勿兑入其它酒类。不可就菜果饮用。

中国 北京

北京同仁堂

Actions: Stimulating blood circulation quenching pain

Indications: Rheumatism, muscular spasm, hemiplegia, lumbago aching legs general weaknessin the ageal, arthralgia, locomoter troubles, injuries, local accumulation of blood with pain

Dosage: To be taken twice daily 10c c (equalto 2 tea-spoonfuls each time

Caution: Not to be taken by pregnant women

Notice: No other wines are to be added and avoid fruit and dishes whep drinking.

BEIJING TUNG JEN TANG
BEIJING CHINA

京卫药准字(80)第1056号

SOURCES OF TIGER-BONE TRADE DATA

Information for this review has been gathered from the TRAFFIC Network, members of the IUCN/SSC Cat Specialist Group, WWF — the World Wide Fund for Nature, the World Conservation Monitoring Centre, CITES Management Authorities and Customs administrations worldwide. Unfortunately, many Tiger range states and consuming countries do not keep records of international transactions in Tiger bone *per se*. In some cases, such as Hong Kong, imports of Tiger bone are recorded together with imports of other animal bones (Anon., 1992), while in Cambodia, records of wildlife trade were destroyed during the reign of the Khmer Rouge (S. Nash, *in litt.*, 15 February 1994). The most complete set of trade statistics comes from South Korea, where the importation and exportation of Tiger bone was legal until CITES came into force there in October 1993, and where domestic trade in Tiger-bone derivatives will continue to be legal until March 1995 (D.G. Rhee, *in litt.*, 31 May 1994).

REPORTED TIGER-BONE TRADE

Limitations of available data

The data included in this review come mostly from CITES annual reports and Customs statistics and, therefore, have significant limitations (Mulliken and Haywood, 1994; J. Xu, *in litt.*, 25 February 1994; Y.Q. Chen, pers. comm., 1993; P.M. Chan, pers. comm., 1994), which include the following:

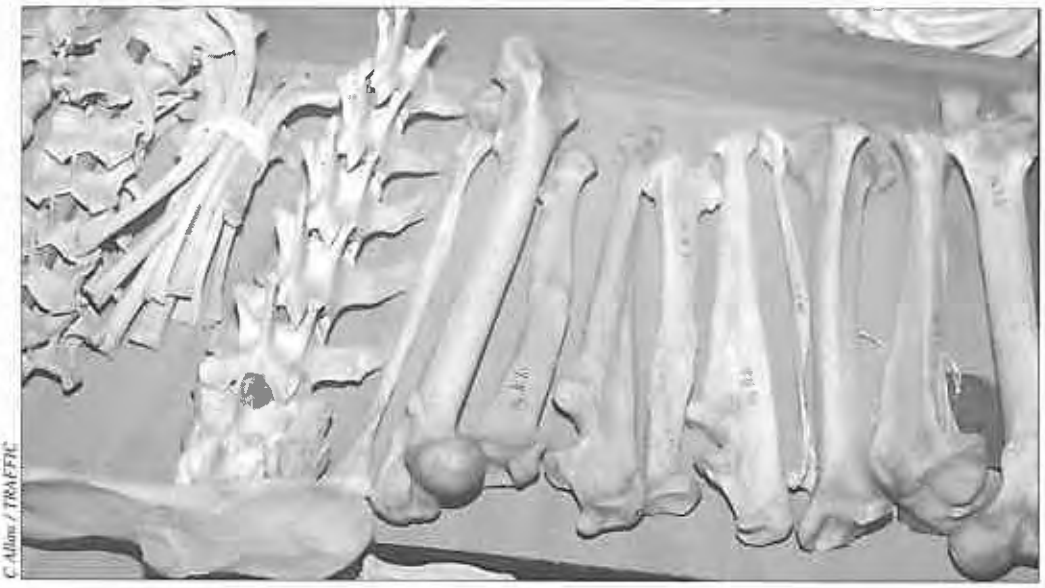
- Some CITES Parties have a policy of not reporting trade in Tiger bone and Tiger-bone derivatives either because they are not readily recognizable as such, or because they are assumed to be counterfeit;
- Some CITES Parties report only trade for which permits were issued, omitting seizures of smuggled goods;
- CITES Parties reporting trade in Tiger bone and Tiger-bone derivatives, both legal and illegal, often do so in varying forms and units of measure, once again confounding the quantification of the amount of Tiger bone in trade;
- Countries of export are often either missing from CITES reports and Customs statistics or are in fact transshipment points, making the range states of origin impossible to determine;
- Some CITES Parties file incomplete annual reports or file them only intermittently;
- Not all Tiger range states nor all major consumer countries are CITES Parties;
- Some goods that claim to contain Tiger bone do not, making impossible the quantification of the actual amount of Tiger bone in trade;
- Some countries' Customs statistics do not include a separate and distinct category for Tiger bone;
- Import tariffs may vary from year to year and country to country. When tariffs are high, there exists an incentive to underdeclare imports, a practice which would distort the calculation of true amounts and values of imports;
- The international trade in Tiger bone is illegal, with extremely few exceptions, in range states as well as key consuming countries, making smuggling an important means of conveyance, and one which, by definition, goes unreported.

In summary, many, if not most aspects of the global trade in Tiger bone and Tiger-bone derivatives remain undocumented. Therefore, this review provides an indicative rather than definitive representation of the worldwide trade in Tiger bone.

Country reports

Range states

In general, information about the export of Tiger bone from the 14 Tiger range states is poor and, in many cases, non-existent. It should be stated that, generally speaking, Tiger range states are not wealthy in terms of per capita GNP nor in resources to police wildlife poaching and smuggling. These factors, combined with the relatively high price paid for Tiger bone as compared to per capita income for these countries, provide fertile ground for growth of a mostly undocumented black market. In fact, reports from seven range states[2] show that the sale of one Tiger skeleton[3] can yield profits equivalent to more than 10 years' salary (see Table 2). As a consequence, poachers are using guns, poisoned livestock carcasses, nets, snares and traps of myriad sorts to kill Tigers.



C. Allan / TRAFFIC

Dismantled Tiger skeleton.

Table 2

Prices paid for Tiger bone to poachers and middlemen in range states

Country	US$/kg	US$/skeleton	Per capita (average) GNP*
Cambodia	100	1700	200
China	31-126	527-2142	435
India	15-200	255-3400	310
Lao PDR	12-76	204-1292	230
Nepal	100-130	1700-2210	180
Russia	20-300	340-5100	2100
Viet Nam	100-375	1700-6375	220

* Per capita GNP from *Asiaweek*, 22 June 1994.

Sources: Anon., 1994f; Anon., 1994i; S.D. Roy *in litt.*, 23 September 1993; Martin, 1992a; C. McDougal *in litt.*, 21 October 1993; Martin, 1992b; Anon., 1994g; S. Nash *in litt.*, 15 February 1994.

It should be noted that range states are defined here as being primarily exporters of Tiger bones and Tiger-bone medicines, though some are also importers and have a domestic market for Tiger-bone and its derivatives. China, in particular, plays this multiple role as exporter, importer and consumer.

Bangladesh: Tiger population: 300-460

CITES entered into force in Bangladesh in 1982, and Bangladesh filed annual reports with CITES from 1982 to 1988, in which no trade in Tiger bone or Tiger-bone derivatives was reported. While Bangladesh shares with India what is possibly the last contiguous Tiger population of more than 500 animals, it does not appear as an exporter or importer of Tiger products in any known trade records.

Bhutan: Tiger population: 50-240

Bhutan is not a CITES Party, and the annual reports of CITES Parties do not cite Bhutan as a source, nor as a destination for Tiger bone.

The frequency of Tiger sightings in the forests of Bhutan increased between 1988 and 1993, though the 1993 data have not been verified and confirmed by Government wildlife officials. Bhutanese officials admit that the true status of their Tiger populations is difficult to assess (Dorji and Wangchuk, 1994).

South Korean Customs data document 30kg of Tiger bone imported from Bhutan in 1974 (Table 3), but no other country's records of international trade in Tiger bone mention Bhutan.

Table 3

Tiger bone imports into South Korea, 1970-1993, by weight, and value (US$)

Year	Hong Kong	S'pore	Thailand	USA	Indonesia	India	Bhutan	Japan	Malaysia	Taiwan	Madagascar	China	Others	Total
1970	100kg													100kg
	$1900	$500	$800											
1971		66kg	100kg											166kg
		$5189	$2000											
1972		120kg	60kg	20kg										200kg
		$3413	$1663	$527										
1973					80kg	90kg								170kg
					$2077	$2329								
1974	20kg		70kg		194kg	20kg	30kg							334kg
	$664		$2232		$6030	$622	$924							
1975			40kg		620kg			3kg						663kg
			$1661		$6188			$150						
1976			60kg		131kg									191kg
			$3102		$7707									
1977			74kg		110kg									184kg
			$6643		$11 283									
1978					96kg				30kg					126kg
					$12 458				$4101					
1979			11kg		144kg	70kg			30kg					255kg
			$1701		$17 731	$3875			$4883					
1980			15kg		70kg	33kg								118kg
			$2298		$10 536	$5699								
1981					1060kg	20kg			13kg					1093kg
					$12 513	$3706			$2169					
1982			100kg			15kg								115kg
			$18 000			$3366								

Table 3 continued

Year	Hong Kong	S'pore	Thailand	USA	Indonesia	India	Bhutan	Japan	Malaysia	Taiwan	Madagascar	China	Others	Total
1983					18kg $3019								100kg $13524	118kg
1984								No trade reported						0kg
1985		9kg $2048			41kg $7875									50kg
1986					23kg $3852					100kg $6445			9kg $2384	132kg
1987			7kg $1470		182kg $44 026								7kg $3434	196kg
1988			20kg $1820		560kg $31 584								40kg $14 856	620kg
1989			50kg $9267		190kg $32 165					50kg $6222			50kg $6121	340kg
1990					170kg $21 932						100kg $16 062		400kg $63 607	670kg
1991					250kg $44 349							600kg $96 404		850kg
1992					55kg $13 144				100kg $14 000			252kg $35 801		407kg
1993									320kg $47 000			1563kg $195 667		1883kg
Total kg														**8981**

Source: Customs Administration, South Korea.

Cambodia: Tiger population: 100-200

Cambodia is not a Party to CITES, nor does it appear as an exporter or importer of Tiger bones or medicines in CITES annual reports. Whether Cambodia officially exported or imported Tiger products in the past is impossible to confirm, as relevant state documents were destroyed, but there has been no legal international trade in Tiger derivatives from or to Cambodia in more recent times (Anon., 1994c).

Tiger products were found on sale openly in Phnom Penh and Poipet in early 1994 (Anon., 1994c), Tiger bones being offered for sale at US$100 per kilogramme. Stock turnover was estimated at 10 to 16% per month, leading investigators to estimate annual sales of 100 to 200 Tigers per year (Anon., 1994c), an amount which would account for the entire estimated population of wild Tigers remaining in Cambodia. The main markets for Tigers and their parts were said to be Thailand and Viet Nam.

China: Tiger population: 30-80

CITES entered into force in China in mid-1981. However, prior to 1990, China did not issue CITES import or export permits for Tiger-bone derivatives, based on the premise that most Tiger derivatives were unrecognizable as coming from CITES-listed species (J. Xu, *in litt.*, 25 February 1994). In addition, Chinese officials are aware that not all medicines said to contain Tiger bone necessarily contain the authentic ingredient (J. Xu, *in litt.*, 25 February 1994). However, as a Tiger-conservation initiative, beginning in 1990, China began issuing export permits for any goods purporting to contain Tiger bone, whether or not derivatives were recognizable as being genuine (J. Xu, *in litt.*, 25 February 1994). On 1 December 1992, the Government of China ceased this practice (Mulliken and Haywood, 1994), and thus, China's 1990, 1991 and 1992 CITES annual reports show a sudden flood of exported Tiger derivatives and, moreover, perhaps the only officially documented glimpse of the scope of China's export trade in Tiger derivatives.

CITES data for 1990-1992 show that China exported more than 27 million units of Tiger products to 26 countries/territories (Table 4). These officially exported products consisted of Chinese medicines and Tiger-bone wine, which come in varying units of measure (Table 4) and contain varying amounts of Tiger bone, if any at all, making it impossible to assess how many Tigers may have gone into the production of the more than 27 million items (Mulliken and Haywood, 1994). Of those products which reported an origin, some 460 000 allegedly came from pre-Convention stocks, 865 from captive-bred animals and 6200 from wild Tigers (Mulliken and Haywood, 1994).

Table 4

Destinations reported by China for Tiger products exported, 1990-92

Destination	1990	1991	1992	Total
Australia		50 con.	53 con.	103 con.
Belgium		5 con.	5 con.	10 con.
			250 000 pills	250 000 pills
Bulgaria		5 con.		5 con.
Canada	346 con.	247 con.	600 con.	1193 con.
Cuba		104 cw		104 cw
		6 con.		6 con.
			1440 bot.	1440 bot.
Denmark	1 con.		1 con.	2 con.
France		200 cw		200 cw
	50 con.			50 con.
Ghana			3600 con.	3600 con.
Hong Kong	4198 cw	5373 cw	50 cw	9621 cw
	14 270 con.	6966 con.	157 635 con.	178 871 con.
Indonesia		175 con.	50 con.	225 con.
Italy		40 con.	7 con.	47 con.
Japan		492 cw		492 cw
	7014 kg	40 900 kg	23 100 kg	71 014 kg
	1377 con.	3022 con.	2031 con.	6430 con.
			40 000 bot.	40 000 bot.
	12 000 000 grains		14 400 000 caps	26 400 000 grains/caps
Macau	50 cw	50 cw		100 cw
	814 con.	2351 con.	11 221 con.	14 386 con.
Malaysia	1700 cw	935 cw	370 cw	3005 cw
	556 con.	650 con.	1280 con.	2486 con.
		200 bot.		200 bot.
Mauritius		5 con.	16 con.	21 con.
			5 cw	5 cw
Netherlands			10 cw	10 cw
Panama			1 con.	1 con.
Philippines	80 cw	230 cw		310 cw
	190 con.	244 con.		434 con.
Russia/USSR			15 144 bot.	15 144 bot.
			18 bw	18 bw
Singapore	400 cw	1 110 cw	100 cw	1 610 cw
	21 720 con.	2 078 con.	780 con.	24 578 con.
Sweden		10 con.		10 con.
Taiwan		5 cw		5 cw
		120 con.		120 con.
	360 bot.		24 bot.	384 bot.
Thailand	150 cw	640 cw		790 cw
	500 con.	140 con.	260 con.	900 con.
Togo	100 con.		1200 con.	1300 con.
UAE			1 con.	1 con.
USA		500 cw		500 cw
		12 100 con.	200 con.	12 300 con.
Total units exported	**12 053 876**	**78 953**	**14 909 202**	**27 042 031**

kg = kilogrammes; cw = cartons of wine; con. = containers (boxes, cartons, bags); bot. = bottles; bw = bottles of wine

Source: Mulliken and Haywood, 1994 (from CITES annual reports).

CITES annual report data for 1975 to 1992 also show evidence of the exportation from China of an additional 49 218 units of Tiger medicines (Table 5) and, in addition, 852kg of Tiger bone from China appear in South Korea's 1991 and 1992 Customs records (Table 3). Since 1992, evidence of exports of bone from China has continued to appear in South Korea's data: during the first nine months of 1993, China reportedly exported 1563kg of Tiger bone to South Korea (Tables 3 and 6).

Table 5

Reported imports of Tiger-bone products from China not reported as exports in China's annual reports to CITES, 1986-1992

Year	Quantity	Reporting country	Status
1986	10 derivatives	USA	commercial
1987	2 derivatives	USA	seized
1988	2 derivatives	USA	seized
1989	65 derivatives	USA	?
	36 derivatives	USA	commercial
	30 derivatives	USA	seized
1990	2270g bone carvings	USA	seized
	6000kg derivatives	Japan	commercial
	368kg derivatives	Japan	commercial
	4030 derivatives	USA	seized
	306 derivatives	USA	seized
	20 040 derivatives	Japan	commercial
	6966kg derivatives	Japan	commercial
1991	9033 derivatives	USA	seized
	47 derivatives	USA	seized
	5 derivatives	USA	?
1992	8 derivatives	Luxembourg	seized
Total	**49 218 units**		

Source: CITES annual reports.

Table 6

South Korea's imports of Tiger bone for 1993

Month	From China	value (US$)	From Malaysia	value (US$)
January/February	0		100kg	14 000
May		CITES accession announced		
June	700kg	87 641	200kg	28 000
July	0		20kg	5000
August	0		0	
September	863kg	108 026	0	
October		Prohibition imposed		
Total	**1563kg**	**195 667**	**320kg**	**47 000**

Source: Customs Administration, South Korea.

An analysis of the Bureau of National Medicine's 1985 *Catalogue of Proprietary Chinese Medicines in Mainland China*, which lists 3866 proprietary drugs produced by 528 manufacturers of traditional medicines throughout the country, identified 130 manufacturers (25%) producing 40 different products containing Tiger derivatives (T. Milliken, *in litt.*, 20 July 1994). Laboratory analysis of Chinese-manufactured Tiger-bone derivatives at the National Fish and Wildlife Forensics Laboratory in the USA and visits to medicine manufacturers in China have confirmed that some medicines claimed to include Tiger bone do indeed use it as an ingredient, but tests also showed that others did not contain the genuine ingredient (Gaski and Johnson, 1994; J. Mills, pers. comm., 1993). Whether containing genuine Tiger bone or not, the number of different Chinese-made Tiger medicines on the US market and the amount of these products recorded in international trade data indicate large-scale exports of alleged Tiger-bone derivatives from China — exports which, as noted above, did not appear in China's CITES data until 1990 (Gaski and Johnson, 1994; Mulliken and Haywood, 1994).

In early 1994, China submitted a proposal to the CITES Secretariat to register its one commercial Tiger farms as an official captive-breeding facility under the terms of CITES. (A former proposal had also been submitted, in 1992, and subsequently withdrawn.) The proposal put forward China's plan to breed Siberian Tigers for possible release into the wild at some unspecified time in the future, while in the meantime seeking increased reproductive rates of captive animals. Excess animals would then be culled and sold for their bones and other marketable parts, through a limited legal international trade, thereby financing the farm's operation (Anon., 1994d). The proposal has since been withdrawn, in mid-1994 (J. Howes, *in litt.*, 10 June 1994).

India: Tiger population: 2750-3750

CITES came into force in India in late 1976, since when India has submitted annual reports for every year. While India reported trade to the former USSR of two Tiger bodies in 1988 and a few international transactions involving live Tigers and Tiger skins, Indian exports and imports of Tiger bone do not appear in CITES records from 1975 to 1992. No other records of international trade of Tiger bone are kept by the Indian Government (A. Kumar, pers. comm., 1994).

Apart from those mentioned above as part of whole animals, the only known records[4] of Tiger bones exported from India are found in South Korea's import data, which record 248kg of Tiger bone coming from India, between the years of 1973 and 1982 (Table 3). Apart from 110kg, these reported shipments would appear to have been exported after CITES entered into force in India (Table 7), and in contravention of India's *Wildlife Act* (Nichols, *et al.*, 1991).

Table 7

Tiger-bone exports to South Korea, by weight and value (US$), after entry into force of CITES for various countries (unshaded portions)

Year	Hong Kong	S'pore	Thailand	USA	Indonesia	India	Bhutan	Japan	Malaysia	Taiwan	Madagascar	China	Others	Total
1970	100kg $1900	$500	$800											100kg
1971		66kg $5189	100kg $2000											166kg
1972		120kg $3413	60kg $1663	20kg $527										200kg
1973					80kg $2077	90kg $2329								170kg
1974	20kg $664		70kg $2232		194kg $6030	20kg $622	30kg $924							334kg
1975			40kg $1661		620kg $6188			3kg $150						663kg
1976			60kg $3102		131kg $7707									191kg
1977			74kg $6643		110kg $11 283									184kg
1978					96kg $12 458				30kg $4101					126kg
1979			11kg $1701		144kg $17 731	70kg $3875			30kg $4883					255kg
1980			15kg $2298		70kg $10 536	33kg $5699								118kg
1981					1060kg $12 513	20kg $3706			13kg $2169					1093kg
1982			100kg $18 000			15kg $3366								115kg

Table 7 continued

Year	Hong Kong	S'pore	Thailand	USA	Indonesia	India	Bhutan	Japan	Malaysia	Taiwan	Madagascar	China	Others	Total
1983					18kg $3019								100kg $13524	118kg
1984								No trade reported						0kg
1985		9kg $2048			41kg $7875									50kg
1986					23kg $3852					100kg $6445			9kg $2384	132kg
1987			7kg $1470		182kg $44 026								7kg $3434	196kg
1988			20kg $1820		560kg $31 584								40kg $14 856	620kg
1989			50kg $9267		190kg $32 165					50kg $6222			50kg $6121	340kg
1990					170kg $21 932						100kg $16 062		400kg $63 607	670kg
1991					250kg $44 349							600kg $96 404		850kg
1992					55kg $13 144				100kg $14 000			252kg $35 801		407kg
1993									320kg $47 000			1563kg $195 667		1883kg
Total kg														**8981**

Source: Customs Administration, South Korea.

Indonesia: Tiger population: 600-650

A CITES Party since 1979, Indonesia reported no trade in Tiger bone in annual reports filed from 1980 to 1991. However, South Korean Customs data indicate that Indonesia supplied the majority of Tiger bone imported by South Korea from 1970 to 1993 (Tables 3 and 14). Of the total 3994kg of Tiger bone reportedly imported into South Korea from Indonesia during that time, at least 2619kg were probably exported once CITES was in force in Indonesia (Table 7), and yet do not appear in Indonesia's CITES reports. Taiwanese Customs data document further that Indonesia exported 100kg of Tiger or bear bone to Taiwan in 1984, though how much of that shipment was Tiger bone is unknown (Table 8).

Finally, China's CITES annual reports reveal that Indonesia imported 225 containers of Tiger medicines during 1991 and 1992 (Table 4).

Table 8

Taiwan's imports and exports of Tiger bone and bear bone, 1980-1987 and exports of Tiger bone for 1990

		Imports		Exports	
Year	Country	Kg	Value (US$)	Kg	Value
1980	Singapore	320	138 000		
	Others	36	800		
1981	Hong Kong	1600	21 640		
	Singapore	241	8480		
1982	Hong Kong	1100	21 000		
	Singapore	800	11 480		
	South Korea			100	25 840
1983	Hong Kong	2710	29 840		
1984	Hong Kong	950	21 080		
	Indonesia	100	2560		
	Singapore	1012	26 560		
	Thailand	69	2000		
1985	Hong Kong	645	16 440		
	Malaysia	740	20 560		
	Singapore	1194	29 600		
1986	Hong Kong	240	6840		
	Singapore	252	5720		
1987	Israel			8	160
	Singapore	130	2280		
1990	Japan			1900	1400
Totals		**12 139 (imported)**		**2008 (exported)**	

Exporting countries (% total)		
Hong Kong:	7245kg	(59.7%)
Singapore:	3949kg	(32.5%)
Malaysia:	740kg	(6.1%)
Indonesia:	100kg	(0.8%)
Thailand:	69kg	(0.6%)
Others:	36kg	(0.3%)

Source: Directorate General of Customs, Ministry of Finance, Republic of China.

Lao PDR: Tiger population: unknown

The Lao PDR is not a Party to CITES. However, the Lao PDR appeared in US CITES data as exporter of 20kg of Tiger products in 1991, but is not mentioned in relation to Tiger bone in other known international trade records.

The Lao PDR has maintained strong trade relations with southern China along the border between the two countries, including an active commerce in Tiger bones (Martin, 1992a). In 1990, a WWF/IUCN investigator found that one of two Chinese-medicine stores in Vientiane offered Tiger bone for sale. In 1992, the same investigator was told that traders were paying poachers from US$20 to as much as US$76 per kilogramme for Tiger bone in Lao PDR and that prices were significantly higher at the border with China (Martin, 1992b).

Malaysia: Tiger population: 600-650

CITES came into force in Malaysia in 1978, and Malaysia began submitting annual reports in 1980. From 1980 to 1992, Malaysia reported no international trade in Tiger bone nor its derivatives in its CITES reports, and the Government holds no separate records of export of Tiger bone prior to or after CITES accession (S. Elagupillay, *in litt.*, 20 June 1994).

South Korean Customs records for 1970 to 1993 do show imports of 493kg of Tiger bone from Malaysia (Tables 3 and 7). An additional 320kg of Tiger bone were reportedly imported from Malaysia to South Korea during the first seven months of 1993 (Table 6). Taiwan's Customs records show that Malaysia shipped 740kg of Tiger or bear bone to Taiwan between 1980 and 1987, though it is impossible to ascertain the ratio of Tiger to bear bone (Table 8). Meanwhile, China's CITES reports from 1990 to 1992 show shipments to Malaysia of 3005 cartons of Tiger-bone wine plus 2486 containers and 200 bottles of Tiger-based medicines (Table 4).

TRAFFIC Southeast Asia's observations confirm that Chinese-manufactured products purporting to contain Tiger bone are widely available in traditional Chinese and modern chain-store pharmacies in Kuala Lumpur and a number of other large towns in Peninsular Malaysia (S. Broad, *in litt.*, 8 July 1994).

Myanmar: Tiger population: unknown

Myanmar is not a Party to CITES. It appeared as the exporter of eight kilogrammes of Tiger products in US CITES records for 1989 (Mulliken and Haywood, 1994), though it does not appear as an exporter or importer of Tiger bone or medicines in other known international trade statistics.

It is known that an estimated 50 to 100 Tigers were killed annually in Myanmar during the 1980s, for export as whole animals or in the form of bone "jelly" and skins. Tiger bone from Myanmar was reportedly sold to Chinese companies for about US$200 per kilogramme in the late 1980s (Tan, 1987). In a market town across the border from the Thai town of Mae Sai, a TRAFFIC investigator found Tiger bones for sale in December 1992 (S. Nash, *in litt.*, 15 February 1994).

Nepal: Tiger population: 150-250

CITES came into force in Nepal in late 1975, and Nepal has submitted annual reports since 1978. No international exports or imports of Tiger bone nor its derivatives involving Nepal are recorded in CITES data, though there is evidence of a black market for Tiger bones from Nepal.

North Korea: Tiger population: fewer than 10

North Korea is not a Party to CITES, nor does any international trade record in Tiger bone involving North Korea appear in CITES data, nor in any other known data.

Russia: Tiger population: 150-200

CITES came into force in Russia in 1976, when it was still part of the USSR. Its first CITES annual report, in 1977, showed no international trade in Tiger bone nor its derivatives, nor was any such trade reported in subsequent years up to 1992. No official records of trade in Tiger bone have been kept by Russia or the USSR so far this century (Anon., 1994f)

However, despite suggestion to the contrary by such international trade records, investigations by TRAFFIC and other non-governmental organizations suggest that Russia is a key supplier of Tiger bones to the Oriental-medicine trade (Anon., 1994f; Galster, *et al.*, 1994). Tiger carcasses were shipped to China for use by pharmacists at least as early as the 1930s (Hepner and Sludski, 1972). By the 1950s, there were reports of Tiger bones leaving Russia for both China and Korea (Hepner and Sludski, 1972). Nowadays, Russian Tigers and their parts, bound primarily for China, South Korea, Japan and the USA, usually leave Russia aboard ships, fishing boats and trains, though they are sometimes taken on foot across the border into China (Salkina, 1994; Anon., 1994f). Other reported destinations include Hong Kong, Malaysia, Singapore, Taiwan, Thailand and Viet Nam (Anon., 1994f).

A TRAFFIC investigation in early 1994 (Anon., 1994f) documented that a Tiger skeleton with processed skin is worth from US$2000 to US$10 000 on the black market in Russia which, given a per capita GNP equivalent to US$2100, renders a Tiger worth one to four years' income to a Russian poacher. Groups of Russian hunters specializing exclusively in Tigers reportedly include law enforcement officials, nature protection authorities and other public figures (Salkina, 1994). Middlemen reportedly can obtain one or two second-hand cars in exchange for a Tiger skeleton and skin, while a trader in an open market in Khabarovsk offered a TRAFFIC investigator an entire frozen Tiger carcass for US$5000 (Anon., 1994f).

Table 9

Prices paid in US$ for Tiger bones from the Russian Far East

Item	To hunter in Russia	To middleman in Russia (% Increase)	Abroad (% Increase)
Bones (per kg)	20-100	30-300 (50-300%)	up to 3000 (up to 10 000%)
Skeleton (whole)	1000-2000	2000-4000 (100-400%)	4000-10 000 (100-500%)
Carcass (whole)	1000-4000	3000-6000 (300-600%)	10 000-15 000 (300-500%)

Source: Anon., 1994f.

As is reportedly the case in other range countries, (S.D. Roy, *in litt.*, 23 September 1993), poachers take Tigers both opportunistically and to specific order from middlemen, who may live in the area or travel through periodically. A second tier of middlemen is located in urban centres. Tiger products are taken

abroad either by Russian nationals, such as sailors, who peddle the goods in various ports of call, or by foreign buyers who come to Russia especially to purchase Tiger parts for export (Anon., 1994f). While changing hands from poachers through various middlemen to end-use consumers, prices for Tiger parts undergo multiple increases (Table 9).

According to various estimates, at least 50 to 110 Tigers were killed during the winters of 1992/1993 and 1993/1994 (Anon., 1994f), numbers equivalent to approximately half the remaining Tiger population in the Russian Far East. The centres for the illegal trade in Tigers and their parts are the Russian Far East cities of Khabarovsk, Vladivostok and Ussuriisk (Salkina, 1994; Anon., 1994f). Owing to the breakdown of the central Government's authority in the Russian Far East, it is doubtful that present-day Tiger-bone commerce in the region will ever be officially documented.

Russia features as a recipient of Tiger bone, also, appearing in official Chinese CITES data for 1992 as the destination for 15 144 bottles of Tiger-bone products and 18 bottles of Tiger-bone wine (Table 4), and Chinese-made medicines are sold openly in the Russian Far East (Anon., 1994f).

Thailand: Tiger population: 150-600

Thailand itself has not reported any international trade in Tiger bone nor its derivatives since CITES came into force there in 1983. However, the USA and New Zealand have reported confiscating Tiger bone and derivatives dispatched from Thailand since 1983 (Table 10). South Korea also reported receiving from Thailand 607kg of Tiger bone between 1970 and 1989, 77kg of which would appear to have been exported after CITES was in force in Thailand (Table 7). Taiwan reported receiving 69kg of Tiger and/or bear bone from Thailand in 1984, though how much of that amount was Tiger bone is impossible to ascertain (Table 8).

With regard to Thailand's imports of Tiger-bone derivatives, China's CITES annual reports show exports to Thailand of 790 cartons of wine and 900 containers of derivatives from 1990 to 1992 (Table 4).

Table 10

Confiscated Tiger products reported from Thailand, 1983-1991

Year	Quantity	Status	Country reporting importation
1983	8 bone products	confiscated	USA
1986	114g derivatives	confiscated	USA
1988	4kg derivatives	confiscated	USA
1990	8 bags derivatives	confiscated	New Zealand
	60 derivatives	confiscated	USA
	16 derivatives	confiscated	USA
1991	42 derivatives	confiscated	USA

Source: CITES annual reports.

Viet Nam: Tiger population: 200-300

International trade in Tiger bone involving Viet Nam does not appear in any known records, and Viet Nam has yet to file an annual report, having joined CITES only in 1994.

In 1992, a TRAFFIC investigator witnessed the sale of two large sacks of Tiger bones from one shop in Cholon, the Chinese district of Ho Chi Minh City (S. Nash, *in litt.*, 15 February 1994). The bone reportedly was to be made locally into Tiger-bone balm. This transaction involved approximately 20kg of bones, selling at US$100 per kilogramme. At the same time, locally produced Tiger-bone balm was selling for US$25 per 1.5" x 0.5" x 1.5" square. A commercially manufactured Tiger-bone balm from China was also for sale, at US$7 per package. The shopkeeper claimed to obtain 10 Tiger skeletons a year (S. Nash, *in litt.*, 15 February 1994).

In April 1994, the Beautiful Taiwan Foundation investigated the Tiger trade in Ho Chi Minh City and reported that Tiger skeletons were selling for US$1000 each, with Tiger bone priced at US$125 per kilogramme (Anon., 1994e)

Consumer states

For the purposes of this report, consumer states are defined as those countries which do not have indigenous wild Tiger populations, but do have large and relatively wealthy human populations of Asian descent, or otherwise appear in trade data as importers of a significant amount of Tiger medicines. It should be noted in this context that sociological research has shown that changes in lifestyle brought about by modernization, industrialization and/or immigration to a foreign country has caused people from Asian cultures to re-embrace key cultural symbols such as traditional foods and medicines (Wu, 1979; Pang, 1984; Hong, 1989; Mills, 1993a).

As noted already, several countries fall into both categories of range state and supplier of Tiger bone, on the one hand, and consumer on the other, China in particular, providing such an example.

Belgium

CITES came into force in Belgium in 1984, and Belgium officials report having confiscated more than 10 000 Tiger-based medicines since 1989 (Mulliken and Haywood, 1994).

Belgium was the second-largest importer from China, after Japan, in terms of numbers of items of Tiger derivatives from 1990-92. These imports totalled 250 000 pills and five containers. Given that Belgium does not have a large Asian community, it may be that Belgium serves as entrepôt for Tiger medicines destined for other countries in the European Union, where confiscations of Chinese-made Tiger medicines have also been made (Mulliken and Haywood 1994).

Canada

Canada is potentially a key market for Chinese medicines, having several large communities of wealthy Asians, though no record of legal imports or exports of Tiger bone is held by the Government, the Customs category for imports of Tiger parts being shared with that for all other fur-bearing animals (J. Kenney, *in litt.*, 24 June 1994; C. Saint-Laurent, *in litt.*, 14 July 1994). Moreover, Canada's CITES reports record only one incidence of trade in Tiger derivatives between 1975, when CITES came into force in Canada, and 1992. The sole instance concerned the seizure of two bottles of derivatives in 1982. However, exports reported by China show Canada as the destination for 1193 containers of Tiger derivatives exported from 1990 to 1992, and US records show the export of 157 Tiger derivatives from Canada between 1987 and 1990, 85 of which were seized (Table 11).

Table 11

Canada's reported trade in Tiger-bone products, 1982-1992

Imports

Year	Quantity	Exporter	Origin	Status	Reporting party
1982	2 bottles derivatives	unknown	n/a	seized	Canada
1990	346 cartons derivatives	China	n/a	commercial	China
1991	247 cartons derivatives	China	n/a	commercial	China
1992	600 cartons derivatives	China	n/a	n/a	China

Exports

Year	Quantity	Importer	Origin	Status	Reporting party
1987	2 derivatives	USA	China	seized	USA
	24 derivatives	USA	n/a	n/a	USA
1988	16 derivatives	USA	China	seized	USA
	1 derivative	USA	China	n/a	
1989	47 derivatives	USA	n/a	n/a	USA
	9 derivatives	USA	n/a	seized	USA
1990	58 derivatives	USA	n/a	seized	USA

n/a = not available

Source: CITES annual reports; Mulliken and Haywood, 1994.

Hong Kong

Before acceding to CITES as a UK Territory in 1976, Hong Kong reportedly shipped 120kg of Tiger bone to South Korea during the period 1970 to 1974 (Table 3). Subsequently, Hong Kong reported no imports or exports of Tiger derivatives to CITES from 1978, the year of its first annual report, to 1992. Hong Kong's lack of any records of international trade in Tiger bone or derivatives is not surprising given that any such trade would have been recorded by the Government under a general category of bones, horn cores and powder, and waste of these products. As such, this classification would include bone meal from domestic animals, and any estimate of Tiger bone trade from such a broad grouping would be useless (P.M. Chan, pers. comm., 1994).

However, Hong Kong does appear in the CITES annual reports of other countries as a major exporter of Tiger bone. (Given that Hong Kong has no Tiger populations of its own, its status as an entrepôt and importer is implied.) Hong Kong was listed as the exporter of 214 164 units (91%) of Tiger products entering the USA between 1982 and 1991 (Table 12), and named as exporter in 31% of seizures of illegal Tiger products made by the USA during the same period.

Hong Kong also appears as Taiwan's major supplier of Tiger and bear bone, the imports and exports of which were listed together in Taiwan Customs statistics from 1979 to 1987. Between 1981 and 1987, Hong Kong reportedly exported (or re-exported) 7245kg of Tiger or bear bones to Taiwan, which account for 59.7% of Taiwan's imports of those products from 1980 to 1987 (Table 8). Whether these exports were Tiger or bear bones, they were traded after Hong Kong's theoretical compliance with CITES. South Korean importers in 1993 claimed much of their Tiger-bone stock had come from Hong Kong (M.S. Cha, pers. comm., 1993; E.H. Lyhim, pers. comm., 1993; Y.K. Chung, pers. comm., 1993), though Hong Kong does not appear as a source of Tiger-bone imports in South Korean Customs records after 1974 (Table 3) — augmenting the body of information indicative of Tiger-bone smuggling through Hong Kong.

Table 12

Reported US imports of Tiger-bone products from Hong Kong, 1982-1991

Year	Quantity	Origin	Status
1982	236 derivatives	China	seized
	23lb derivatives	China	commercial
	109 293 derivatives	n/a	seized
	2 shipments	n/a	seized
1983	6kg bone products	China	commercial
	72 000 bone products	n/a	seized
	480 derivatives	n/a	seized
	7kg derivatives	n/a	commercial
	5 derivatives	n/a	n/a
1984	1 bone product	n/a	seized
	3084 derivatives	n/a	seized
1985	7020 derivatives	n/a	seized
	1 derivative	n/a	n/a
1986	3599 derivatives	n/a	seized
	1 derivative	n/a	n/a
1987	431 derivatives	n/a	seized
1988	4720 derivatives	n/a	seized
1989	30 bone products	n/a	n/a
	1007 derivatives	n/a	seized
	70 derivatives	n/a	n/a
	10kg derivatives	n/a	seized
1990	1 bone carving	n/a	seized
	9041 derivatives	n/a	seized
	1711 derivatives	"wild"	seized
1991	1385 derivatives	n/a	seized
Total	**218 046 units**		

Source: CITES annual reports.

Japan

In a review of CITES annual report data after 1980, when CITES came into force in Japan, discrepancies emerge between Japan's reported international trade in Tiger derivatives and trade in the same as reported by China (Table 13) and the USA. Where Japan reported the importation of 35 366kg and 68 747 units of Tiger products from 1990-92, China reported the exportation to Japan of 71 014kg and 26 446 430 units for the same period. Furthermore, 1900kg of Tiger bone from Taiwan were sold to Japan in 1990 (Table 8). No other trade in raw Tiger bone involving Japan appears in known Customs or CITES data, apart from three kilogrammes reportedly shipped to South Korea in 1975 (Table 3). TRAFFIC Japan was not able to substantiate this report, but confirmed that Japanese drug companies import Tiger-bone medicines made in China for repackaging and distribution in Japan and that the sale of Tiger-bone medicines remains legal in Japan (A. Ishihara, *in litt.*, 17 June 1994; A. Ishihara, *in litt.*, 22 July 1994).

With regard to exported Tiger products, since 1980, Japan has reported sending one Tiger derivative to the former USSR and one Tiger skeleton to Switzerland. The USA, on the other hand, reported receiving 627 units of Tiger products from Japan between 1981 and 1991.

Table 13

Japan's trade with China in Tiger-bone products, 1990-1992

Year	Quantity	Exporter	Reporting Party
1990	6000kg medicine	China	Japan
	368 cartons medicine	China	Japan
	7014kg derivatives	China	China
	1377 cartons derivatives	China	China
	12 000 000 grains derivatives	China	China
	20 040 flasks derivatives	China	Japan
	6966kg derivatives	China	Japan
1991	40 900kg derivatives	China	China
	3022 cartons derivatives	China	China
	14 000kg medicine	China	Japan
	15 750 flasks medicine	China	Japan
	685 cartons medicine	China	Japan
	320 medicine items	China	Japan
1992	23 100kg derivatives	China	China
	2031 cartons derivatives	China	China
	40 000 bottle derivatives	China	China
	14 400 000 capsules derivatives	China	China
	8400kg medicine	China	Japan
	84 cartons medicine	China	Japan
	31 500 flasks medicine	China	Japan

Total units reported exported to Japan by China = 71 014kg + 26 446 430 items
Total units reported imported from China by Japan = 35 366kg + 68 747 items

Source: Japan's CITES annual reports, 1990-1991; Mulliken and Haywood, 1994 (from CITES annual reports).

Macau

Macau, as Portuguese territory, acceded to CITES in 1981. No trade in Tiger derivatives involving Macau appears in Portugal's own CITES data for the territory. However, China's annual reports show Macau as the recipient of 100 cartons of Tiger-bone wine and 14 386 containers of medicine from 1990 to 1992 (Table 4).

Singapore

CITES came into force in Singapore in 1987, since which time Singapore has recorded no international trade in Tiger products. By contrast, from 1990 to 1992, China's annual reports show that Singapore was the designated recipient of 1610 bottles of Tiger-bone wine and of 24 578 containers of Tiger-based medicines (Table 4).

Exports from Singapore are reported to have comprised 195kg of Tiger bone, between 1970 to 1985, South Korea being the importer (Table 3), while between 1980 and 1987, Taiwan recorded importing 3949kg of Tiger or bear bones from Singapore, although it is impossible to determine what proportion of this consignment was Tiger bone (Table 8). The USA reported confiscating 24 Tiger derivatives in 1990, and one kilogramme of Tiger derivatives in 1991, which had arrived from Singapore.

South Korea

As South Korea prepared to accede to CITES in mid-1993, Korean policy makers considered taking a reservation on Tigers (meaning that the country would still permit trade in that species) (Mills, 1993b). Although this reservation was not in the end taken, international trade of Tiger bone remained legal in South Korea until CITES came into force in October 1993. The domestic trade in Tiger bone will remain legal in South Korea until November 1994, while the domestic trade in Tiger-bone medicines will be allowed until March 1995 (D.G. Rhee, *in litt.*, 31 May 1994). Because of this legal market and because South Korea has kept a Customs category exclusively for Tiger bone since 1970, this country provides the most comprehensive documentation of Tiger bone trade of any consumer nation (Table 3).

From 1970 to October 1993, South Korea officially imported 8981kg of Tiger bone (Table 3). Indonesia supplied 3994kg (44.5%) of the total, while China provided 2415kg (26.9%) and Thailand 607kg (6.8%) (Table 14). Malaysia, India, Singapore, Taiwan, Hong Kong, Madagascar, Bhutan, the USA and Japan were among the remaining supply countries mentioned by name.

As exporter, South Korea was cited in US records as trading 434kg of Tiger derivatives to the USA between 1985 and 1991 (Table 15).

Table 14

Total South Korean imports of Tiger bone by country, 1970-October 1993, (In order of total quantities)

Exporting country	Kg	% of total
Indonesia	3994	44.5%
China	2415	26.9%
Thailand	607	6.8%
Malaysia	493	5.5%
India	248	2.8%
Singapore	195	2.2%
Taiwan	150	1.7%
Hong Kong	120	1.3%
Madagascar	100	1.1%
Bhutan	30	0.3%
USA	20	0.2%
Japan	3	0.03%
Others	606	6.7%
Total	**8981**	

Source: Customs Administration, South Korea.

Table 15

US imports and interceptions of Tiger products, 1981-1991

Country of export	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	Total
Australia										11	4	15
Canada							26	17	56	58		157
China						10	2	13	131	4814	9085	14 055
Hong Kong		109 554	72 498	3085	7021	3600	431	4720	1117	10 753	1385	218 046
Japan									10	92	525	627
Lao PDR											20	20
Myanmar									8			8
Philippines											20	20
Singapore										24	1	25
South Korea					30				4	361	39	434
Switzerland										3		3
Taiwan								3	10	110	40	163
Thailand			8	4		114		7		76	42	251
Unknown	2					23	192	6	1795	2541	757	5316
Total	**2**	**109 554**	**72 506**	**3089**	**7051**	**3747**	**651**	**4766**	**3131**	**18 843**	**11 918**	**239 140**

Source: CITES annual reports; Mulliken and Haywood, 1994.

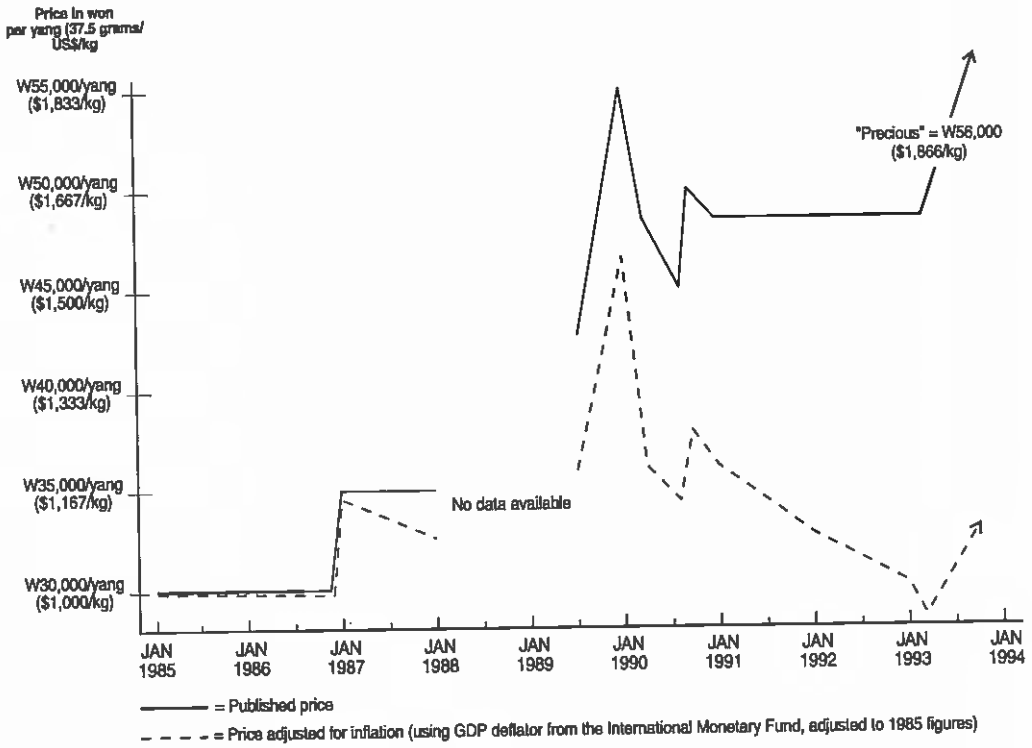
Ik Su Pharmaceutical Co. Ltd. is South Korea's largest manufacturer of Tiger-bone medicines, using Tiger bone in its *Kohohwan*, a popular remedy for rheumatism (W.K. Kim, pers. comm., 1994). Ik Su uses an average of 400kg of Tiger bone annually to manufacture *Kohohwan*, while the four other Korean pharmaceutical companies making Tiger-bone medicines use 200-300kg per year, collectively. This estimated annual pharmaceutical use of 600-700kg corresponds roughly with the average amount of Tiger bone recorded as imported into South Korea annually during the five years prior to South Korea's accession to CITES (Table 3).

Customs data show that some degree of stockpiling occurred with the announcement of CITES accession (Table 6). Where only 100kg of Tiger bone were imported during the first five months of 1993, another 1783kg were imported between June and September — nearly as much as the three previous years' imports combined (Table 3). In September 1993, Ik Su claimed to have 450kg of Tiger bone remaining in stock. By December, it had approximately 1600kg in its storeroom (W.K. Kim, pers. comm., 1993; J.A. Mills, pers. obs., 1993). The latter quantity corresponds closely with the amount of Tiger bone imported into South Korea during 1993 prior to the October ban on imports (Table 6). One wholesaler who tried to stockpile Tiger bone after South Korea's accession to CITES was unable to find overseas suppliers with any in stock (Y.S. Lim, pers. comm., 1993). The average import price per kilogramme for 1993 was US$160, only US$3 per kilogramme more than average import prices during the 1990 to 1992 (Mills, 1993b) — indicating that stockpiling and the impending import ban did not drive up prices dramatically.

Wholesale prices were somewhat more sensitive to the import ban. For example, in 1985 and 1986, Seoul's Chin Hyung Dried Medicinal Materials published its wholesale price[5] for Tiger bone as the equivalent of US$1000 per kilogramme. Chin Hyung's prices then fluctuated as high as US$1833 per kilogramme in mid-1990, but remained at US$1600 per kilogramme from late 1990 until early 1993. At the time of discussions of US trade sanctions to be imposed on South Korea, and of the country's accession to CITES, Chin Hyung's published prices for Tiger bone were replaced with the term "precious". According to wholesalers, "precious" meant a price of US$1866 per kilogramme in September 1993 — a price increase of 14% since February 1993. When adjusted for inflation, the fluctuations in wholesale prices for Tiger bone were similar to those for unadjusted figures, but the total price differential between 1985 and late 1993 was less significant (Figure 4).

Figure 4

Trends in published wholesale price for Tiger bone in South Korea, 1985-1993 (excluding 1988)



Source: Chin Eyung Dried Medicinal Materials

There is ample evidence of a robust domestic trade in Tiger derivatives for medicinal use in South Korea. Manufactured Tiger-bone medicines can be seen in nearly every pharmacy — both traditional and Western-style — in Seoul (J.A. Mills, pers. obs., 1993). Tiger bones and handmade medicine balls made from them are on open display in Oriental-medicine shops. A pet shop in central Seoul has a fixed sign advertising authentic Tiger bone for sale. The owner claims to kill 10 zoo Tigers per year, obtained through a tacit agreement with South Korean zoo-keepers, and had photos of Tiger kills made from 1988 to 1993. In September 1993, this shop was selling Tiger bones at US$1167 per kilogramme and Tiger-bone powder at US$1667 per kilogramme.

Taiwan

Despite its expressed wish to do so, Taiwan cannot be a Party to CITES because the United Nations does not recognize it as a sovereign nation. It nonetheless has appeared in the CITES annual reports of other Parties with regard to international trade in Tiger derivatives. Canada and the USA reported imports of 312 Tiger derivatives from Taiwan between 1988 and 1992. In addition, China reported exporting 509 Tiger derivatives to Taiwan from 1990 to 1992 (Table 4).

From 1979 to 1987, the Taiwanese Government combined its records of international Tiger-bone trade with those for bear bone, so Customs statistics for this period are at best indicative of numbers of Tiger bone shipments (Table 8). However, imports in this joint category for the period totalled 12 139kg. If half were Tiger bone, Taiwan could be considered a major consumer of Tiger bone.

There are reportedly two types of Tiger bone sold within Taiwan (H.C. Chang, *in litt.*, 31 May 1994). "True" Tiger bone consists of the bone of Tigers, Lions and Leopards. The humerus of these species sells wholesale for US$1067 per kilogramme and, on the retail[6] market, from US$2133-$3200 per kilogramme. Other bones from these large cat species sell for US$400 per kilogramme. So-called "common" Tiger bone includes the bones of bears, cows, deer, dogs, horses, pigs and sheep. Wholesale prices for bear bones range as high as US$133 per kilogramme, while retail prices reach up to US$320 per kilogramme. Prices for the bones of other species, sheep being preferred, range as high as US$20 wholesale and US$160 retail (H.C. Chang, *in litt.*, 31 May 1994).

USA

CITES came into force in the USA in 1975, and the US Government began filing annual reports in 1977. Owing to several large concentrations of Asian immigrants and their descendants, the USA is regarded as a potential major consumer of Tiger bone, though, like Hong Kong, its Customs do not record importation or exportation of Tiger bone as a separate commodity (A. Gaski, *in litt.*, 13 June 1994).

From 1981 to 1991, the USA recorded in its CITES annual reports the attempted import of 235 257 Tiger products — most of which were seized as illegal imports (Table 15). Hong Kong was listed as the exporter for 91% of that total, while six per cent reportedly came from China. The remaining three per cent came from 11 other named exporting nations as well as some classified as "unknown" (Table 15).

The USA reportedly exported 20kg of Tiger bone to South Korea in 1972 (Table 3).

DISCREPANCIES IN INTERNATIONAL TRADE DATA

According to CITES annual report data, Parties neither exported nor imported Tiger bone, nor its derivatives, between the years of 1975 and 1980. From 1981 to 1992, only eight units of whole Tiger bone or Tiger-bone pieces appear in CITES data, though tens of thousands of bone products and derivatives are recorded from 1982. When comparing these statistics with those from South Korea, however, it is clear that CITES annual reports document only a fraction of the international trade in Tiger bone (Table 3). From 1970 to 1993, South Korea imported 8981kg of Tiger bone, which do not appear in CITES trade data, despite the fact that many of the reported exporting countries were CITES Parties at the time of the transactions (Table 7). These discrepancies underscore the fact that CITES annual reports are often incomplete reflections of actual international trade in endangered species, such as the Tiger.

Discrepancies in available data indicate underreporting of trade in Tiger bone on a scale which may be sufficient to exterminate entire Tiger subspecies. For example, South Korea's imports of 600kg of Tiger bone from China in 1991 — which went unreported by China — represent the deaths of at least 30 Tigers, which may equal the entire population of wild Tigers remaining in China. Hong Kong's unreported 214 163 Tiger products entering the USA from 1981 to 1991 may have contained little if any Tiger bone (Gaski and Johnson, 1994). However, if each contained the recommended daily dose of between three and six grams of Tiger bone, these shipments could represent between 642 and 1285 Tigers — the higher figure being six times the latest estimate of the Siberian subspecies and only 100 less than the total number in India's tiger reserves.

LEGAL CONTROL OF THE TIGER BONE TRADE

Continuing reductions of wild Tiger populations and recent seizures of Tiger bones found in trade in range states provide evidence of ongoing illegal trade in Tiger bones. The available data do not definitively document whether the trafficking of Tiger bone from range states and the demand for Tiger bone in consuming nations is increasing, decreasing or remaining relatively steady. However, the remaining wild Tiger populations cannot currently withstand even a diminishing commercial trade in their bones. Working from this premise, range states and consumer states alike have strengthened and continue to strengthen domestic laws and law enforcement devised to stop the illegal trade in Tiger bone and its derivatives.

Range states

On 3-4 March 1994, official representatives of 11 of the 14 Tiger range states — China, the Lao PDR and North Korea were absent — met in New Delhi to create the Global Tiger Forum. The secretariat for the Forum is currently based in India. The Parties to the Forum agreed that the primary threat to their Tiger populations was poaching to satisfy the demand for bones. They pledged to co-operate with one another to police the illegal Tiger-bone trade, to discourage the commercial consumption of Tigers and to encourage other countries to enter into and enforce international conventions aimed at conserving Tigers. For the most part, existing control of the illegal trade in Tiger bone and its derivatives in range states is minimal at best, owing to the fact that most such countries are developing or, as in the case of Cambodia and Russia, political upheaval has left little or no infrastructure, still less monetary resources for wildlife protection.

Bangladesh

While Tigers are protected under the **Bangladesh Wild Life Preservation Act**, protection forces are inadequate, lacking in manpower, equipment and funding (Jackson, 1993).

Bhutan

Hunting is prohibited by law and is repugnant to Bhutan's Buddhist majority (Dorji and Wangchuk, 1994). Tiger poaching has been deemed "almost non-existent" by Bhutanese wildlife officials, though they acknowledge "isolated" poaching incidents along the country's southern border with the Indian state of Assam (Dorji and Wangchuk, 1994).

Bhutanese officials acknowledge that Bhutanese forest guards are too few and poorly equipped to repel Tiger poachers from Assam (Dorji and Wangchuk, 1994).

Cambodia

There are no hunting regulations in Cambodia, and insurgency movements are allegedly purchasing arms with profits from exports of wildlife (S. Nash, *in litt.*, 15 February 1994). Though Cambodia's **Wildlife Conservation Act** is being drafted, Government officials admit that wildlife protection currently is non-existent, and most Government staff trained in wildlife management were either killed or fled the country during the Pol Pot regime (Anon., 1994c).

China

China's wild Tiger populations are given the highest degree of protection under the **Wild Animal Protection Law of the People's Republic of China** of 1988 (Jackson, 1993). However, the trade in Tiger bone and Tiger-bone medicines was not definitely addressed by Chinese law until 1993. After threats of

trade sanctions by the USA and other CITES parties because of its continuing trade in Tiger-bone medicines, China issued a legal notice on 29 May 1993, prohibiting the importation, exportation, sale, purchase, transport and pharmaceutical use of Tiger bone. China's state-run media publicized the ban in newspapers, by radio and television (Anon., 1994g). All manufacturing of Tiger-bone medicines was ordered to stop, while Tiger-bone stockpiles and medicines were consolidated, sealed and stored under Government supervision in preparation for a complete prohibition which came into effect on 1 December 1993. Despite a claimed economic loss of US$230 million to China's pharmaceutical industry, the Government of China declared that by the end of 1993 all Tiger bones and Tiger derivatives had been consolidated and sealed and that sales of such products had stopped (Anon., *in litt.*, 12 January 1994). A total of 625.4kg of Tiger bone were registered and sealed (J. Xu, *in litt.*, 25 June 1994).

In an effort to verify China's legislative success in ending commerce in Tiger bones and Tiger-bone medicines, a team of TRAFFIC investigators surveyed more than 380 pharmacies, department stores and gift shops in 13 major Chinese cities for the availability of Tiger bone and Tiger-bone derivatives, between November 1993 and March 1994 (Anon., 1994g). The team also visited six herbal-medicine markets. Commercially manufactured Tiger-bone wine and/or Tiger-bone plasters were found in 25 retail outlets (less than seven per cent of the total sample). Whether these wines and plasters actually contained Tiger bone is unknown. However, investigators noted that some products were one-and-a-half to five times more expensive than others superficially the same (Anon., 1994g), a factor claimed to be one indicator of authentic Tiger bone, according to Chinese Government officials (Y.Q. Chen, pers. comm., 1993). Three merchants at herbal markets offered raw Tiger bone for sale, though investigators did not see the bone. The TRAFFIC study further noted a widespread awareness that Tiger-bone medicines were banned, as testified to by the fact that more than 56% of the retailers visited mentioned the ban (Anon., 1994g), indicating that any continuing sale of Tiger bone or its derivatives was not as a result of ignorance on the part of traders.

India

India's wild Tiger populations are given maximum possible protection under the **Wildlife Protection Act**, but protecting Tigers adequately within India's 75 reserves containing the species would cost an estimated US$15 million per year (Jackson, 1993).

Police actions in India and just across India's border with Nepal have resulted in the seizure of 617.5kg of Tiger bone since 1989, and indicate an escalating trade in Tiger bone (Table 16). On 30 and 31 August 1993, New Delhi police and wildlife officials, with the assistance of TRAFFIC India, made the largest seizure of illegally traded Tiger bones in India's history. The seizure of 287kg of Tiger bone led to the arrest of a previously convicted Indian wildlife trafficker and a Tibetan refugee, who admitted smuggling Indian Tiger bones into China via Tibet. Before his arrest, the Tibetan middleman had been able to promise investigators the delivery of another 1000kg of Tiger bone within a month's time (A. Kumar, pers. comm., 31 August 1994).

TRAFFIC India

Tiger bones confiscated in India's largest Tiger-bone seizure to date.

The seizure in August 1993 and other subsequent seizures of smaller amounts of Tiger bone have led the Indian Government to pledge formation of a police unit whose sole brief is to be the investigation of illegal wildlife trade, though that unit has yet to begin operations (A. Kumar, pers. comm., 1994).

Table 16

Seizures of Tiger bone in India and Nepal, 1989-June 1994

Year	Bones
1989	15.0 kg
1990	77.5 kg
1992	4.0 kg
1993	491.0 kg
1994	30.0 kg
Total	**617.5 kg**

Source: TRAFFIC India.

Indonesia

In 1990, Indonesia passed the **Act of the Republic of Indonesia on Conservation of Living Resources and Ecosystems (1990)** (also known as the **Conservation Act (no. 5)** of 1990) and this Act is now used as the legal basis for the conservation of wild species, including fully protected species, such as the Tiger. While there are nature reserves containing Tigers, little is known about the adequacy of Tiger protection in Indonesia and an estimated 14 Tigers are known to be lost annually to poaching and pest management, but the actual number is thought to be higher (Jackson, 1993).

Lao PDR

The Decree on Management and Protection of Aquatic Animals and Wild Animals and on Hunting and Fishing No. 118/CCM (1989) lists the Tiger as a totally protected species. Nonetheless, Tigers are probably shot whenever the opportunity permits, and the animal's parts traded both within the country's

borders and between the Lao PDR and Thailand, China and Viet Nam (Salter, 1993), since Protection forces for Tigers in the Lao PDR are thought to be inadequate (Jackson, 1993).

Malaysia

Until the 1950s, the rural people of Malaysia considered Tigers pests to be destroyed by any means, and state governments paid bounties for dead Tigers. In 1955, the Tiger was upgraded from a pest to a game species and between 1960 and 1976 at least 223 Tigers were killed in Peninsular Malaysia. Efforts to conserve the Tiger did not begin until 1976. Since that time, the average number of known Tiger kills has dropped to one per year, and problem Tigers have been placed in the captive-breeding programme at Zoo Melaka (Elagupillay, 1994). The Government of Malaysia believes it has adequate staff, training, equipment and funding to protect its wild Tiger populations, protected under the **Protection of Wild Life Act 1972,** amended in 1990 and 1991, from the threat of poaching for bones (Jackson, 1993).

Myanmar

The Government of Myanmar acknowledges that illegal trade in wildlife is virtually uncontrolled within its borders and that high prices paid for Tiger parts offer strong incentive for citizens of Myanmar to poach these animals. These factors have caused the Government to "seriously consider effective protection of the Tiger" (Anon., 1994h). At present, the Tiger is not specifically mentioned in the **Burma Wildlife Protection Act** (Jackson, 1993).

Nepal

Wildlife authorities believe that Tigers were not poached in Nepal for economic gain until the late 1980s (C. McDougal, *in litt.*, 21 October 1992). In 1988, three sacks of Tiger bone were seized at a post office in north-west Nepal (Martin, 1992c) and, between 1989 and 1990, 24 Tigers disappeared from Chitwan National Park. Local poachers involved in the latter incidents, most of whom were nearby farmers, were promised US$130 per kilogramme for the Tigers' bones. The bones reportedly were bound for China via Tibet (Martin, 1992c). In August 1993, another 40kg of bones, thought to be from Tigers, were confiscated near the Indian border (A. Kumar, *in litt.*, 2 September 1993).

Nepal requires more manpower, equipment and funds for adequate protection of its remaining wild Tiger populations (Jackson, 1993).

North Korea

Nothing is known of North Korea's efforts to protect its last Tigers (Jackson, 1993).

Russia

Tiger populations in the Russian Far East were thought to be expanding at the time of the dissolution of the Soviet Union in 1991 (Chestin and Poyarkov, 1993). The subsequent opening of borders and concomitant dissolution of border controls and weakening of law enforcement coincided with a dramatic drop in personal incomes and the opening of a free-market economy, factors which conspired to increase significantly commercial demand for Russia's Tigers (Chestin and Poyarkov, 1993).

While the Tiger is protected in Russia by the **Law of the Russian Federation on Environmental Protection and Management**, there is no mechanism nor finance for its execution (Jackson, 1993). As a result, Russia's Tiger population may have lost 25% of its total number in the winter of 1993/1994 (Anon., 1994f). To slow the rapid decline of Russia's Tigers, the UK-based non-governmental organization, Tiger

Trust, in co-operation with WWF Germany, WWF US and the Russian Government, has established a corps of private guards to protect Tigers from poachers.

Thailand

Tigers are not specifically mentioned in Thailand's **Wild Animals Preservation and Protection Act, B.E. 2535 (1992)**, and little is known of Thailand's Tiger-protection measures.

Viet Nam

The Tiger is legally protected in Viet Nam, though funding for enforcement efforts is inadequate (Jackson, 1993).

Consumer states

The following examination of efforts to police the Tiger-bone trade in entrepôt and/or consumer countries is limited to those countries which have conducted law enforcement efforts aimed specifically at stopping the trade in Tiger bone and its derivatives. It should be noted that these countries were, along with China, cited by the US Government and the CITES Standing Committee in 1993-94 as targets of possible trade sanctions, owing to their continuing trade in Tiger bone and Tiger-derived medicines.

Hong Kong

The law in Hong Kong did not enforce the CITES prohibition on international trade of Tiger parts until 1985, when it did so under the **Animals and Plants (Protection of Endangered Species) Ordinance (Chapter 187)** (J.K. Chan, pers. comm., 1994). International trade in Tiger-based medicines, meanwhile, remained legal until 29 January 1994 because of the impracticalities of identifying Tiger derivatives in medicines (J.K. Chan, pers. comm., 1994).

On 28 April 1994, after a three-month notice period, the unlicensed possession of all medicines containing or even claiming to contain Tiger ingredients became an illegal offence in Hong Kong. The new prohibition effectively bans any use of Tiger medicines within the Territory, since the Government has stated that it has not and does not intend to issue licences. Possession or trade of Tiger derivatives or alleged Tiger derivatives now carries a maximum fine of US$3250 for the first offence and a fine of US$6500 and up to six months' imprisonment for subsequent convictions (Agriculture and Fisheries Department, *in litt.*, 22 April 1994).

Between January and May 1994, 69 seizures of Tiger bones and alleged Tiger-based medicines were made in Hong Kong (Table 17). Of these, 57 involved cross-border smuggling and 12 involved domestic possession. A total of 2.39kg of Tiger bone, 6205 packages of medicines and 32 bottles of Tiger-bone wine were seized (P.M. So, *in litt.*, 23 June 1994).

Hong Kong's Customs and Excise Department has the resources to inspect only up to 12% of the 130 million tonnes of cargo that enter Hong Kong via air, land and sea, annually, it should be noted. Moreover, the primary mandate of staff of this Department is to seek out contraband drugs and firearms (D. Melville, *in litt.*, 18 August 1994).

Table 17

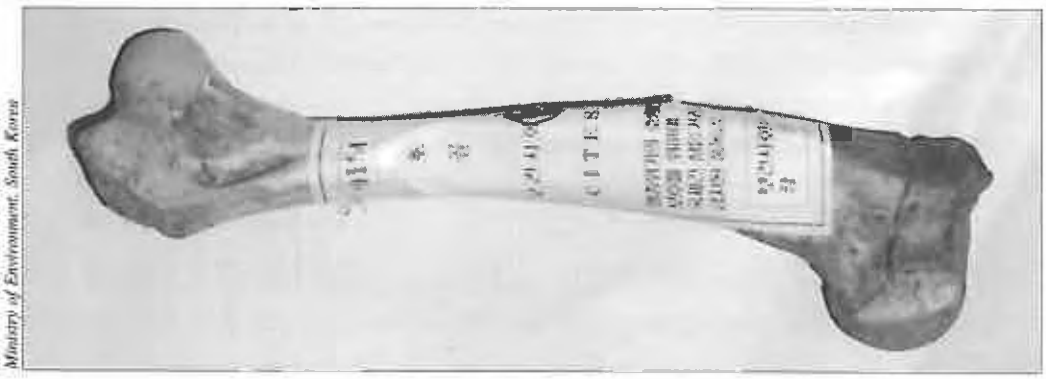
Seizures of Tiger-bone products in Hong Kong, January-May 1994

Type violation	Number seizures	Bones	Medicine packets	Wine bottles
Cross-border smuggling	57	0	5702	32
Domestic possession	12	2.29kg	503	0
Total	**69**	**2.39kg**	**6205**	**32**

Source: Agriculture and Fisheries Department, Hong Kong.

South Korea

In a voluntary registration of Tiger-bone stocks in South Korea, which concluded in February 1994, five pharmaceutical manufacturers registered 1061.5kg of bones and 227.8kg of Tiger-bone powder. An assortment of importers, wholesalers, clinics and pharmacies (classified as Oriental-medicine sellers) registered an additional 100.9kg of bones and 10.3kg of powder (K.H. Lee, *in litt.*, 2 June 1994). Between 26-30 May, nine staff from the Ministry of Health and Social Affairs registered 90.6kg of Tiger bones and 852.6kg of Tiger-bone powder held by 44 pharmaceutical companies, wholesalers and Oriental-medicine establishments (D.G. Rhee, *in litt.*, 23 June 1994). All bones and containers of powder were affixed with numbered labels and photographed.



Ministry of Environment, South Korea

Tiger bone labelled and photographed according to the South Korean Government's registration scheme.

Owners now are required to record use of these stocks, supplying information on date of use, name and address of the buyer or user, and the quantity sold or used. The Government has given the Korean medicine industry until March 1995 to sell its remaining Tiger-bone derivatives on the Korean market legally and thereby recoup its capital investments in Tiger bone.

The presidents of the largest pharmaceutical company, Ik Su Pharmaceutical Company, and the largest distributor of Oriental medicines, Heung Il Oriental Medicine Distributing Company, were recently arrested, on 10 June 1994, for violating the **Law for Special Measures to Control Health Related Crimes**. Their conviction rests on the fact that the two men had attempted to substitute bones of herbivorous animals (80%) and various Tiger bones (20%) for Tiger shin bones (tibias), the only bones for the use of which licence had been granted by the Government. The supply of bone was held by the South Korean Government upon its arrival from Singapore.

Its discovery raises again the difficulty of determining actual quantities of Tiger bone in trade (D.G. Rhee, *in litt.*, 20 July 1994). Ik Su holds 86% of all stocks of Tiger bones owned by pharmaceutical manufacturers in South Korea, while Heung Il owns 56% of the stock held by Oriental-medicine sellers (K.H. Lee, *in litt.*, 2 June 1994).

Taiwan

Taiwan began controlling the importation of Tiger bone on 16 August 1985 (D.J. Lu, *in litt.*, 15 June 1994) and on 6 March 1986, Taiwanese pharmaceutical manufacturers were prohibited from applying to register new medicines containing Tiger bone. Taiwan enacted the **Wildlife Conservation Law**, which emulates CITES, on 23 June 1989 (Nichols, *et al.*, 1991). On 4 August 1989, the Tiger was listed as an endangered species under Taiwan's **Wildlife Conservation Law**, making importation and exportation of Tiger products illegal, without permission from the Council of Agriculture (Council of Agriculture, *in litt.*, November 1993). Customs reports from 1988 to 1992 show that small quantities of Tiger bones, penises and other parts have been confiscated from time to time at Taiwan's border entry points, documenting some level of smuggling.

Regarding domestic trade in Tiger parts, a brief TRAFFIC survey in October 1992 found that 15 of approximately 50 wholesale businesses dealing in Oriental medicines displayed alleged Tiger bones (Nowell, 1993). The investigator, trained in the identification of Tiger bones, determined that 13 of the 15 businesses displaying "Tiger bone" had authentic Tiger bone. The wholesale price for Tiger bone quoted during this survey averaged US$1280 per kilogramme.

Between June and December 1993, the Government investigated seven cases involving illegal sale of Tiger bones, one case of displaying a Tiger skull for sale and one involving possession of a Tiger penis. Violations of the law of this sort are punishable by up to US$1200 and one year's imprisonment for a first offence and up to US$3600 and three years' imprisonment for recidivists. Proposed amendments to the **Wildlife Conservation Law** would increase those penalties (Anon., 1994i). Suspects in three of the bone cases were fined and two were sentenced to gaol (Anon., 1994i) and a further two cases involving Tiger bone were dropped, the bone being diagnosed as fake. Two other bone cases are pending.

The Government called for a voluntary registration of all stocks of Tiger products in Taiwan between 18 November 1993 and 17 February 1994. One Tiger bone, two Tiger penises, and various other parts not used as medicines or home remedies were registered as a result (Anon., 1994i). A brief follow-up survey was conducted by the non-governmental organization Earthtrust Taiwan in February 1994 in the towns of Taipei, Keelung, Taichung and Kaohsiung. Fifteen of 25 Oriental-medicine stores visited either claimed to have Tiger bone or promised they could obtain it (Highley and Highley, 1994).

There have also been allegations of Tigers being farmed for their bone in Taiwan (Highley and Highley, 1994). The Council of Agriculture reported registration of 124 captive Tigers in Taiwan in 1993 (D.J. Lu, *in litt.*, 8 July 1994).

To combat smuggling and illegal domestic sale of Tiger bone, the COA established the Wildlife Protection Unit, under the Department of Forestry, in January 1994 (S.N. Ling, *in litt.*, 22 June 1994). This police unit has as its sole mandate the investigation of the black market in endangered species and is supported by enforcement assistance from 352 police officers nationwide. In their first undercover investigation in March 1994, Government law enforcement agents visited 519 Oriental-medicine pharmacies and found 27 to be selling Tiger products. A second undercover operation, in April 1994, found 22 of a total of 5623 stores investigated to be selling Tiger products (Anon., 1994i) — from which more than four kilogrammes of Tiger bone were seized. During a third undercover investigation in May 1994, Government agents found only one of 932 Oriental-medicine pharmacies selling Tiger bone, from which 375 grams of Tiger bone were seized (D.J. Lu, *in litt.*, 8 July 1994).

Stickers have been issued by the Government in Taiwan to those pharmacists who have signed a written declaration that states that neither rhinoceros nor Tiger products are for sale in their shops.
J.A. Mills / TRAFFIC

CONCLUSIONS

When considering the conclusions that follow, it is important to remember the aforementioned limitations of the data on which they are based. To summarize those limitations, the data are not only incomplete and of suspect accuracy, but also the units of measure used to report the trade in Tiger-bone derivatives make the amount of trade in Tiger bone impossible to quantify. In addition, it is impossible to ascertain which shipments actually contain real Tiger bone and Tiger-bone derivatives rather than counterfeit products. It should also be remembered that use of Tiger products has been documented in almost every Tiger range state (Jackson, 1993), a facet of the trade which will not be accounted for in international trade statistics. The available data, therefore, cannot document how much Tiger bone is in trade worldwide. Moreover, available date can only hint at the range states of origin for Tiger bone found in trade.

With the above caveats in mind, this review of international trade data suggests that the major countries supplying Tiger bone and Tiger-bone medicines are China, Hong Kong, Indonesia, Singapore and Thailand (Table 18). Conspicuously missing from this list is India, whose large Tiger populations and recent spate of seizures of Tiger bone in trade would indicate that it too is one of the foremost suppliers. Considering the low number of wild Tigers thought to remain in China and the high volume of Tiger bone and Tiger-bone derivatives exported from China, China is not only a major supplier but certainly also a major importer and entrepôt for Tiger bones from other range states. Given that Hong Kong and Singapore do not have wild Tiger populations, it is clear that these countries are also entrepôts for Tiger products from range states. In fact, where countries of origin are noted, Hong Kong is often a reported transshipment point for Tiger products from China.

The apparent major importers of Tiger bone and Tiger medicines are South Korea, Japan, the USA, Taiwan and Singapore (Table 18). These countries alone accounted for at least 10 881kg of Tiger bone, 12 139 Tiger or bear bones and 27 million Tiger derivatives reported in trade between 1970 and 1993. Gaps in the data become apparent here, too, as Hong Kong is conspicuously missing as a major importer. Certainly if Hong Kong is a major entrepôt, it was first a major importer and, therefore, it should be added to the list of major importers.

Table 18

Prominent exporters and importers of Tiger bone and Tiger derivatives, according to various sources of trade data

Exporters

Country	Quantity reported in trade	Years
China	27+ million derivatives (incl. at least 71 014kg) 2415kg bones	1990-1993
Hong Kong	214 164 units 7245kg (Tiger and/or bear) bones 120kg bones	1970-1991
Indonesia	4094kg bones	1973-1992
Singapore	3949kg (Tiger and/or bear) bones 195kg bones	1970-1987
Thailand	607kg bones 69kg (Tiger and/or bear) bones 252 units	1970-1991

Importers

Country	Quantity reported in trade	Years
South Korea	8981kg bones	1970-1993
Japan	26 446 430 derivatives 1900kg bones 17 014kg derivatives	1990-1992
USA	235 257 cartons and containers of derivatives	1981-1991
Taiwan	12 139 (Tiger and/or bear) bones	1980-1990
Singapore	26 188 derivatives	1990-1992

Sources: CITES annual reports; Mulliken and Haywood, 1994; Customs Administration, South Korea; Directorate General of Customs, Republic of China.

While these numbers and orderings may be accurate, they undoubtedly reflect only part of true trade dynamics. It should be remembered that South Korea is the only consuming country with comprehensive import records. While Japan may have imported 1900kg of Tiger bone from Taiwan in 1990, the corresponding value of only US$1400 is either a mistake, a deliberate false declaration to avoid tariffs, or the bones were counterfeit. In the case of the 235 257 Tiger derivatives appearing in the USA's CITES

data from 1981 to 1991, these were mostly items from Hong Kong seized in Customs inspections. This raises two possibilities for speculation, firstly, that especially stringent Customs inspections are applied to cargo and passengers from Hong Kong, and secondly, that, in all likelihood, the number of items seized during Customs inspections account for only a small percentage of actual smuggled goods, since it is beyond the manpower of most ports of entry to inspect more than a small percentage of all goods imported.

Rates of seizures of Tiger products in India and reported incidents of poaching in Russia in the past three years suggest an escalating trade in these countries, perhaps because traders only began seeking supplies of Tiger derivatives in these range states once Tiger populations in China and neighbouring countries dropped to their present very low levels. Increased poaching incidents may also be a result of the depletion of longstanding stockpiles of Tiger bone. Alternatively, the rise in rates of confiscations in India could indicate increased attention to the trade by law-enforcement bodies. Certainly, the escalation of trade in Russia is a reflection of a breakdown in wildlife management and law-enforcement infrastructures. In summary, whether there has been an actual escalation in the trade in Tiger derivatives is impossible to prove with available data.

The only certainty is that wild Tiger populations cannot sustain even limited commercial trade in their parts. Given fragmented habitats and small, isolated populations, many of the remaining wild Tiger populations will require rigorous protection and management just to survive the continuing loss of habitat and the deleterious affects of genetic isolation, much less the pressures of poaching to supply the international market with Tiger bones and Tiger-bone derivatives.

The fragility of the conservation status of Tiger species presents a problem of gravity and complexity equal to that facing rhinoceroses, yet while harvesting of horn from living rhinoceroses may be a practicable future possibility, there is no conceivable way of obtaining bone from living Tigers in such a relatively benign manner. If wild Tigers are to survive the commercial demand for their bones, conservationists cannot ignore the question of how to meet the medicinal needs of Asian people dedicated to the use of Tiger bone as medicine. Consumers of Tiger derivatives are understandably resistant to the prospect of relinquishing medicines which have eased chronic pain for more than a millennium, especially since such a change is seen by some as further erosion of important cultural values. Sociological research shows that people have little compunction in breaking laws which run contrary to the underlying tenets of their culture (Kidder, 1983). If anything, the meagre data documenting the black market in Tiger bone and Tiger derivatives bears out this theory.

Conservationists must also grapple with the difficulty of safeguarding animals which, for the most part co-exist with human populations living in poorer, underdeveloped rural parts of the world. Worth up to 10 years' income per animal to a poacher, Tigers will remain at risk as long as economic and social conditions make poaching an attractive option for earning a living.

In part, the conservation of Tigers depends on the strength of trade laws and the capacity to enforce those laws within and among trading nations. Clearly, the tracking, reporting and policing of trade in Tiger derivatives have been lax, inadequate and sometimes non-existent. Therefore, it is essential that some laws regulating the trade in Tiger derivatives be made more stringent and that all such laws be enforced more rigorously, more uniformly and with greater resources. In most cases in the aforementioned trade data, exporters reported trade where importers did not and vice versa. If authorities in trading countries were to co-operate on a routine basis, sharing official trade reports as well as intelligence information, smuggling could be intercepted more readily.

The overriding conclusion of this review is that the trade in Tiger bones and other medicinal derivatives of the Tiger thrives as a black market, which represents an imminent threat to the survival of the species in the wild. Given that just one of the major Tiger-bone consuming countries, China, has a human population approaching 1.2 billion, growing at a rate of 1.2% per year (Anon., 1994a), with an annual economic growth rate of 12.7% (Anon., 1994b) — the highest in Asia — one may assume that the demand for Tiger-bone medicines will only increase. Therefore, solutions must be drastic, unprecedented in scope and international collaboration and put into place immediately.

Behind bars at China's Tiger farm, this animal and other Tigers are at the centre of the cultural dilemma posed by the conflicting forces of conservation and Oriental medicine, which prizes Tiger bones for the most-favoured traditional Oriental cure for rheumatism. Unfortunately, Tiger populations are too depleted to make any trade in Tiger parts – even those from captive -bred animals – a viable consideration.

The sign on this pet shop in Seoul advertizes genuine Tiger bone for sale.

Tigers may be the first of many majestic species – including rhinoceroses and bears – to go extinct because of demand for their parts as traditional Oriental medicines. Tiger bones are now so valuable as a treatment for rheumatism that poachers stand to earn many times a year's salary from killing just one. Consequently, as many as a quarter of Russia's remaining Siberian Tigers may have been poached this past winter. In the early 1990s, Tiger derivatives have been traded by the millions on the international market. With more than one billion potential users of Tiger bones as medicine, the world's last 5000 to 7000 wild Tigers will require drastic conservation measures to ensure their survival.

Tiger bones for sale in an Oriental medicine shop in Taipei.

A ribbon-wrapped Tiger skull in an Oriental medicine store window advertizes the availability of genuine Tiger bones within.

Tiger bones surrounding handmade Tiger-bone medicines in Seoul.

Manufactured Tiger-bone medicine is even seen in most Western pharmacy in South Korea.

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RECOMMENDATIONS

Before enumeration of the recommendations which emerge from this review, the recent improvements made in monitoring and curtailing the commercial trade in Tiger bone and its derivatives made by governments of certain Tiger range states and consuming countries should be acknowledged. This is not to say that they or any other nation has done enough to avert the threat that the medicinal trade poses to the survival of the remaining Tiger subspecies. However, the 11 Tiger range states who came together to form the Global Tiger Forum deserve credit for at least creating the theoretical infrastructure for co-operative conservation of wild Tiger populations. In addition, China, Hong Kong, South Korea and Taiwan deserve praise for enacting new laws and launching new law enforcement operations. That said, the following recommendations are commended.

Legislation

Although stricter laws for the control of trade in Tigers and their parts have been produced both in range states and consumer nations in recent years, there still exist notable areas of inadequacy in legislation for the conservation of Tigers. Such shortfalls, it is recommended, should be addressed.

- Besides **encouraging relevant countries not yet a Party to CITES to take up membership** (Bhutan, Cambodia, Lao PDR, Myanmar, North Korea, for example),

- effort should be focused on **improving domestic legislation** within many countries. Hong Kong may serve as an exemplar of comprehensive domestic legislation with application to the control of Tiger-bone trade within a consumer state: not only trade in, but possession of Tiger-bone products, even if unproven as such, is against the law. While other consuming countries have gone almost as far in their legislation, Myanmar and Cambodia, as examples, are without any law at present designed to benefit Tiger conservation. The offer of advice from countries already with good domestic legislative regulation of trade in Tiger bone could prove beneficial to countries drafting new and improved legislation to this end.

- **Penalties for breaking existing Tiger trade laws should be sufficiently high** to act as deterrents to those tempted to risk illegal trade. For example, whenever fines are imposed, they should be commensurate with the retail value of the commodity traded, so that they act as an effective deterrent, rather than as a minor inconvenience. (In this context, it is interesting to note that mandatory prison sentences are the penalty in some African countries for poaching of African Elephants *Loxodonta africana* and rhinoceroses.) Penalties should be set with care, however, as experience has shown that judges may be reluctant to convict where punishments are considered excessive (T. Milliken, *in litt.*, 14 July 1994).

- The legislation against trade and possession of counterfeit Tiger-bone products, as exists in Hong Kong, should be a model for consideration by other consumer countries. Simultaneously, **techniques for forensic analysis of Tiger bone should be developed**, if possible, to allow proof of possession of authentic Tiger bone, especially in countries where trade in simulated Tiger-bone goods are legal.

Enforcement

Adequate enforcement must accompany adequate legislation for the latter to be beneficial in its aims. It is necessary in this respect, not only to provide good enforcement of domestic laws, but

- to **concentrate effort on the implementation of CITES regulations** during international border checks.

Given that all Tiger subspecies have been listed in at least Appendix II of CITES since 1975, reporting of most international trade in Tiger bones and its derivatives should have been reported by CITES Parties since then. From 1987, all Tiger subspecies were categorized as Appendix I animals, thereby banning the international commercial trade in all Tiger bone and Tiger-bone derivatives not taken from pre-Convention stocks. CITES Parties should be encouraged to realize the importance of reporting all trade in Tiger-bone products, especially those from confiscated shipments, and including those which are not readily recognizable, but are nonetheless said to contain Tiger bone.

CITES provides the infrastructure for monitoring the international trade in Tiger bone and its derivatives comprehensively, and clearly that infrastructure is not being used to its full potential.

Owing to Tiger bone's status as a product banned from legal international trade, the monitoring of the trade in Tiger bone and its derivatives falls largely to police and Customs authorities in the context of domestic trade. This is not an easy task, given that police and Customs officials already find themselves underfunded, understaffed and undertrained to detect the trade in other priority contraband, such as narcotics and weapons. However, if range states and consumer countries are

- sincere in their professed wish to curtail the Tiger-bone trade, then **enforcement of relevant laws will have to be given a higher official priority, more financial resources, better technology and increased personnel.**

- It may be necessary to **consider undercover investigations** as a means of more successful enforcement. Through infiltration of the black market in Tiger bone, law officers could gain knowledge of routes and contacts involved. Many may consider this an unethical course of action, with obvious risk attached, yet it has proven results as a method, as illustrated by Indian undercover action in August 1993. Along similar lines, a system of reward for informants contributing to the apprehension of illegal traders should be considered.

Legislation and associated penalties for infraction are ultimately interpreted by courts of justice. The

- **judiciary should be made aware of the seriousness of Tiger poaching and trade** in parts of the dead animals. Moreover, **information should be collected on convictions** of Tiger poachers and illegal traders, so that over-lenient sentences may be advised against for the future, and apt sentences may be upheld as precedents for following cases.

Public awareness

Against a background of continuing attempts to expand public awareness of the urgency ot Tiger

- conservation, the **traditional-medicine communities in consumer countries should be involved** in determining future strategies for reducing utilization of Tigers. Primary results of a study of the feasibility of dissuading Asians from using Tiger bone as medicine show that some Oriental-medicine specialists have been offended by demands that they stop using such preparations (Parry-Jones and Mills, in prep.). If future attempts are more successful, however, practitioners of Oriental medicine could be invaluable in advising on acceptable substitutes for Tiger bone. It should be noted that

synthetic substitutes, such as the one for the active ingredient in bear bile, are regarded as Western medicine and not generally accepted by users of Oriental medicine (Mills and Servheen, 1991).

Research

- Before accepted substitutes are promoted, **further research should be conducted to determine the status of the substitute species in the wild.** For example, the Chinese promotion of the use of pika bones as an alternative for Tiger bone may not have taken account of the fact that several of China's pika species may be seriously depleted in the wild (A.T. Smith, *in litt.*, 8 March 1994).

International co-operation

- **The Global Tiger Forum should continue to meet,** establishing itself as a symbol and means of international co-operation for Tiger conservation, and providing a forum for exchange of information from global experts on the subject. Those range states which are not yet members of the Forum should be encouraged to join.

- As noted previously, **increased membership, scope and effectiveness for CITES** is also desirable in this context.

REFERENCES

Anon. (1992). Hong Kong imports and exports classification list (harmonized system). Hong Kong Census and Statistics Department. The Government Printer, Hong Kong.

Anon. (1993). Status of forest cover in Project Tiger reserves. India Ministry of Environment and Forests, New Delhi.

Anon. (1994a). Vital signs. *Asiaweek* 20(25): 54.

Anon. (1994b). The bottom line. *Asiaweek* 20(25): 51.

Anon. (1994c). Kingdom of Cambodia: country paper. *Proceedings of the 1994 Global Tiger Forum*, New Delhi.

Anon. (1994d). Proposal to register the first commercial captive-breeding operation for Siberian Tiger. Submitted to the CITES Secretariat by the People's Republic of China and the Breeding Center of Felidae Animals of Hengdaohezi, People's Republic of China.

Anon. (1994e). Tiger penis, Leopard penis, Tiger bone and bear gall bladders are what Taiwanese gourmands desire. *Hong Kong Today*, 26 June 1994.

Anon. (1994f). Analysis of the market for Tiger, bear and Musk Deer in the Russian Far East (Primorsky Kray and Khabarovsky Kray). TRAFFIC International.

Anon. (1994g). An investigation of the retail availability of rhinoceros horn and Tiger bone in the People's Republic of China. TRAFFIC International.

Anon. (1994h). Status and conservation needs of Tiger [sic] in Myanmar. *Proceedings of 1994 Global Tiger Forum*, New Delhi.

Anon. (1994i). Action plan and progress report for strengthening enforcement of the Wildlife Conservation Law. Council of Agriculture, Republic of China, Taipei.

Bensky, D. and Gamble, A., with Kaptchuk, T. (1993). *Chinese Herbal Medicine Materia Medicine*. Eastland Press Inc., Seattle.

Chestin, I.E. and Poyarkov, A.V. (1993). Preliminary data on the illegal wildlife trade in Russia. Unpublished draft.

Dorji, D.P.J., and Wangchuk, T.R. (1994). *Panthera Tigris* in Bhutan: An overview of its status. *Proceedings of the 1994 Global Tiger Forum*, New Delhi.

Elagupillay, S. (1994). The conservation of Tigers in Malaysia. *Proceedings of the 1994 Global Tiger Forum*, New Delhi.

Galster, S., Day, M., Chan, R. and Shaitrov, S. (1994). The year of the Tiger: 1994. The Tiger Trust.

Gaski, A.L. and Johnson, K.A. (1994). Prescription for extinction: endangered species and patented Oriental medicines in trade. TRAFFIC USA.

Goodwin, H.A. and Holloway, C.W. (compilers) (1978). *Red Data Book, Volume 1: Mammalia*. IUCN, Morges.

Hepner, V.G. and Sludski, A.A. (1972). *Mammals of the Soviet Union*, Vol. II(2). Smithsonian Institution and The National Science Foundation, Washington, D.C. (English edn.).

Highley, K. and Highley, S. (1994). Taiwan survey: the tiger bone trade. Earth Island Institute.

Hong, S.P. (1989). Traditional Korean medicine in the modernization process: institutional and attitudinal changes. PhD thesis, Iowa State University.

Jackson, P. (1990). *Endangered species: Tigers*. Chartwell Books, New Jersey.

Jackson, P. (1993). The status of the tiger in 1993 and threats to its future. *Cat News*, 19: 5-11.

Kidder, R.L. (1983). *Connecting law and society*. Prentice Hall Inc., Englewood.

Liu, X.C. (1993). A plans [sic] of training Siberian Tigers and living in the wild and release to their natural habitat. Submitted to the IUCN Cat Specialist Group by The Breeding Centre of Felidae Animals of Hengdaohezi, People's Republic of China.

Martin, E.B. (1992a). The trade and uses of wildlife products in Laos. *TRAFFIC Bulletin* 13(1): 23-28.

Martin, E.B. (1992b). Poaching of bones threatens the world's last Tigers. *Cat News* 17: 2.

Martin, E.B. (1992c). The poisoning of rhinos and Tigers in Nepal. *Oryx* 26(2): 82-86.

Mills, J.A. (1993a). Market under cover: the rhinoceros horn trade in South Korea. TRAFFIC International.

Mills, J.A. (1993b). Tiger bone trade in South Korea. *Cat News* 19: 13-16.

Mills, J.A. and Servheen, C. (1991). The Asian trade in bears and bear parts. TRAFFIC USA.

Mulliken, T. and Haywood, M. (1994). Recent data on trade in rhino and Tiger products, 1988-1992. *TRAFFIC Bulletin* 14(3): 99-106.

Nadkarni, A.K., (ed.) (1993). *Indian Materia Medica*. Vol. 2. Popular Prakashan Private Ltd., Bombay.

Nichols, D.G., Fuller, K.S., McShane-Caluzi, E. and Klerner-Eckenrode, E. (1991). Wildlife trade laws of Asia and Oceania. WWF-US.

Nowell, K. (1993). Tiger bone in Taipei. *Cat News* 13(3): 112-114.

Ohnuki-Tierney, E. (1984). *Illness and culture in contemporary Japan*. Cambridge University Press, Cambridge.

Pan, L. (1990). *Sons of the Yellow Emperor: a history of the Chinese diaspora*. Little, Brown and Company, Boston.

Pang, K.Y.C. (1984). Everyday life, health, and illness of the elderly Korean immigrants: cultural construction of illness. PhD dissertation, The Catholic University of America.

Parry-Jones, R. and Mills, J.A. (in prep.). Feasibility of dissuading Asians from the use of endangered species as medicine. TRAFFIC International.

Read, B.E. (1982). *Chinese materia medica: animal drugs*. Southern Materials Center Inc., Taipei.

Reid, D.P. (1993). *Chinese herbal medicine*. Shambala Publications Inc., Boston.

Salkina, G. (1994). Untitled. *Proceedings of the 1994 Global Tiger Forum*, New Delhi.

Salter, R.E. (compiler) (1993). Wildlife in Lao PDR. A status report. IUCN, Vientiane.

Simon, N. (compiler) (1966). *IUCN Red Data Book, Volume 1: Mammalia*. IUCN, Morges.

Tan, B. (1987). The present status of Chinese Tigers. *Cat News* 6: 7-10.

Thapar, V. (1992). *The Tiger's destiny*. Kyle Cathie, London.

Wu, D.Y.H. (1979). Traditional Chinese concepts of food and medicine in Singapore. Occasional paper no. 55. Institute of Southeast Asian Studies, Singapore.

Wu, X.Z., Zhang, M.H., Gao, Z.X., Ju, Z.L., Zhao, Y.F., Liu, W.X., Yu, L.G., and Mu, B.G. (1994). Current population and distribution of *Panthera tigris altaica* in Heilongjiang Province. *Chinese Wildlife* 3(79): 17-20.

Zhang, E., (ed.) (1988a). *Rare Chinese materia medica*. Publishing House of Shanghai College of Traditional Chinese Medicine, Shanghai.

Zhang, E., (ed.) (1988b). *Highly efficacious Chinese patented medicines*. Publishing House of Shanghai College of Traditional Chinese Medicine, Shanghai.

Zhang, E., (ed.) (1988c). *Prescriptions of traditional Chinese medicine*. Publishing House of Shanghai College of Traditional Chinese Medicine, Shanghai.

NOTES

[1] Peter Jackson is Chairman of the IUCN/SSC Cat Specialist Group.

[2] Prices from range states indicate prices paid to poachers or to middlemen before exportation of Tiger bones to consuming countries.

[3] Because the weight of a Tiger skeleton varies with age, sex and health of the individual at the time of death, and can range from approximately 7 to 27 kg, this report will use an average skeleton weight of 17 kg.

[4] The term "known records" refers to records known to the authors and their information sources.

[5] "Wholesale price" refers to price paid by Oriental-medicine dealers or traditional pharmacies.

[6] "Retail" price refers to that paid by the end-use consumer.

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AUGUST 1994