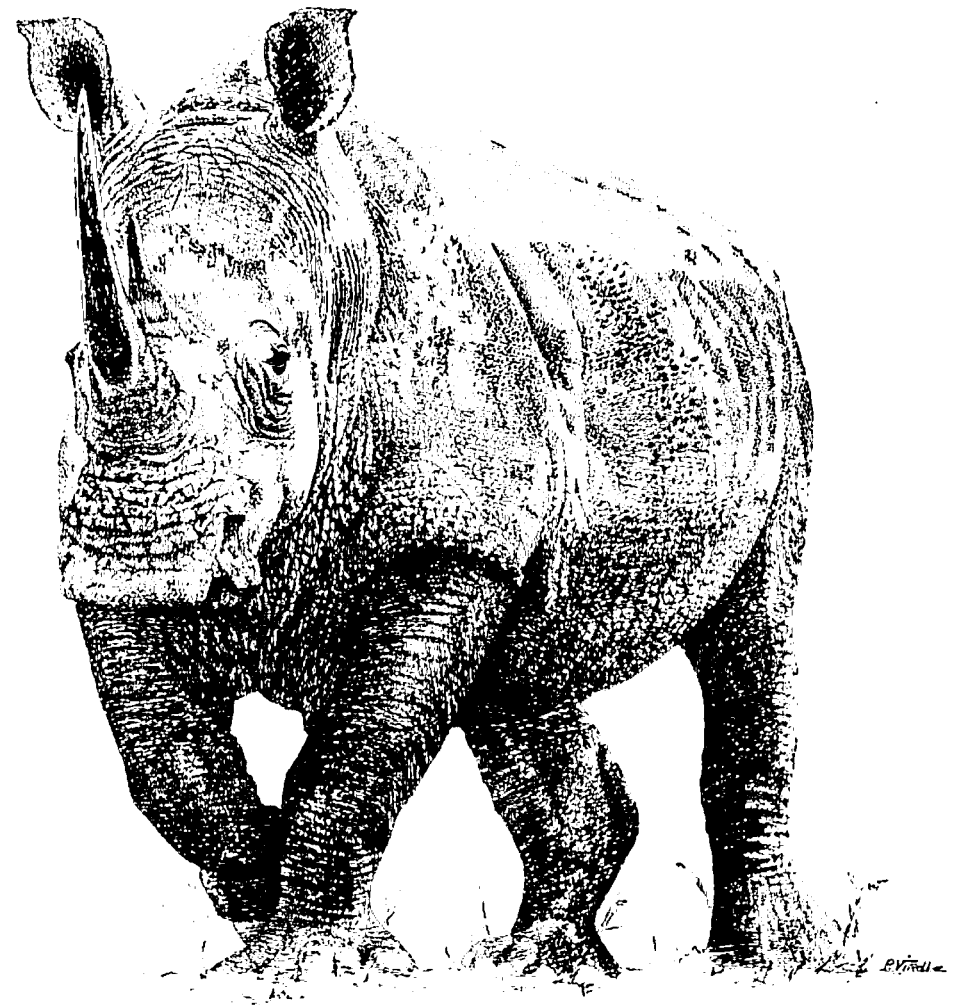


THE INTERNATIONAL TRADE IN RHINOCEROS PRODUCTS



By Esmond Bradley Martin
December 1979

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THE INTERNATIONAL TRADE IN RHINOCEROS PRODUCTS

A REPORT FOR THE WORLD WILDLIFE FUND (WWF) AND
INTERNATIONAL UNION FOR CONSERVATION OF NATURE AND
NATURAL RESOURCES (IUCN)

DECEMBER 1979

by

ESMOND BRADLEY MARTIN

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THE INTERNATIONAL TRADE IN RHINOCEROS PRODUCTS

PREFACE

The International Union for Conservation of Nature and Natural Resources (IUCN) and the World Wildlife Fund (WWF) have received a report from their consultant, Dr Esmond Bradley Martin, on the international trade in rhinoceros products, based upon survey work undertaken in Africa and Asia. The report is being made widely available for the information it reveals on the nature of this trade, covering such topics as the uses to which rhino products are put, the pattern of prices in recent years, geographical aspects of the trade and a quantitative assessment of world consumption of rhino horn. The report is the first comprehensive account of its kind, bringing together and evaluating data already available, as well as new information brought to light by Dr Bradley Martin's research. The conclusions are alarming, for they point to continuing pressure on the already highly vulnerable five species of rhino.

The most striking point to emerge from the study is that the wholesale price of rhino horn has risen twentyfold over the last five years in response to an upsurge in demand in several parts of Asia. Whilst the study has dispelled the myth that the Chinese use rhino horn as an aphrodisiac it has shown that they regard it instead as a powerful fever-reducing drug, and that other rhino products are widely used. In Southeast and East Asia, more than half of the annually available supply of rhino horn is consumed for such medicinal purposes. In parts of India rhino horn is used for its supposed aphrodisiac properties. A major use of African rhino horn is for making Yemeni dagger handles, and it is primarily because of the present demand in the Yemen Arab Republic that the prices for rhino horn have risen so high.

The world rhino population is only a fraction of what it was a hundred years ago. And the dramatic upsurge in the value

of rhino horn in recent years has put even greater pressure on these species; it is believed that there were twice as many rhinos in 1970 as there are now.

To save the two African and three Asian rhino species from extinction, WWF has mounted an international fund-raising campaign, "Save the Rhino", for a programme of rhino conservation projects developed by IUCN in Africa and Asia. Much of the funds raised are being committed to anti-poaching operations, creation of new reserves, reinforcement of national park operations and public education projects. Clearly conservation measures of this kind are essential, as two success stories - the white rhino in South Africa, and the Indian rhino in India and Nepal - show. But the picture generally is depressing. The populations of African black and northern white rhino are under severe pressure and the small numbers of Sumatran and Javan rhino are surviving only in restricted ranges.

Conservation measures alone are insufficient and the greatest effort should be directed towards arresting the trade in rhino horn. This offers the best hope for the long-term survival of rhinos. Dr Bradley Martin has made a number of recommendations to this effect, which have been carefully reviewed by IUCN, WWF and the Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The action which IUCN and WWF are taking is as follows:

1. A campaign is being mounted to encourage interest in producing, consuming and trading countries to join CITES, to enforce CITES more effectively, and to halt trade in rhino products. The help of competent international organizations, such as the Organization of African Unity, the Association of South East Asian Nations, and the Arab League Educational, Cultural and Scientific Organization, is being enlisted.
2. Technical assistance is being provided to producing countries, especially in Africa, on improvements to the administration and enforcement of trade controls under CITES, so as to make full use of this Convention.
3. Particular attention is being given to bringing the seriousness of the situation to the notice of the Chinese authorities, who have indicated their desire to adhere to CITES and control the trade in rhino products. Contact is being made with medical and pharmaceutical associations and with practitioners in other Asian countries to persuade them not to prescribe or dispense any rhino derivatives, and to encourage the use of alternatives and substitutes. Far Eastern wholesale dealers in rhino products are being encouraged to withdraw from this market - as dealers in Hong Kong have already done.

4. Particular attention is also being given to drawing the attention of the Government of the Yemen Arab Republic to the consequences of the demand for rhino horn daggers. An approach which recognizes the deep respect of the Yemeni people for Islamic traditions and which urges the use of alternative materials for dagger handles is also being made.
5. Governments are being requested to halt all internal as well as external trade by placing a moratorium on the sale of all government and parastatal stocks of rhino products. Records of these stocks, regularly up-dated, should be made available to IUCN.
6. Hunting of rhino should be prohibited anywhere in the world, except where such hunting serves to promote the conservation of particular populations and provided that proper control of the hunting and disposal of products and trophies is assured.

INTRODUCTIONBlack rhinoceros (*Diceros bicornis*), Uganda.

Photo: J. H. Slover/J. Allan Cash

From 1970 to the present approximately 90 per cent of the rhinoceroses in Kenya, Uganda and northern Tanzania have been killed.¹ Rhinos in these three East African countries constituted at the beginning of the decade the world's largest numbers. Today prospects for their very survival are shrouded in pessimism. Official statistics, which exclude smuggling, show that a total of almost 24 tonnes of rhino horn was sent overseas from East Africa between 1970 and 1976.² This represents approximately 8280 rhinos;³ the entire rhino population of Africa now is estimated between 14,000 and 24,000 animals.⁴ In Asia, there are only about 2000 Indian, Sumatran and Javan rhinos left.

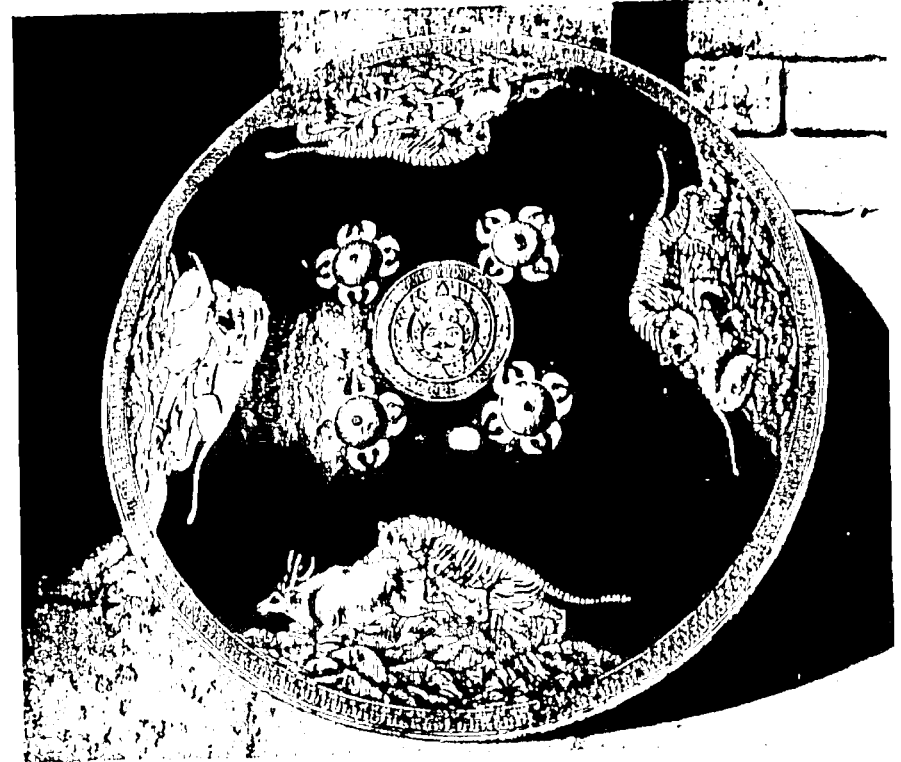
The main reason for the accelerated killing of rhinos is due to the strong demand for rhino products, especially the skin and horn, in the Yemens, India, Singapore, China, Hong Kong, Malaysia, Taiwan, South Korea and Japan. Moreover, despite the fact that the quantity of rhino horn available on the market has increased in the 1970s decade, prices have risen to an all-time high. In attempting to understand this unusual phenomenon and to ascertain specifically why there has been an increase in demand for rhino horn in Asia, I visited and carried out field research in North Yemen in October 1978, India in December 1978 and January 1979, and Mauritius, Singapore, Hong Kong, Macao, Taiwan, Thailand and Sri Lanka during the months of August, September and October 1979. As an Honorary Consultant to the Survival Service Commission of the IUCN African Rhino Group, I have also been actively involved in the Kenya Rhino Group, studying East Africa's role in the rhino trade.

I could not have prepared this report without the co-operation and assistance of dealers and pharmacists in Asia. I carried out interviews with more than a hundred wholesalers, retailers, importers and pharmacists to obtain information on prices and trading practices. Much of the material I gathered was made available to me in strict confidence (as some of the data could be used adversely by their competitors), and, therefore, I have not mentioned any of my informants by name in this report. To these

individuals, I would like to express thanks and appreciation for their invaluable help.

My wife, Chryssee, took a special interest in this project, assisting me from the beginning during interviews in the field to the completion of this report; I am most grateful to her. I also want to thank the World Wildlife Fund for their financial assistance which enabled me to spend two and a half months in Southeast Asia. Dr Kes Hillman, Chairman of the IUCN African Rhino Group, encouraged my pursuit of this study and presented me many pertinent statistics. Ian Grimwood also helped me considerably and shared with me his observations on the status of Asian rhinos. Finally, I want to thank especially Ian Parker who read this report in draft form, suggested many ideas, and gave of his time so generously to me.

Esmond Bradley Martin



A shield made out of rhino hide in Vdaipur, Rajasthan, India in the early eighteenth century.

Photo: Esmond Bradley Martin

Note: Throughout this report prices have been converted to U.S. dollars.

1. THE USES OF RHINO PRODUCTS IN THE PAST

Horn

It is the horn of the rhinoceros which for many centuries has been the most prized part of the animal. The Chinese carved it into magnificent works of art, including ceremonial cups and decorative dishes for washing paint brushes, none of which were actually used, but were instead treasured gifts commissioned by Chinese aristocrats to present to emperors on their birthdays during the Ming and Ching dynasties. Today, there are not a great many of these vessels remaining to be seen; the best known ones are in the National Palace Museum in Taipei and in the King of Sweden's art collection.⁵

Less elaborate cups carved out of rhino horn, for the purpose of detecting poison, were widely made and used in the Muslim, Hindu and Buddhist worlds, from central Africa in the west to China in the east. If one feared that a poison might have been added to a drink, one would pour the suspect liquid into a rhino horn cup. It was believed that if poison were present, either an effervescence of bubbles would emerge or the liquid would be rendered harmless. The practice of submitting drinks to this test spread to Europe, where popes and monarchs also used rhino horn cups.⁶ Dr Lee Talbot thinks that these cups may have been partly successful in detecting poison. Since many of the old poisons were strong alkaloids, they would have reacted when put into contact with rhino horn, which is made up of keratin and gelatine.⁷

One of the main centres for making rhino horn cups outside of China was in the Sudan; and, when the famous explorer Sir Samuel Baker left Africa, he was presented with three such cups mounted on silver by Hussein Khalifa Pasha.⁸

In China for hundreds of years the horn was also used for making sword handles, buttons, buckles for belts and cross-pieces on straps.⁹ But the major use in China in the old days was for medicinal purposes. The most famous Chinese pharmacist, Li Shih Chen, who wrote the Pen Ts'ao Kang Mu in the sixteenth century, stated that the best horns came from freshly killed males and noted that the tips of



A rhino being shot in the Sudan in the nineteenth century.

them were the most expensive part. He strongly warned that rhino horn should not be taken by pregnant women because the fetus would die. The main diseases and disabilities which rhino horn would cure, according to Li Shih Chen, were snake bites, "devil-possession", hallucinations, typhoid, headache, carbuncles, boils and fever; if the horn were burnt and mixed with water, then vomiting and food poisoning could be cured.¹⁰ Even today, Li Shih Chen's 50-volume work, including 12,000 medicinal recipes, is considered the most outstanding study of Chinese pharmacology. It is also the classic on the use of rhino horn, and much of the horn prescribed now is based on his research.

In India there are references dating back to the twelfth century of rhino horns being used for making knife handles,¹¹ and there is a long tradition of the horn being ground up into a powder and mixed with liquids to be used as an aphrodisiac.

Aside from cups, the horn was used in the Sudan in the nineteenth century for making walking sticks and handles for swords.¹² Farther south, in East Africa, the Dorobo made snuff boxes and clubs from the black rhino horn.¹³ Richard Burton reported that medicinal properties of the horn were also recognized by Africans: "The inner barbarians [of Tanganyika] apply plates of the horn to halcomas and ulcerations, and they cut it into bits, which are bound by twine around the limb."¹⁴

Other Products

The skin was traditionally the second most widely used part of the rhino, and the most common items made from it were shields. Indians in Gujerat and Rajasthan so skilfully cured rhino skin that it became almost transparent amber in colour. It was especially attractive, and when cut into the shape of a round shield it was decorated with jewels.¹⁵ Baker described the making of rhino shields in Ethiopia:

"The skin of the rhinoceros is exceedingly compact and dense. When stretched over a block and dried, it is rubbed down with sand-paper, and oiled; it then becomes semi-transparent, like clouded amber, and is much esteemed by the great personages of Abyssinia for shields; these are beautifully mounted with silver, and are highly ornamental."¹⁶

Much plainer shields were made in the nineteenth century in Somalia¹⁷ and Zanzibar.¹⁸

In addition to shields, people in East Africa made whips from rhino skin, which were reputedly of better quality than those of hippo hide.¹⁹ In Ethiopia, according to the sixth-century merchant, Cosmas Indicopleustes, ploughs were made out of rhino skin.²⁰ Gujeratis made jewel boxes from

it,²¹ and the Chinese in the eighth century sometimes used rhino skin to cover the back of small boats in order to deflect arrows and spears.²²

The inhabitants of the island of Borneo may have had more uses for the rhino than any other people. Beside the more common ones, the Borneo people constructed boxes out of rhino feet and wore the toes of Sumatran rhino as amulets. Their belief in an almost supernatural power of the rhino was responsible for some bizarre practices. For example, they used to hang the tail of a rhino in a room where a woman was in labour, believing that it would ease childbirth pains. In severe cases of labour, they held a rhino penis over the woman's head and poured water through it.²³

It was the demand for the meat of the rhino which probably led the rhino to the brink of extinction in Borneo. Less well known is the fact that the British and the Dutch in South Africa in the nineteenth century preferred white rhino meat to any other game animal;²⁴ in Mashonaland and Matebeleland the white rhino was almost exterminated on account of the demand by Europeans for its meat.²⁵

2. THE PRESENT USES OF RHINO COMMODITIES



A Yemeni outside of Sanaa wearing the typical jambia (dagger).

Photo: Edmond Bradley Martin

Horn

Since 1972 a vast quantity of rhino horn has been used for making the handles of traditional Yemeni daggers, called jambias. We do not know for how many years or even centuries rhino horn has been in demand in the Yemen for dagger handles, but there is strong evidence that it has been only recently that there has been a large demand. Prior to the North Yemen Civil War which erupted in 1962, the country was one of the poorest in the world and was almost completely cut off from all outside influences; in fact, in 1962, North Yemen was essentially a medieval state, under the absolute rule of a traditional Iman and completely lacking in almost all forms of modernization. Thus it was most likely that only the Iman's family and a few other relatively wealthy people could afford rhino horn; 99 per cent of the population was barely surviving at an extremely low standard of living. Of course, most men possessed traditional daggers, but the handles of these were generally made out of cow horn.

In South Yemen, which was under British control from 1839 until 1967, the population was much smaller than that of North Yemen. The small elite of Arab Sheikhs in South Yemen also had daggers with rhino handles, most of which were made in South Yemen, then called the Aden Colony and Protectorate. When Ian Grimwood was working in the Hadramaut in 1962, he saw craftsmen making dagger handles from rhino horn in Mukalla.²⁶

However, the official East African statistics show that the countries of Kenya, Uganda and Tanzania, the world's major suppliers of rhino horn, exported essentially no horn to either North or South Yemen from 1949 to 1955, primarily due to the fact that North Yemen hardly imported anything at all, and the per capita income of Aden at that time was extremely low as well. Later, between 1956 and 1961, South Yemen imported a yearly average of 98 kilos, and from 1962 to 1969 the annual average increased over four and a half times to 474 kilon.²⁷

I do not wish to carry out an analysis of the Yemeni trade in rhino horn in this section, so suffice it to say here that, after the Civil War in North Yemen ended in 1970, North Yemen replaced South Yemen (then a socialist state) as the major importer in the world of rhino horn. According to official North Yemen statistics from 1969 to 1977, 22,645 kilos of rhino horn were imported.²⁸ In other words, an annual average of 2831 kilos of rhino horn came into the country, representing for this eight-year period the death of approximately 8000 rhinos, which is almost the same figure as the one based on the total legal exports from East Africa at this time.

This huge amount of rhino horn imported into North Yemen in the 1970s was used to make handles for daggers. Since the per capita income of the country has increased fivefold in the past ten years, there is now enough money for many people to purchase the horn. The expensive daggers, which vary in price from \$ 300 to \$ 13,000, have a very special place in the life of Yemeni men. Almost all males over the age of 14 possess one of these traditional weapons, and most Yemeni men wear them daily. To some extent, the dagger represents status and is a symbol of a man's sexual maturity. A dagger with a beautifully carved rhino handle encrusted with gold or silver coins is a personal adornment and is often attached to a very elaborate belt. The traditional role of the dagger as a weapon is still portentous. A Yemeni will make use of his dagger as an offensive weapon and also as a deterrent to personal attack. In present day North Yemen the central government does not have control of the whole country and, especially in the eastern parts, there are rebels and bandits. Also, in the northern part of the country it is common to see men in the streets armed with, in addition to their daggers, modern rifles and hand grenades. In the town of Saada in the main market are several merchants who openly display for sale machine guns, automatic rifles, pistols, etc. While I was visiting there, one of the nurses who worked in the hospital told me that a man had recently been admitted who had been stabbed in the back by a fellow Yemeni wielding a jambia, and she had also, that very morning, assisted in an operation to mend another man's hand which had almost been severed by a dagger in the course of an argument among neighbours. Such illustrations indicate the continuing importance of the dagger as a weapon.

Most of the jambias which are offered for sale in North Yemen are made in the main market of the capital of Sanaa, within a short distance of the Bab al Yemen. In October 1978 at least five merchants were buying rhino horn from one main wholesaler in Sanaa. Each of these merchants employed several craftsmen to carve the horn into handles for the jambias; other craftsmen made the blades for them. One kilo of rhino horn will usually provide enough material for three handles, and thus between 1969 and 1977 approximately 8500 jambias with rhino horn handles were made each year. Now

that the North Yemenis are able to afford more rhino horn handles, these are more in demand than the daggers with cow horn handles, which are very considerably cheaper. There is a feeling that rhino horn handles are superior to others, as there is also a certain mystique about the rhino as an aggressive, potent animal.²⁹

Curiously, the preference for rhino horn handles on daggers is not apparent in other Arab countries. Neither the Arabs of Oman nor of the United Arab Emirates, who also carry daggers, import rhino horn for them.

Rhino horn as medicine

Although North Yemen is the country which imports the greatest amount of rhino horn, the making of rhino horn handles for daggers is secondary to the use of rhino horn in traditional Chinese medicine. However, it is not in demand in Southeast Asia as an aphrodisiac. Only in India, and in particular in Gujerat and Bengal, have I come across reports of rhino horn used as an aphrodisiac. I was told by World Wildlife Fund officials when I was in India that Gujerati men sometimes grind down to a powder a piece of rhino horn (usually from a black rhino) and mix it with water to form a paste which they apply to the penis and testicles to increase sexual potency. The name is said to be true in Bengal, but Indian rhino horn is used there; possibly the practice is less common in Bengal than in Gujerat because Gujeratis have long-standing contacts with East Africa and probably can more easily obtain rhino horn than the Bengalis, who instead rely on a supply of Indian rhino horn. However, whether or not the use of rhino horn in either of these places as an aphrodisiac is widespread remains at present unknown. More research is required, especially since there have been recent reports of an increase in poaching of Indian rhinos for their horn.

In my field research in Singapore, Hong Kong, Macao, Taiwan and Thailand no one suggested any possibility of aphrodisiac qualities pertaining to rhino horn. Moreover, traditional medicine practitioners denied that it is used in China as an aphrodisiac. It is possible that rhino horn may be used as an aphrodisiac in one or two remote places in Asia (other than in India), but its use as such is definitely only of minor significance. I understand, also, that neither the South Koreans nor the Japanese, both of whom are major importers of rhino horn, use it as a sexual stimulant. The popular belief among westerners that the major use of rhino horn is by the Chinese as a "love potion" is unfounded.

The published medical literature on the uses of rhino horn, in both Chinese and English, does not include descriptions of rhino horn for curing impotence or for stimulating sexual desire. In the forementioned Pen Ts'ao Kang Mu, from which much of today's Chinese traditional medicine is derived,

several uses are given for rhino horn, but not as an aphrodisiac. In John Keys' book, Chinese Herbs, the main uses of the rhino horn are listed as cardiotoxic, antipyretic and antidotal.³⁰ H. Wallnofer and A. von Rottauscher in Chinese Folk Medicine state that: "Rhinoceros horn (Hsi chio) is highly effective when applied to pus boils (furuncles). It is also prescribed as an antitoxin for snake bites."³¹ In Tibetan Medicine Jampal Kunzang adds that rhino horn is also used to purify the blood.³² In Singapore I visited the Chinese Physicians Association and talked with one of their foremost research officers in traditional Chinese medicine, Stephen Lau Kiew Teck. He confirmed to me that the Chinese never use rhino horn as an aphrodisiac and illustrated the point by kindly translating for me all the passages pertaining to rhino in the Chinese Medical Dictionary, one of the most complete Chinese reference books on traditional medicine. It contains a full description, covering several pages, of each of the five species of rhino and the various medicinal purposes to which are put the horn, meat (for snake and animal bites and headaches), and skin (for rheumatism). From all the rhinos horn is taken primarily for the treatment of high fevers. The Chinese Medical Dictionary purports that Indian rhino horn is the strongest.³³ Dr Lau himself claimed that he would be willing to prescribe substitutes for rhino horn, such as saiga antelope or even buffalo horn. He also thought that young, inexperienced doctors would hesitate about prescribing rhino horn as it is also believed that improper use of it can cause dangerous side-effects.

Although rhinoceros horns are not used as aphrodisiacs by the Chinese, other animal products and herbs are extensively employed by them as sexual stimulants. According to the literature, a pig's kidney is eaten to cure impotence, and deer antlers are "an excellent excitant for men whose sexual potency is declining". Dragonflies are "counted among the love-medicines since they reputedly intensify sexual vigour". Other traditional Chinese aphrodisiacs include the brain of the monkey, the tongue of the sparrow, human placenta, the tail of the deer, the penis of a white horse, mutton from wild sheep, velvet horns of the sika deer, rabbit hair from old brushes and human finger nails.³⁴

The most common aphrodisiac from an animal that I saw offered for sale in most of the larger medicine shops in Southeast Asia was the tiger penis and testicles. These were all dried and packaged in China, but because of their low price (between \$ 17 and \$ 78 each), there was obviously doubt as to whether they were genuine articles. Chinese men wishing to improve their sexual performance place the dried sexual parts of the male "tiger" in a bottle of European brandy for up to six months. Afterwards, they drink part of this potion immediately before engaging in sexual activity. Other aphrodisiacs which I saw in pharmacy shops in Southeast Asia were dried deer penises and testicles at \$ 150, dried geckos, and snake blood mixed with snake gall bladder, costing \$ 2.25 a mouthful.

Today most rhino horn in Southeast Asia and the Far East is used as a fever-depressing drug; it is also occasionally used to relieve headache, for heart trouble, to "cleanse" the liver and pancreas, and, when made into an ointment, to cure skin diseases. Rhino horn is available in all the large cities there and in many smaller ones as well. Of the 76 traditional medicine shops in which I held interviews with the pharmacists, 50 had rhino products for sale (90 per cent consisting of rhino horn). All of the shops I examined closely in Taipei had rhino products, but only 52 per cent of the ones in Bangkok sold any.

The traditional medicine shops in Southeast Asia are almost exclusively owned and managed by Chinese. Hundreds of traditional medicine shops are spread throughout the commercial areas of Singapore and Hong Kong. And even in Thailand, it is the Chinese, not Thai, medicine shops which dominate the market. Traditional medicine shops are not tucked away in remote back streets, but are instead major places of business, to be found in upper-middle class shopping areas as well as in poorer neighbourhoods. Many have modern showcases, lighted with fluorescent bulbs to display traditional herbs and animal products. Quite often, on shelves opposite, or above, modern western antibiotics, vitamins, etc. are displayed for sale. Some shops have separate consultation rooms, and most of the premises are exceptionally clean and neat; moreover, they are blessedly free from jarring recorded music so prevalent in other types of shops in this part of the world, although in Taiwan there is usually a television turned on softly to entertain customers and employees alike. The hours of business are long: in Singapore and Hong Kong the day begins around 9:00 a.m. and does not finish until 10:00 p.m. The employees and managers rarely leave during this 13-hour period, taking their meals, reading their newspapers, playing cards, etc. when they are not preoccupied by their work. The atmosphere is pleasant, and the sales people are more genuinely helpful and concerned for their customers than in ordinary shops. Hot tea is made available in many of these commercial establishments; traditional hospitality is offered even in the most humble ones. Most of the customers are women, the majority of whom are probably over 40 years of age, and who usually patronize such shops early in the morning on their way to buy food, or at night after 8:00 p.m.

Rhino horn can be purchased without a prescription. Chinese medical shops operate somewhat along the lines of western pharmacies prior to the enforcement of drug laws, which is to say that someone with a complaint would be just as likely to consult a pharmacist as a doctor for a cure. In traditional Chinese medicine shops, you will find patients handing over prescriptions written in Mandarin to the pharmacist (almost always a man), and you will also see customers explaining their problems in detail and afterwards being given mixtures of herbs and animal products as remedies. In so far as rhino horn is concerned, a customer

will not usually purchase a powder that has already been made from it. A customer prefers to examine closely the horn from which scrapings will be made. Ground-up rhino horn powder is very pale grey in colour and may easily be faked by other horn, such as water buffalo or antelope. Since it is one of the more expensive animal products, it is natural that the customer wants to be certain of getting what he/she is paying for!

Wariness is a standard characteristic among the Chinese when they are engaged in business deals, but what I found to be the case generally was that customers of the medicine shops relied heavily on the experience and knowledge of the pharmacists, taking for granted their integrity. This seems to be well founded. On the other hand, the pharmacists themselves displayed marked suspicion of any processed animal product, especially when such were packaged in other countries. They often said that they would not purchase tablets or tonics reputed to have rhino components because they doubted whether the traders in these products were honest.

The dispenser of rhino horn, knowing well that his customer will be interested in seeing the object, produces it from a display cabinet or a little drawer (where it is often kept carefully wrapped in cotton wool); upon agreement that it is of good quality, he will take a sharp knife and scrape a small amount from the edge of the horn; the resultant shavings are next weighed on a scale. In Singapore, Macao and Hong Kong an old-fashioned hand scale is often used, the top bar of which may be of ivory or bone. In these places the tael is the weight by which the horn is priced, and the tael corresponds to roughly 37.8 grams. Individual purchases amount to a twentieth or a tenth of a tael. In Taiwan the chien, one-tenth of a tael, is the more common weight for pricing, obviously a more convenient measurement of rhino horn for retail sales. In Thailand, even though the merchants in traditional medicine are mostly Chinese, the metric system prevails, and rhino horn is usually retailed by the gram, but occasionally also by the tael.

When the rhino horn purchaser returns home, he removes the shavings from the paper package in which the dispenser has invariably wrapped the drug, and places the contents into a glass and adds boiling water. When cool enough to swallow, the brew is given to the patient. If the fever has not come down within a few hours, the procedure is repeated.

The most knowledgeable pharmacists I interviewed in the course of this research professed a preference for Indian over all other species of rhino horn, with the exception of those in Thailand. I was not able to ascertain a satisfactorily cogent explanation for the supposed superiority of the Indian rhino horn, possibly because it is difficult for a westerner to comprehend the philosophy on which so much traditional Chinese medicine is based. Put

most simply to me, the pharmacists declared that there is a quality of temperature, which is something almost mystical, ascribed to medications: the most powerful drugs are called "hot", and the less powerful ones are "cold". Rhino horn belongs to the first category, but there are certain nuances of degree, and the Indian rhino horn composites, while basically the same as those in other rhinos, are said to be more concentrated; hence it is the "hottest" of the species. When I tried to obtain more details, inevitably contradictions arose! For instance, I would be told that the horns of the two African species had less value because the animals themselves were bigger; but, in size, both Javan and Sumatran rhinos are smaller than the Indian one. Very few pharmacists knew anything at all about the Javan rhino, and so further questions on the differences between that single-horned rhino and the Indian species were irrelevant. When I asked why the composites were most concentrated in the Indian rhino, I was also told that this was due to the climate where the Indian rhino lives. Since the present habitat of Indian rhinos in the wild is limited to northern India and Nepal, it is true that they are subjected to extreme climatic changes, that is to say temperatures ranging from 7°C. min. in the winter to 38°C max. in summer. Traditionally, the Chinese of Southeast Asia feel that the year-round hot, humid weather of places like Singapore is less healthful than those areas where there are definite seasons. It may well be that this is the most plausible reason for which the Chinese believe that Indian rhino horn is superior.

Still today, in accordance with the dictates of Li Shih Chen, the best quality rhino horns are thought to be from recently killed males, and the best part is the tip (which can more easily be faked by the horn of another animal than any other part). For some reason, the Chinese prefer the darker coloured horn, and the horn is generally darkest at the tip. The question of colour is complicated by the fact that because the Ceratotherium simum is called in English the "white" rhino, it is generally presumed by the Chinese that its horn is lighter in colour! The health of a rhino is to some extent determined by the Chinese by the darkness of its horn; and, here again, the degree of "powerfulness" of the horn as a drug is related to the animal's state of health.

Thais of Chinese origin are the only pharmacists I found who do not ascribe to the theory that Indian rhino horns are the best; they instead prefer those of the Sumatran rhino, in particular ones taken from the northern Thailand border with Burma. Moreover, contrary to other Asian pharmacists, they seldom buy any African rhino horn.

As far as I know, nowhere now in Africa is the rhinoceros horn used as an aphrodisiac or for medicinal purposes of any sort. Unlike in the Yemen, Southeast Asia and the Far East, Africans do not attach any special qualities to rhino horn

per se; however, because of the tremendous demand for rhino horn outside Africa, it has become an item of great commercial value, not just for the middlemen who arrange its export but also for the poachers, who, in Kenya, can make as much as \$ 400 for supplying one rhino horn to the market.

Arabs in the Sudan, whilst not personally interested in rhino horn today, carve cups and boxes out of it for sale to wealthy Arabs in the Gulf States and Saudi Arabia. According to information given to me by Ian Parker, a well known Khartoum merchant in 1978 was trying to spread a certain mystique about rhino horn by telling people that when a rhino horn box is completed, the craftsman who made it would sometimes place a live scorpion inside and close the lid. He and his friends would then hear a lot of noise coming from the box and, after a while, total silence. When they opened the lid, all that would be left of the scorpion would be a little dust.

Other Products

In the world today, next to the horn, the most widely used part of the rhino is its skin. In demand in Singapore, Hong Kong, Macao, Taiwan and Thailand, people believe in its efficacy for curing skin diseases and occasionally for relieving rheumatic pains and blood disorders. The major supplier of rhino skin to the above-named countries (except Thailand) is now South Africa, which legally exports dried rhino skin to dealers (mainly in Hong Kong) who in turn sell it directly to Chinese traders in other countries or to local wholesalers who sometimes arrange for it to be "processed" into thin strips. This procedure entails first slicing the skin into pieces about one-third of a centimetre thick, then boiling and drying them once again. The thin slices are afterwards arranged in little packages measuring approximately 2.5 cm x 9 cm and tied with red and green ribbon. Processed rhino skin is cheaper than plain dried skin, and there is some concern that the so-called "processed" variety may not always be real rhino skin, for when buffalo hide is treated in the same manner it looks like that of the rhino. Another reason for its cheapness is that it is less "pure" as a result of the boiling procedure. However, its popularity is apparent in Singapore, Taiwan and Macao where it is often displayed in medicine shops for sale in large, glass European-type bonbon jars. The merchants in Macao told me that the hide which is processed is generally taken from the stomach of the rhino while most of the plain dried skin is from the animal's back. They did not think there was much difference between Asian and African rhino skin once it was "processed".

Throughout Southeast Asia, wealthy people often display in their homes (and sometime on business premises) a pair of elephant tusks as a symbol of their prosperity and good luck. To some extent, parts of the rhino are also kept for

display in homes and pharmacies as the same kind of symbol, and as such they are not for sale.³⁵ Because of the commercial value of the rhino horn, I believe that people in Hong Kong in particular like to show that they can afford to buy it and that this is the main reason they display it. There is, however, more significance to the symbol of the rhino in Thailand, for there one is just as likely to come across a small piece of skin hanging on a string from the ceiling as a trophy-sized rhino horn to ward off misfortune. Such a practice may seem odd to westerners, but to the Thais it is probably just as difficult to understand why people in America and Europe keep rhino horn trophies simply as mementos of successful hunting safaris, without any other significance attached to them - and that those same westerners often wear elephant hair bracelets because they believe these are good luck symbols.

Powder, Tablets and Tonics

On account of the fact that purchasers of rhino products are willing to pay high prices for genuine rhino items, the market for rhino powder, tablets and tonics is limited. In fact, I never even saw a single tonic containing rhino products, although I asked for such in every country I visited, having been shown prior to my trip a label from a tonic called "Three Legs Brand Rhinoceros Horn Anti-Fever Water". This was made by the Wen Ken Drug Company in Johore, Malaysia, and the label further states:

"This medicine is carefully prepared from the best selected Rhinoceros Horn and Anti-Fever Drugs, and under the direct supervision of Experts. This wonderful medicine acts like a charm in giving immediate relief to those suffering from: Malaria, High Temperature, Fever affecting the Heart and Four Limbs, Against Climate Giddiness, Insanity, Toothache, etc."

As for tablets, I did come across some in Hong Kong and Macao which are supposed to contain rhinoceros horn. Called "Rhinoceros and Antelope Horn Febrifugal Tablets", the box contains 12 tablets of 0.3 grams each and, according to the label, the tablets are for "treatment of colds, fevers, headache and cough". The dosage is four tablets boiled in water every four hours. These tablets contain "0.2% Cornu Rhinoceri Asiatici". They were manufactured by the Tsinan People's Medicine Works, Tsinan, China, and distributed by the China National Native and Animal By-Products Import and Export Corporation, Shantung Native Produce Branch, Tsingtao, China. They are very cheap, about \$ 0.02 each.

When I was in northern Thailand, a Burmese friend of mine showed me a bottle containing a granular powder which she had obtained from Rangoon; it was supposed to contain dried rhino blood. The commercial name of this medicine is "The Lu Pyan

Daw Padamya Rejuvenating Powder". The English language part of the label reads as follows:

"Preserve your Vital Forces and Maintain Full Vigour and Activity...This PADAMYA puts off age by imparting new strength to your nerves, to your brain and muscles...Men and women are amazed at the quick rejuvenating effect of...PADAMYA POWDER...This Powder is prepared on the line of formula profounded since the time of Burmese Kings. The manufacturers of this Specific are so certain of its efficiency that they strongly recommend [it] for General Debility, Impure Blood and Defective Vision. It positively restarts the female periodic cycle, safely, surely and quickly.

Dose: One grain with 3 oz. of water or 1 oz. liquor.

Available at all our agents throughout Burma or direct from the manufacturers: Thamadawgyi Saya Min's, Ahsayathukha Medical Hall, 840, Mahabandoola Street, Rangoon."

My friend confided to me that she had been taking this medicine for a couple of years and she was certain that it had given her more energy. She was a well educated woman, belonging to the upper class of the Shan people, many of whom have fled from Burma in the past decade.

Additional Products in Thailand, Burma, India and Nepal

While the traditional medicine shops of Singapore, Hong Kong, Macao and Taiwan deal almost exclusively in horn and skin in so far as rhino products are concerned, some in Thailand sell several other parts of the rhino as well. Bearing in mind that in Thailand mainly the Sumatran rhino is used, and not the African or Indian, this particular species serves a multitude of medicinal purposes. After the horn and skin, the most common rhino product is the hoof (there are three hooves on each rhino foot). The hoof is used for the same purpose as the horn, although it is considered much weaker. Hooves are usually sold individually, but pieces can be bought by weight. One grinds the matter down into a fine powder and steams it in water, then drinks the mixture to reduce fever. Dried rhino blood is prescribed by Chiangmai pharmacists "to improve the quality of human blood", i.e. for tiredness and malaise. It is believed to be one of the stronger rhino products and is never given to women who may be pregnant for fear of causing a miscarriage. Occasionally, when a patient suffers severe pain from a broken limb, a poultice of powdered rhino bone may be applied. I was told that boiled rhino stomach was helpful for intestinal pain, although I did not see any for sale. Of all the items I was shown, what surprised me most was rhino dung. In the course of a long conversation with a pharmacist in Chiangmai, I

learnt that the best rhino dung is collected from the lower intestine of a freshly killed rhino, and that it is not picked up from the ground because then it is "contaminated by other impurities". Once dried, minute particles of the dung are swallowed as a laxative.³⁶

I believe that because the rhino is the most powerful wild animal in Thailand (other than the elephant, which is considered a very special creature, unlike all other animals, and traditionally revered), it is endowed by the Thais with curative properties. Many of the rhino parts which are used for medicinal purposes correspond to the same parts of the human anatomy that are afflicted by disease: rhino blood is used to cure human blood disorders; bone for relieving pain in human broken limbs; skin for skin disorders, etc. Since illness is associated with weakness, curative measures must include the restoration of strength. The various parts of the rhino are thus seen to be capable, through their own powerfulness, of transmitting strength to similar parts of man. Accordingly, we do find in the north of Thailand a part of the rhino used as an aphrodisiac - its penis. It takes a whole penis, not just a small part of it, for the treatment of one man's impotence, and because the rhino has become rare now, it is seldom used today. Only one pharmacist in Chiangmai had sold a rhino penis in recent years, although he said in the 1940s and 1950s it was not a scarce aphrodisiac. The rhino's penis is prepared in the same way as a tiger's: it is first dried, then soaked in a bottle of brandy for several months before the potion is drunk.

Moving westwards from Thailand to Burma, northern India and Nepal,³⁷ there are other uses for rhino products. In Burma, aside from dried blood, liquified blood is drunk as a tonic to improve general health. Unfortunately, it was not possible for me to study the use of rhino products there, due to the political situation. However, from reports that I gathered in northern Thailand, the rhino appears to play as important a part in Burmese medicine as in Thailand, and it would be well worth while to study its uses there. In northern India, some of the staff in zoos collect rhino urine to be used in traditional medicine, for what purpose I am not sure. Small bamboo vials of rhino urine sold in Calcutta in 1955 for the equivalent of \$ 0.15.³⁸ In Nepal rhino urine is drunk to cure coughs and earache, especially in children.³⁹

Rhino products outside Asia are of relative unimportance. Even in Africa today, where there may be between 14,000 and 24,000 rhinos left in the wild, they are seldom killed for their meat, except in Rhodesia.⁴⁰ In Kenya some Kamba, Dorobo, Taita, Boni and Liangulu peoples will occasionally eat rhino meat when it is available, but it is certainly not a general practice of theirs. There is, however, a superstition held by the Yao tribesmen around the Mwabvi Reserve in southern Malawi regarding rhino bone. They

pulverize it into a powder, which they tie up in little bags and wear as talismans; they believe that the rhino bone powder will prevent theft, attract women and permit men to commit adultery without detection from their wives.⁴¹

The general decline of uses for rhino products in Africa today is remarkable, but because of the demand for rhino horn in Asia, poaching has become especially severe. The demand has probably reached record levels; more rhino horn was traded on the Asian markets in the 1970s than at any other time - at least in the twentieth century.

Chinese traditional medicine is not confined to any particular geographical region in Asia, to any social class nor to any religion, such as Buddhism. On the contrary, Chinese traditional medicine is ubiquitous throughout Asia, with only a few exceptions (the major one being Sri Lanka). Chinese traditional medicine is the basis also for the Korean and Japanese practices. Moreover, the role of animal products in treatment of illnesses is very pronounced, and rhino horn is believed to be able to cure many common and widespread afflictions, ranging from fevers to headaches. Despite the fact that westernization has penetrated all the different cultures of the Asian countries, age-old remedies such as rhino horn are still required and often they are sold over the counter in shops along with western aspirin tablets and antibiotics. Reliance on the efficacy of rhino horn as a medicine is probably more of a long-term threat to the continued existence of rhinos than anything else.

3. PAST AND PRESENT PRICES FOR RHINO PRODUCTS

There is a wide difference between the prices of African and Asian rhino horn because there are only 10 per cent as many Asian as African rhinos, and because Asian horn is considered much more effective as medicine. While it is possible to provide an historical review of the price of African horn, it is difficult to do so for Asian horn because of the impossibility of distinguishing between the two forms in trade statistics, where they exist, and the reluctance of dealers to provide information about prices they paid in the past.

African Rhino Horn

From the early years of this century up to 1975, there was a gradual increase, except for the Depression years, in the wholesale price of African rhinoceros horn. Since 1975 there has been a dramatic 21-fold rise, one of the greatest increases in the world for any product over so short a period of time! And this leap is not due to an acute shortage of horn; in fact, as I will show in the next section, the quantities of horn involved in international trade actually increased in the 1970s.

Before 1900 there are few statistics on the price of rhino horn, but from the beginning of the twentieth century, accurate figures do become available. A major distinction must be made between the wholesale price, that is the price paid by dealers and large pharmacy shops, and the retail price which is what is charged to the consumer. Since the average customer buys only a few grams of rhino products at a time, the mark up seems to be very high, if calculated on a kilogram basis. But we must remember that the average traditional chemist sells relatively little rhino horn in a year, as compared with other medicines, and he is also selling to his customer his medical skill and long time experience in dealing with animal drugs.

From 1909 to 1914 the London wholesale price of rhino horn ranged between \$ 1.61 and \$ 9.30 a kilo.⁴² I have no reliable figures from 1915 to 1925, but from 1926 to the

present I have a complete run of the wholesale prices of rhino horn from the three East African countries of Kenya, Uganda, Tanganyika (from 1964 onwards, Tanzania).⁴³ These figures show that from the mid-1920s the price for the horn steadily increased until it peaked in 1929 at \$ 22.68 a kilo. During the entire decade of the 1930s the average price per year was a low \$ 6.93, due to the world depression. There was a slight recovery in the 1940s to a yearly average of \$ 8.07 a kilo, but it was not until 1950 that the price of rhino horn recovered to its pre-depression level (\$ 20.50 a kilo). Prices continued to rise slightly in the 1960s to \$ 23.55 a kilo per year on average. A more pronounced increase came about in the first half of the 1970s with prices averaging \$ 33.11 per kilo annually.

It was, however, beginning in 1976 that the wholesale price of rhino horn began to "rocket". By using a wide variety of sources, including the official East African export and import figures for North Yemen and several countries in Southeast Asia, we can calculate that the wholesale price of African rhino horn went up more than threefold in that year to \$ 105 a kilo. The following year the price almost doubled to \$ 190 and in 1978 reached \$ 300. By September 1979 in Southeast Asia the minimum wholesale price was an astonishing \$ 675 a kilo, some 2000 per cent increase in only four years.

What factors were responsible for the fantastic rise in prices? To reiterate, supplies of rhino horn did not drop in the 1970s; quite the opposite happened: supplies from East Africa and from the African continent in general reached a peak in the 1970s, so we must look elsewhere for an explanation. Immediately after the Yemeni Civil War in 1969, many thousands of Yemenis migrated to Saudi Arabia and the Gulf States to earn high salaries as unskilled labour.⁴⁴ Since the Yemenis are Muslim, speak Arabic and are very hard workers, they are especially welcomed by their Arab neighbours. When oil prices tripled in 1973-4 Saudi Arabia began an unprecedented building boom. The Kingdom needed tremendous numbers of workers for massive development projects, and men from North Yemen were eager to go there because of the fortunes they could make, and although North Yemen has no oil, since the Revolution it had become an avid consumer society. In 1978, out of a total population of 6,000,000 almost 1,000,000 Yemenis were working in Saudi Arabia, and they brought back home in that year \$ 1,500,000,000.⁴⁵ On account of the remittances from abroad, the per capita income of North Yemen climbed from \$ 80 in 1970 to \$ 500 in 1979. With such wealth available, many Yemenis who had not been able to have rhino horn daggers suddenly began asking for them on the market. As it was, despite the increase of supply, there was not enough horn available to meet the demand. Consequently, the wholesale price of rhino horn in Sanaa rose to \$ 675 a kilo by 1978, higher than the price in Hong Kong.⁴⁶ Dealers in Hong Kong soon found that they were being out-bid for the

first time Arabs were able to break the monopoly of the Chinese traders.

Unless immediate measures are taken against the import of rhino horn in North Yemen, the demand is going to continue, with an additional 50,000 young men coming of age each year. Should the supply continue as it has for the 1969-1977 period, it will satisfy only 17 per cent of the potential demand for rhino horn, if every teenage boy were to want a new jambia made with a rhino horn handle. Granted not everyone would be in a position to buy one and, obviously, some of the daggers belonging to fathers and grandfathers would also possibly be at the disposal of the youngsters. Nevertheless, with only approximately 8492 rhino horn jambias coming onto the market annually (from just under a thousand rhinos), the price for rhino horn will inevitably become higher, and the threat to the remaining rhinos in the wild will be proportionately that much greater.

Another reason for the rise in the price in rhino horn resulted from political changes in Kenya and Tanzania. From the nineteenth century until a few years after independence, it was the Indians in these countries who bought from government auctions ivory and rhino horn for export to Hong Kong. Gradually, in the 1970s, new buyers, mostly Africans, entered the market, and the "bonhomie" among the dealers turned into real competition; in other words, the Indians had kept the prices reasonable among themselves, hoping that the low East African selling price would realise greater profit for themselves when they sold the trophies abroad. When competition started in earnest, they had to bid more just to stay in business. Officialdom also began to play a role in the auctions: nationalistic policies worked against the Indians, and those with direct access to licensing authorities found that there were ways of displacing the former monopolists in the ivory and rhino trade. Once the prices began to soar in East Africa, it was up to the people in Singapore, Macao, Hong Kong, South Korea, Taiwan and Japan (then gradually North Yemen) to raise their own offers - and this they willingly did in the mid-1970s. Some of these countries had in fact during this decade the largest percentage increases of GNP in the world.

Concern about the price increases began to manifest itself in 1977 in a typical fashion; the Asian dealers bought more rhino horn, actually stockpiling it, believing that the price would continue to go up and that they, in turn, would be able to make more profit from it. They also had their eyes open to conservationists' reports of a widespread decline in rhino numbers. It seemed a good idea to them to obtain as much as possible. Moreover, the world economy showed unhealthy signs of high inflation and economic instability, generating the feeling that a wise investor should move out of cash, stocks and bonds and into works of art and precious commodities - and rhino horn had indeed entered into the latter category.

Asian Rhino Horn

I have been unable to obtain year-by-year wholesale prices of Asian rhino horn, even for the 1970s decade. There are several reasons why, but the main one is that most Asian countries which still have wild rhinos have banned all trade in their products. So what does appear on the market is entirely illegal and not accounted for by government import/export figures. Even where Asian rhino horn is legitimately bought and sold (e.g. Singapore, Taiwan and Japan), it is not differentiated in the trade statistics from African rhino horn. Up to 1979, Hong Kong was the main entrepôt for all rhino horn, but the Customs Department there never kept any statistics on it: rhino horn could be lumped into such general import/export categories as "bones and horn cores", "horns, antlers, etc." and "ambergris and animal products for pharmaceuticals". When I questioned the officials of Hong Kong's Agriculture and Fisheries Department (which is concerned with the import and export of all animals), I was told that there was not even a way to guess which category would most likely include the majority of rhino horns - it was up to the individual filling out forms to choose which one sounded most appropriate at the time! I can only quote certain Asian rhino prices in late 1979, in the countries I found them for sale at the time. Traders and dealers were themselves reluctant to tell me the exact prices they had paid for horn in the past years because, understandably, they were not keen for me to calculate their profits!

In September 1979 the average wholesale price per kilo for Asian rhino horn (i.e. Sumatran and Indian) was in Taiwan, Thailand and Hong Kong \$ 4433, of which Thailand's was the lowest, \$ 2200, because until fairly recently traders had been able to obtain what they needed from their resident rhino population. The highest wholesale price is presently in Hong Kong (\$ 6500 per kilo), where all rhino imports have become illegal since February 1979.

In so far as the skin is concerned, most of it on the market, except in Thailand, comes from African species, and the wholesale price for this, too, has increased markedly during the past few years. In Hong Kong in 1974 the wholesale price for skin was only \$ 25 but by 1978 it had jumped to \$ 160. In September 1979 the wholesale price for rhino skin in Taiwan was slightly higher than most other places (\$ 220 per kilo), mainly as a result of the government's 24 per cent import duty on all rhino products.

Retail prices for rhino products in traditional medicine shops may seem exorbitant, but one must remember that the pharmacists do not sell very much rhino horn in a year; and one small horn for which a pharmacist has paid a considerable sum may last for several years. Thus the return on his investment is spread over a long period. Conservationists may well decry the fact that some 2500

rhinos are being annually slaughtered for the market, but, taking into consideration the population of North Yemen, northern India, China, Japan, Indonesia and Taiwan, the major consuming countries, these people are using only about 0.000,006 of a kilo a year on a per capita basis! Moreover, we must also bear in mind that when rhino horn is prescribed as a medicine, it is considered as a very powerful drug and is not dispensed by just anyone; the customer, when paying the highest average price of \$ 35 for a dose of three grams, is also buying the services of a highly experienced pharmacist who will explain in precise detail what herbs may be mixed with it and under which circumstances the drug is to be administered. Even though it may seem to an outsider that the pharmacist is "profiteering" in rhino horn, this would not appear to be the case to the buyer, who probably accepts the situation with more equanimity than many westerners who go to private doctors for consultation, receive the same mass-produced tablets that the doctor prescribes for a whole variety of complaints, and end up with a bill of at least the same amount!

I am not aware of any study carried out to ascertain average retail prices for rhino horn for the past few years, and without any more information than what I could gather from shopkeepers and dealers on this subject, I am skeptical of such statements as "ounce for ounce, rhino horn is more valuable than gold", which have been familiar fare in conservationist magazines ever since gold began making astounding leaps on international markets. Certainly today gold is dearer than rhino horn. Furthermore, small quantities are always much more expensive than larger ones, and, as earlier mentioned, rhino horn is retailed by a fraction of the tael or sold by the chien, while an ounce is more than ten times the usual quantity by which rhino horn is sold in medicine shops.

Although no one would ever buy as much as a kilo of rhino horn in a medicine shop (the optimum dose is less than 0.333 kilo), for convenience and comparative purposes, I have converted from taels, chieng and grams into kilograms the retail prices of rhino horn. These prices vary tremendously, not only from country to country, but also within one city. The most extreme price ranges I found were in Hong Kong, from \$ 2011 per kilo to \$ 18,522. However, the majority of the prices in Hong Kong fell between \$ 7938 and \$ 13,230 a kilo, and the average price was \$ 11,615, very close to the average in Singapore, \$ 11,103. In Macao, the average price was only \$ 4127, with a range from \$ 3083 to \$ 4728. There are fewer shops in Macao, obviously, and it is easy to find the better bargain. Furthermore, prices in general are cheaper there; the per capita income is \$ 950, in contrast to \$ 2000 for Hong Kong and \$ 2800 in Singapore. However, the main reason for the difference in prices may lie in the fact that dealers in Macao are specifically invited to Canton for the annual trade fair at which they can obtain rhino supplies at reportedly lower costs than from wholesalers in Hong Kong.

In Taipei there are both African and Asian rhino horns in the medicine shops. The African horn is even lower priced than in Macao, averaging \$ 1596 per kilo, with a range from \$ 882 to \$ 2940. The Asian horn, mostly from the greater one-horned rhinoceros of India, is very expensive, averaging \$ 17,090 per kilo retail, but varying between \$ 5880 and \$ 22,052. The Taiwanese demand for Indian rhino horn is so much greater than for the African species that it has driven up the price to phenomenal heights, and the shortage in supply of Indian horn exacerbates the situation.

In Bangkok, the average retail price for rhino horn is a low \$ 3654, with a range from \$ 1628 to \$ 9122, and it is mostly Sumatran. Since Thailand's per capita income is by far the lowest of any of the countries I visited, the cheaper prices were to be expected, but there may well be also a lessening in demand for rhino products in this capital city, where age-old traditions are rapidly falling by the wayside. Much of the rhino horn I saw in Bangkok was old stock; however, in northwest Thailand, in the city of Chiangmai (population 175,000), the price of rhino horn varies between \$ 10,428 per kilo and \$ 13,136 in the three medicine shops which sell it. There is no doubt that the horn is in considerable demand in Chiangmai; moreover, dealers are very worried about the prospects of replenishing their supplies. Only the Sumatran rhino is used in their pharmaceuticals, and the extreme rarity of this animal is well known. I think that the horns which come onto the market in this part of Thailand are almost all smuggled out of Burma now, and the risk of getting them across the border is much greater than the fear of getting caught poaching within Thailand in the recent past.

Rhino Skin and Other Parts

The retail prices of dried but unprocessed rhino skin also vary, but not to the same extent as horn. In Singapore the skin sells for \$ 923 a kilo, the highest price for any place I visited. In Hong Kong the raw dried skin is not so much in demand by the pharmacists; they prefer the processed variety which retails for \$ 366 a kilo. But where the unprocessed rhino hide is available there, the price is \$ 423 a kilo. In Macao the dried skin sells for a little more than in Hong Kong - \$ 442. In Taiwan, as in Singapore, Hong Kong and Macao, practically all the skin is of African origin and sells for an average of \$ 417 a kilo. In Bangkok most of the skin is again Sumatran, and the retail price is only \$ 236 a kilo, but, oddly enough, the same costs only \$ 50 in Chiangmai.

The hooves of rhinos are not so widely available as the horn and skin. They are sold in Singapore individually, not by weight, and they cost \$ 14 each, weighing around 35 grams. I saw only a few hooves in Bangkok, and these sold for about \$ 36 each. There was just one shop selling rhino hooves in Chiangmai; the price was \$ 15 for one.

The other parts of the rhino I saw for sale were all in Chiangmai medicine shops. Dried rhino blood sold for \$ 148 a kilo, rhino dung for \$ 246 a kilo, and dried stomach (which I did not actually see, although one had been recently available), for \$ 500. These rarer parts of the rhino are expensive, and over the last 20 years have increased enormously in price. For instance, in 1959 rhino bone sold for only \$ 4 a kilo in Chiangmai, but in 1979 the price had risen by over 400 per cent to \$ 22. The same is true for the rhino penis and testicles; in 1959 the price was \$ 125 but the last sold went for \$ 740.

4. A GEOGRAPHICAL SURVEY OF THE TRADE

A typical Chinese medicine shop in
South East Asia.

Photo: Esmond Bradley Martin

Trade Statistics

Rhino horn from eastern Africa has been traded with various people in the Indian Ocean for at least two thousand years, but it is outside the scope of this paper to delve into the early history of the international rhino horn trade. The beginning of its modern history dates back to the middle of the nineteenth century, after the Sultan of Muscat moved his capital to the island of Zanzibar. From there the Sultan expanded his colonial empire to the mainland, stretching from Somalia in the north to Mozambique in the south. Arab and Swahili caravans went in great numbers to the Tanganyikan hinterland to obtain slaves and such animal products as elephant ivory, hippo teeth and rhino horn. These were brought back to Zanzibar town, where they were sold and often re-exported.

It is not possible to calculate the quantity of the value of the rhino horn trade for the nineteenth century that passed through Zanzibar. We have the occasional figures for values and weights, but rarely both for the same year. Christine Nicholls estimated that in the 1840s a minimum of 6750 kilos of rhino horn was sent from the interior of East Africa to the coast for sale annually.⁴⁷ At first glance this figure appears big, but it may be roughly correct, as rhinos were abundant. Richard Burton noted this when he reported on his trip through Tanganyika in 1856:

"The...black rhinoceros with a double horn is as common as the elephant in the interior. The price of the horn is regulated by its size; a small specimen is to be bought for 1 jembe or iron hoe."⁴⁸

During the financial year 1863-4 \$ 4000 worth of rhino horn was imported into Zanzibar.⁴⁹ Using Richard Burton's slightly earlier figure of \$ 10 per frasila (35 lbs) for the value of the horn in Zanzibar,⁵⁰ then \$ 4000 would represent some 6349 kilos. In 1877 rhino horns were the

eleventh most valuable import into Zanzibar, worth \$ 10,000; they came from the interior to the port of Bagamoyo in Tanganyika by caravan and from there by dhow to Zanzibar.⁵¹

According to Richard Burton, the Zanzibar merchants exported these horns to Bombay, from whence they went on to China and central Asia for making cups, and to Muscat and Yemen for making "sword-hilts, dagger shafts, tool handles, and small boxes for tobacco."⁵²

Farther north, in Ethiopia, there was a brisk trade in rhino horn as well. In the latter part of the nineteenth century the merchants of Gondar traded about 50 rhino horns worth \$ 65 a year, while the southern part of the country (known then as Borana) exported \$ 1200 worth of rhino horn, probably weighing around 750 kilos, in 1907. Some of these horns from Ethiopia found their way to Mogadishu, where they were put on dhows to be shipped to Arabia and India; in 1896-7 \$ 1120 worth of rhino horn left Mogadishu.⁵³ In fact, the slaughter of rhinos in Ethiopia was so great in the late nineteenth and early twentieth centuries that the populations were practically decimated, and it is highly unlikely that today there are more than a dozen left in the entire country.⁵⁴

The killing of rhinos in India, Malaysia, Siam and Borneo also reached a peak in the late nineteenth and early twentieth centuries, and by the time of the First World War East Africa had become the world's major supplier of rhino horn. In the financial year of 1913-4 Kenya alone supplied about 2350 kilos of rhino horn to markets abroad, worth \$ 3271; about half the amount was exported to India and Burma, whilst the remainder went to Britain (some as sportsmen's trophies⁵⁵) and to Zanzibar.⁵⁶

From 1930 to 1969 the official exports from the East African countries of Kenya, Uganda and Tanzania remained remarkably constant. During the decade of the 1930s the average export figure per year was 1598 kilos; for the 1940s, 1520 kilos; for the 1950s, 1783; and for the 1960s, 1483 kilos per year. Then, from 1970 to 1976, the quantity more than doubled for the three countries, averaging annually 3772 kilos, the highest amount for over 50 years.

It was at this time, as already mentioned, that the demand for rhino horn in North Yemen became significant. Before then, from 1949 to 1969, the largest importers of East African horn were Hong Kong, Zanzibar, Aden, Britain and the U.S.A. Both Zanzibar and Hong Kong were primarily entrepôts for rhino horn. Most of the horn passing through Zanzibar in the 1950s and 1960s went on to Hong Kong,⁵⁷ whilst Hong Kong itself re-exported during this period to China, Taiwan, South Korea and other places in Asia.

Smuggling

Of course, these figures are the official ones only, which are in fact all under-estimates of the true volume of exports. Horns were illegally smuggled out of East Africa by ship, dhow, plane and overland by motor vehicles. The problem is to try to determine the approximate volume, but this is extremely difficult to do. Some Indian merchants in Mombasa have told Ian Parker that between the 1930s and 1970s about as much horn went out of Kenya illegally as did legally. Any definite figures pertaining to illegal exports are unavailable from the exporters of contraband who, naturally, keep neither copious records nor inform the world at large of their activities.

One method of attempting to ascertain an estimate of some of the discrepancies between legal and illegal exports is to look at the official export figures of East Africa for rhino horn going to "the Yemens" from 1969-70 to 1976-7 and the official imports of North Yemen for the same years. The official export figures of East Africa show that about 6000 kilos were sent there, whilst the official import figures for the same period for North Yemen alone show that 22,645 kilos came in⁵⁸ - a shortfall of over 16 tonnes. While there may also have been imports from the Sudan and southern Africa, these would have been only a small percentage of the total.

Another way to calculate the amount of horn smuggled out of Kenya in the 1970s is to compare the official export statistics with the number of rhino which died in the same period. I estimate, from figures given to me by the IUCN African Rhino Group, that the rhino populations in Kenya were at least 18,000 in 1969, but by 1979 only about 1500 remained. Discounting any natural increase in numbers, the 16,500 animals that had died produced approximately 47,520 kilos of horn, based on 2.88 kilos of horn per animal. However, the official Kenya export figures from 1969 to 1978 were 24,335 kilos, suggesting that perhaps about 50 per cent of the total exports were illegal. Such an amount confirms what the traders told Ian Parker.

The official export figures of Kenya's rhino horn for 1977 and 1978 are almost meaningless as a true picture of the situation. For 1977 they listed Denmark and Greece as the only recipients, and the total horn amounted to 84 kilos which, moreover, had a declared value of just \$ 3.28 a kilo! Yet Japan alone imported 304 kilos of horn from Kenya with a declared value of \$ 107 a kilo, according to that country's own statistics for the same year. In 1978 Kenya officially exported only 40 kilos, all to South Yemen, valued at \$ 33 a kilo when the world market wholesale price was actually \$ 300; again Japan's import statistics listed 367 kilos of horn from Kenya.

But Kenya is not the only country in East Africa which in

involved in large-scale illicit exports of rhino horn. Tanzania in 1974 officially exported no horn at all, but Japan claimed imports of 84 kilos from Tanzania, worth \$ 5974 for that year. Japan was just one country which received imports of horn from Tanzania; unfortunately, most other countries importing rhino horn do not name the source countries.

Exporting countries in Africa

Certain central African states, such as the Sudan, Central African Republic and Zaïre, export small quantities of rhino horn, but figures, either official or unofficial, for these countries are not known at present. We have a few statistics from Zambia, which show a total of 31 kilos having been legally exported from 1963 to 1967, or about six kilos a year. But one authority believes that there was in addition a considerable traffic in illegal horns during that period.⁵⁹ Between 1973 and 1977 sportsmen in Zambia killed 75 rhinos on licence, producing 333 kilos of horn.⁶⁰ Presumably, most of these were taken out of the country to Europe and America. The killing of rhinos on licence continued in 1978, but in November 1979, the government of Zambia prohibited further rhino hunting. The month before, a survey had been carried out to determine the number of black rhino in the Luangwa Valley in Zambia; this showed that there were probably about 3500 rhinos remaining. Calculating from the average estimated population in 1973, possibly as many as 4500 rhinos had been killed in the intervening years. The October 1979 survey also estimated an additional 350 to 850 rhinos in other parts of the country.⁶¹

To the south, in Rhodesia, the export of rhino horn has been taking place for many years. From 1959 to 1965 (excluding 1960), 159 kilos of horn were obtained from Rhodesian rhinos, either legally shot or from confiscated trophies, and exported to South Africa and Hong Kong. In addition, horns were also imported from the neighbouring countries of Zambia and Angola for export overseas. For instance, in 1963 local traders in Rhodesia imported 113 horns, weighing 185 kilos, and exported them to Zanzibar and Aden.⁶² The year before, the government initiated protective measures for the white rhino, which now number about 160 and are increasing. From 1965 to 1975 the government also initiated translocation programmes for the black rhino from areas in which they were threatened to parks and wildlife estates. Poaching of black rhinos decreased in the 1970s, and the rhino populations stabilized until the outbreak of civil war in 1978. The Chewore area in the Zambesi Valley seems to have the densest numbers of black rhinos, but it has been infiltrated by Zipra terrorists from Zambia, and more men and equipment are needed for the anti-poaching patrols to be able to continue their work. Another area of concern for the black rhinos is that of Chete/Chizarira. There have been only three public auctions of rhino products in

Rhodesia during the past 10 years and no permits for hunting rhinos have been issued in the last three years. The estimated numbers of black rhinos have increased from 440 in 1971 to approximately 1110 in 1979, but during the past eighteen months poaching has become once again a serious problem, and rhino horn is being illegally exported. The authorities know of seven black rhinos having been poached in Chizarira National Park in the last year.⁶³ It is believed that the horns from poached animals are smuggled out of Rhodesia into South Africa for sale to Asian countries.

Merchants in South West Africa (Namibia) over the past few years have been responsible for a moderate volume of rhino horn exports in the 1970s. Most of the horn has originated in northern Namibia and southern Angola, but it has not been possible to quantify the trade.⁶⁴

For at least the past 15 years South Africa has been a major supplier of horn to the Far East. For instance, in 1978 Japan officially imported 350 kilos at \$ 106,380 from South Africa, and Taiwan in the same year imported 166 kilos from traders in South Africa. However, the figures I have been given by South African authorities show that only 176.5 kilos were legally exported from South Africa in 1978;⁶⁵ this might imply large-scale smuggling, but I suspect instead that the official figures are just incomplete. Almost all of the South African horn is sold to merchants in Hong Kong who re-ship it to dealers in Taiwan, Japan and China, keeping about 20 per cent to sell to local wholesalers. One large dealer in rhino products in Hong Kong has a Chinese relative who has an import/export business in South Africa. This man travels all over the Republic and Rhodesia, buying up horn and skin to ship back directly to the dealer. I was not able to obtain exact figures for the mid and late 1970s from that particular dealer on his imports, but he admitted that they were not less than 100 kilos per year. There are also at least three other businesses in South Africa which deal in exports of rhino horn to Hong Kong.

Although 50 years ago, white rhinos were on the brink of extinction in South Africa, today, because of the success of strict conservation measures, it is they, and not the black rhinos, which can be legally hunted and commercially exploited. There are only about 480 black rhinos in the country, and poaching of them is limited to an average of just one a year.⁶⁶ Thus, of the horn actually originating in South Africa, almost all that is exported is of the white species, but this amount is perhaps no more than two-thirds the total, due to imports from other countries.

The Hong Kong merchants are buying the horn cheaply from South Africa. Horns owned by the national parks, reserves and private individuals are sold by tender on the open market at low prices. For example, in 1978 176.5 kilos of

horn were sold for only \$ 50 a kilo, approximately one-sixth of the world market price. An official of the Natal Parks, Game and Fish Preservation Board, wrote in 1979 that "the value of horn has not yet been realised in this country", but gave no explanation why.⁶⁷

Although South Africa is not the largest exporter of horn, it is the major exporter of rhino skin. It is worth noting that in East Africa, where there has been almost unlimited poaching in recent years, skin is rarely removed from the carcasses. The reason is that wet rhino hide is extremely heavy and before it can be transported any distance, it must be dried. This necessitates either the hunters' staying in close proximity to the kill site for several days or bringing a vehicle right up to it. Also, rhino hide is bulky and difficult to conceal, even after being dried. These factors make it too risky for the poachers to handle the skin. However, when rhino hunting was legal in East Africa, a certain amount of skin was removed from animals killed on licence, and exported.

The Asian Rhino Trade

Well over 90 per cent of the international trade in rhino products is from the white and black species, for the simple fact that there are 10 times more live rhinos in Africa than in Asia. Two Asian countries, which have rhino populations and export their products, are India and Indonesia. Although all trade in rhino products in India was prohibited some years ago, horn is still being exported, especially to South Korea, Taiwan and Thailand. There are of course no Indian statistics on this export since it is illegal, but two of the major importing countries publish statistics showing how much Indian horn is coming in. In Taiwan and Thailand I was told by traders that they were still able to purchase Indian horn, but at a very high price. My guess is that some of the horns which were smuggled out in the 1970s were probably old trophies brought out because the price had risen so. Whether the majority comes from recently poached animals, I do not know; however, in 1974 in the Laokhawa Reserve, on the south bank of the Brahmaputra river, 22 rhinos were poached.⁶⁸

Exactly how the Indian rhino horn is leaving the country, and who is involved, I have not been able to find out. I have been to India several times, but not to the areas where the rhinos live, nor to Bengal, from where much of the horn is probably exported. More research in northern India is urgently required to answer these questions. I have been told by a World Wildlife Fund official in India that the traders in Gujerat have been importing small quantities of horn from East Africa for medicinal and aphrodisiac purposes; the wholesale price, according to him, was \$ 875 a kilo in 1978. There is also a domestic demand for horn in Bengal, but the traders there do not have the contacts with

East Africa that Gujerat does, and consequently they purchase the horn from poachers who kill rhinos in the nearby state of Assam.

As another source of illicit trade in rhino horn, Indonesia, exported, from 1973 to 30 May 1979, 1045 kilos to South Korea alone. In fact, the South Korean figures for the first five months of 1979 make fascinating reading. Out of a total of 122 kilos imported then, 72 kilos came from Indonesia, 20 from Thailand, 20 from India and 10 from Malaysia; the declared value per kilo was \$ 396.⁶⁹ Out of the thousand kilos that went to South Korea from Indonesia in the 1970s, I am almost positive all must be from Sumatran animals, as there is no evidence of African horns passing through that country.

There are, furthermore, at least two other countries with Asian rhinos which export their products - all illegally, of course. In Nepal there are an estimated 300 rhinos, and most Nepalese believe that their King is essentially the owner of them; thus, poachers are afraid to keep horns in their possession and quickly trade them across the border to merchants in India.⁷⁰ In Burma there is a scarcity of consumer items; and, on account of shortages, there is a considerable amount of smuggling on the eastern border with Thailand. The Burmese export illegally many animal products, including elephant ivory as well as rhino horn, to Thai traders in exchange for food, radios, cassette recorders and modern medicines. The quantities of rhino horn coming from both Nepal and Burma are relatively small, but they realize very high prices on the market.

Major Importers

So far in this section, I have discussed the principal exporting countries of rhino products. Turning now to the major consumer countries, I want to examine the trade with them, the laws which affect this trade, and how the dealers operate.

Looking first at North Yemen, presently the main one, what is most striking is the fact that there are so few importers. In Sanaa I interviewed craftsmen in the market who were carving the horn into handles, and they said that their source of supply came from one person only; in late 1978 he was charging them \$ 667 a kilo. The craftsmen commented that all the rhino horn came from Kenya and Somalia. After the craftsmen carve the handles, they collect all the shavings remaining and sell them to another dealer, who, in turn, ships them to Hong Kong for sale; the shavings are not ground down into a powder in North Yemen; if they were processed, the traders in the Far East would find it difficult to identify them as genuine rhino horn.

Hong Kong businessmen have been buying these shavings from

North Yemen in considerable quantities in the 1970s. I estimate that about 20 per cent of the gross imports of rhino horn into Sanaa are re-exported; this amounts to approximately 4.5 tonnes for this decade. Fairly large amounts of shavings have also been exported from South Yemen, but I do not have any figures concerning them. There appears to be a lot of shavings available on the world market; from several sources I heard of an Arab who attended the Canton Trade Fair in 1978 and was offering such an astonishing amount that it became the talk of the Fair!

The prices for rhino horn shavings have risen sharply in Hong Kong since 1977. In early 1978 the Hong Kong merchants bought them for \$ 150 a kilo; by the middle of 1979 their value had doubled. Almost all of the shavings are bought in Hong Kong by agents of mainland Chinese companies. The Chinese mainlanders have preferred buying shavings from dealers in Hong Kong rather than from the countries of origin, because it is easier and more convenient for their agents to examine the goods in Hong Kong. There are grounds for fear of being swindled: one prominent Hong Kong importer of rhino horn and ivory was shipped, by air from South Yemen, a gunny bag full of cow horn shavings instead of rhino. Since the import ban on rhino products early in 1979 in Hong Kong, the wholesalers there told me that the mainland Chinese are now having to buy from the Yemens directly and that they are paying \$ 300 a kilo.

All the wholesalers of rhino products in Hong Kong are also importers of elephant ivory. The reason for this is that they have agents, usually Indians, in East Africa, who have traditionally supplied them with large quantities of ivory. Until 1976, most of the ivory was purchased at government auctions where rhino horn was also offered for sale, and it was convenient to buy the horn from the same source. The wholesalers in Hong Kong told me that they did not make much money from the sale of rhino products, but I believe it was more than the purported 10 per cent. During my many hours of conversation with wholesale importers in Hong Kong, it became clear that they were much more interested in their ivory dealings and that they were not at all experts on rhino products. They of course knew the prices, but did not know, for instance, which part of the horn was most valuable, nor the exact medicinal uses of it. Since about 80 per cent of the rhino horn was re-exported to China, their transactions had to be made mostly with mainland agents, who drive very hard bargains. In early 1979, prior to the import ban, there were no more than 20 regular importers of rhino products in Hong Kong, compared with 52 major raw ivory importers.

Before 1976 there were no restrictions on the importation of rhino products in Hong Kong, but in August of that year, when the government introduced the Animals and Plants Ordinance to conform with the explicit Convention on International Trade in Endangered Species of Wild Fauna and

Flora (CITES),⁷¹ dealers were in theory then required to obtain licences to export or import any rhino products, and they were also supposed to get permits for their possession. However, the legislation was badly written, and only specified "rhinoceros species" which technically covered just the Indian and Javan rhinos because the other three rhinos belong to different genera.⁷² The error was not rectified until June 1978 by subsequent legislation. It was the Director of Agriculture and Fisheries who was made responsible for issuing licences, and he did so when he was convinced that the horn was obtained from countries with legal exports, e.g. Tanzania, Zambia and South Africa.

At the end of 1978 Ian Parker, who was carrying out a major survey of the international ivory trade for the U.S. Fish and Wildlife Service, talked to the dealers in rhino products and explained to them that the rhinoceros was under severe pressure from poaching and that in the interest of conserving the remaining rhinos in the wild, the Hong Kong dealers should immediately cease all trade in rhino commodities. The dealers agreed, and in fact went to the Director of Agriculture and Fisheries and requested him not to issue further import/export licences for any rhino products. There had been 444.7 kg of rhino horn imported on licence into Hong Kong from June 1978 to 22 February 1979, when, after consultation with the dealers, the Director of Agriculture and Fisheries put an end to all import, and exports of rhino commodities.⁷³

As a result of having interviewed, in September and October 1979, many government officers and local dealers in Hong Kong as well as the importers in neighbouring countries, I am convinced that, after the ban, there was very little smuggling of rhino products into or out of Hong Kong, although horn and skin are still traded within Hong Kong. Moreover, because it was the dealers themselves who initiated the action taken against the international trade, I believe that the success is much greater than it could have been had the government acted independently. If dealers in other countries would follow the example set by the traders in Hong Kong, much of the demand for rhino products would be reduced, and the pharmacists would have to use substitutes, if not modern remedies, probably saiga antelope horns for fever-reducing drugs.

Singapore has for several years held second position to Hong Kong as an entrepôt for rhino products, because there are fewer dealers than in Hong Kong, and their connections have not been as close with suppliers in East and South Africa. The situation may change to some extent as a result of the ban in Hong Kong, and Singapore could well become the most important centre for the rhino product trade in Southeast Asia. There are no restrictions on that country's animal trade, nor is there any conservation body actively protesting against the sale of products from endangered species. The government has shown no interest in signing

CITES, and apparently condones the large-scale trafficking in birds and animals.

In Macao, a small Portuguese territory with a population of 260,000, pharmacists in recent years have had two major sources of supply for rhino products, Hong Kong and mainland China. Possibly because of the small size of Macao, the main pharmacists are also the wholesalers. They had started to be encouraged by mainland China to buy their supplies at the Canton Trade Fairs before Hong Kong's ban, and with the cheaper prices there they have not been especially bothered by the turn of events in Hong Kong. They told me that they expected to buy all their rhino products from mainland China in the future. Should mainland China ratify and put into effect provisions from CITES, it is probable that Macao pharmacists will turn to Singapore; they have a strong demand for African horn and both dried and processed rhino skin.

I was not able to visit China, and even if I had been able to go there, I doubt whether I would have obtained statistics on the trade of rhino products. Nevertheless, Chinese influence in the use of animal drugs throughout Asia is well known, and the country is also a major supplier of rhino-based tablets and tonics, mainly for local consumption but also for export. Although there was a decline in traditional medicine in China in the late nineteenth century, due to western influence, Dr Norman Miller, who spent September 1979 in Peking, Shanghai and Sian, studying traditional medicine, reports that, under Mao's regime in the mid-1950s, a revival in the use of traditional drugs was strongly encouraged, and special institutes were set up for research pertaining to traditional medicine.⁷⁴ East African statistics show that by the early 1970s the People's Republic of China had become an extremely important purchaser of rhino horn. From Kenya, 4554 kilos in 1972 and 2225 kilos in 1973 were imported, and in recent years mainland China has also been the major consumer of rhino horn shavings from the Yemens. I believe that the shavings are generally used in the production of low-cost drugs for the treatment of various common ailments. The price of such tonics and tablets can be kept quite low because the percentage of rhino horn is very small in comparison to the other components.

Taiwan is notorious for its use of animal products in both its cuisine and in medical preparations. In fact, one of the major attractions of the capital city of Taipei is the animal market. Busloads of tourists take a night tour to see the sights, including Taiwanese eating dogs in the food stalls. In order to learn something about the animal trade in Taipei, I went late one afternoon to Snake Alley, off Hwa Hsi street. Outside one particular place was an eagle on a chain, perched above a carton full of live Taiwanese snakes. Inside were hundreds of bottles full of dead snakes, preserved in Chinese wines. Potions from these

bottles as well as tablets made from ground up snake penises (\$ 28 for 40 tablets) are taken by Taiwanese men as sexual stimulants. (Houses of prostitution are close to this area.) As I was leaving the first shop, the proprietor of another one nearby was beginning to attract a large crowd. My interpreter, an attractive young Chinese girl, and I went to join the throng of men listening to him. With a microphone around his neck, a knife in one hand and a wriggling snake in the other, the proprietor cut open the snake and drained its blood into a glass. He added some wine and then removed the gall bladder from the snake and mixed it with the blood and wine. After he had harangued the crowd for 15 minutes about the value of his snake tonic, one man came forward, paid \$ 2.25 and quickly swallowed the concoction. Farther down Snake Alley, I saw a man on a motorcycle with a yellow monkey from the Taiwanese mountains, which he was offering to sell for \$ 100. He also had in tow a bear, for which he was asking \$ 1050. Although passers-by were intrigued by the bear and stopped to watch it for a while, the mobile entrepreneur had no customers; I cannot imagine to what use an ordinary Taiwanese, living in a small flat with a large family, would put the bear! Not far from this spectacle, an old man was squatting on the street corner, surrounded by stuffed monkeys, skulls of various animals and reptiles, including terrapins, extolling their virtues in the Taiwanese dialect to some 20 men. Across from this group were several other men sitting at tables set out on the street, being served snake meat, snake blood and snake juices. On my way out of Snake Alley, I witnessed a tortoise being gruesomely dismembered in front of a large crowd who were more interested in watching women wrestling on a colour television set just inside the merchant's shop. At the end of his performance with the tortoise, the man was unable to sell the meat and retreated to the back of his shop to give the remains to his employees. All these activities were taking place, as I said, during the afternoon in Snake Alley, at the slack time of day. At night business is very brisk, and the whole area is packed with men, coming to consume aphrodisiacs on their way to patronize the ladies of the night.

Not surprisingly, given the fascination of the Taiwanese for animal products (and curious pets), rhino commodities are more widely available in Taipei than in any other city I visited. Merchants of Taiwan do not, of course, buy any rhino products from mainland China, and have instead usually bought them from Hong Kong. The wholesale rhino product business for all of Taiwan is centred in Taipei, especially in Di Hwa Street, but there are several other small lanes also lined with wholesale shops dealing in rhino horn, skin and other traditional pharmaceuticals. These shops are unattractive, dingy, noisy and polluted. Gunny bags, barrels, boxes and other containers of various items clutter the area, and it is difficult to approach the sales counter of most of them. Sometimes there are several electric machines producing clouds of dust whilst grinding roots and

twigs for packaged medical preparations. In the back of such a shop there is usually a table and a few chairs where the owner and his employees gather to sip tea and play cards or mah-jong. However, they spend most of their time sorting out the pharmaceuticals, processing and packaging them for sale to retailers. There is nothing elegant or romantic about this occupation, and the employees put in long hours doing tedious work.

Taipei's retail medicine shops stand in stark contrast to the wholesale outlets; they are the most modern and elaborate I saw anywhere in Asia. Air-conditioning, colour televisions, comfortable chairs, pleasing tea sets for the customers' use, and decorative displays of traditional medicines were the rule here. Many of these shops also had adjoining consultation rooms which resembled fashionable salons. One shop in particular was striking. At its entrance there was a Mandarin-speaking parrot in a cage on a stand. There were three rhino horns in the shop window and inside two other large ones were on view. On one wall, above an impressive display of expensively packaged Korean ginseng was a framed letter of appreciation to the proprietor for his extensive sales of this product. The consultation room was elegant: heavy, large nineteenth-century Chinese style armchairs, with their backs inlaid with marble, were grouped together beside twin couches with maroon cushions. In the centre was a round table surrounded by several intricately carved stools. On the wall opposite the doorway hung a mounted head of a very big black rhino (horns still intact), flanked on the left by an antelope head and on the right by a deer. Business was very good at this establishment; but, to my disappointment, the proprietor was unwilling to discuss in much detail his rhino horn sales, possibly because he was aware of the recent ban on imports in Hong Kong.

It may be difficult to meet the extensive demand for rhino products in Taiwan in the future since supplies until quite recently have come from Hong Kong. However, one dealer told me that there are at least 1000 kilos of rhino horn privately held in Taiwan, and that, due to the high prevailing price (\$ 770 per kilo wholesale in September 1979), much of this will very likely come onto the local market. The Taiwanese wholesalers have no direct connections with East African dealers, but they have purchased horn both directly and indirectly from South Africa, and they could try to buy more from there. At the moment, there are no restrictions in Taiwan pertaining to the import or export of rhino products, other than the 24 per cent duty. Taiwan has not signed CITES, and the rhino dealers felt confident in late 1979 that their trade would continue one way or another.

Thailand, until a few years ago, was one of the major exporters of Asian wild animals and their products. However, due to intensive pressure from conservationists,

within and outside Thailand, and the introduction of legislation against exports, the trade has declined. For example, the famed week-end market at Pramane ground, Bangkok, used to offer for sale gibbons, tapirs, pangolins, otters and many rare species of birds. But when I visited this market in September 1979, only more common types of animals were on sale, such as Thai monkeys (\$ 100 each), baby mongooses (\$ 100), squirrels (\$ 10), turtles (\$ 0.25), crickets (\$ 0.10), and various fighting fish and birds.

A considerable part of the range of the Sumatran rhino is located in Thailand; but since the nineteenth century these rhinos have been under extreme stress from Thai poachers, with the result that in the 1950s only about 50 remained. Even in the 1960s there was still a considerable trade in their products; Japan imported 50 and 100 kilos of horn from Thailand in 1968 and 1969 respectively. In the early 1970s a few local conservationists, led by Dr Boonsong Lekagul, encouraged the government to pass a law prohibiting all trade in both Sumatran and Javan rhino. (Most likely, all the Javan rhinos in Thailand had already been exterminated.) In 1972 it became illegal to import or export Javan and Sumatran rhino commodities, or to possess products from them.

Nevertheless, the trade continues in practice, especially within Thailand. There is no law against the sale of African or Indian rhino products, although one is supposed to have an import licence for possession of them and also pay an import duty of 30 per cent and a business tax of 7.0 per cent. One might think that the pharmacist cleverly persuade the officers of the Wildlife Conservation Division of the Royal Forest Department that their stocks are "foreign" when in fact they are not, but it appears that even this is not necessary in reality: the officers are employed in many other conservation activities, and pharmacy shops are rarely investigated. To be blunt, many conservation laws are openly flouted. Even after 1961, when it became illegal to hunt any rhino in the country, poachers were hardly discouraged, as the export figures to Japan seven and eight years later show. The last officially recorded instance of a poached Sumatran rhino was in 1973,⁷⁵ although dealers obviously obtained products from poached Thai rhinos after that date. Now, with probably less than 10 Sumatran rhinos left in the country,⁷⁶ supplies come from Burma, across the frontier northwest of Chiangmai and over the Tenasserim range west of Bangkok.

The lack of qualified staff to compile government statistics on Thailand's imports and exports has caused blatant inaccuracies in the figures pertaining to rhino horn. For example, in 1953 the Thai statistics state that 22,500 kilos of rhino horn were exported, worth \$ 0.06 a kilo - nonsense! Imports of rhino horn per se are only listed for 1958 (four kilos valued at a total of \$ 615) and 1961 (100 kilos at \$ 477); even these stated values are suspect, and

in all other years rhino horn imports appear to have been aggregated with other horns and pharmaceutical products.⁷⁷ To obtain an idea of rhino exports from Thailand in the 1970s, one can look at South Korea's official import statistics. These show that South Korea legally imported from Thailand 81 kilos of horn in 1974, 65 kilos in 1976 and 66 kilos in 1977.⁷⁸ Although these horns were shipped from Thailand, it is not possible to know what percentage of the amounts were from Thai rhinos; some may have been re-exports from other countries.

Thailand's conservation problems are acute, and some of the seeming apathy of law enforcement may be due to unscrupulous dealers who succeed in corrupting officials, paying them bribes in order to export illegal wildlife products. There are about six major dealers in Bangkok involved in wildlife exports, and all of them are rich and influential personages; some have developed clever ploys to elude customs inspectors, such as prominently marking their air shipments "poisonous snakes", when in fact they may contain Sumatran rhino horn or other illegal commodities. They also have been known to take endangered species products to Laos where they easily obtain documents claiming Laotian origin, bring them back to Bangkok "in transit" for overseas destinations, e.g. Belgium.⁷⁹

Nevertheless, Thailand is responsive to international pleas, as the following anecdote illustrates. A restaurant in Bangkok began advertizing to its clientele the availability of tiger penis soup. It became well known, yet the authorities did nothing about it until several months later when some conservationists from an internationally known organization visited Bangkok, went to the restaurant and verified that, although the concoction was not written on the menu, it was offered by the waiters. The conservationists approached the Wildlife Conservation Department, and the restaurant owner was immediately arrested.

For as long as there remain legal loopholes in the existing legislation, ways of circumventing inspection and dishonest officials, the plight of the rhino in Thailand will be desperate. It may already be too late to save the remaining few, but if immediate action were taken by international conservation agencies, perhaps some of the other species that are presently threatened in Thailand could have a chance of survival.



Black rhinoceros (*Diceros bicornis*). Photo: C. A. W. Guggisberg

5. A QUANTITATIVE ASSESSMENT OF THE WORLD CONSUMPTION
OF RHINOCEROS HORN

There are two independent methods which can be used in an attempt to quantify the world-wide trade in rhino horn from 1972 to 1978. The first is to assess the amount of horn imported by consumer countries from official import statistics and make estimates for those countries for which statistics do not exist. The second is to estimate the decrease in rhino populations during this period. In both instances I must insist that the total figures are minimum estimates. Regarding import statistics, it is important to point out that dealers would minimize the quantities of their imports for tax reasons; it is consequently most unlikely that, except for clerical errors, the official import figures could be less than stated. As for rhino populations in the 1970s, I have taken the mid-point in rhino counts and I have not included any possible natural increase in populations.

From the foregoing remarks, it is evident that my figures on the world-wide trade cannot be precise, but they are based on the most up-to-date and dependable data now available and they provide a minimum assessment of the trade.

Table X quantifies the annual average trade in rhino horn from 1972 to 1978. For North Yemen, Taiwan and South Korea accurate import statistics exist; their total imports average five tonnes a year. The People's Republic of China does not record imports of rhino horn; in figuring the minimum approximation of that country's imports, I have taken into consideration the imports of shavings from the Yemens, other possible sources, and correlations with Japan's and Taiwan's imports. For the remaining countries I have aggregated official export statistics from source countries, subtracted known imports and allowed for a certain amount of smuggling, based on reports from traders. Thus I have arrived at an estimate of 7.75 tonnes as the minimum world-wide imports of rhino horn per year for this period.

In attempting to calculate the number of rhinos which were



Rhinoceros killed by poachers for horn near Lake Magadi, in controlled area, Kenya.

killed between 1972 and 1978, I have referred to aerial censuses of rhinos, counts by wardens, dealers' estimates and figures provided by the IUCN African Rhino Group. For black rhino, the greatest paucity in data is in central Africa, for which we do not know the number of living rhinos, nor do we have reliable figures on poaching there. However, these lacunae are not as disastrous as they might first seem when making total African rhino population estimates due to the fact that we do know that East and South Africa supply approximately 75 per cent of the world's rhino products.

During the past decade Kenya appears to have provided slightly over one-half of the world's rhino horn. This calculation is based on the following assumptions: if there were 18,000 rhinos alive in Kenya in 1969⁸⁰ but only 1500 in 1979,⁸¹ then 16,500 had died, some 1500 a year. On average, each animal possessed 2.88 kilos of horn, and thus these rhinos may have provided 4320 kilos of horn every year for the trade. (I am discounting the possibility that some of the horn may not have reached the market because I am using only the averages between the maximum and minimum estimates of the rhino populations in Kenya in 1969 and 1979.)

I have chosen the figure of 2.88 kilos as the average weight of horn per animal,⁸² because this represents the average from the largest and most geographically varied sample available in Kenya, that of the 6425 horns which passed through the Mombasa auction rooms on behalf of the Kenya Game Department and National Parks from 1959 to 1976.⁸³

Tanzania has been the next most important supplier of rhino horn in the 1970s. From figures given to me by the Rhino Group, which pertain to the number of deaths of rhinos in that country, I estimate that Tanzania has been exporting approximately 2000 kilos of horn per year, given that the average amount of horn per animal is the same as in Kenya.⁸⁴

The central African states of Zaïre, Uganda, Central African Republic, Sudan and Zambia have, taken together, a mortality rate of possibly 800 rhinos a year, based largely on known declines of rhinos. I do not think, however, that even half of this horn reaches the market, because of political instability, poor communications and a lack of awareness of the commercial value of the horn. Whilst some of Zambia's marketed rhino horn passes through South Africa, I would guess that the rest makes up about two-thirds of the total from the central African countries.

The southern African states, excluding the Republic of South Africa, have supplied a minimum of 300 kilos annually to the world market. Angola was probably supplying more than any other country in this group, due to its relatively large rhino population in the early 1970s.⁸⁵

Because of its role as an entrepôt, South Africa's exports include considerable amounts of rhino horn originating from neighbouring countries. In the recent past, statistics show that South Africa was exporting more horn than in the first years of the decade; this may be explained as a result of the sharp increase in prices. Even though the selling price in South Africa still remains extremely low in comparison to its value on the world market, there has been a 100 per cent increase in it since 1973. The average weight of a pair of horns exported from South Africa in 1966 was 3.36 kilos.⁸⁶ Possibly two-thirds of the South African exports consist of white rhinos; I have consequently estimated an average weight of 3.60 kilos per white rhino export.

In Asia, of the approximately 2000 rhinos in the wild, most (1500) are the one-horned Indian species, inhabiting India and Nepal.⁸⁷ They are well protected in comparison to the black rhinos of Africa. Estimates for the Sumatran rhino vary between 50 and 500, but 300 is a reasonable figure for the numbers remaining.⁸⁸ It is the Sumatran rhino which is being poached more for its horn and other parts of its anatomy than any other Asian rhino because of its vulnerability in the wild. The only confirmed population of Javan rhino is that in the Ujung Kulon Nature Reserve, on the western tip of Java. The most recent count was made in August 1979, and the figure given at that time was 50 animals.⁸⁹

The horn of the Indian rhino is smaller than the larger of the two horns in both the black and white rhinos. The second horn of the Sumatran rhino is sometimes so small as to be unrecognizable as a horn; generally, in the female of this species the first horn is about one-third the size of the male's.⁹⁰ There is controversy about whether or not the female Javan rhino has any horn at all! The Red Book claims that the male's horn is half the length of that of the Indian rhino.⁹¹ Unfortunately, we have no statistics on average weights for any of the Asian species of rhino horn, but we may presume that the weight of the horn per animal for these three species averages well under half that of the black rhino.

It is probably unlikely that more than a 100 kilos of fresh horn from the Asian species were traded annually in the 1970s. Of course, more Asian horn has been involved in the trade, but that is old horn, formerly kept as trophies which have been put onto the market because of the sharp rise in prices.

The total number of rhinos killed annually in the wild from 1972 to 1978 produced 7970 kilos of horn, or about eight tonnes for the world trade. This is roughly the same amount as the total of imports from consumer countries. Thus, from two very different and independent sources, we can conclude that a minimum of 7.75 tonnes of rhino horn has entered the world market annually from 1972 to 1978.

If at least 7.75 tonnes of rhino horn have gone onto the world market annually in this period, as I believe, then the wholesale value of this trade in Asia in 1972 was worth \$ 255,750 at \$ 33 a kilo. By 1978 the wholesale value had increased to about \$ 2,400,000. If the same amount of horn came onto the world market in 1979 as in the previous year, the wholesale value was \$ 4,650,000. If one were to calculate the retail value of that portion of it which ended up in the pharmacies of Asia (4778 kilos), the price would be \$ 41,602,046, a gigantic sum of money for one single animal product.

Can the world-wide populations of rhinos continue to support a trade of close to eight tonnes of horn a year, which is the result of the death of about 2580 animals on an annual basis? The answer is a resounding NO! Continual killing at this rate (even if one were to subtract a theoretical maximum average of six per cent natural increase per year⁹²), will mean that in 10 years' time there will be none left in the wild.⁹³ The brunt of the pressure from trade is on the black rhino in Africa and the Sumatran rhino in Asia. The bleakness of their future is compounded by agriculturalists and ranchers who are encroaching on their habitats. This will lead to further splitting of rhino populations, outside parks and reserves, into small and unstable units, not conducive to breeding. Urgent help for these two species is required.

6. CONCLUSION

This study has shown that the wholesale value of rhino horn has increased by 2000 per cent since 1975. It has dispelled the myth that the Chinese use rhino horn as an aphrodisiac, and explained that they regard it instead as a powerful fever-reducing drug. In Southeast Asia and the Far East more than half of the annually available supply is consumed. The other major use of rhino horn is for making Yemeni dagger handles, and it is primarily because of the present demand in North Yemen that the prices for rhino horn have risen so high. But it is reliance on rhino horn as a medicine which is probably the greatest long-term threat to the survival of rhinos.

Today's world rhino populations are probably 10 per cent of what they were in the middle of the nineteenth century. The decline has been especially severe since 1970; it is believed that there were then twice as many as there are now.

Conservation measures can help the situation, as the case of the white rhino in South Africa has proved. Also, because of additional parks, more patrols and an active tourist-orientated programme to see rhinos in the wild, the Indian rhino in northern India and Nepal is now better off than before, even though its horn commands in Asia seven times more than that of the black rhino on the wholesale market. The black rhino is by far the most widely distributed of any of the species, but as a result of warfare, uncontrolled poaching, human population pressures and increased agricultural activity, the black rhino populations in Africa are being subjected to such stress that not only are they diminishing in numbers because of continual killing but also because their breeding habits are being impaired. Only in very select small areas of parks in southern Africa has there been any natural increase in rhino populations during the past ten years. There are not more than two known viable rhino populations of the Sumatran species left today; one is in the Gunung Leuser Reserve in northern Sumatra (50 animals) and the other is in Endau-Rompin in west Malaysia (15 animals). In both of these areas the sex ratios appear to be favourable and sub-adults have been observed.⁹⁴

Fortunately, these areas also have enough space and suitable vegetation to allow for increased numbers of rhinos, but obviously more such places where Sumatran rhinos exist need to be given adequate protection in order to ensure the survival of the species. As far as the Javan rhino is concerned, with only 50 animals, all in one reserve, the outlook is precarious. Natural hazard, disease, poaching, and other risks could wreak havoc on any single population unit. I mention here the diverse status of rhino populations in order to emphasize their present plight. It is only in conjunction with conservation measures that trade in rhino products can be stopped, and this trade must cease if any insurance is to be given for the survival of the remaining numbers of rhinos.

TABLE I

PERCENTAGE OF PHARMACIES HAVING RHINO PRODUCTS
FOR SALE IN 1979

<u>Place</u>	<u>Total No. of Shops Examined</u>	<u>No. Having Rhino Products</u>	<u>Percentage with Rhino Products</u>
Singapore	15	8	53%
Hong Kong (Kowloon)	15	11	73%
Macao	9	7	78%
Taipei	9	9	100%
Bangkok	23	12	52%
Chiangmai	5	3	60%
	----	----	----
Total:	<u>76</u>	<u>50</u>	<u>66%</u>

N.B. This sample is based only upon the larger traditional Chinese medicine shops in the various cities. Small shops were not usually examined, nor were predominantly "modern" (i.e. western) medicine shops.

TABLE II

AVERAGE RETAIL PRICES OF RHINO HORN PER KILO
IN 1979

<u>Place</u>	<u>Type</u>	<u>Price in \$</u>
Singapore	Almost all African	11,615
Hong Kong	Almost all African	11,103
Macao	Almost all African	4,127
Taipei	African	1,596
	Asian (Indian)	17,090
Bangkok	Mostly Asian	3,654
Chiangmai	Sumatran	11,764

	Average:	<u>\$ 8,707</u>

AVAILABILITY OF RHINO PRODUCTS FOR MEDICINAL PURPOSES IN 1979

City	Horn	Dried Skin	Processed Skin	Horn	Dried Blood	Dung	Stomach	Bone	Penis
Singapore	*	*	*	*	*	*	*	*	*
Hong Kong	*	rarely	*	*	*	*	*	*	*
Macao	*	*	*	*	*	*	*	*	*
Taipei	*	*	*	*	*	*	*	*	*
Bangkok	*	*	*	*	*	*	*	*	*
Chiangmai	*	*	*	*	*	*	*	*	rarely

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TABLE VI

WHOLESALE PRICES IN US DOLLARS OF AFRICAN RHINO HORN (INCLUDING TAXES, IF ANY)

Place	(Sept) 1979	(April) 1979	(Feb.) 1979	(July) 1978	1977	1976	1975	1970
	Hong Kong (illegal)	800	525	500	300	190	105	32
Macao	675	525	300	300	190	105	32	34
Singapore	675	525	500	300	190	105	32	34
Taipei	778	605	376	345	215	105	40	40

TABLE III

AVERAGE RETAIL PRICES OF DRIED (UNPROCESSED) RHINO SKIN PER KILO IN 1979

Place	Price in \$
Singapore	923
Hong Kong	423
Macao	442
Taipei	417
Bangkok	236
Average:	<u>\$ 488</u>

TABLE IV

RETAIL PRICES OF MISCELLANEOUS RHINO PRODUCTS IN CHIANGMAI, THAILAND, IN 1979

Product	Price in \$
Dried Blood (per kilo)	148
Stomach (whole)	500
Penis and Testicles (whole)	740
Bone (per kilo)	22
Dried Dung (per kilo)	246

TABLE VII

WHOLESALE PRICES OF ASIAN RHINO HORN (INCLUDING TAXES, IF ANY)

<u>Place</u>	<u>Price per Kilo</u> <u>(September 1979)</u>
Hong Kong	\$ 6,500
Taipei	\$ 4,600
Bangkok	\$ 2,200

Average:	<u>\$ 4,433</u>

TABLE VIII

SOUTH AFRICAN OFFICIAL RHINO HORN EXPORTS

<u>Year</u>	<u>Weight (kilos)</u>	<u>Value in U.S. \$</u>	<u>Price per kilo</u> <u>in US \$</u>
1966	605	15,275	25
1973	389	9,611	25
1974	304	9,402	31
1977	126	3,610	29
1978	176.5	8,924	51

Sources: Personal communication with Peter Hitchins, and Natal Parks, Game and Fish Preservation Board, 1979, courtesy of Ken Hillman.

TABLE IX

IMPORTS OF RHINO HORN INTO HONG KONG
FROM JUNE 1978 TO FEBRUARY 1979

<u>Weight (kilos)</u>	<u>Exporting Country</u>	<u>Declared Origin</u>
50	Dubai	East Africa
47	South Africa	South Africa
25	South Africa	South Africa
98	South Africa	South Africa
50	Dubai	East Africa
8.7	South Africa	South Africa
141	South Africa	South Africa
<u>25</u>	South Africa	South Africa
Total: <u>444.7</u>		

Source: Agriculture and Fisheries Department, Hong Kong Government (unpublished), courtesy of Chris Huxley.

TABLE X

MINIMUM ESTIMATES OF RHINO HORN IMPORTS
INTO MAIN CONSUMER COUNTRIES PER YEAR FROM 1972 TO 1978

<u>Country</u>	<u>Weight (kilos)</u>	
North Yemen (1971/2 to 1976/7)	2,972	roughly, 3 tonnes
(20% has been deducted from gross imports as this amount is re-exported in the form of chippings to Hong Kong and China)		
Taiwan	943)
Japan	792) roughly, 2 tonnes
South Korea	223)
China		
Chippings imported from North Yemen and Hong Kong	750) 1.75 tonnes
Other imports	1,000)
Others (Hong Kong, Singapore, India, Nepal, Malaysia, Burma, Thailand, Indonesia, Macao, western Europe, the American, etc.)	1,000	1 tonne
Total :	<u>7,970</u>	<u>tonnes</u>

N.B. Entrepôts, such as Hong Kong and Singapore, consume relatively small amounts of rhino horn; in this Table the estimates refer only to their own consumption.

Sources: Official Import Statistics for North Yemen, Taiwan, Japan and South Korea; information from dealers, government officers; correlations of various import/export figures; and government auction figures.

TABLE XI

MINIMUM ESTIMATED AMOUNTS OF HORN PRODUCED FROM THE DEATHS OF
RHINOS IN VARIOUS COUNTRIES AND GEOGRAPHICAL AREAS,
ON AVERAGE PER YEAR BETWEEN 1972 AND 1978

<u>Country (or Area)</u>	<u>No of Deaths per year</u>	<u>Kilos per year</u>
Kenya	1,500	4,320
Tanzania	690	2,000
Uganda and Central Africa (Sudan, C.A.R., Zaire, Zambia, and Rhodesia)	200*	900
Republic of South Africa	100	350
Others in southern Africa (Angola, Southwest Africa, Botswana, Malawi, Rhodesia and Mozambique)	90	300
Asia	80(?)	100 (?)
Totals:	<u>2,660</u>	<u>7,970</u> (or 8 tonnes)

* This figure is adjusted to indicate only the deaths of those rhinos whose horn reached the international market.

N.B. The weight of horn per animal for Central Africa is based on an average of 4.54 kilos. (Source: G.B. Kaweche and A.N. Mwenye, Recreation Hunting in Zambia, a paper for the Fifth Regional Wildlife Conference for East and Central Africa, Gaborone, Botswana). For average weight of horn per animal in other countries, see text.

TABLE XII

OFFICIAL IMPORTS OF RHINO HORN INTO JAPAN FROM 1951 TO 1978

Origin	Weight (Kilos)	Value (US Dollars)	Price per kilo (US Dollars)
<u>1978</u>			
Kenya	367	110,342	301
South Africa	350	106,380	304
Hong Kong	120	40,200	335
Singapore	16	6,532	408
Total:	<u>853</u>	<u>263,454</u>	<u>308</u>
<u>1977</u>			
Kenya	304	32,678	107
Hong Kong	229	27,815	121
South Africa	25	3,754	150
Singapore	3	616	205
Total:	<u>561</u>	<u>64,863</u>	<u>116</u>
<u>1976</u>			
Kenya	704	49,965	71
South Africa	64	6,511	102
Hong Kong	55	5,038	92
Total:	<u>823</u>	<u>61,514</u>	<u>75</u>
<u>1975</u>			
Kenya	143	9,172	64
South Africa	22	1,538	70
Hong Kong	16	3,731	233
India	-	807	807
Total:	<u>181</u>	<u>15,248</u>	<u>84</u>
<u>1974</u>			
Kenya	409	26,131	64
South Africa	164	12,404	76
Tanzania	84	5,974	71
Hong Kong	27	3,229	120
Total:	<u>684</u>	<u>47,738</u>	<u>70</u>
<u>1973</u>			
Kenya	1,016	60,747	60
South Africa	462	27,559	60
Hong Kong	265	15,326	58
Zambia	49	3,289	67
Total:	<u>1,792</u>	<u>106,921</u>	<u>60</u>

TABLE XII
(Continued)

Origin	Weight (Kilos)	Value (US Dollars)	Price per kilo (US Dollars)
<u>1972</u>			
Kenya	588	28,822	49
Hong Kong	45	2,892	64
South Africa	15	813	54
Total:	<u>648</u>	<u>32,527</u>	<u>50</u>
<u>1971</u>			
Kenya	447	23,983	54
Tanzania	414	23,119	56
Hong Kong	197	11,594	59
South Africa	121	7,517	62
Democratic Congo	60	3,456	58
India	31	1,539	50
Total:	<u>1,270</u>	<u>71,208</u>	<u>56</u>
<u>1970</u>			
Hong Kong	353	15,511	44
Tanzania	262	7,872	30
Kenya	203	10,208	50
South Africa	37	1,503	41
Thailand	20	528	26
China	10	481	48
U.S.A.	8	450	56
Total:	<u>893</u>	<u>36,553</u>	<u>41</u>
<u>1969</u>			
Kenya	295	7,781	26
Hong Kong	274	10,603	39
Thailand	100	1,300	13
Tanzania	85	2,206	26
C.A.R.	60	936	16
South Africa	11	464	42
Total:	<u>825</u>	<u>23,290</u>	<u>28</u>
<u>1968</u>			
Hong Kong	106	1,967	19
Thailand	50	1,075	22
Tanzania	49	2,272	46
South Africa	25	958	38
Kenya	9	278	31
Total:	<u>239</u>	<u>6,650</u>	<u>28</u>

TABLE XII
(Continued)

Origin	Weight (Kilos)	Value (US Dollars)	Price per kilo (US Dollars)
<u>1967</u>			
Tanzania	261	8,319	23
Hong Kong	162	6,525	40
India	86	3,853	45
Kenya	59	2,053	35
Rep. of Congo	50	1,861	37
Democratic Congo	50	1,753	35
China	20	575	29
Total:	<u>688</u>	Total: <u>24,939</u>	Average: <u>36</u>
<u>1966</u>			
Tanzania	146	5,833	40
Kenya	91	3,492	38
Rep. of Congo	85	3,750	44
China	75	3,656	49
Hong Kong	49	2,678	55
South Africa	43	2,006	47
Southwest Africa	30	1,764	59
Total:	<u>519</u>	Total: <u>23,179</u>	Average: <u>45</u>
<u>1965</u>			
Rep. of Congo	130	4,222	32
Hong Kong	68	2,228	33
India	62	2,194	35
China	53	1,831	35
South Africa	39	1,150	29
Kenya	38	1,308	34
Democratic Congo	30	1,511	50
Tanzania	10	336	34
Total:	<u>430</u>	Total: <u>14,780</u>	Average: <u>34</u>

TABLE XII
(Continued)

Year	Weight (Kilos)	Value (US Dollars)	Price per kilo (US Dollars)
1964	97	3,428	35
1963	494	14,147	29
1962	446	14,947	34
1961	144	5,797	40
1960	160	6,169	39
1959	182	7,031	39
1958	36	1,469	41
1957	186	6,367	34
1956	168	5,292	31
1955	266	7,056	27
1954	78	1,989	25
1953	275	4,083	15
1952	457	7,742	17
1951	116	1,842	16

Sources: Institute of Developing Economies, Tokyo, Foreign Trade Statistics of Japan, 1951-1965, Time Series by Commodity, Volume I, Table of Commodity Totals in Time Series, I.D.E. Statistical Data Series No. 2 (Tokyo, 1972); and Government of Japan, Ministry of Finance, Japan: Exports and Imports, Commodity by Country, 1966-1978 (Tokyo, 1967-1979).

TABLE XIII

OFFICIAL IMPORTS OF RHINO HORN INTO TAIWAN FROM 1966 TO 1978

<u>Origin</u>	<u>Weight (Kilos)</u>	<u>Value (US Dollars)</u>	<u>Price per Kilo (US Dollars)</u>
<u>1978</u>			
South Africa	166	14,301	86
Hong Kong	84	9,057	108
Singapore	12	1,379	115
Other	<u>643</u>	<u>49,365</u>	<u>77</u>
Total:	<u>905</u>	<u>74,102</u>	<u>82</u>
<u>1977</u>			
Hong Kong	200	2,635	13
Tanzania	<u>24</u>	<u>1,107</u>	<u>46</u>
Total:	<u>224</u>	<u>3,742</u>	<u>17</u>
<u>1976</u>			
Unknown	681	27,088	40
<u>1975</u>			
Unknown	1,908	61,107	32
<u>1974</u>			
Japan	5	185	37
Other	<u>1,595</u>	<u>58,839</u>	<u>37</u>
Total:	<u>1,600</u>	<u>59,024</u>	<u>37</u>
<u>1973</u>			
Hong Kong	152	7,418	49
Japan	3	498	166
Other	<u>189</u>	<u>9,541</u>	<u>50</u>
Total:	<u>344</u>	<u>17,457</u>	<u>51</u>
<u>1972</u>			
Hong Kong	216	4,700	22
Other	<u>725</u>	<u>17,625</u>	<u>24</u>
Total:	<u>941</u>	<u>22,325</u>	<u>24</u>
<u>1971*</u>			
Hong Kong	119	5,653	48
Other	<u>11</u>	<u>880</u>	<u>80</u>
Total:	<u>130</u>	<u>6,533</u>	<u>50</u>

TABLE XIII
(Continued)

<u>Origin</u>	<u>Weight (Kilos)</u>	<u>Value (US Dollars)</u>	<u>Price per Kilo (US Dollars)</u>
<u>1970*</u>			
Hong Kong	122	4,047	33
Japan	4	341	85
Other	<u>85</u>	<u>3,818</u>	<u>45</u>
Total:	<u>211</u>	<u>8,206</u>	<u>39</u>
<u>1969*</u>			
Hong Kong	242	10,386	43
Other	<u>119</u>	<u>3,358</u>	<u>28</u>
Total:	<u>361</u>	<u>13,744</u>	<u>38</u>
<u>1968*</u>			
Hong Kong	1,077	19,510	18
Japan	10	173	17
Other	<u>394</u>	<u>10,305</u>	<u>26</u>
Total:	<u>1,481</u>	<u>29,988</u>	<u>20</u>
<u>1967*</u>			
Hong Kong	226	6,668	30
Other	<u>268</u>	<u>6,572</u>	<u>25</u>
Total:	<u>494</u>	<u>13,240</u>	<u>27</u>
<u>1966*</u>			
Hong Kong	326	10,612	33
Other	<u>48</u>	<u>2,312</u>	<u>48</u>
Total:	<u>374</u>	<u>12,924</u>	<u>35</u>

* Includes some antelope horn, but not any other horn or antlers.

Source: Chinese Maritime Customs, Statistical Department, Inspectorate General of Customs, Taipei, The Trade of China, 1966-1978 (Taipei, 1967-79).

TABLE XIV

OFFICIAL IMPORTS OF RHINO HORN INTO SOUTH KOREA
FROM 1970 TO 1978

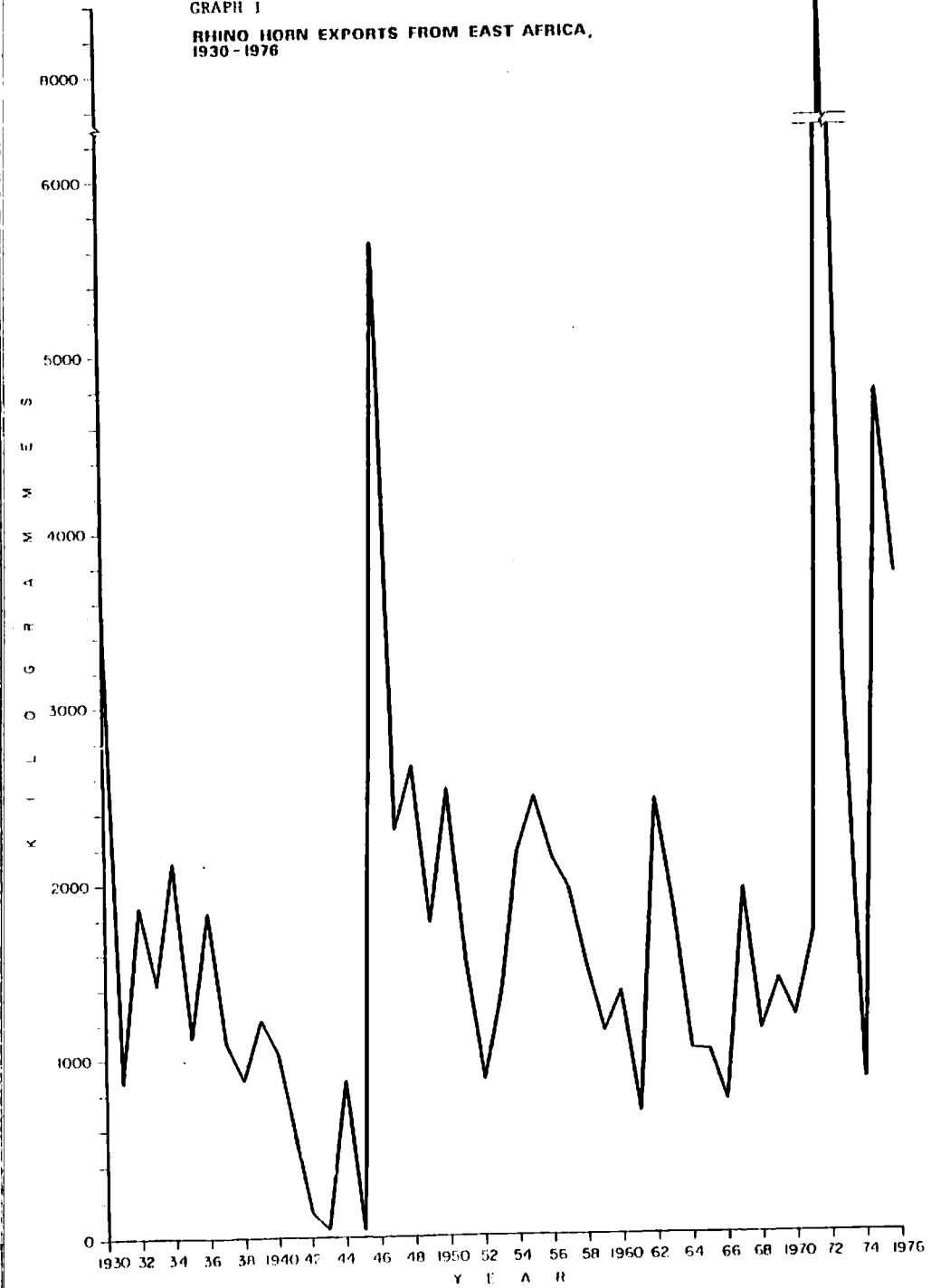
<u>Origin</u>	<u>Weight (Kilos)</u>	<u>Value (US Dollars)</u>	<u>Price per Kilo (US Dollars)</u>
<u>1978</u>			
Indonesia	51	14,492	284
<u>1977</u>			
Indonesia	207	37,850	183
Thailand	66	10,204	155
India	19	1,661	87
Japan	15	3,044	203
Total:	<u>307</u>	<u>52,759</u>	<u>Average: 172</u>
<u>1976</u>			
Indonesia	204	9,439	46
Thailand	65	3,012	46
Japan	8	1,016	127
Total:	<u>277</u>	<u>13,467</u>	<u>Average: 49</u>
<u>1975</u>			
Indonesia	200	11,012	55
Japan	12	1,258	105
Total:	<u>212</u>	<u>12,270</u>	<u>Average: 58</u>
<u>1974</u>			
Indonesia	97	3,612	37
Thailand	81	3,098	38
Hong Kong	30	1,127	38
Japan	6	242	40
Total:	<u>214</u>	<u>8,079</u>	<u>Average: 38</u>
<u>1973</u>			
Indonesia	214	7,843	37
India	30	1,055	35
Japan	9	484	54
Total:	<u>253</u>	<u>9,382</u>	<u>Average: 37</u>
<u>1972</u>			
Singapore	197	6,749	34
Japan	31	1,000	32
U.S.A.	20	737	37
Total:	<u>248</u>	<u>8,486</u>	<u>Average: 34</u>

TABLE XIV
(Continued)

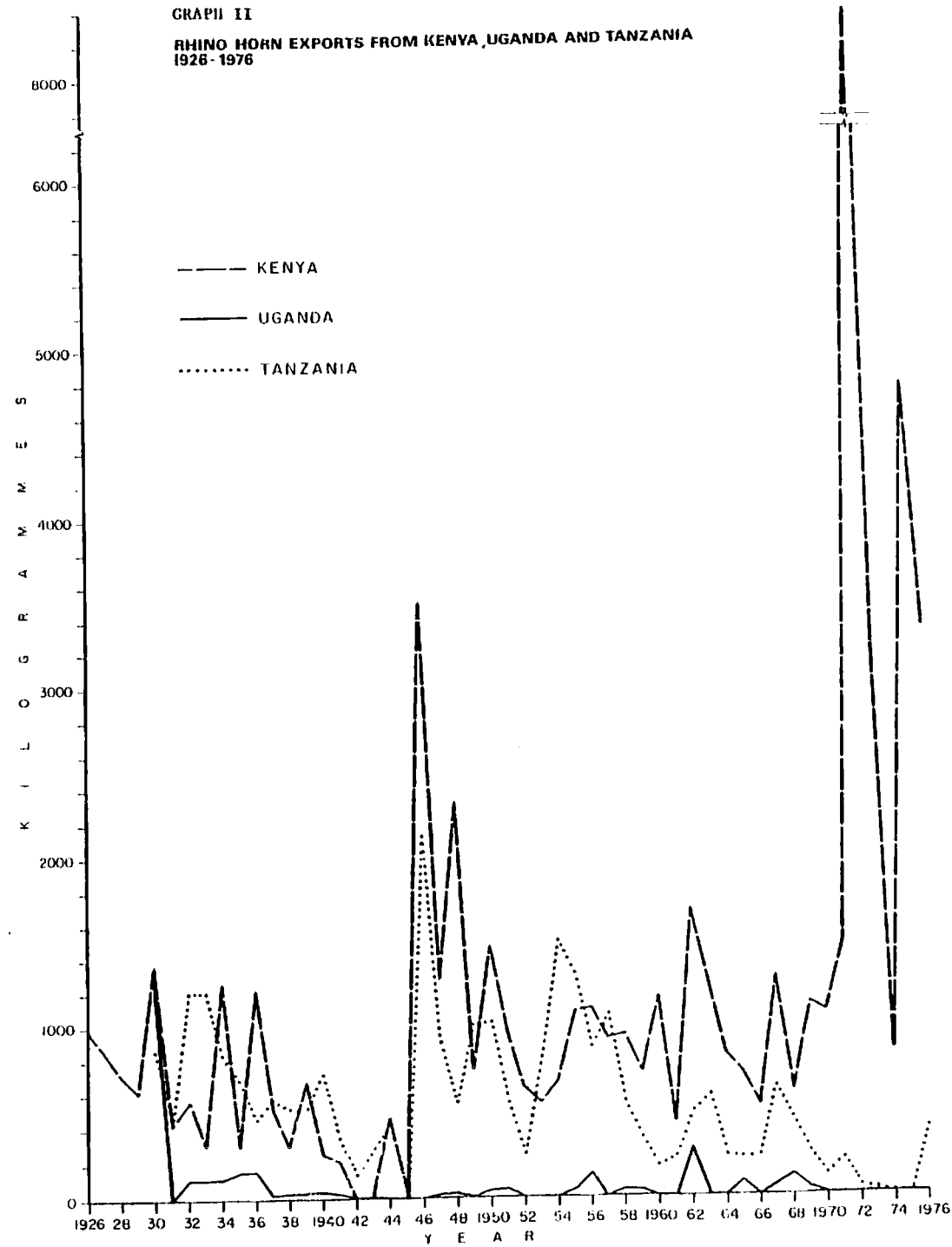
<u>Origin</u>	<u>Weight (Kilos)</u>	<u>Value (US Dollars)</u>	<u>Price per Kilo (US Dollars)</u>
<u>1971</u>			
Singapore	50	4,416	88
Japan	2	321	161
Total:	<u>52</u>	<u>4,737</u>	<u>Average: 91</u>
<u>1970</u>			
Hong Kong	2	49	25
Japan	1	40	40
Total:	<u>3</u>	<u>89</u>	<u>Average: 30</u>

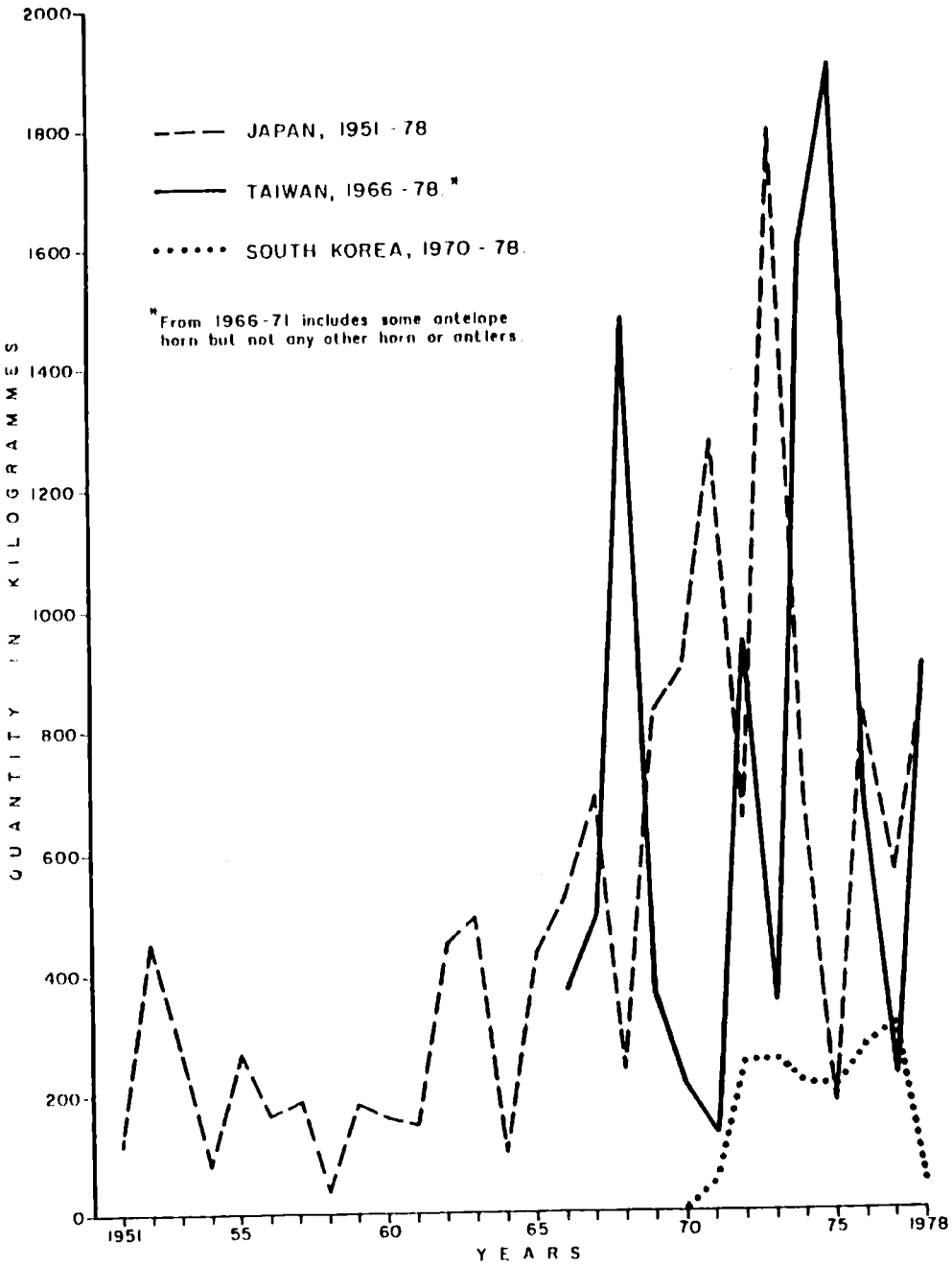
Source: Republic of Korea, Office of Customs Administration,
Statistical Year Book of Foreign Trade, 1970-78
(Seoul, 1971-79).

GRAPH I

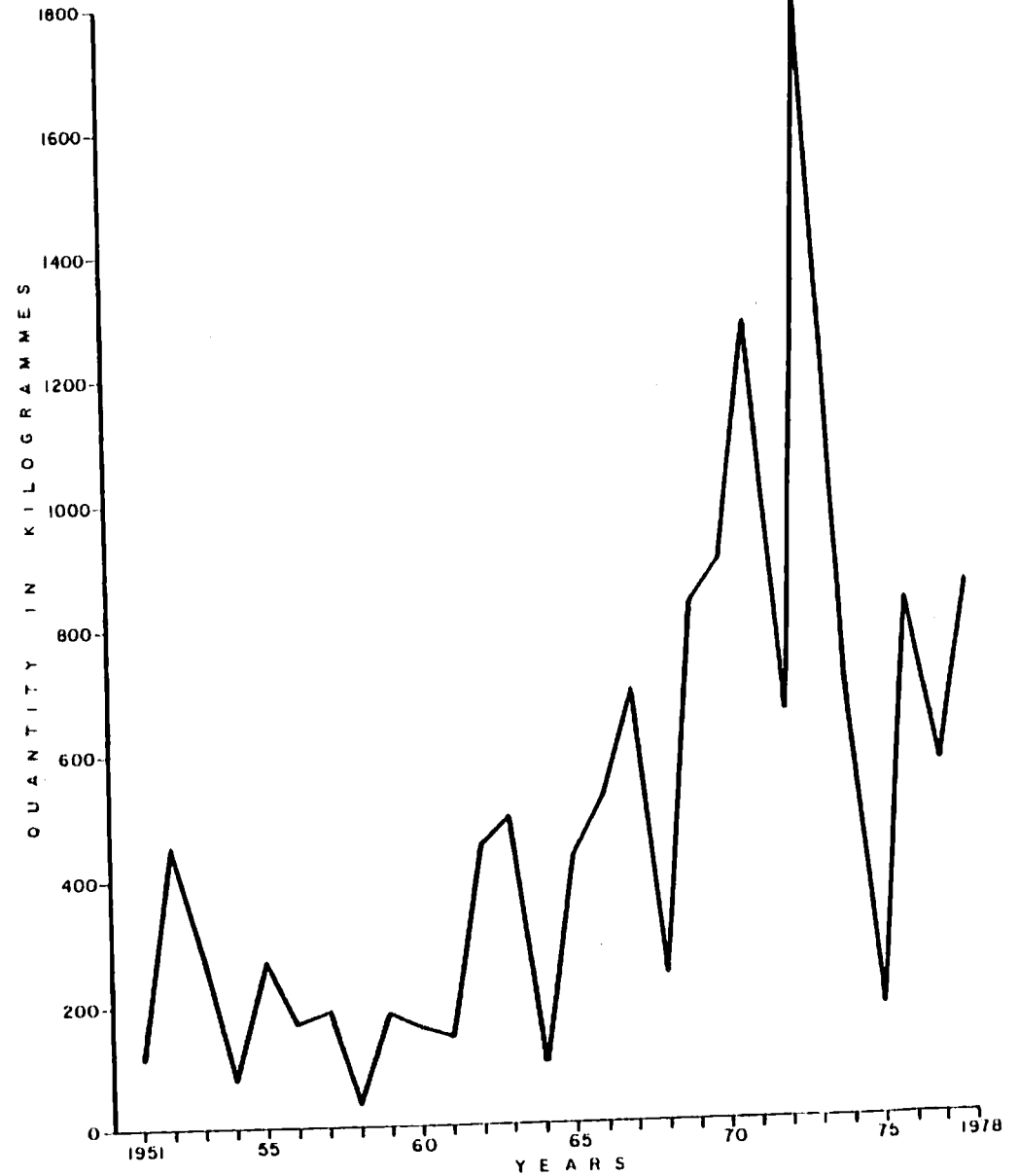
RHINO HORN EXPORTS FROM EAST AFRICA,
1930 - 1976

GRAPH II

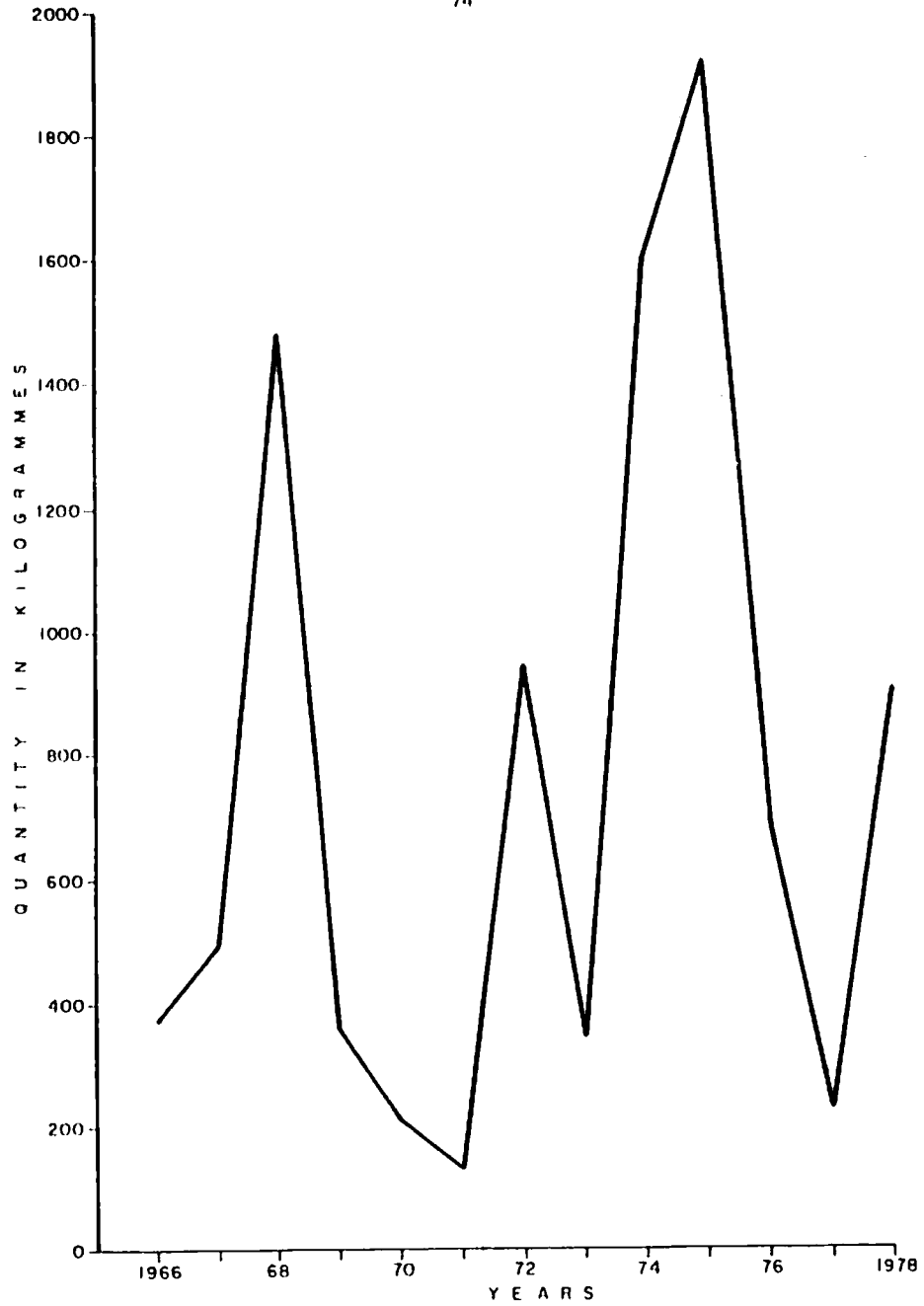
RHINO HORN EXPORTS FROM KENYA, UGANDA AND TANZANIA
1926 - 1976



GRAPH III
 OFFICIAL IMPORTS OF RHINO HORN INTO JAPAN, TAIWAN,
 AND SOUTH KOREA FROM 1951 TO 1978.

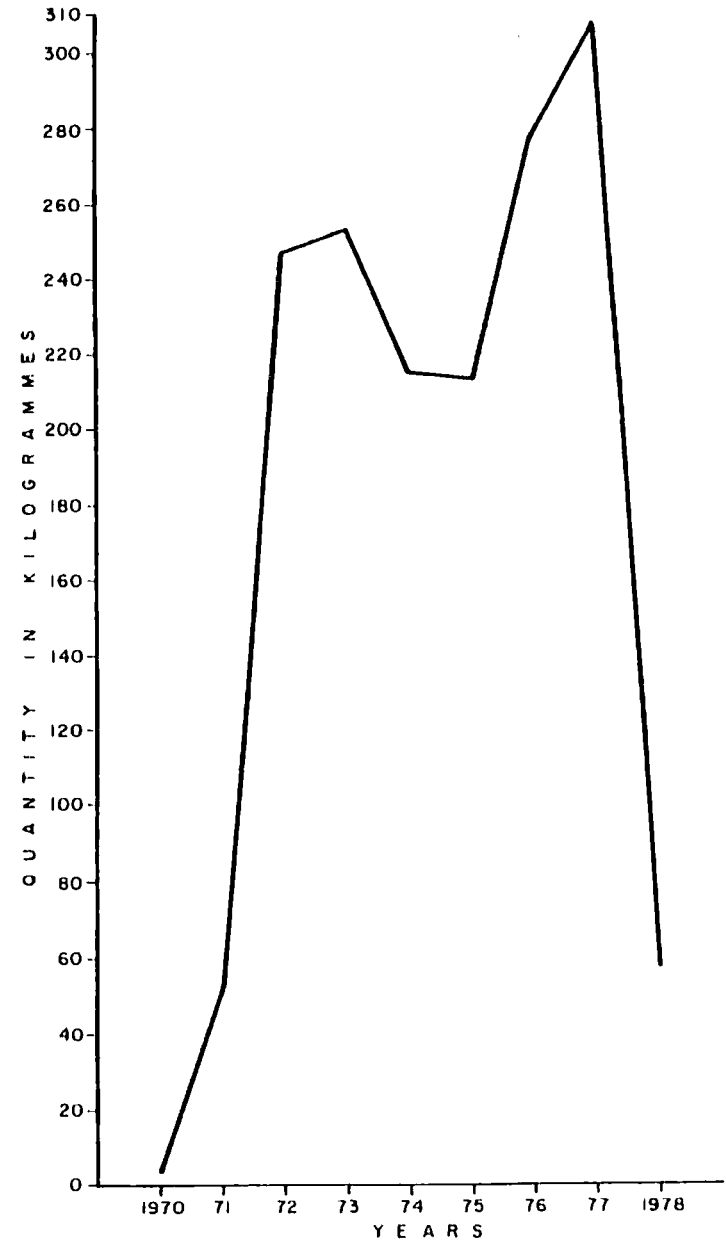


GRAPH IV
 OFFICIAL IMPORTS OF RHINO HORN INTO JAPAN
 FROM 1951 TO 1978.



GRAPH V

OFFICIAL IMPORTS OF RHINO HORN INTO TAIWAN FROM 1966 TO 1978 (From 1966-1971 includes some antelope horn but not any other horn or antlers).



GRAPH VI

OFFICIAL IMPORTS OF RHINO HORN INTO SOUTH KOREA FROM 1970 TO 1978.

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12. Baker, p. 294.
13. Kalman Kittenberger, Big Game Hunting and Collecting in East Africa: 1903-1926 (London, 1929), pp. 201-202; the

- Masai and Chagga peoples also made clubs from rhino horn (Simon, p. 255).
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 16. Baker, pp. 294-295.
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 19. Kittenberger, p. 202.
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 26. Personal communication with Ian Grimwood, Nairobi, May, 1979.
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 28. Government of the Yemen Arab Republic, Central Bank of Yemen, Annual Reports, 1969/70 - 1976/7 (Sanaa, various years), various pages; and I.S.C. Parker and Esmond Bradley Martin, "Trade in African Rhino Horn", Oryx (Vol. XV, No. 2, November, 1979), p. 157.
 29. Interviews with merchants, carvers of rhino horn and other Yemenis, October, 1979.
 30. John D. Keys, Chinese Herbs: Their Botany, Chemistry and Pharmacodynamics (Rutland, Vermont, N.D.), p. 303.

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32. Ven. Renchung Rinpoche Jampal Kuzang, Tibetan Medicine (Berkeley and Los Angeles, 1976), p. 71.
33. Chinese Medical Dictionary (Hong Kong, 1978).
34. Read, Items 322, 327, 363, 364, 382, and 413; Wallnofer and Rottauscher, pp. 71-74; and Traditional Chinese Medicine: Herbal, Mineral and Organic: An Exhibition Presented by the National Museum and the Institute of Chinese Medical Studies, Singapore (Singapore, 1979), Items 146, 300, and 490.
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38. Talbot, p. 170.
39. Personal communication with Andrew Laurie, November 1979.
40. Information supplied by D.H.M. Cumming, Chief Research Officer (Wildlife), Department of National Parks and Wildlife Management, Salisbury, in November 1979, in reply to questionnaire for IUCN African Rhino Group; Dr Cumming also comments that there is a demand in Rhodesia for mounted rhino feet, but I have no further details.
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- available to the Fauna Preservation Society (London) details on the destinations of the exports of rhino horn from East Africa from 1949 to 1976.
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 53. Richard Pankhurst, Economic History of Ethiopia, 1800-1935 (Addis Ababa, 1968), pp. 351, 437 and 441.
 54. Personal communication with Steve Stephenson, former Advisor to the Ethiopian government on wildlife, 1975-78, Nairobi, July, 1979; during Mr. Stephenson's stay in Ethiopia, he never saw a single rhino but he was told of the tracks of one rhino in the Omo area in the southwest part of the country.
 55. In the early years of the twentieth century, London was an entrepôt for rhinoceros horn; the merchants in London probably sent most of the horn they received from Africa to India and the Far East.
 56. General Exports from the Colony of the East Africa Protectorate in the Year 1913-14, C.O. 543/13, Public Records Office, London.
 57. Zanzibar Protectorate, Annual Trade Reports for the Years 1952, 1953 and 1954 (Zanzibar, various years).
 58. Unfortunately, North Yemen rhino imports are not broken down country by country.

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60. G.B. Kaweche and A.N. Mwenye, Recreation Hunting in Zambia, A Paper for the Fifth Regional Wildlife Conference for East and Central Africa, Gaborone, Botswana, July, 1978 (mimeographed).
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63. D.H.M. Cumming, in reply to questionnaire.
64. Personal communication with Ian Parker, who visited Namibia in early 1979.
65. Information supplied by Natal Parks, Game and Fish Preservation Board, and Peter Hitchins, in reply to questionnaire for IUCN African Rhino Group.
66. Peter Hitchins, in reply to questionnaire.
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68. William Andrew Laurie, The Ecology and Behaviour of the Greater One-horned Rhinoceros, a dissertation submitted to the University of Cambridge for the degree of Doctor of Philosophy, December, 1978, p. 397. x
69. Republic of Korea, Office of Customs Administration, Statistical Yearbook of Foreign Trade (Seoul, 1979).
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71. The name of this ordinance is Animals and Plants (Protection of Endangered Species), Chapter 187 of the Revised Edition, 1976.
72. See page 21 of Animals and Plants Ordinance.
73. In order to sell rhino horn domestically in Hong Kong, a dealer is supposed to have a licence for possession, but the government has not so far taken action against pharmacists with small supplies that have not been licensed; the statistics on the amounts of horn legally imported from June 1978 to February 1979 were supplied to me by Chris Huxley, of the Agriculture and Fisheries Department of the Hong Kong government.
74. Personal communication with Norman Miller, Nairobi, December, 1979; see also a forthcoming article by Norman Miller and James Strickler, "China's Revolution in Health", A.U.F.S. Report (Hanover, New Hampshire, January, 1980).

75. Information supplied by Pong Leng-EE, Chief of the Wildlife Conservation Division, Royal Forest Department, Bangkok, September 24, 1979.
76. Personal communication with Boonsong Lekagul and Pong Leng-EE, Bangkok, September, 1979.
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79. "Saving Asia's Wild Treasures", Asiaweek (Vol. 5, No. 37, September 21, 1979), pp. 26-31.
80. The exact populations of Kenya's rhino in 1969 are unknown; my figure of 18,000 falls within the range from 15,000 to 20,000, which has been suggested by Kes Hillman and David Western, who have calculated their figures from estimates obtained for all the country's major rhino areas and from John Goddard's work on the Tsavo Eco-system (John Goddard, "Aerial Census of Black Rhinoceros using stratified random sampling", East African Wildlife Journal [Vol. VII, August, 1969], p. 105).
81. The 1979 population figure is based on information gathered by the Kenya African Rhino Action Group in 1979; and from the Kenya Rangeland Ecological Monitoring Unit (KREMU), which estimated a maximum of 3936 and a minimum of 2118 rhinos in 1977 and a maximum of 1442 and a minimum of 871 in 1978 (John Stelfox and John Kufwafwa, Distributions, Densities and Trends of Elephants and Rhinoceros in Kenya, 1977-78, from KREMU's Aerial Surveys, mimeographed report, Nairobi, 30 April, 1979).
82. From 1959 to 1977, the average weight of all rhino horns collected from Kenya's National Parks was 1.85 kilos per horn, or 3.69 kilos per animal; however, this average is from a smaller amount of horns, only 3453.
83. Information supplied by Ian Parker.
84. There has been a tremendous amount of rhino poaching in northern Tanzania, reducing the population there by 90% in the 1970s; however, the main rhino populations in Tanzania are concentrated in the Selous Game Reserve in the south, and the estimate of 2700 rhinos in 1976 remains roughly the same today (Hillman and Martin, "Countdown", p. 6; and personal communication with W.A. Rogers, Nairobi, 1979).

85. Information supplied by Ian Parker, Nairobi, November, 1979; and from estimates made by the IUCN African Rhino Group.
86. Peter Hitchins, in reply to questionnaire.
87. R. Schenkel and L. Schenkel, General Report and Synopsis of SSC Asian Rhino Specialist Group, Special Meeting, Bangkok, 13-16 August 1979 (mimeographed).
88. Laurie, p. 386.
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90. James Fisher, Noel Simon and Jack Vincent, The Red Book: Wildlife in Danger (London, 1969), pp. 114-115.
91. The Red Book, p. 112.
92. It is not possible to quantify the precise rate of increase in rhino populations under natural conditions because not enough research has been carried out on rhino populations in the wild. However, we can make some estimates. Andrew Laurie, working mostly in the Royal Chitawan National Park in Nepal, estimates that the Indian rhino populations he was studying were increasing between 2 per cent and 6.1 per cent per year (Laurie, p. 107). In South Africa, the white rhino populations have been increasing since 1968 from 8 per cent to 10 per cent per annum, but for some unknown reason the black rhinos have not been increasing in Hluhluwe and Mkuzi reserves at all and only very slightly in Umfolozi (Personal communication with J. Vincent, Director of Natal Parks, Game and Fish Preservation Board, September 1979, by courtesy of Kes Hillman). According to the Red Book (pp. 119-120), under normal conditions the net annual population increase for black rhinos is about 5 per cent to 8 per cent. Of course, conditions for most black rhino populations are not "normal" due to pressure from hunters and agriculturalists, and they are continually deteriorating. Thus, it is likely that the annual increase in population for all black rhino averages closer to 4 per cent than 6 per cent.
93. The formula used to calculate the number of years remaining for wild rhinos is as follows:
- $$R_t = (R_{t-1} - X) e^n$$
- where R = rhino population in time (t) and the previous period (t - 1); X = offtake; and n = natural rate of growth (Courtesy of T.C.I. Ryan, Associate Professor of Economics, University of Nairobi).
94. Personal communication with Ian Grimwood, Nairobi, December, 1979.



Indian rhinoceros (Rhinoceros unicornis), Kaziranga National Park, India.
Photo: E. Schuhmacher