

(Caretaker of the Tourist Lodge at Baradabri), for the invitation to assist in their 1966 wild life census, for the accommodations and facilities provided during my two visits to Jaldapara, and above all for their assistance and wonderful hospitality. Special thanks goes to Mr. S. S. Sanyal (Assistant Divisional Forest Officer, Cooch Behar) who accompanied me in the field and graciously answered my many questions. In this report I relied to a great extent upon the Forest Department's 'Jaldapara Working Plan' which demonstrates much hard work and good judgment in the establishment of management plans for this outstanding wild life area.

#### VII. GLOSSARY OF LOCAL TERMS

<i>basti</i>	.. a settlement of cultivators.
<i>chak</i>	.. a village land surrounded by Reserved Forests.
<i>jhora</i>	.. a stream or water-course.
<i>khola</i>	.. a stream or water-course.
<i>khasmahal</i>	.. land owned by the Government.
<i>kutcha</i>	.. thatch hut, the wall of which may or may not be plastered with mud or a mixture of mud and cow dung.
<i>kukat</i>	.. any local tree species other than <i>sal</i> or teak.
<i>makhma</i>	.. a male elephant without tusks.
<i>nadi</i>	.. a river.
<i>nala</i>	.. a ravine.
<i>paddy field</i>	.. rice field (paddy is unhusked rice).
<i>taungya</i>	.. sowing and tending of forest tree species in conjunction with agricultural crops.

#### Wild Life Conservation in Nepal

BY

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(With two plates and one map)

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## I. INTRODUCTION

The two major industries in Nepal are the production of agricultural and forest products. Wild life is under the jurisdiction of the Forest Department and should probably be considered as an integral part of the forests. Most wild animals in Nepal are also forest or forest-edge dwellers and their basic requirements of food and shelter are usually provided on Forest Department lands. Therefore, generally speaking, the problems confronting the forests in this country are also the problems confronting the wild life.

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Between 1846 and 1950 Nepal was under the rule of the Rana family. There were practically no wild life conservation laws during this time, but animals such as tiger and rhino were considered strictly as royal game and as a whole wild life in the country fared very well. This was changed, however, when the Rana regime came to an end in 1950 and democracy came into being. During the period of political instability which followed, lasting until the present Panchayat System of Government came into existence in 1961, wild life suffered greatly. Strong representations concerning the dire straits of both the forests and wild life were made by the Forest Department to the Government in 1962. Since then some notable gains in conservation have been achieved. Presently the outlook for wild life in this country is better than it has been at any time during the past fifteen years. However, there still remain some problems to be solved and much work to be done. Continued vigilance must also be exercised or the gains of the last few years may be lost almost literally overnight. It is to be hoped that Nepal can benefit from the mistakes of other countries and particularly that she will refrain from committing some of the errors that other Asian nations have committed in wild life conservation.

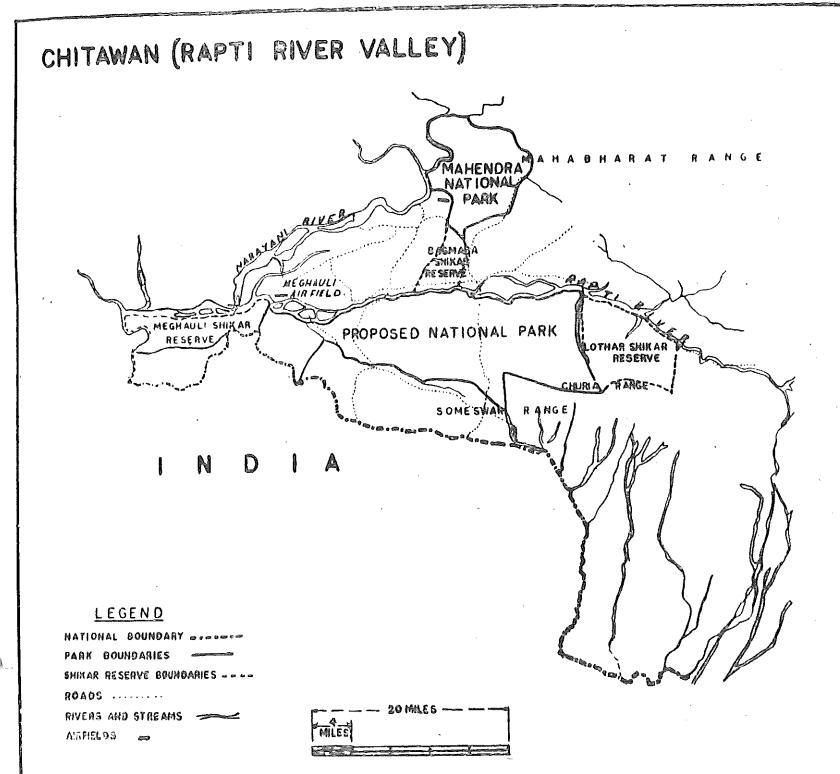
We spent 15 days (April 9-23) as guests of the Forest Department of Nepal, during which time information for this report was collected. Three days were spent meeting with Government officials in Kathmandu. Another three days were spent on elephant back in the rhino areas along the Rapti River and approximately 450 miles were travelled by jeep. Both of the proposed national parks were visited and two of the shikar reserves (Bagmara and Lothar). In addition we visited the Churia Hills and forests in the *bhabar* and *mahabharat* areas. We also spent two enjoyable days at 'Tiger Tops' as the guests of Mr. and Mrs. J. V. Coapman. Information concerning the Himalayan wild life areas is from Mr. Tamang's previous visits or from R. G. M. Willan (Chief Conservator of Forests) and other Forest Department personnel. Among the wild animals which we observed were: 11 rhino (including 5 adult males, 4 adult females, and 2 young), sambar, chital, hog deer, barking deer, four-horned antelope, wild pig, otter, tiger, and Gangetic dolphin.

## II. GENERAL REVIEW AND THE PRESENT SITUATION

### National Parks

The Mahendra Mrigan Kunja (Mahendra Deer Park), which was established in 1959, is presently being reconstituted as the Mahendra National Park. This was necessitated by the encroachment of settlers in some areas inside the former park, their subsequent resettlement also within the confines of the former park, and to include forest areas along

the Narayani River. Therefore, the boundaries of the proposed park do not exactly coincide with those that were formerly established. The total area of the present park is 60-square-miles (see Map).



Map of Chitawan (Rapti River Valley) in Southern Nepal, depicting the proposed national parks and shikar reserves

Another national park, yet to be named, is also proposed south of the Rapti River. This will include the riverain and low-lying forests in that area, as well as most of the present rhino habitat in Nepal. In addition, the adjoining extensive grasslands of Sukehaar westwards up to Dhakray Khola, close to the confluence of the Rapti and Narayani rivers, will also be included. To the south the proposed park will extend to the Someswar Range (Indo-Nepal border), excluding the Madi areas of cultivation and the new resettlement areas south of the Reu River. It then extends eastwards to Amuwa and Hasta Khola back to the Rapti River. The total area to be included in this park, all of which is south of the Rapti River, is approximately 240-square-miles (Map). Concrete pillars have been placed to demarcate the boundaries. The wild life of this area is very rich, both in abundance and in the variety of species.

Large mammals found here include : rhino (*Rhinoceros unicornis*), wild elephant (*Elephas maximus*), gaur or Indian 'bison' (*Bos gaurus*) sambar (*Cervus unicolor*), chital or spotted deer (*Axis axis*), hog deer (*Axis porcinus*), barking deer (*Muntiacus muntjak*), four-horned antelope (*Tetracerus quadricornis*), wild boar (*Sus scrofa*), tiger (*Panthera tigris*), leopard (*Panthera pardus*), Himalayan and sloth bear (*Selenarctos thibetanus* and *Melursus ursinus*). Over 100 species of birds also inhabit this area and the numerous species of fish found in the Rapti and Reu rivers offer excellent opportunities for sport fishing.

A draft act and rules for both national parks is presently under the consideration of the Government and it is hoped that these parks will be legally constituted in the near future. Both areas are already being rigidly protected and patrolled by armed rhino guards.

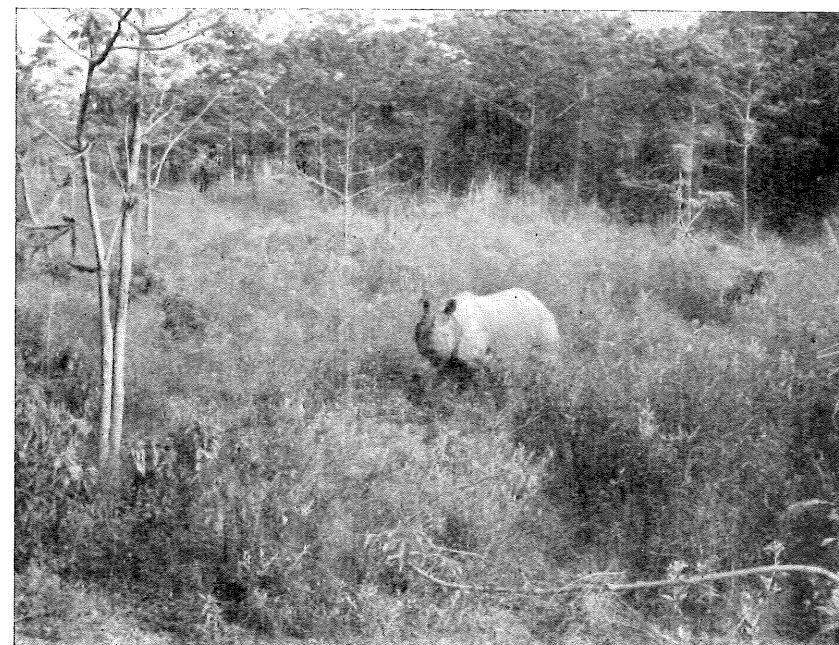
#### Visitor Facilities

(1) 'Tiger Tops', a private hotel located inside the proposed national park south of the Rapti River, has been operating successfully since it was opened in November 1965. It has already gained considerable publicity and has made a commendable impression upon visitors by showing them the rich and varied wild life of this area. Situated near the confluence of the Rapti and Reu rivers, the location provides a magnificent view of the high Himalayas to the north, including such peaks as Annapurna (26,490 feet) and Machlapuchre (22,958 feet). It is located in the heart of the jungle and provides the luxuries and comforts of modern living, but in a primitive atmosphere. The Meghauli airstrip, built for use during the 1961 visit of Queen Elizabeth, is less than three miles from the hotel and is served by frequent flights. Royal Nepal Airlines flights take less than 30 minutes to cover the 35 airline miles from Kathmandu to Meghauli.

This hotel serves as an excellent example of how a national park can be developed for tourism by private enterprise and also earn revenue and foreign exchange with only a relatively very small investment by the Government or the department involved.

(2) Kasra Durbar was originally built as a shooting lodge during the 1930's for the Rana rulers. It is situated on the south bank of the Rapti River, approximately 10 miles east of 'Tiger Tops'. It is also located on the site of a former shooting lodge built for the 1911 visit of King George V, then the Prince of Wales. The Forest Department has proposed the renovation of this lodge for a tourist rest house. Approach roads from the east and west are presently being constructed. With accessibility by road and improved accommodations, this lodge should provide a much needed facility for the general public visiting the national park in which it is located. It should also help to generate public interest in wild life conservation in Nepal.

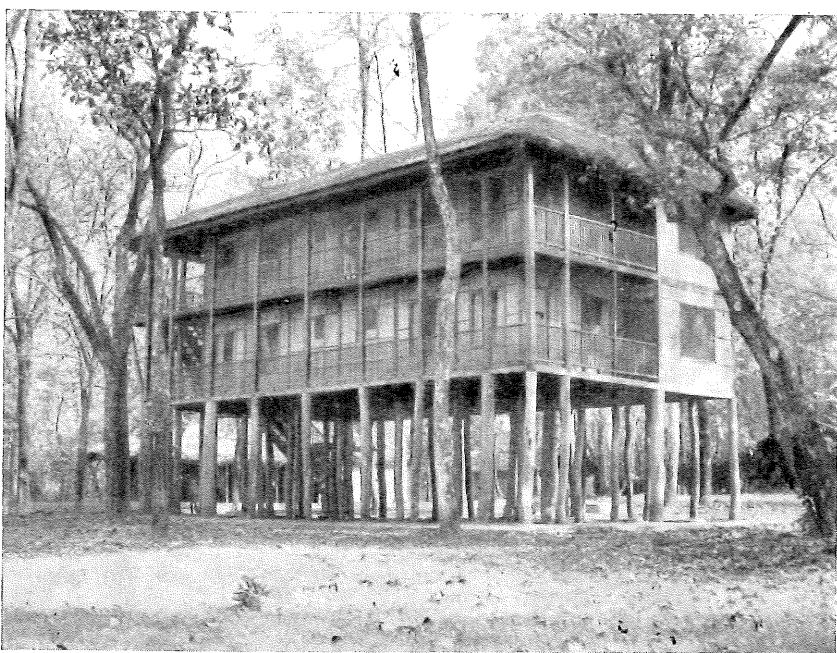
Spillett : Conservation in Nepal



Rhino in typical habitat in the Rapti River Valley, Nepal

(Photos : J. Juan Spillett)

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Above : Mother and large young rhino

These domestic buffaloes should be removed from the proposed national park where they are grazing.

Below : The 'Tiger Tops Hotel' near the confluence of the Rapti and Narayani rivers, Nepal

(Photos : J. Juan Spillett)

#### Proposed Sanctuaries and Shikar Reserves

A 44-square-mile forest area near Sukla in the Kanchanpur District of western Nepal has been proposed as a wild life sanctuary by the Forest Department. A forest rest house and the demarcation of the boundaries for this sanctuary have already been completed. Besides wild elephant, sambar, chital, hog deer, barking deer, wild boar, tiger, leopard and bears, this area also has large numbers of swamp deer and a few blackbuck or Indian antelope. Nowhere else in Nepal are swamp deer found in such abundance. The open and extensive grassland vegetation in the Sukla Phanta area also provides visitors with excellent opportunities to view wild life. Although a few blackbuck are still to be found in the Mainapokhar area in the Bardia District and in the Bankey District in the terai of west Nepal, the future of this species in these areas is not promising. Both are near heavily populated villages and the short-grass areas, typical habitat for the blackbuck, are being abused through overgrazing by domestic livestock. Some of the short-grass areas in the Sukla Phanta area in Kanchanpur are ideal for the preservation of blackbuck in Nepal.

Presently, the area in which the proposed sanctuary is located is not readily accessible to visitors. The nearest airstrip is at Dhangarhi in the Kailali District, about 30 miles away. However, with proper development of roads and accommodations, the prospects of attracting visitors to this wild life area appear very promising.

Wild buffalo (*Bubalus bubalis*) have been practically exterminated throughout their former range in Nepal. However, 20 to 30 are reported still to inhabit the flood plain along the Kosi River in the eastern part of the country. The Forest Department is presently attempting to demarcate and establish a small sanctuary in this area, primarily for the protection of this species.

Throughout the history of Nepal royal shoots have been notable events. As has previously been mentioned, Chitawan or the entire Rapti River Valley was formerly a strictly protected shooting reserve for the Rana rulers. In keeping with this ancient tradition, three shikar reserves or royal hunting blocks have been established solely for the use of members of the royal family or their guests.

The Meghuli Reserve adjoins the proposed national park to the west and lies south of the confluence of the Rapti and Narayani rivers. It encloses approximately 75-square-miles of forest lands. The Bagmara Reserve consists of a narrow neck or forest belt connecting the two national parks. It is north of the Rapti River and is bordered on the east and west by cultivated lands. It also contains approximately 20-square-miles of forest. The Lothar Reserve adjoins the proposed national park to the east and lies south of the Rapti River. It consists of approximately a 60-square-mile area.

Rhino, once considered as royal game, is now strictly protected throughout its range in Nepal, including the shikar reserves. His Majesty King Mahendra is very conservation-minded. And, although the shikar reserves are officially recognized as shooting blocks for royalty, in reality little shooting will probably take place in these areas and they can probably be considered almost as extensions to the adjoining national parks.

#### Himalayan Wild Life Areas

The scenic grandeur of the high Himalayas of Nepal needs no emphasis. The flora and fauna of these mountain areas have been and will continue to be of exceptional scientific interest. Although there is practically no information, up-to-date or otherwise, concerning the large mammals of the high Himalayan regions of Nepal, there are a few unofficial reports that remnants of some species are still to be found in a few isolated places.

Concerning wild sheep : nayan or great Tibetan sheep (*Ovis ammon hodgsoni*), and bharal or blue sheep (*Pseudois nayaur*) are said to occur in a number of locations. Marco Polo's sheep (*Ovis ammon polii*) has never been recorded from Nepal and whether or not it exists inside the country is not known. Wild goats : fair numbers of Himalayan tahr (*Hemitragus jemlahicus*) are reported still to inhabit some parts of Nepal. The range of the ibex (*Capra ibex*) is given as Kashmir to Kumaon. However, a well-known shikari reported shooting a number of these rare animals in Nepal in the early 1960's. The markhor (*Capra falconeri*), said now to be on the verge of extinction, used to be found in Kashmir and westwards. It is not known whether or not it is or has ever been found in Nepal.

Goat-antelopes : the goral (*Nemorhaedus goral*) appear to be surviving in fair numbers in some parts of Nepal. On the other hand, the serow (*Capricornis sumatraensis*) is believed to be very rare throughout most of its range. The skins of ounce or snow leopard (*Panthera uncia*) and clouded leopard (*Neofelis nebulosa*) are still occasionally seen in the markets, although they are also becoming rare. The brown or red bear (*Ursus arctos*) is reported to be quite common in many of the mountainous regions.

The establishment of national parks or sanctuaries to protect the flora and fauna of the mountainous regions and to provide opportunities for people to see and study them is of paramount importance. The Khatpar forest area north of Doti, at an elevation of about 11,000 feet, and Rara Lake at 9805 feet, including the forests surrounding the lake, are two places in the western Himalayas of Nepal that deserve serious consideration.

Mr. Willan visited the forests around the Thyangboche Monastery

(13,500 feet) in Khumbu in May 1966. This is also the closest forest area to Mt. Everest. He reports that this is an incredibly beautiful and interesting place. The Head Lama, according to the Buddhist ideals, is very anxious to secure complete protection for the flora and fauna of the area. The Lama claimed that some years ago musk deer (*Moschus moschiferus*), Himalayan tahr, and bharal or blue sheep were commonly seen there. However, later on many were shot by Army Officers for their meat, which was taken down to Kathmandu and given to friends. As a result, now they are rarely seen. However, signs of musk deer were seen.

Mr. Willan has proposed that the Gosainkund area and the Langtang Valley be examined as possible Himalayan National Parks. The Langtang Valley, north of Kathmandu, is surrounded by peaks that exceed 23,000 feet.

#### Rhino

Mr. E. P. Gee, a noted authority on the Great Indian One-horned Rhinoceros, reviewed the history of the rhino in Nepal in his 1959 'Report on a Survey of the Rhinoceros Area of Nepal'. He again visited Nepal in 1963 and reported further observations and recommendations in his 'Report on a Brief Survey of the Wild Life Resources of Nepal, including the Rhinoceros'. Mr. Willan has brought the record up-to-date with his reports in *Oryx* (1965) and the *IUCN Bulletin* (1965). Therefore, we will only briefly review the history and present status of the rhino in this country.

In ancient times rhino inhabited suitable areas, particularly in the *dun* country, throughout the entire length of Nepal. However, by modern times the range of this prehistoric-looking animal had decreased considerably. During the rule of the Rana family, which lasted over one hundred years, very few foreigners were even permitted to visit Nepal. Although there is little specific information concerning the status of the rhino during this time, there are numerous reports as to the abundance of big game, including rhino, particularly in Chitawan and neighbouring areas. The south central part of Nepal was strictly guarded as a shooting preserve for the Ranas. Royal hunts in these areas were renowned for their elaborate preparations and grandeur, as well as for the great numbers and variety of big game species shot. Hundreds of elephants were sometimes used in a single beat in honour of visiting royalty. Mr. E. A. Smythies, Forest Adviser to the Nepal Government during World War II, and his wife spoke of the abundance of wild life in the Narayani, Rapti, and Reu valleys between 1941-1945 in their books, *BIG GAME SHOOTING IN NEPAL* and *TIGER LADY*. This changed with the coming of democracy. Many rhino were poached and the horns sold to further the cause of the political upheaval which

ended the Rana rule. Poaching of rhino and other wild life continued in the following years. Of greater consequence was the influx of thousands of settlers into the areas once occupied only by rhino and other wild life species.

It is estimated that prior to democracy there were some 800 rhino in the open grasslands and swamps at the western end of the Rapti Valley. In 1957, Mr. P. D. Stracey, then Director of Forest Education in India, estimated about 400 rhino for the entire country. Their numbers were reduced to such an extent that in his 1959 visit Mr. Gee estimated only 300. Large scale poaching continued in 1959 and 1960, until it was estimated that only 165 rhino remained in the entire country in 1961. Strong action was taken in 1962 by the Forest Department and also by the present Government. Since then rhino poaching has been noticeably reduced. It is officially estimated by the Forest Department that there are now about 180 rhino in the country. However, based upon limited observations and discussions with people inhabiting the principal rhino areas, we believe there are probably fewer than 100 rhino in Nepal. The important factor, however, is not the exact number but the steps being taken by the Government and the Forest Department for the protection of those that are present. Under the present policies the country's rhino are relatively immune to further depredations and their numbers will undoubtedly increase.

#### Fish

The rich natural fishery resources of Nepal remain virtually unexploited and uncontrolled. The country has three major river systems, the Karnali in the west, the centrally located Narayani, and the Kosi in the east. Each has numerous tributaries that run mainly from north to south. Almost without exception, all are rich in fish and some are teeming with valuable fishery resources. *Mahseer* (*Barbus tor*), *catli* (*Barbus hexagonalepis*), and a few other species offer excellent opportunities for sport fishing. In addition to these, there are numerous species which also offer excellent possibilities for commercial exploitation.

There is very little sport fishing presently done even in the first-class streams of the country. Further, there appears to be little realization that such fishing could easily become a major tourist attraction and could thereby become an important source of revenue and much-needed foreign exchange. In a few areas there is some fishing for local consumption, but there are no real commercial enterprises tapping this valuable food supply. Development plans for Nepal should include planned and managed exploitation of both types of fisheries.

Prior to extensive exploitation, a thorough survey of the country's fishery resources should first be undertaken. Scientific studies should

then be initiated to determine how these resources can best be utilized on a perpetual basis. For example, some areas should probably be restricted solely for sport fishing, while both sport and commercial fishing may be allowed in others. Spawning seasons and growth rates for the different fish species should be determined for the various rivers so that sound management principles can be practised. There is also the added possibility that certain rivers at higher elevations could be stocked with trout species, some of which have done exceptionally well in Kashmir and Bhutan. However, thorough studies should first be conducted to determine whether or not native species would be superior to introduced ones, as well as whether or not the introduced species would thrive in these areas.

Plans for hydro-electric and irrigation projects should also provide for the protection of fishery resources. Stream pollution is not yet apparently a problem. Nevertheless, steps should be taken now to ensure that streams are not polluted in the future. Conservation practices, particularly in the catchment areas, will also help to protect the fisheries and other resources, such as the land, forests, and agriculture. Planned management and control of the nation's fishery resources will result in untold benefits for the country, as well as the protection and perpetuation of these valuable assets.

#### III. CONSERVATION PROBLEMS

##### Livestock

Overgrazing by domestic livestock is undoubtedly the major threat to wild life conservation in Nepal. Differing only in intensity, all forest areas are subject to livestock grazing. Forest lands near villages are the most drastically abused. Concentrated grazing throughout the year in these areas has resulted in extensive tracts of bare and badly trampled ground. Well-beaten trails continue to extend from the villages ever deeper into the near-by forests.

Although light to moderate grazing encourages the reproduction of some species of trees, overgrazing is detrimental both to the forests and to the wild life. The first result of this common practice is the replacement of desirable forage plants with undesirable ones, such as thorny shrubs and bushes. Continued abuse eventually converts entire forests into little more than deserts. Apart from direct competition for food and other disturbances resulting from the presence of livestock in areas inhabited by wild life, there is always the possibility of disease transmission.

It is probably impossible, as well as impractical, to stop livestock grazing completely in all but a few selected forest areas. However,

grazing must be controlled. Conservation practices and scientific management must replace the almost omnipresent practice of overgrazing. Otherwise, the entire nation will suffer. It is, therefore, suggested that in many areas the numbers of domestic animals be greatly reduced and that whenever possible rotational grazing or other scientific methods of range management be employed.

#### Encroachment

During the ten-year period of political instability which followed the advent of democracy in 1950, it became known that land for cultivation was available in the lowlands of Nepal. People from different parts of the mountains and hills, where agriculture at its best provides only a scant living, began to move into the richer valleys and forest areas. The effects of the devastating floods of 1954, the worst in the recent history of the country, gave impetus to this mass migration movement. Soil erosion, landslips, and other damages to farmlands in the high country caused thousands to leave their homes and migrate to the rich forest areas of the *dun* valleys and the *terai* plains. A malaria eradication programme initiated in the early 1950's also opened the way into areas which hitherto had been avoided primarily because of malaria.

The Rapti River Valley, known as Chitawan, once supported the best forests in Nepal. Its forests and grasslands, combined with an abundant supply of water, were inhabited by great numbers of wild animals, such as rhino, elephant, gaur, chital, sambar, swamp deer, hog deer, wild boar, tiger, and leopard. This area was also strictly protected until 1950 as the shooting preserve for the Ranas. In 1955 the Government of Nepal, in co-operation with the USAID Mission, launched the Rapti Valley Multi-purposes Project. This development programme envisaged, among other things, to develop and to settle the many grasslands (savannahs) of the valley as agricultural lands. Prior to this time, except for a few scattered villages of Tharus who were reputed to be immune to malaria, this large valley was uninhabited.

The construction of a road from Hetaura to Narayangarh, the eradication of malaria, and the distribution of land to the landless invited increasing numbers of people every year to come to the lowlands. Forest encroachment had reached such epidemic proportions by 1959 that it had spread all over the Rapti Valley, including Hetaura and the Churia Hills to the east. The illegal encroachment upon forest lands by these thousands of people resulted in the destruction of millions of valuable trees and untold numbers of wild animals.

The gravity of the situation was finally recognized by the Government. Starting in 1959, various bodies comprised of local administrative officers were formed. In 1963 a fact-finding commission headed by a senior government official investigated the situation. Upon the basis of the

report submitted, another government commission headed by a cabinet minister was formed in October 1963 to settle the problem on a permanent basis. This commission has functioned effectively ever since and its achievements thus far have been commendable.

Approximately 4400 families from different encroachment areas have been resettled along the Indo-Nepal border in the Reu Valley and near Thori. Six hundred families of ex-servicemen have also been settled in the forests north of Khaireni, south of the foothills and west of Lothar. Except for the oldest Tharu villages, all new cultivations and encroachments south of the Rapti River, north of the Churia Hills, and west of Lothar up to the Narayani River have been completely vacated. The encroached areas north and north-west of Tikoli, east of Khagari Khola, viz. Tilkaney, part of Jirauna, etc., have also been vacated. The total gain in terms of forest area from these evacuated areas comes to 10,200 acres and the forest area lost in resettlement of the ex-servicemen is 2500 acres. Concrete boundary pillars have been fixed by the commission along these settled areas, thus demarcating the forest areas that will be permanently retained as forests.

Except for a few cultivated patches in the remaining portion of the Rapti Valley, the overall situation in this area appears favourable. However, problems urgently remain to be permanently settled in the areas east of Lothar and Harda Khola up to Hetaura and the valley east of the Hetaura-Amlekhganj main road.

The present Government of Nepal is demarcating or has demarcated all forest lands in the *dun* and the *terai* areas. However, the problem still remains to maintain these boundaries against further encroachment. This is further complicated by increasing population pressures and demands for more and more agricultural land. Marginal lands or those best suited for forests should remain as such. Rather than continually seeking new crop lands, the emphasis should be placed upon intensive farming methods so that optimum production can be realized from those lands best suited to agricultural use.

#### Fire

Every year all forest areas in Nepal are subject to intensive burning between February and June, prior to the monsoon. The two main causes of fire are carelessness and the common belief by most rural people that burning improves grazing for their livestock. The movements of the local people are unrestricted in the forest areas where they graze their livestock, gather firewood and cut thatch for their huts. These factors must be considered in any future plans to control fires on forest lands.

Controlled burning in some areas, such as low-lying forests on relatively level terrain and with sufficient precipitation, is probably beneficial.

When properly managed, burning such lands helps to control undesirable plants, permits the regrowth of forage, and quickly returns the nutrients of old or undesirable plants to the soil. However, all burning should be controlled and not let to run rampant or left to haphazard methods. For example, early burning in the winter season, when plants still have a high moisture content and when humidity conditions are right, generally does not greatly hinder forest regeneration or destroy the humus on the forest floor. Burning later in the season under drier conditions often results in scorching fires that damage both the forests and the undergrowth.

It should also be recognized that burning at any time is probably detrimental on precipitous slopes or in forest areas with relatively scant rainfall, less than approximately 40 inches per annum. Fires eating their way up the steep forest slopes of Nepal are an all too common sight during the late winter months of April and May. Total damages as a result of these burnings are incalculable. The regeneration of entire forests is prolonged or completely destroyed. As a result of burning, large patches of low quality stunted trees can be observed in many areas. The net result of this practice is erosion and a loss of soil which results in devastating floods and silting in the agricultural lowlands and the ruin of the forest above. Although detrimental, early burning in many areas would be preferred to late burning and its more serious consequences.

The Forest Department is presently conducting scientific studies on the effects of burning under controlled conditions on 64 plots in the Ramoli-Pratappur forests west of Hetaura. Similar studies are also proposed in a low-lying forest area near Bharatpur. As soon as definite conclusions can be derived from these studies, the results should be utilized in determining fire control practices on an extensive scale.

#### Poaching

There was undoubtedly some poaching in Nepal during the Rana rule. However, due to the feudalistic powers of the rulers it was probably so restricted during this time that for all practical purposes it could be considered negligible. With the coming of democracy, however, poaching in many areas attained major proportions and continued unabated for a number of years. Under the present government the situation has improved, but poaching still remains a major problem in many parts of the country.

A Wild Life Management Division of the Forest Department, with headquarters at Tikoli, is responsible for the protection of wild life and its habitat in that area. This division is directly under the Kathmandu Circle Conservator of Forests, and is headed by a Wild Life Preservation Officer, Major Nara Raj Thapa. The division has a total of 185 employees, consisting of the Major, 1 lieutenant, 5 subedars, 23 havildars,

146 rhino guards, 4 clerks, and 5 peons. Major Thapa has instilled in his men an *esprit de corps* that is commendable. As a result of the fine work of this division, Major Thapa has been awarded the Gorkha Dakshin Bahu by His Majesty the King.

The rhino guards are stationed in different *chowkis* all over the Rapti and Reu valleys and in rhino areas in Nawalpur, west of the Narayani River. They are almost continually in the field and have done exceptionally well in the execution of their duties, including the protection of the forests and the evacuation of settlers from encroachment areas, as well as protecting the wild life. However, outside of the areas under the jurisdiction of the Wild Life Management Division, the regular Forest Department staff is charged with the protection of both the forests and the wild life.

Thousands of villagers in Nepal own muzzle loading firearms, most of which are locally made. The shooting of animals, such as wild pig and chital, by villagers for meat is the most common form of poaching. Perhaps it would help to minimize poaching if shooting regulations were made as simple as possible and if shooting licences and fees were well within the financial means of the common people. For example, if a nominal fee entitled a Nepali to a specified number of game animals, there would be little excuse for him to poach. In addition, licences should be readily obtainable from Forest Officers with a minimum of delay and forms or paperwork. Licences and fees for trophy species, such as tiger and leopard, should remain relatively high or perhaps even be increased. Fees for foreigners shooting in Nepal should also be high. It is further suggested that protective measures, similar to those used so effectively by the Wild Life Management Division in rhino areas, be used in all important wild life areas in the country.

#### IV. RECOMMENDATIONS

The following recommendations are made :

1. That the Government of Nepal recognize the importance of the country's wild life resources, both flora and fauna, and that necessary steps be taken to protect, utilize, and develop these resources on a perpetual basis for the benefit of the people.
2. That a programme of education and publicity be undertaken to develop an appreciation among the people of Nepal for the cultural and economic values of wild life preservation and conservation, and to develop tourism, based upon wild life conservation, as an important source of revenue.
3. That the Mahendra National Park, the proposed national park south of the Rapti River, and the proposed wild life sanctuaries in the Sukla area of Kanchanpur District in south-west Nepal and along the

Kosi River in the eastern part of the country all be legally constituted as such, as has been presented to the Government by the Forest Department.

4. That high altitude areas of special scenic and wild life attraction or significance be selected and legally constituted as national parks or wild life sanctuaries.

5. That measures, both protective and legislative, be taken to ensure the preservation of the flora and fauna in Nepal, and particularly in the parks and sanctuaries. This perhaps can best be done by a nation-wide Wild Life Branch of the Forest Department, which would have jurisdiction of all parks and sanctuaries, as well as the wild life on all Forest Department lands, and would be charged with the enforcement of all wild life legislation.

6. That facilities for visitors to the parks and sanctuaries (i.e. air-fields, roads, accommodations, etc.) be developed and that private enterprise, supervised by the Forest Department, be encouraged in the development, maintenance, and use of these facilities.

7. That a systematic survey of the country's faunal resources, including fish, be undertaken by qualified personnel. This would form the foundation upon which long-range management plans could be based.

8. That shooting blocks be established in all suitable Forest Department lands not devoted to parks or sanctuaries and that, with proper control and management, the game species in these areas be systematically harvested. The shooting or harvesting of wild game is an integral part of wild life conservation. However, conservation practices, such as control and management, must be exercised to ensure that the wild life species involved are harvested on a sustained yield basis.

9. That the country's fishery resources be studied and then developed so as to ensure both a sustained yield of valuable protein food and an attraction for sport fishing.

10. That selected personnel from the Forest Department be sent abroad for conservation training in such fields as wild life and range management, recreation, and so forth, as well as deputed to visit and study management practices in parks and sanctuaries in other countries.

11. That the numbers of domestic livestock grazing on Forest Department lands be strictly controlled and that wherever possible scientific range management methods, such as rotational grazing, be employed. Also, that the grazing of domestic livestock in selected areas, particularly in national parks or sanctuaries, be completely prohibited.

12. That forest lands demarcated as such be retained inviolate to further encroachment by people seeking new agricultural lands.

13. That a programme of fire control or prevention, based upon the results of the studies presently being conducted by the Forest Department, be undertaken on all forest lands. This would entail both control and educational measures. People, particularly those living in or near

forest areas, should understand the serious consequences of uncontrolled or, in many cases, of any type of burning in forest areas.

14. That the protective measures that have so effectively reduced poaching in the rhino areas be extended to all important wild life areas.

#### V. ACKNOWLEDGEMENTS

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#### VII. GLOSSARY OF LOCAL TERMS

<i>Bhabar</i> or <i>charkosya</i> ..	an almost continuous dry belt 8-12 miles wide between the <i>terai</i> and the hills and at an elevation of 600-1000 feet. The soil is dry, porous, and infertile and consists mostly of sand, gravel and boulders washed down from the mountains.
<i>jhari</i> ..	
<i>chowki</i> ..	a station or post, such as those used by rhino guards.
<i>Churia Hills</i> or <i>Siwalik Range</i> ..	2000-4000 foothills which rise sharply north of the <i>bhabar</i> and consist of sand, gravel, and boulders. They are irregular in size, comprise one or two chains and stop short east of the Kosi River.

<i>dun</i>	.. a wide or flat valley between the <i>bhabar</i> and the <i>mahanbhara</i> or Himalayan range. The best known <i>dun</i> in Nepal is the Chitawan or Rapti River Valley.
<i>havildar</i>	.. a non-commissioned officer or head constable with the rank of 'Sergeant'.
<i>khola</i>	.. a stream.
<i>mahanbhara</i>	.. the Himalayan range, which forms 80% of Nepal. It consists of sedimentary rock that has been disturbed by the uplifting of the crystalline Himalayas. The variety of soils and folds and the rocky alluvial deposits make for extreme complexity.
<i>panchayat</i>	.. a committee or council, literally of five members, at any level of government.
<i>shikar</i>	.. shooting or hunting
<i>shikari</i>	.. a hunter or professional shooting guide.
<i>subedar</i>	.. a junior commissioned officer.
<i>tal</i>	.. a small lake.
<i>tapoo</i>	.. an island in a river.
<i>terai</i>	.. a fertile and moist alluvial plain, located south of the <i>bhabar</i> , a few miles from the foothills of the Himalayas and at an elevation of 250-600 feet. In Nepal the <i>terai</i> forms the northern end of the Gangetic plain and is 20 miles across at the widest point.

## Brief Summary of the Status of the Great Indian One-Horned Rhinoceros

BY

J. JUAN SPILLETT

The overall outlook for the Great Indian One-horned Rhinoceros presently appears to be better than at any time during recent years. Nevertheless the preservation of this species is fraught with numerous problems. Chief among these are overgrazing by domestic livestock, human encroachment or exploitation of its few remaining habitats, and poaching. Although there are frequent reports of rhino in areas outside established sanctuaries or reserved forests, particularly in Assam, it is my firm belief that these scattered animals contribute little to the preservation of this species. Only strictly protected and managed sanctuaries or reserves offer reasonable possibilities for preserving, maintaining, or increasing the numbers of Indian rhino presently in existence.

The 166-square-mile Kaziranga Wild Life Sanctuary in Assam was censused on 18 and 19 March 1966. Four hundred or well over half of the Great Indian One-horned Rhinoceros in existence are harboured in this outstanding sanctuary. It also offers better possibilities of maintaining relatively high numbers of rhino than any other area in its present range. However, problems confronting the rhino in Kaziranga include poaching, erosion by the annual flood waters of the Brahmaputra River, and to some extent grazing by domestic livestock.

The Forest Department reports that there are over 40 rhino in the 26-square-mile Laokhwa Reserve in Assam. However, it is doubtful that under present conditions this population will even be able to maintain itself, let alone increase in numbers. Poaching does not appear to be a major problem in Laokhwa. But, besides extensive crop cultivation and forest exploitation, the entire reserve is severely abused by overgrazing by domestic livestock and excessive disturbances caused by numerous people residing in the area. The seven rhino reported for Kukurata actually reside outside of the reserve in about a mile-square grassland area along the Brahmaputra River. In addition to being in an exceptionally vulnerable position in so far as poaching is concerned, these rhino must move elsewhere during the annual flood season when the area that they inhabit is completely inundated.