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# BURMA WILDLIFE SURVEY

1959 - 1960

A report prepared for the International Union for  
 Conservation of Nature and Natural Resources  
 and the  
 American Committee for International  
 Wild Life Protection

by

OLIVER MILTON AND RICHARD D. ESTES

3102

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## INTRODUCTION

THE INDEPENDENT country of Burma (about 260,000 square miles) stretches from 28 to 10 degrees north of the equator and is adjacent to India, China (Tibet and Yunnan), Laos, and Thailand. Its elongated shape (north of the 16th parallel) is divided by the broad Irrawaddy Valley; to the west lie the Chin Hills which border Assam and Manipur; to the north, the snow-covered peaks of Kachin State rise to more than 19,000 feet; and to the east, rugged mountains form the boundary with Yunnan, Laos, and Thailand.

The vast range of geographic, climatic, and edaphic features have provided the country with a great wealth of flora and fauna. In the farthest north are found alpine meadows and rhododendron climax forest; farther south, near Mandalay, there are semidesert conditions. Tropical evergreen rain forests and mangrove forests are dominant in the tail-like southern extremity of Burma which stretches between Thailand and the Andaman Sea from the 16th to the 10th degree parallel.

Besides the species of fauna which one might expect to find in the country (gaur, banteng, sambhur, tiger, *et al.*), both Himalayan and Malayan species are represented by such animals and birds as takin, tapir, tragopan, and Argus pheasant.

As in many other countries of the world, Burma's wildlife population suffers from the depredations of uncontrolled hunting. During the last war many of the existing game sanctuaries became battlefields on which no heed could be paid to the lives of the animals and birds. Since the end of the war the country has been troubled by antigovernment elements whose presence in the jungles makes it impossible for the authorities to carry out any satisfactory conservation work.

For many years Burma has had no separate Game Department. Members of the Forest Department have been seconded for game preservation duties, but this system has not been entirely successful since these officials have neither the necessary time nor the required experience to carry out this important work to any great degree of perfection.

### PURPOSE OF THE SURVEY

In 1958 the Burmese authorities granted permission to a team of wildlife specialists under the auspices of the Survival Service Commission of the International Union for Conservation of Nature and Natural Resources to make a two-year study of Burmese fauna. Particular features of the proposed survey were:

1. To find out, if possible, how many rhinoceros (*sumatrensis* and *sondaicus*) still exist in the country and what steps can be taken to ensure their further protection.

2. To look for areas that might make suitable game sanctuaries in addition to those already existing and to encourage the formation of one or more national parks.

3. To arouse public interest in conservation by giving illustrated lectures, writing articles for the English and vernacular papers, and assisting with the formation of a conservation society or equivalent group.

4. To produce eventually at least one much needed up-to-date book on the wildlife of Burma which would be acceptable to the education authorities for scholastic use as well as for general interest.

5. To take photographs, both still and motion pictures, during the period in the field to provide records of the Burmese flora and fauna, as well as to enable the Burmese to learn more about their own country and its conservation problems.

6. To draft a new set of effective game laws which would be acceptable to the Government. The existing laws had been compiled in 1937.

7. To instruct Forest Officers accompanying the party in techniques of wildlife ecology and in the principles of wildlife management.

#### MEMBERS OF THE PARTY

**Oliver B. Milton** Lived in Burma from 1937 to 1948, where he was with Steele Brothers, East Indian merchants. During the war years he served with the British Army in north Burma, receiving the Military Cross for his war service; he remained in Burma after discharge from the service, in 1945 becoming administrative officer with the Burma Civil Affairs Service at Kutkar for two years. He was also with the Chaunggwe coffee estate near Maymyo, and taught English in the area near the Chinese frontier in 1948. In 1949 he went to Tanganyika, East Africa, where he served for six years as a Game Ranger. In 1959 he entered the Yale University Conservation Program under Dr. Paul Sears and the Peabody Museum under Dr. S. Dillon Ripley.

**Richard D. Estes** Residential training in ethological study and field work at Max Planck Institute at Harvard University under Dr. Konrad Lorenz in 1958, with field observation on wild cattle at the Station Biolog de la Tour with Dr. Robert Schloeth.

**Mrs. Oliver Milton** Artist and illustrator of wildlife books.

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Survival Service Commission, International Union for Conservation of Nature and Natural Resources, Switzerland  
Peabody Museum, Yale University, U.S.A.  
New York Zoological Society, U.S.A.  
American Committee for International Wild Life Protection, U.S.A.

In addition, the Survey is deeply indebted to private individuals whose contributions have made this mission possible.

#### OPERATIONS

In Burma, matters concerning game come directly under the Chief Conservator of Forests, and our Survey worked very closely with members of his Department throughout the country. Without exception we found them cooperative and interested. On each trip we had a Forester or Game Ranger with us, and he was able to provide porters and guides for us whenever necessary.

We also contacted the local civil and military administrative officials in each area we visited, and often they were able to supply current information on the status of the wildlife.

Of prime importance was our link with the Defense Department in the War Office in Rangoon. It was necessary to provide them with a tour program several months in advance; securing approval occasionally took a long time, but such approval was essential for travel throughout the country.

#### PHOTOGRAPHY

The principal habitat of Burmese wildlife is thick tropical jungle, where photography is extremely difficult. Lighting is at a minimum, and in the jungle animals are invisible unless met by accident; such encounters take place for a fraction of a second—seldom long enough to take a usable photograph.

Although we were unable to get the hoped-for photographs of wildlife during our stay in the country, we did make one 16 mm. film of our trip to the northwest of Putao, another short film of the Naga Hills, and an incomplete record of the trip to Tenasserim.

#### CONSERVATION EDUCATION

The Asia Foundation contributed to the Survey by printing several thousand posters on the need for protecting the rhinoceros in Burmese and other dialects, which were distributed throughout the country for public displays.

Colored slides taken by survey team members and films on loan from the Conservation Society were shown to approximately 23,000 people throughout the country. Illustrated lectures were given in Rangoon University, in Rangoon City Hall, and in schools and at public gatherings up country.

Many articles on the conservation of Burmese fauna appeared in leading newspapers and in the *Burmese Forester*, the publication of the Forest Department.

A wildlife conservation group was formed in the north of Burma through the efforts of Col. Saw Myint, an ardent conservationist who is especially concerned about Pidaung Wildlife Sanctuary.

#### EQUIPMENT

Our motor transport consisted of a Land Rover station wagon equipped with a hand winch. This proved invaluable, for no other vehicle would have served the purpose. Although most of our trips were on foot, the station wagon took us to the starting point, where equipment (tent, sleeping bags, ground cloths, etc.) was transferred to porters.

## BURMA'S UNTOUCHED WILDERNESS

LENGTHY expert surveys are not requisite to discover Burma's greatest untapped natural resource—abundant wilderness, seemingly limitless in extent and variety. Range after range of rugged mountains run the length of the country, climaxed by majestic snowy ranges in the north, many of the peaks unscaled; lost valleys and deep gorges where no trace of man can be found; virgin forests of many types, from the tropical evergreen forests of Tenasserim to the cold-stunted pines of northern Kachin State; uninhabited seashore and offshore islands; remote lakes and pure rivers.

The Burmese people need to view their country through trained conservationist eyes to become aware of these tremendous assets, for it seems to be every nation's history that wilderness is abhorred so long as it predominates; only after it has been surrounded and conquered do men begin to value it as an irreplaceable part of their heritage. As a result, little wild country remains in the world except in the less developed countries; and in these, as a rule, the rate of its destruction is equated with progress: primeval wilderness means backwardness.

Wilderness, however, should contribute to the people's welfare, enjoyment, and education. The wealth of this resource must be unlocked without despoiling or destroying it.

To achieve this, Burma needs a system of national parks and reserves where the most spectacular, significant, and unique scenery, flora, and fauna can be guaranteed permanent preservation in the natural state. These parks would be open to the public through well-planned roads and trails, and would be provided with suitable accommodations so that visitors could stay for a holiday or vacation or for scientific study.

The comparative ease with which Burma could establish a national parks program is likely to excite envy from more industrialized and densely populated states, where natural resources are so hard-pressed that creating and maintaining a park involves an endless contest with ill-advised commercial developments. What a contrast here, where the only real problem in acquiring park lands would be choosing from among a great many equally desirable locations!

It may be argued that there is little public demand for the establishment of parks at this time—that most Burmese people appear to have little appreciation of the outdoors or aesthetic awareness of untouched nature. Actually, this is a forceful argument for park establishment. In the United States, where the national park concept originated, national parks were created long before public demand existed, at a time when the frontier still seemed limitless. Americans became interested in nature conservation largely as a result of the establishment of their national parks; now 80,000,000 visits are recorded annually in the 30 superb national parks reserved and protected in the United States.

It is not rash to predict that the Burmese people would be quick to take advantage of the attractions offered by national parks. Under present conditions there is little inducement to see their own country, if for no other reason than lack of access and accommodations. Not surprisingly, many who can afford to do so visit fine mountain and seaside resorts in other countries. Burma's lack in this respect must be considered a major handicap to national progress which the development of national parks with adequate public facilities would largely eliminate.

Even should there be only a moderate immediate response on the part of the Burmese, there is no question but that national parks would be a tremendous additional stimulus for tourists from abroad to interrupt a trip in the Orient here. There is no reason why Burma cannot repeat European experience, where tourism has become a leading industry of equal, if not greater, importance with agriculture or coal and steel.

The fact that tourism could become one of the leading Burmese enterprises within a few years' time offers strong economic incentive for undertaking a national parks program. Probably no other plan for developing wilderness resources could offer such a large immediate return for such a low initial investment.

No time is to be lost if Burma hopes to keep pace with the other southeast Asian nations and share successfully in the growing tourist business. India began a conservation program in 1952 and now has seven national parks and many game sanctuaries; Malaya has the tremendous King George V National Park (1,076,920 acres) and many nature reserves. Even in Thailand, which has no nature reserves or even game laws, the Association for the Conservation of Wild Life in Thailand has been in existence since 1953, urging the government to dedicate seven outstanding areas as national parks or game reserves.

Of course, Burma has had wildlife sanctuaries for years, dating back to 1913, when Pidaung Sanctuary near Myitkyina was first notified. In all, there are 12 sanctuaries scattered throughout the country, comprising a total of 933 square miles. These, and the existence of game laws—even inadequate ones—prove that the idea of conservation is not new here and that a basis for future development has already been established.

Nor is the national park concept new: proposals to make Pidaung Sanctuary a park go back to prewar days, and have been revived in recent years. A variety of interesting big game (including gaur, banteng, elephant, sambhur, and hog deer), readily observed in the dry seasons, gives rise to the thought that Pidaung could become an outstanding attraction.

Unfortunately, the war and postwar years have seen a great decline in the Sanctuary's fauna, mainly due to poaching and other human disturbance. Despite daily patrols of five Game Scouts, poaching remains a most serious problem. What is true of Pidaung applies with even greater force to the other sanctuaries, some of which have no supervision whatever.

Actually, wildlife conservation has never been truly practised in Burma. Good plans and adequate game laws exist on paper, but have been meaningless without sufficient funds and personnel to implement them. The Forest Department has been

expected to manage the wildlife resources and enforce the game laws, but without provision for a full-time staff or separate funds. The country's wildlife has suffered accordingly, and even more drastically since firearms became widely distributed after the war. Today the rhinoceros, formerly common in Burma, may be too near extinction for any effort to save it.

Effective conservation programs are urgent if wild animals are to remain one of Burma's chief potential attractions. After a tour through North American parks, E. P. Gee, one of India's outstanding conservationists, said: "Wildlife, I affirm without hesitation, occupies first place among the attractions of the North American national parks." Thus there is a clear economic incentive for conserving wildlife—as clear as the need for conserving the forests, a concept that has been recognized and acted upon almost from the beginning.

There is another compelling reason, stated in the Burma Game Manual of 1929: "A country-side devoid of wild life is uninteresting and unnatural, and life under such conditions can but adversely affect the national character."

National parks and sanctuaries share the important function of serving as stocking grounds where game animals may multiply undisturbed, thereby providing a surplus to replenish surrounding areas, where hunting may be permissible.

Burma needs, and undoubtedly has, many plans for developing her resources, and national parks offer an immediate remunerative use for the country's vast wilderness tracts. Construction of roads into remote areas may represent a tremendous investment of manpower and money, yet roads must be built eventually if the back-country is ever to be opened for use. Parks would act as definite goals and possible incentives for starting road projects; development and industry would follow. Therefore, even though the conservation program must begin modestly and develop gradually, it is essential to begin at once.

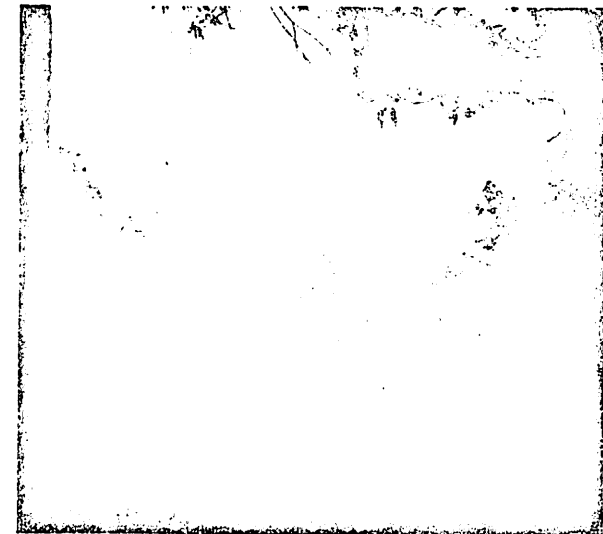
Nor must all the funds required come from Burma. The prospects of foreign aid for road-building have been demonstrated by the United States grant for the Rangoon-Mandalay highway. Grants-in-aid might be forthcoming from other technical assistance programs and from foundations interested in educational, scientific, and recreational aspects of the conservation program. International conservation societies can contribute technical advice and assistance on every phase of conservation planning; this Burma Wildlife Survey is a case in point, financed entirely by organizations and private individuals and costing the Burmese people nothing. Lastly, under proper government supervision and on a profit-sharing basis, private enterprise could be relied upon to build and operate the national parks facilities, as is the practice in some of the United States national parks.

The potentialities of the national parks are far greater than appear on the surface. The benefits and advantages cannot be assessed in purely material terms; it is hard even to foresee the many different ways in which national parks would stimulate the nation's economy. The non-material aspects have hardly been mentioned—the aesthetic and inspirational benefits conferred by the parks, which in the final analysis are what draw people to national parks and give human value to wilderness.

The following data may be of interest:

#### SANCTUARIES IN BURMA

Name of Sanctuary	Area in sq. miles	Wildlife
Shwe U Daung Reserve	126.00	<i>Sumatrensis</i> rhino, gaur, sambhur
Pidaung Wildlife Sanctuary (Kachin State)	279.70	Various species
Taunggyi (Shan States)	6.20	Birds
Kahilu (Karen State)	62.00	Various and rhino
Mulayit (Karen State)	53.51	Various and rhino
Kyatthin	104.00	Brow-antlered deer (thamin)
Shwezettaw	213.00	Brow-antlered deer (thamin)
Maymyo	39.91	Birds
Moscós Islands	19.00	Birds, various
Wettigan	1.70	Birds
Kelatha Hill	9.45	Birds
TOTAL	914.47	



Photograph by Oliver Milton

*R. sumatrensis* habitat in Shwe U Daung Reserve

## SHWE U DAUNG RESERVE

SOME 80 miles northeast of Mandalay, Shwe U Daung Reserve contains approximately 126 square miles, of which 81 lie in the East Katha Division of Burma proper and the remaining 45 in Mongmit State of the northern Shan States.

The Reserve takes its name from the 6,207-foot mountain, the highest peak in the range forming the northwest corner of the Shan plateau. The area is roughly rectangular, 15 miles east-west and 8 miles north-south, and is divided lengthwise, both physically and ecologically, by a main ridge of mountains.

The lower southern slope originates at the Ondan River and rises fairly uniformly to the main ridge, with Shwe U Daung peak as the dominating feature. The lower slope is covered by a consociation of bamboo (*Cephalostachyum pergracile*) used by villagers in building homes and as fences for rice fields; the new shoots also form a popular food. The bamboo clumps are about 10 to 15 feet apart, with practically no undergrowth, presumably owing to the thick canopy of leaves and stems.

At 2,800 feet the bamboo becomes less noticeable as other species—kanazo (*Baccaurea sapiaa*), thitsein (*Terminalia belerica*), banbwe (*Careya arborea*), nabe (*Lannea grandis*), etc.—begin to form a thick forest.

An interesting first order ecotone occurs at 4,500 feet as the forest merges into a mountain meadow. Except for a few patches of mountain forest, this grassland, dominated by *Imperata* sp., extends to the highest points along the ridge.

Above 4,000 feet the southern slope is not only completely exposed to the southwest monsoon, but is also within sight of the hot plains of central Burma near Mandalay. The difference in temperature between the plains and the grassland was about 30°F., and although one would expect the winds to blow down from the hills, the monsoon appeared to reverse this. Violent winds sweeping up the slopes, assisted by driving rain and mist, caused remarkable stunting of many trees, especially *Quercus* sp., and a distinct northerly inclination of the branches. Most of the epiphytes clung to the north side of their hosts or in the fork of a trunk of between branches. One yellow orchid was in bloom on July 29 at 4,900 feet, while another unidentified species had finished blooming at this altitude but was just beginning to blossom at 4,000 feet. Nearly all the creepers clung to the ground, where conditions were more favorable than the exposed side of a tree; they made walking a difficult chore.

Numerous streams have their sources in this grassland. Rising from crystal-clear springs, the water flows over limestone boulders through the thick forest into the Ondan River. The Shan population of Ondan village—100 years ago it was a Paloung village called Ua. tui; (big water)—use the river and its tributaries to irrigate their well-constructed rice fields and to wash the soil for extraction of sulphur and associated minerals.

The northern slopes of the range are quite different. Except for a small area between the Kyaukpya and Po Shwe E hills, there is no grassland. The slopes are covered with thick climax forest which is not subject to the growth-inhibiting wind and is sheltered from the full force of the monsoon. It is Burma subtropical wet hill forest and is typified by *Quercus*, *Castanopsis*, *Lauraceae*, and *Meliaceae*, with woody climbers, root climbers (*Ficus* spp.), and epiphytes.

At the foot of these slopes there is no bamboo climax such as is found on the south side. Edaphic and climatic conditions cause a sudden change. The laterite soil, high diurnal temperatures, and comparatively low rainfall (about 45 inches) result in indaing (or dry dipterocarp) forest, which is unattractive to most animals of the hill forests.

The first steps to preserve the rich flora and fauna of the Shwe U Daung Reserve were taken in 1918, when 81 square miles in the East Katha Division were declared a reserve; 11 years later another 45 square miles in the Mongmit Division (Shan States) were added (Government Notifications No. 243 of September 29, 1927, and No. 138 of July 22, 1929).

The area became a reserve for rhino (*R. sumatrensis*), elephant, gaur (*Bibos gaurus*), hsaing (*Bibos banteng*), sambhur (*Cervus unicolor*), barking deer (*Muntiacus muntjac*), serow (*Capricornis sumatrensis*), pig, leopard, tiger, and bear (*Selenarctos thibetanus*).

Notice boards were placed at vantage points along the boundary, and a handful of gamekeepers did their best to patrol the area. During the last war the wildlife suffered considerably, and even until recently the area has been frequented by anti-Government elements who have enjoyed the hunting and at the same time have prevented Forest Department game officers from carrying out their duties.

### OBSERVATIONS

Accompanied by Mr. H. Z. Kimlai of the Burma Forest Department, Mr. Milton entered the Reserve on July 18, 1959; they were joined by Mr. Estes on August 5, and remained until August 18th. The team's specific purpose was to search for *R. sumatrensis*, at one time fairly common but now believed almost nonexistent. Unfortunately, the Survey team was forced to confirm this latter view as a result of our brief operation.

Our first camp was at 4,700 feet, in the grassland of the south slope near Kyaukpya taung. Until 1958 Gurkhas had settled here and grazed their cattle and buffalo on the very lush herbage. Their disused dwellings offered us some shelter from the consistently unpleasant weather, and a nearby spring provided clear, cold water.

The weather pattern seemed fairly constant. At 4 a.m. the mist started, and about 7 a.m. rain fell. This, together with thick driving mist, continued until 3 or 4 p.m., when it usually cleared up. A few wisps of cloud blew up from the valley, but the evenings and nights were remarkably clear; often we could see the Irrawaddy River about 60 miles southwest near Singu. However, with the approach of

the new moon, the weather worsened and rain fell day and night almost without ceasing. The maximum temperature fell from 72°F. to 68°, and the minimum from 62° to 60°. Mildew formed on personal belongings, and the scarcity of good fire-wood made cooking very frustrating. The thick mist reduced visibility to some 20 feet, and often we were unable to cross the grassland for fear of getting lost.

Although we knew we had chosen the worst two months of the year to visit the Reserve, we were there to verify the reports that rhinoceros congregate at certain wallows during the full moon period of the Burmese month of Waso (about the third week of July).

Our second camp was on the north slopes near Tonkha stream. Here we sheltered under an overhanging rock which, our Burmese guide assured us, was large enough to shelter 40 people. When we arrived, we found the greatest difficulty in arranging space to protect three of us. Fortunately, we were surrounded by forest, and although it rained at various periods every day, the trees afforded good shelter and there was little wind. Below camp the Tonkha stream cascaded over huge boulders, forming natural fountains and beautiful bathing pools in the smooth-worn limestone.

Four main streams rise in the northern slopes: Tonkha, Nansit, Shwegyin, and Ye-nya-u. Because of the configuration of the country, each of these streams has a number of tributaries, although many of these, even during the height of the monsoon, flow only after an exceptionally heavy rain. Those that are annual have their sources at springs, and it was here that we found wallows. Some had been made by pigs, while others had been well churned by elephants.

At the source of the Tonkha we saw an old rhino wallow, and at another puddle there were two indentations that might have been made by the nails of a rhino foot. Another footprint may have belonged to a rhino, but it was too indistinct for positive identification. Near Po Shwe E hill a series of tracks were identified as rhinoceros, and at the headwaters of Nansit stream we saw more tracks and some dung, possibly three or four days old. We visited the western end of the Reserve and examined the upper reaches of the Ye-nya-u stream, but found no rhino.

During our stay we sampled more than half of the Reserve, and came to the conclusion that there are still two rhinos living there, but we are unable to say whether there are more; the continual rain and damp forest floor made it very hard to find, follow, and identify tracks. Local people think there are only two; others say three.

No matter how many animals there might be, it seems likely that they are confined to the upper reaches of the streams, as this is the most remote part of the Reserve. The western portion has been visited by political insurgents, and the eastern sector is overrun by villagers during June and July, when they collect the fruit of the kanazo (*Baccaurea sapida*) to sell in the markets.

Two sources of food to which the rhinoceros is particularly partial, kyansa (*Toddalia aculeata*) and kyein (*Calamus* sp.), grow abundantly at the sources of the four main streams in an area totalling about 25 square miles. So it is here that rhinos should be found during the monsoon months.

#### ADDITIONAL NOTES ON THE RHINOCEROS

By questioning the Chinghpaw villagers of Padang and a Lisu hunter from Mogok, we were able to get some horrifying figures concerning the number of rhino killed since about 1940:

Medicinal needs for mother of Mongmit Sawbwa	1
Medicinal needs for a Shan government minister	1
Shot by Mitung La, Lisu hunter	2 males (one young)
Shot by Ma Yaw, Chinghpaw hunter	7 males
	3 females (one young)
Unknown Karen hunter	2
Unknown Burmese	1
	<hr/>
Total	17

The values attached to various parts of the rhino's body account for much of the slaughter (U.S. dollar equivalents are given in parentheses):

Dried blood	- 5 kyats (\$1.05) per 1 kyat weight (.5 oz.)
Fresh blood	- 500 kyats (\$105.00) per 1 viss (3.65 lbs.)
Bone	- 50 kyats (\$10.50) per 1 viss
Skin	- 100 kyats (\$21.00) per 1 viss
Horn	- Varies from 500 kyats (\$105.00) to 1,000 kyats (\$210.00) per inch

There seems to have been little hunting since 1956, owing to insurgents and, more recently, to the Government's withdrawal of all arms and ammunition.

#### NOTES ON OTHER SPECIES

**Barking Deer** - There undoubtedly are quite a number of these deer, although we saw only two. On the south slope they were frequently heard calling, but the thick mist hid them from sight. On the north side we saw numerous tracks and heard them in the forest.

**Sambhur** - In the grassland on the north and south slopes sambhur were common, and according to local authorities as many as 15 can be seen at once during March and April, after the new grass appears and before the monsoon. We saw seven within an hour; there were tracks throughout most of the Reserve.

**Gaur** - We saw several signs in the grassland of the south slope and many more in the forest on the north. We found one solitary old bull dozing in the rain.

**Elephant** - There were numerous old signs, but very little new.

**Bear** - These seemed almost as common as sambhur, although we never saw one. We came across very fresh spoor, and returning to camp one day we found a tree that had been clawed and bitten during our absence.

**Tiger; Leopard** - Only one or two tracks of these were seen.

**Gibbons** - These were heard nearly every day and seen about five times. They did not appear too worried by our presence, and moved out of sight only after a good look at us.

**Leaf-eating Monkeys; Macaques** - Both were fairly common.

## CONCLUSIONS

Shwe U Daung Reserve is of great value because of its varied wildlife. The rocky pinnacle at the summit, the highland meadows, and the streams are all of considerable beauty.

At the time of our visit there was practically no game control, partly because the insurgents had used the area as a camp and made it unsafe for Forest Department officials to carry out their duties. The Rangers we met who were in charge lived far away from the Reserve and appeared very uninterested and badly informed about it.

The Survey makes the following suggestions concerning this area:

1. Four young and energetic Rangers should be allocated to the area, two to control the northern slope and two on the southern slope of the main ridge.
2. These Rangers should be based in, or at a suitable point on the edge of, the Reserve.
3. The boundaries must be cleared properly and adequate signs be placed at intervals along the boundary trace.
4. One of the Rangers' main duties should be to collect as much information as possible on the few rhinoceros living there. With so many illegal hunters in the area, their present chance of survival is small; unless an active system of control is established, they will soon be killed.
5. Villagers should not be permitted within the Reserve boundaries to collect fruit, to cut cane and timber, or for any other purpose.
6. This is an isolated and unique area with a wealth of flora and fauna. When proper control has been re-established, it might well be considered for National Park status.

## PIDAUNG WILDLIFE SANCTUARY

PIDAUNG is the largest and best known of Burma's 12 wildlife sanctuaries, lying just west of Myitkyina, capital of the Kachin State. An area of nearly 280 square miles, approximately one half of it is taken up by several ranges of low, rounded hills densely covered with mixed evergreen forest. The other half is level or gently rolling plain typical of the Irrawaddy valley of upper Burma, more or less overgrown with scrub forest called *indaing*, mainly *dipterocarp*.

On the plain, surrounded and separated by *indaing* forest, there are numerous open meadows called *lwins*, some only small clearings in the woods, others of many hundreds of acres. The largest, which gives the Sanctuary its name, covers several square miles of plain, bordering and north of the railway line less than 10 miles from Myitkyina, and is continuous except for islands of open scrub and belts of thicker forest along the watercourses. It is these grasslands that make Pidaung potentially one of the most rewarding places in the country for viewing big game.

Recognition of this unusual natural endowment goes back almost to the earliest administration of Myitkyina. As early as 1908 the Commissioner of the Mandalay Division proposed making Pidaung a game reserve. By that time the railroad from Mandalay had been pushed through to Myitkyina, across the heart of the Pidaung grassland, and unrestricted hunting by railway and government officials, using elephants, and by bands of wild Kachins from unadministered territory to the north, was already threatening to deplete the game stocks.

Pidaung was constituted as a Reserve in 1913 and notified under the Burma Game Rules in 1918. To the original 180 square miles a large area south of the rail line was added in 1921, designated as the Pidaung South Extension Reserve. Both Reserves were notified as a Game Sanctuary in 1927; in the 1930's the Pidaung East and West Extension were added.

Owing largely to the interest taken in the Sanctuary by the Governors of Burma—especially Sir Harcourt Butler, who visited it frequently—Pidaung became a well-known attraction. A network of roads was built in the 1930's, and in 1939 it was proposed to add a large area adjoining the South Extension between the Irrawaddy and the Mogaung rivers, to be known as the Namse Reserve. By then the idea of making Pidaung a national park, in the expectation that it would someday rival South Africa's famous Kruger National Park, was well advanced. But the outbreak of World War II ended this plan, and its revival after the war unfortunately fails to take into account the full destruction and neglect of the intervening years.

## OBJECTIVES OF THE SURVEY

Investigation of Pidaung by H. Z. Kimlai, Extra Assistant Conservator of the Burma Forest Department, Mr. Estes, and Mr. Milton, working both separately and



Owing to the configuration of the country, a fairly accurate estimate of distances can be made by halving the map scale. Thus, on the quarter-inch-to-the-mile map, if a straight line joining two villages represents 3 miles, the distance on the ground is nearer 6 miles.

#### Weather

Although we had a few days of rain on the trip up the Chindwin at the end of October, once we left Hkamti the weather was fine. On November 29 there were signs of a change when feathery clouds appeared from the south in midafternoon; the neighboring hilltops were soon shrouded in cloud. No rain fell, but the temperature dropped, and for the next three days the sky was overcast.

The average maximum temperature was 67° F.; average minimum was 43°. The highest temperature we had was 78°, and the lowest recorded at 29°. At Camp II, ice had already formed along the stream edges, and the water temperature was 41°. Higher up the slopes of Saramati, at 11,000 feet, most of the ground had started to freeze, but no snow fell while we were there. On the summit a very strong, cold wind was blowing from the west.

#### Fauna

As most of the hillsides have been deforested by cultivation, wildlife is very scarce and is confined to the few areas in the proximity of any remaining forest. Sambhur, barking deer, and pig are plentiful and do considerable crop damage. Tigers are not uncommon and frequently come near the village to kill mythun. Gaur must be found in the thicker forests, as we saw several skulls in the community houses of various villages.

Serow (goral?) are plentiful, and we met one at close quarters near Lakteh. The animal was as surprised as we were, and, with a characteristic snort, dashed off into the bushes after staring at us for several seconds. They are hunted by the Nagas, who prize the meat and use the horns to adorn their dah scabbards and also, possibly, for medicine.

Gibbons were very common, and we heard them calling nearly every day. The large squirrel (*Rafuta* sp.), small chipmunk, brown squirrel, and civet all were seen. Two civets ran past our camp at Saramati; on another occasion we watched a pair frolic high in a tree near Makware.

Our search for rhinoceros proved unsuccessful. At Payaw the skull of a rhino was tied to one of the posts in the community house. One of the village elders, about 60 years old, said it had been procured when his father was still fairly young and he himself still a small boy. Apparently it was not a local animal; the jawbone was missing and the entire skull was in a dilapidated condition.

We checked on reports of rhinoceros near Layshi, but throughout our travels we found no one who had any knowledge of their whereabouts in the Naga Hills. We did collect some information about them in the Lasai Tracts, near Taung-thonlon, but time did not permit us to go there.

Blood blister flies were very bad at most of our camps, but otherwise there was a remarkable absence of flying insects. In the evenings, when we had the Tilley lamp, we never even saw an insect. On the great cliffs east of the Zakhaw-Layshi road, the villagers collect honey from the many beehives there.

#### Avifauna

In his introduction to *The Birds of Burma* (1953), Smythies writes:

Upper Chindwin. Foothills, higher hills and mountains. The highest peak is Saramati (12,553 feet), but it is merely the highest of a chain of mountains running through the country of the head-hunting Nagas, up to the Hukawng Gap, which no ornithologist has yet succeeded in exploring; I have little doubt that many mountain species at present known only from Mt. Victoria and from localities 50 to 400 miles distant in Northeast Burma will be found one day to link up through these mountains with a more or less continuous distribution.

The Vernay-Hopwood Chindwin expedition of 1935 went inland from Singaling Hkamti only as far as Hatti, where they procured two specimens. Although we were visiting a virgin field for the ornithologist, several factors prevented us from making a good collection. In spite of the many fruiting shrubs and trees, there was a remarkable lack of bird life in all but a very few places. This may have been due to an annual migration with the approach of the cold season.

Most of the terrain over which we travelled was so steep that it was impossible to move off the path we followed. If it was not precipitous, the immediate vicinity was covered with thick and inaccessible vegetation. The broadbill (*Serilophus* sp.) we collected was perched on a branch almost over the path. The bird dropped, and we had the greatest difficulty scrambling down the slope about 40 feet and spending many minutes looking for it. A small stripe-throated yuhina (*Yuhina gularis*) dropped in the bushes a few yards from us, but it took almost 10 minutes to locate it. The thick grass and gigantic stinging nettles were of little help.

On Saramati itself, above 8,850 feet birds definitely were unusual, and those that appeared seemed to be in a hurry, perching on a tree or shrub for only a few seconds before flying off again; most of these were yuhinas. Throughout the trip members of the *Timaliinae* family (babblers) were well represented, and on one march we saw a large green bird that may have been a cochoa (*Cochoa viridis?*), but it lighted only momentarily before flying away.

Near Lakteh, on a pine tree, we found a beautiful nuthatch (*Sitta formosa*) female. We saw *Chloropsis* spp. quite frequently and two small flocks of Sultan tit (*Melanochlora sultanea*) at about 7,000 feet. Hawks, owls, woodpeckers, and nightjars (*Caprimulgus* spp.) seemed almost nonexistent, as did pigeons and doves, although the latter were noticed in the vicinity of taungyas.

On the Chindwin River the commonest bird was the shelduck, of which we saw several hundred. Some were in twos and threes, but some were in flocks of more than 50.

Near Mawlaik we noticed one group of about 70 bare-headed geese.

Mr Saramati, Naga Hills

for a national park; these views were confirmed by the District Forest Officers of both Moulmein and Tavoy.

After making arrangements for visiting the area, we left Tavoy by local bus on February 23 for the small Karen village of Yapu, 64 miles north on the main road to Ye. Milton's diary reads:

"Feb. 24: The path up to the Tavoy River passes some new huts and clearings; the river is crossed on a log, and then we find ourselves in climax bamboo forest for a while. Soon, however, this gives way to thick rain forest with gigantic trees and creepers of immense length and girth. Bird life is quite remarkable because the orchestra of sounds is different from other parts of the country we have visited. There are many racket-tailed drongos and leaf birds, but they are hard to see in the thick foliage of the treetops.

"After three miles I suddenly became aware of a peculiar smell and realized we had reached the hot sulphur springs. I was pleasantly surprised. We found ourselves at the west end of a large meadow, maybe 20 acres or more, at the source of one of the hot springs. For the next hour we explored the area and found several springs, many of them steaming and the water quite unbearable to the touch. The hard ground is churned up by the footprints of elephant and gaur, many of them made during the last monsoon, but with numerous recent tracks.

"At the east end of the L-shaped field I found the fresh tracks of a tapir, which was rather unexpected as I was told they only occurred farther south. Two old platforms hidden in the trees showed that the Yapu villagers regarded this as a good hunting spot. I think it surpasses anything I saw in Pidaung, and according to the local people a lot of animals come next month when it is hot and many of the small forest streams have stopped flowing.

"We left for camp on the Kin chaung on the 25th; reached a camp site at 1 p.m.

"Feb. 25: The spot is attractively situated on a bend of the Kin chaung and has a small beach. There is a deep pool beyond which towers an impenetrable wall of evergreen forest. From the time we left the village the path had been very monotonous, winding in and out of clumps of bamboo which formed the climax growth for some nine miles. The sun was hot and the fallen dead bamboo remarkably tiresome and treacherous; bird and animal life was almost nil.

"Feb. 26: We move to another camp at the junction of the Kin and Chauklongyi chaungs. Immense rain forest, and every now and then the gibbons start to whoop and unknown birds give shrill whistles and screams.

"I followed the banks of the Chauklongyi for three miles. In most places we followed elephant paths but often had to cut our way. There were several tapir tracks and one fresh pile of dung. We found the remains of a sambhur that had been killed by a tiger, and later came across a couple of sambhur drinking in the river. Signs of gaur, barking deer, and bear.

"In the evening the porters tell me that there definitely are two types of rhino in this general area; two *sumatrensis* also are known west of the Tavoy-Ye road at Natkyisin. There also are one or two near the headwaters of the Meke chaung farther south.

"Feb. 27: . . . follow a path that eventually leads into Thailand after crossing and recrossing the Kin chaung. At 12:30 we halt at a small stream junction where an outcrop of rock forms a deep pool. The background is a wall of tremendous trees, bamboos, and creepers. The actual bed of the Kin chaung is about 75 yards wide, but at this time of year the stream itself is not more than 50 feet across. The remainder of the river bed is covered with a species of *Sida* which seems to favor the rocky watercourse.

"From morning until night gibbons can be heard. Their calls are quite different from the ones we heard in the north; these sounds resemble of a low whistle which is— or filling a bottle from a tap—starting low and an irregularly pitched note where they pause for a moment and then come suddenly back to the original note, another pause for a moment and then a tremendous note of high-pitched whistles.

"At one spot the Kin chaung runs through a small gorge and as the river flows this vicinity is covered with a particular type of bamboo (*Myriophorum*). The local Karen name for the spot is "Wa mah lu". In the gorge, which is about 100 yards long, there is a deep pool; as I looked, the whole surface was broken by the splashing and jumping of dozens of large fish. The guide said they are always there. I managed to climb to a point overlooking the pool, from where I dropped a stone into the water. Immediately, out of the darkness of the pool, well over 100 fish swam toward the rippling surface; some were 2 feet and larger. Upstream still more were breaking the surface continually.

"The whole forest is beyond my expectation and although remote for visitors, except for those who have the time and patience to reach these parts, it seems to possess many of the requirements for a national park."

These qualifications include:

1. It is already part of a gazetted Forest Reserve.
2. There are no villages lying within the suggested boundaries.
3. From approximately Kaleinaung northward a natural belt of bamboo forest provides an ideal buffer zone about 9 miles wide.
4. Its possible area, roughly estimated, is 450 square miles.
5. Both *R. sumatrensis* and *R. sondaicus* are reported living in the area; in addition can be found elephant, gaur, serow, tapir, mouse deer, barking deer, sambhur, tiger, clouded leopard, bear, gibbons, and monkeys.
6. The hot springs at Yapu form an important attraction.
7. It is virgin territory.

#### Suggested Boundaries

Starting where the present Forest Reserve boundary reaches its highest point on the Mahlwe Hills, east along the range to the Thai border at point 3508. Thence southeasterly following the Burma-Thai border to Kyauk Taung. From here along the Reserve boundary in a westerly direction to point 3974, then along the Yebon chaung to the Forest Reserve boundary a few miles northeast of the village of Heinze. From here along the Reserve border to the Tavoy River; follow the river to a point east of the village of Yapu, then north to the point of commencement.

Tenasserim