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Oryx - The International Journal of Conservation, is now published quarterly by Cambridge University Press on behalf of Fauna & Flora International. It is a leading scientific journal of biodiversity conservation, conservation policy and sustainable use, with a particular interest in material that has the potential to improve conservation management and practice.

The website, <http://www.oryxthejournal.org/>, plays a vital role in the journal's capacity-building work. Amongst the site's many attributes is a compendium of sources of free software for researchers and details of how to access Oryx at reduced rates or for free in developing countries. The website also includes extracts from Oryx issues 10, 25 and 50 years ago, and a gallery of research photographs that provide a fascinating insight into the places, species and people described in the journal.

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RHINOCEROS SONDAICUS IN BURMA : THE PROBLEM OF CONSERVATION.

By H. R. BLANFORD, O.B.E.

Lately Chief Conservator of Forests in Burma.

The following notes are based in part on my own experience in Burma, and, as regards existing conditions, on information given me by the present Game Warden. I shall show that *Rhinoceros sondaicus* is in great danger of extinction in Burma, that there are serious difficulties in the way of conserving the small remaining stock and that to provide for it the conditions which would encourage increase is still more difficult.

It was not until after the Great War that the authorities in Burma first realized the very precarious position which *sondaicus* had reached. I think I am correct in saying that it was Mr. Hubback, when he came over from Malaya in 1921 to shoot a *sondaicus* for the British Museum, who first drew attention to the fact that *Rhinoceros sondaicus* was practically extinct. Mr. Hubback eventually shot a cow, but during his expedition through the forests of Tenasserim in Lower Burma, he discovered that these forests, which up to that time had been considered a stronghold for *sondaicus*, contained practically no more Rhino. Subsequently searches organized by the Forest Department confirmed the opinion that the species was in a bad way. No definite evidence was obtained during these searches to show that any *sondaicus* existed in the Tenasserim forests. In 1927, however, information was received that a few Rhinoceros, the description of which suggested that the species was *sondaicus*, inhabited an area in the Lower Salween, the small Kahilu reserved forest being their main haunt. Mr. H. C. Smith of the Forest Department, who had just become Burma's first Game Warden, visited the Kahilu area in 1927 and came to the conclusion that four or five Rhinoceros existed there and, although he was unable to obtain a view of the animals, he

drew, from the reports of local inhabitants and from measurement of foot-prints, the conclusion that these Rhino were *sondaicus*. He accordingly submitted proposals for forming a sanctuary and in 1928 the Kahilu sanctuary, comprising 52 square miles, was constituted and two Game Keepers were appointed to look after it.

The sanctuary included about 12 square miles of the Kahilu reserved forest. The remainder was unreserved forest containing a number of Karen villages, the inhabitants of which utilized all the unreserved forest area for shifting cultivation. In addition, rights of grazing cattle and fishing already existed in the reserved forest portion which also contained several rights of way. Hunting of all animals was prohibited in the sanctuary but, in the unreserved area, which comprised about 80 per cent of the sanctuary, no powers were given to control the movements of persons and the grazing of cattle within the area, nor even immigration into it.

There certainly are some Rhino in Kahilu and the available evidence suggests that they are *sondaicus*. Absolute identification is far from easy owing to the fact that about 90 per cent of the area consists of the densest jungle imaginable. In the small reserved forest portion there is a dense undergrowth of evergreen climbers and shrubs, whilst outside the reserved portion the ground is covered with the almost impenetrable secondary growth which follows shifting cultivation. A chance meeting on one of the village paths is about the only opportunity one gets of viewing the Rhino and the animals appear to avoid these paths as much as possible, preferring to force their way through the dense undergrowth in which their main routes appear as tunnels. From time to time local villagers have caught momentary glimpses of the animals; the keepers also have had occasional glimpses of them. All their reports agree that the Rhino possess either a single horn or none at all. Similarly reports by the local villagers on animals killed in the past state that the males carried a single horn and the females carried no horn. The description given by the headman of the largest village

in the sanctuary of a female Rhino, which was trapped by his villagers several years ago, tallied with these reports, and his description of the animal's skin left little doubt that the animal was *sondaicus*. Since the sanctuary was formed two Rhinos have died and in both instances, one occurring in 1928, the other in 1933, the British Museum (Natural History) identified the skulls as those of *Rhinoceros sondaicus*. In 1932 a Forest Officer who was specially deputed to report on the sanctuary saw a Rhinoceros which carried a single horn, and in 1933 a subordinate of the Forest Department reported that he climbed a tree and saw two Rhinos, the male with a single horn and the female with a bulge on the nasal ridge. All the evidence available therefore leads us to believe that these Rhinos in Kahilu are *sondaicus*. I have mentioned this point especially because in 1938 a non-official visitor spent four days in the sanctuary and, although he did not see any Rhino, he expressed the opinion that, judging from the tracks, the animals in Kahilu might easily be the smaller two-horned species—*sumatrensis*. This opinion has since been circulated in correspondence on this sanctuary.

During March of this year the Game Warden spent a fortnight in the sanctuary. The purpose of his visit was to study conditions generally in the sanctuary, but a special object he had in view was to obtain further evidence of the presence of *Rhinoceros sondaicus* and to form, if possible, a reliable estimate of their numbers. I ought, perhaps, to remark in passing that the functions of the Game Warden in Burma are purely advisory, the executive work being entrusted to the local Divisional staffs.

The Game Warden was unfortunately unable to obtain a view of any of the Rhinos although on one occasion he was within 50 yards of a pair feeding in the dense evergreen of the reserved portion. A closer approach, without disturbing the animals, was impossible. With the help of the keepers he located five wallows, each of which he estimated had been visited by Rhinos within a month of his arrival. Each wallow was situated at the source of a small stream and was well concealed by overhanging jungle. As these wallows appeared

to offer the best chances of viewing the Rhino he decided to build hides close by. This, however, involved a certain amount of jungle clearing over the wallows which effectually frightened off the Rhino and, in the course of a fortnight during which he paid periodical visits to the wallows, only once, at the end of his visit, did he find fresh tracks. This experience suggested that the Rhino would get accustomed to the clearing in time, and the hides are accordingly being made permanent features. He hopes by this means to get definite information about the Rhinoceros in the future.

From the tracks which he measured, he formed the opinion that there were two Rhino at least which were considerably larger than any *Rhinoceros sumatrensis* which he had come across.

In the Shwe-u-daung Sanctuary, which contains *Rhinoceros sumatrensis*, he had measured tracks, the largest of which was $7\frac{1}{2}$ in. across. In Kahilu he found and measured two tracks, one of which measured $8\frac{1}{2}$ in. and the other slightly under 9 in. As regards numbers in Kahilu, he concluded that there were undoubtedly five Rhino and probably seven, consisting of six animals which usually go about in pairs and a smaller animal which appears to go about singly. Some doubt existed regarding one of the pairs, which although found in a different part of the sanctuary to that occupied by the others, might still have been a pair which had moved across the sanctuary during his visit.

Thus, ten years after its establishment, one can say of the sanctuary that it has saved the Rhinoceros from extermination, but no more. There has been little success in increasing the stock, only one birth, in 1935, having been reported. The reasons for this are, in my opinion, not far to seek. When the sanctuary was established it was realized that the presence of villagers and the practice of shifting cultivation were drawbacks, but it was hoped that the influence of the keepers and the general respect in which the local villagers hold these Rhino would ensure conditions under which the Rhino would thrive. This hope has been disappointed owing to the continual disturbance to which the sanctuary is subject.

Six villages exist inside the sanctuary and the villagers from several more villages on the boundaries work shifting cultivation within its borders. It is estimated that approximately 1,000 persons are engaged in shifting cultivation inside the unreserved portion of the sanctuary. As a result of these operations combined with uncontrolled grazing of cattle, passage of villagers through the sanctuary—also uncontrolled, collection of firewood and thatch, fishing, and similar activities, there is no peace and quiet in the sanctuary. Keepers have reported cases of dogs chasing the Rhino and early last year it appeared that Rhino had been sharing a wallow with village buffaloes. In the small reserved forest portion of the sanctuary conditions are somewhat better, but village paths exist and the villagers have rights to fish and to graze cattle. There are several guns also in the sanctuary for crop protection. These Rhino are, according to all experience, extremely shy and must, under such conditions, live in a state of continual apprehension in which increase in the stock cannot be expected. Unfortunately it is evident that conditions are growing worse through immigration into the area. Since the date when the sanctuary was formed one new village has been established and there has been a 20 per cent increase in the number of households in the villages which were already in being.

As it is now clear that the Rhinoceros cannot thrive in proximity with so many human beings, the question arises whether the local villagers might be induced to move their villages elsewhere. Before any proposals to this end can be made, complete and detailed information regarding the Rhino in Kahilu is needed. It is hoped that such information may be acquired by observations made from the hides near the wallows.

In order to give the Rhino freedom from disturbance it will be necessary to extend the area of strict reservation and remove all villages from the extended area. This would involve at least four villages comprising about 150 householders and much will depend, naturally, on their attitude. It is most unlikely that the villagers will fall in with a scheme

of this nature unless financial and other inducement is offered. The villagers have no desire to kill the Rhino. The question is whether they can be sufficiently interested in their protection to move farther away and save them from disturbance.

There are areas of suitable forest for shifting cultivation in another reserved forest close to the Kahilu sanctuary, and as none of the villages inside the sanctuary possess permanent fields removal to these nearby areas should not cause great inconvenience. They would, however, at least, need financial help in moving their belongings and erecting new houses. Subject to these considerations the removal of the villages and closing of the area to all persons seems to be a practical proposition.

In the present small reserved portion of the sanctuary all villagers' rights will have to be cancelled but as the existing rights belong chiefly to those villages which it is proposed should be removed, cancellation will not be a matter of great difficulty, if the primary difficulty of removal can be overcome.

The final outcome of the above proposals would be the reservation of an area of about 40 square miles well suited as regards shade, fodder, and water, in which the Rhino would be wholly free from disturbance. The task of the keepers, who work at present in very discouraging circumstances, would, moreover, be more simple, more interesting and, it might be hoped, more fruitful.

SUMMARY OF GENERAL AND LOCAL LEGISLATION FOR THE REGULATION OF HUNTING IN FRENCH INDO-CHINA.

The fauna situation in French Indo-China is governed by an Act of the 7th April, 1927, amended by an Act of 27th June, 1934, and supplemented by local decrees made by virtue of the principal and amending Acts.