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## THE VERNAY-HOPWOOD UPPER CHINDWIN EXPEDITION.

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(With 6 plates).

As an introduction to an account of the Vernay-Hopwood Upper Chindwin Expedition of 1935 I cannot do better than quote Mr. Vernay's own words in the June Number of 'Natural History' (*the Journal of the American Museum of Natural History*).

'The plan to penetrate the Chindwin region of inner Burma grew out of a conversation that I had several years ago with Mr. S. F. Hopwood, Chief Conservator of Forests of Burma.

'At the time, we were collecting specimens in Lower Burma for the South Asiatic Hall of the American Museum of Natural History. Mr. Hopwood pointed out to me the exceptional rewards which this remote section would yield to a scientific expedition. The Chindwin River, or the "Mighty Chindwin" as he called it, wound through a country which in many parts was unknown, a region buried in dense jungle, unvisited by white men. Interest was added by the fact that a journey to this region would take one within the territory of the head-hunting Nagas.

'Thus the seed was sown. From time to time we further discussed the possibilities of an expedition, and later I took up the matter with members of the scientific staff of the Museum. When I was informed that no animals from the Upper Chindwin country were in the collections of the Museum and that such specimens were greatly to be desired, the importance of the undertaking became apparent.

'It was in December 1933 that Mr. Hopwood offered his help and also expressed his willingness to do all he could to further the objective, with the result that definite plans were made for the expedition to form in Rangoon early in January 1935.

'The personnel had been carefully chosen. We were fortunate in being able to have an old friend of mine, Mr. Randolph Morris,

the "shikari" of Southern India; also Major Rowley, an experienced shikari and Mr. Charles McCann, Assistant Curator of the Bombay Natural History Society. And finally, a few months before the Expedition set out, Mr. H. C. Raven, Associate Curator of comparative and human anatomy at the American Museum, fortunately was able to join us. Mr. Hopwood accompanied the Expedition for a few weeks. The task of organizing fell chiefly to his lot, and the success of the Expedition is evidence of his thoroughness in these preparations.'

Mr. Vernay and Major Rowley arrived in Calcutta by the Imperial Airways Plane on the 4th January and we met at the Great Eastern Hotel. The Imperial Airways bus called for us at 4 a.m., and at 5.30 a.m. the plane left the Dum Dum Aerodrome for Rangoon. The route took us over the Sunderbans and then over the open sea until we sighted the coast of Burma at about 7.45 a.m. From the air the Sunderbans looked like a vast low-lying mass of swampy jungle cut up by numerous streams and channels. Landing at Akyab at 8.30 a.m. we breakfasted and left for Rangoon at 10 a.m. A squadron of Air Force planes took off for Rangoon and Singapore just ahead of us. Flying over the Arrakan Yomas we reached the Mingladon Aerodrome, Rangoon, at 12.45. Here we were met by Messrs. Hopwood and Raven. Mr. McCann of the Bombay Natural History Society had already preceded us to Nanyaseik, our first collecting point. Spending the next two days in Rangoon completing our outfit etc. we left by train for Mandalay on the 8th afternoon in a special self-contained Railway Officers' carriage. Arriving at Mandalay on the following morning we proceeded up the Irrawaddy river in a steam launch visiting the 'Great Bell' of Mingun, the world's largest or second largest bell, and the huge unfinished and ruined pagoda nearby. Detraining at Mogaung on the following morning we loaded our outfit on buses, including four cows and six goats for baits! and, after a tiring journey on an appalling road, arrived in the evening at Nanyaseik where Mr. J. K. Stanford, the District Commissioner of Myitkyina, and Mr. McCann, who had already been successful in collecting a number of specimens of mammals, met us.

An amusing incident occurred on the railway journey up to Mogaung from Mandalay. Hopwood's dog, we discovered, had been left behind at a wayside station soon after the train had started and the mail train was stopped to send back for it!

On the 11th and 12th all our stores and outfit were packed into 60 lb. loads for mules and we started collecting specimens, the mammals shot comprising squirrels, *Callosciurus sladeni*, *Tamiops*, *Tomeutes*, tree shrews and monkeys and quite a number of birds. McCann had already collected specimens of the above as well as of the Hoolock gibbon (*Hylobates hoolock*), two macaques and a male and female Barking Deer.

On January 13th 110 mules were loaded up and we left at 8 a.m. for Namting and Lonkhin (19½ miles). Including our interpreters, skinners, Burmese servants and the Yunnanese muleteers we were a party of fifty-eight. The skinners comprised

Mr. Stubbs, kindly lent to us by Mr. Stanford, Mr. Fernandez of the Bombay Natural History Society, and Mr. Gabriel Joseph lent to the expedition by the writer. Each muleteer had five mules under his control and very efficiently handled the mules were. The two leading animals were adorned with brilliantly coloured plumes of dyed goat's hair and a mirror in the harness to keep off the evil spirits. I think I am correct in saying that the hire paid *per mule per month* was Rs. 16-8-0. The assistance of Mr. Stanford was most valuable. The path to Namting and Lonkhin led through hills and valleys covered with dense evergreen jungle, 750 ft. above sea level at Namting and rising to nearly 1,300 ft. a few miles from Lonkhin. Dropping down to Lonkhin we pitched camp round the Rest House, perched on a knoll (850 ft.) on the bank of the Uyu river. In the evening two members of the party accompanied Mr. Stanford out after woodcock and secured a couple. Dense morning mists were a feature of both Lonkhin and Nanyaseik. Maximum and minimum temperatures recorded by Mr. McCann at Nanyaseik were in the region of 76° and 50° respectively. We continued our collecting at Lonkhin and traps were put out every evening. Efforts to secure a specimen of the White-winged Wood Duck were unsuccessful. As at Nanyaseik, there were large numbers of Hoolock gibbons, their howling in the mornings resound through these jungles. Very human as these gibbons are, it was hateful work shooting them for the collection. The minimum temperature at Lonkhin went down to 44° while the maximum during the day rose to 82°F. A young civet, *Viverra zibetha*, was secured near the bungalow and the traps yielded rats and tree shrews. A visit was paid to the Kansi Duwar's house in the village where we saw the very fine pair of elephant-tusks portrayed on page 486 of the *Bombay Natural History Society Journal*, vol. xxxvii, No. 2. The Kansi Duwar, the ruler of the Kansi State, was instrumental in clearing for us many miles of paths through the jungle from Lonkhin to Dalu (Taro) on the Tanai Hka (upper reaches of the Chindwin river). Journeys at night in dugouts were made up-river with 'jacklights' on our heads for anything we could secure for the collection, three owls and a nightjar being secured. Shooting rapids in the dugouts on our way back was not without excitement. On the 17th most of the party left for the Hpakan Jade Mines. Photos of scenes in the bazaar and at the Jade Mines were taken and that night we spent an hour or so in the streets of Hpakan. Most interesting it all was, not excepting the gambling tables both in the houses and out in the streets, the opium dens and other features typical of mining towns and camps. We all slept the night in the Hpakan Rest House and on the following morning, Stanford accompanied us over the mines again and further photos were secured. The methods used for pumping water out of the workings were most ingenious, long hollowed-out bamboos, with a bamboo piston covered with soft leather, being employed most efficiently as pumps. Most of the workings were on the Uyu river here, and every stone in the vicinity had been at one time or another turned over and examined. The workings

were in no case of great depth and apparently the labourers employed by the owners of these workings received only their food with a share of the profits of any find. These mines are of special interest in that they are the only true green Jade Mines in the world, nearly the entire output being exported to China. Jade stones of other colours were shown to us in the most beautiful shades of mauve, pink, orange and blue; but none of these are of any real value. White jade we were informed is mined on the Yunnan border, and a form of soft green jade in Tibet. After buying some jade in the rough we returned to Lonkhin (14 miles) where McCann had carried on the good work of collecting, his bag including a crab-eating mongoose (*Herpestes urva*).

The following morning saw us marching to Tawmaw, about 12 miles from Lonkhin at an elevation of 2,700 ft. where we camped. The path led through dense forest for most of the way ascending at times over crests of over 2,000 ft. Gibbons were in evidence on all sides, and langurs. A few of the latter were collected. At Tawmaw are a number of disused Jade Mines and the houses of their owners, some of which are in charge of watchmen. That night four specimens of civets (three of *Arctogalidia leucotes*, a female and two young, and one of *Viverricula malaccensis*) were secured by the party with the aid of jacklights. A total eclipse of the moon occurred lasting a considerable time. During the night the minimum temperature recorded was 42° and the maximum during the day 76° and on the following night the minimum temperature was 39°. The Kachins brought in a number of peacock-pheasants and partridges and the party secured five specimens of *Callosciurus* and some birds.

On the 21st we moved camp to Mansun, a 12-mile march. The path led over crests of 3,000 ft. and through dense forest the whole way. The camp at Mansun (elevation 3,200 ft.), where our tents were pitched near a long Kachin's hut, proved most productive. Perched on a ridge and surrounded by dense evergreen and bamboo forest, Mansun was a most picturesque spot. Blister flies were bad here. Traps were laid out daily. The temperatures recorded were from 42° to 45° during the night and 76° to 78° during the day. The dew was very heavy. A number of gibbons, squirrels and birds were collected including a young baby gibbon captured alive, which however died later. Kachins brought in a few pheasants, frogs, snakes, crabs, a tortoise and a live adult bamboo rat. A baby stump-tailed monkey (*Macaca*), which McCann had procured from the locals at Lonkhin died here. Tracks of tiger being in evidence a couple of baits were put out.

Just as we were leaving for our next camp news came in that a tiger had killed one of the baits. The kill was visited and a machan prepared. Vernay and Raven sat up that night but with no result. In the meantime the rest of the party proceeded to the next halt, Kora, passing through the Kachin village of Hpala. The Kachins are very neat in their water supply arrangements. Bamboo-pipes are installed in many places and wooden stands erected for bamboo water containers. The path to Kora dropped down to the upper reaches of the Uyu river (1,000 ft.)

and rose steeply to Kora (2,600 ft.). We were met on the way by Kachin villagers who had already collected for us specimens of reptiles, mammals, birds and amphibians for which they were duly paid. Blister flies continued to be very bad and it was noticed that the legs and arms of the Kachin villagers were a mass of bites. The Kachins are most adept with their bows and clay pellets with which they shoot birds and squirrels. Specimens of silver and peacock-pheasants, partridges, squirrels, bamboo rats were brought in by the villagers on the 25th. A stump-tailed monkey was collected by a member of the party.

The Kachins like most jungle folk have a keen sense of humour and they appeared to derive great enjoyment from the frequent tosses members of the party took while collecting over the rough and tricky country.

Raven sat up over the kill at Mansun again that night but saw nothing of the tiger. Apparently a number of tiger are accounted for annually by trapping in Burma. One method is to plant bamboo stakes thickly on both sides and close up to a path frequented by tiger. The split half of a bamboo clapper, released by the tiger coming into contact with a cord tied across the path, springs back against the other half with a loud report and apparently causes the tiger to jump to one side and so impale itself on the bamboo stakes! The jungle around Kora is very dense, chiefly bamboo. Both here and in the Mansun and Tawmaw jungles a feature of the forest is the large number of a gigantic species of *Dipterocarpus* with a scaly bark. One of them had a girth of 24 ft. 7 in. with a clear trunk reaching 150 ft. up to the lowest branches. On the 26th, five specimens of the stump-tailed monkey, including a young, were secured, a very welcome addition to the collection. The digging out of a bamboo rat by Kachins was witnessed and proved most interesting. The Kachins brought in many specimens. On the following day three more stump-tailed monkeys were collected, also a giant squirrel. A large part of the area traversed was *taungya* (abandoned cultivation) and here a number of bison and sambhur tracks were in evidence and also those of pig.

The Kachins in these parts are neither good trackers nor tree-climbers and we often had great difficulty in keeping them from conversing in loud tones while out collecting.

Some fine specimens of *Lobelia* were in flower in the *taungya*.

The minimum temperature during the night was in the region of 50° to 51° and the maximum during the day about 74°.

On January 28th camp was moved to Pumsin, the path dropping down to 1,900 ft. from Kora to the Kum Hka and rising at the village of N'bung Hku to an elevation of 3,150 ft. From here the path ascended at Pumsin to 3,900 ft. Gibbons were collected and a young gibbon about a year old captured alive. The country round Pumsin is steep on all sides. The Kachins erect bamboo benches where their main paths top hills and ridges, a most convenient and thoughtful habit. Some of the Kachin women in the village of N'bung Hku wear large cylindrical pieces

of amber in their ears. Violets were growing all round our camping ground at Pumsin and in the jungles round about, as also at Mansun and Kora, there are a large number of fish-tailed palms. One of them was cut down by the Chinese muleteers, which very nearly led to trouble with the Kachin villagers, as these palms are considered sacred. The Kachin headman demanded Rs. 30 in compensation but was eventually satisfied with Rs. 2! From our camp we had a wonderful view of vast chains of forest-covered hills, while away in the distance lay the Naga Hills, the region we were heading for. Our collection was being rapidly increased. Mammals, birds and reptiles were secured by the party and brought in daily by the Kachins, while Raven took plaster casts of the villagers' faces and feet. The forest was chiefly bamboo interspersed with patches of evergreen trees. A brush-tailed porcupine was brought in, and traps yielded tree shrews (*Tupaia*) and rats. The minimum temperature in the night was in the region of 50° and the maximum during the day was 80°. The Kachin headman of Pumsin, a villainous-looking individual bore on his face the scar of a *dah* slash and he had one finger missing. On January 30th we struck camp and marched to our next halt at Tasu Bum. The path rose to 4,000 ft. and then dropped down through dense forest of bamboo and *taungya* to a stream at 2,900 ft. Ascending from here to the village of Pum Noi, we watched Kachin women weaving their Tartan cloth. From this point the path dropped in some places very steeply to the Khara Hka, a stream at 2,800 ft. Rising abruptly the path led up to Tasu Bum (4,200 ft.), the highest point of our march (14 miles from the last camp). On our arrival we quenched our thirst with cups of cocoa made with Nestle's milk chocolate and water boiled in bamboos. The Kachins here cultivate a small patch of tea, as also oranges, peaches and plums. Blister flies were bad. Villagers brought in a number of peacock-pheasants and a squirrel (*Dremomys*).

On January 31st the party secured specimens of langurs, squirrels (*Callosciurus*) and gibbons, while a cobra and two green whip snakes were brought in by the villagers, as also several birds and small mammals. Here the minimum temperature recorded during the night was 51° and the maximum temperature during the day 84°. On February 1st we struck camp and marched to the river Tapa Hka. Three langurs and a gibbon were collected; once a bison crashed across the path ahead of us. Pitching camp at Tapa Hka (800 ft.) the surrounding area was explored and a few specimens collected. Tracks of tiger were seen and numerous old tracks of elephant. Leeches were much worse here. 'Gooming' at night with jacklights yielded nothing, but Raven secured a Scop's owl. Baits put out for tiger yielded no result. Gibbons, squirrels and a pheasant were secured by the party on the following day.

Four of the mules and one of the goats became very ill here through eating something poisonous, two of the former dying.

Species of *Dipterocarpus* and *Pterospermum* were frequent, growing to a tremendous size. Aroids were numerous, bird life

fairly rich, but animal life definitely poor. The temperature recorded was minimum 54° and maximum 78°. Specimens collected on February 2nd were a male gibbon, a *Callosciurus*, a peacock pheasant and some birds. On February 3rd we moved to the Tumri Hka, a distance of about 20 miles, and camp was pitched on a sandbank. The mules kept up marvellously well in spite of the fact that some of the going was difficult: had they been less sure-footed, casualties would have occurred along places where the ground dropped steeply from the path. In one stream we found a quantity of petrified wood including large logs which Raven considered were possibly of the Tertian (Miocene) period, about twenty million years old. Three species of a beautiful wild Begonia were seen and gathered by McCann. The jungles were full of two or three kinds of stately palms. White sap oozing from stumps of saplings and trees, cut by the men clearing the path ahead of us, gave the stumps the appearance of having been whitewashed. A sambhur hind and a muntjac were seen crossing the Tumri Hka in the evening. The young gibbon captured at Pumsin was by now quite tame and flourishing.

On February 4th leaving Tumri Hka at 8 a.m. we waded down the river (650 ft. above sea level) for one and a half hours. Four otters were seen, but we were not successful in collecting a specimen. Quite a number of tracks of elephant, bison, sambhur and tiger were in evidence though few were fresh. From here onwards the greater hornbill was common. Down the stream, we frequently came on places where gold washers had been at work. Crossing the Taro Hka the path led through tall elephant grass and on through dense evergreen and bamboo forest finally entering *taungya* and cultivation. Along the path were tracks of tiger, some quite fresh. A mile from Dalu (Taro) we passed Kolun, a Chin village. Dalu, a Shan and Kachin village on the banks of the Chindwin or the Tanai Hka, as it is known here, was reached at noon. On the way one of our goats was drowned in the river, how this actually occurred we were never able to discover. Some of the outfit, including two boxes of cartridges, some cases of skins and one containing kit, got soaked in crossing the rivers. Baits were tied out in the evening and those of the party who were keen fishermen went afishing, the two fish caught being served up for dinner. Two of the party occupied the local Rest House at Dalu, while the remainder were in tents. We had marched about 130 miles from Nanyaseik. On the following morning, Major Rowley and the writer, crossing the Chindwin in a dugout, set out for a Kachin village, Taga Hku, at the foot of the Naga Hills, west of the Chindwin river. The river flowed for eight miles mainly through fields of poppies (cultivated for opium). Wild strawberries, insipid to the taste, grew in profusion. A heron and two or three other river birds were collected, and Taga Hku was reached at about noon. With the aid of our interpreter the possibilities of a visit to a salt spring some distance away in the jungles were discussed with the villagers. Here we saw our first Nagas or Wangas as they called themselves. Our interpreter informed us that Nagas were actually sections of the Chin tribe,

Returning we travelled down the Taga Hka on bamboo rafts, shooting rapids, collecting birds, and taking movies, reaching Dalu in the evening. When nearing the western bank of the Chindwin, the leading Kachin drew the writer's attention to what apparently was a fine jungle cock. Fortunately the writer's aim was not good, a torrent of language from a neighbouring hut proclaimed that the owner wanted to know why we were firing at his poultry! On the following morning Rowley and Hopwood went fishing down stream, while preparations were made for an expedition to the salt springs in the jungles at the foot of the Naga Hills. Specimens of squirrels (*Tomeutes* and *Callosciurus*) were secured in the jungle nearby and thirty frogs along the river's edge. On February 7th, McCann and the writer, accompanied by our interpreter, a servant, and seventeen men, left for the salt spring at Lakhaw Hka following our previous route to Taga Hku. From Taga Hku village to Lakhaw Hka, where a camp had been prepared for us in the depth of a vast area of evergreen forest, we had to wade knee deep, two or three miles up the Tara Hka. Following an elephant-path we eventually reached our camp. The huts were of palm-leaves and one joint bed, raised a little off the ground, was covered with a mattress of the same material. Leeches were in abundance and the path to the salt springs, about a mile away, led through an evil-smelling bog. At the salt springs, tracks of elephant and bison, all old, a few fresh tracks of sambhur and those of a large tiger were seen. The tiger was obviously a regular visitor. The salt-lick and its surroundings were truly beautiful—banks of grey or of grey-blue overlaid with brown sandstone. That evening the Kachins brought in a Banded Krait. On the following morning another visit was made to the salt-lick. The tiger had again visited the salt-lick during the night and some of its droppings were found to be chiefly composed of salt-lick earth. There was nothing salt in the taste of the earth of this lick and, as in the case of most so-called salt-licks in India and Burma, it was hard to determine the reason for its popularity. The Lakhaw Hka salt springs are in two parts. One of the banks at the upper lick had been worn into a curve by elephants continually rubbing against it. Kachins were deputed to erect two machans over the licks, on the chance of seeing the tiger during the night. But our hopes were however not fulfilled, we had a wet night's vigil without the reward of seeing a single animal. At the lower and smaller lick elephants had holed the banks with their tusks in several places. The Kachins informed us that we were the first Europeans to visit the salt-lick and, in fact, that part of the country. On the 9th February the salt-lick was re-visited, photos and samples of the earth being taken. During the day we collected some birds and a type of *Callosciurus* quite new to us and possibly a new form. Kachins brought in a number of birds including pheasants, partridges, and a squirrel (*Dremomys*), also a small pit viper. Snares laid for pheasants in the jungle around produced victims daily. It is obvious that the Kachins live well of the jungle and in view of the large number of snares set for birds, porcupines, etc. in the vicinity of Kachin

villages it is amazing that such a large number continue to exist. Snares for pheasants were invariably of the bent-over stick type with a noose held down on a small circular patch of cleared ground, the bait being small red berries which appeared to attract the bird. On February 10th we struck camp and returned to Taga Hku collecting *en route*. Leeches were very bad after the previous night's rain. A number of birds were collected, among them a serpent eagle. We found the Tara Hka deeper after three days' rains. When near Taga Hku, McCann and the writer were both stung by the giant stinging nettle (*Laportea crenulata*) which is common on the banks of the rivers and streams in those parts. Contact with water increased the pain from the stings considerably and their effects were felt for three days. At Taga Tku we pitched camp. A 'goom' after dark produced no results although a muntjac and a small animal, probably a civet, were seen. On February 11th two Pied-Hornbills were secured on a *Ficus* tree nearby before leaving for Dalu, also a diminutive squirrel (*Tamiops*), two monkeys (*M. rhesus*) and another specimen of *Callosciurus* similar to that obtained at Lakhaw Hka. Boarding dugouts, we were paddled by the Kachins down the Taga Hka, shooting several rapids. On the way down several birds including another Serpent Eagle were collected. Dalu was reached at about 5 p.m., after taking photos of a few semi-wild buffalo. Hopwood and Rowley had in the meantime returned from their fishing trip, the latter having caught several fish, but no Mahseer. One of the baits had been killed by a tiger, but Raven had no luck sitting up. On February 12th Vernay, Hopwood, Rowley and the writer left in five dugouts for the Partip Gorge, about 30 miles up-river. Arriving at the lower part of the gorge in the afternoon, we camped on the rocks bordering the river. The river here was narrow and obviously very deep, while the evergreen forest descended steeply to nearly the water's edge on both sides. Large splashes all through the night indicated the presence of turtles. A langur was collected on the journey up. On February 13th an early start was made upstream; three or four birds including a grey heron were collected on the way. Above the Partip Gorge we found gold diggers at work and landed for a few minutes to watch them. Lunching on a sandbank, we continued our journey finally tying up at 3-30 p.m. on a large sandbank. Vernay and Rowley fished for the pot while the writer collected birds in the adjacent forest. It was noticeable that the slots of sambhur in these jungles were very large, possibly due to the swampy nature of the jungles in wet weather. Similarly the semi-wild buffalo leave tracks almost as large as quarter-plates. On the following morning, while breakfasting at 5 a.m. peculiarly raucous calls were heard from the other side of the river and a pair of eyes was reflected in the light of a jacklight flashed across. Rowley quickly slipped across the river with his rifle and shot one of a pair of large Fishing Cats, a fine specimen and a welcome addition to the collection. Returning to Dalu, our progress down-river for the first hour was very slow on account of dense mist. The Partip Gorge is indeed beautiful with its steep forest-clad sides and low banks of rock, either bare

or fern- and moss-covered, while the water appeared to be as still as in a pond. Although the journey up had taken nearly two full days we reached Dalu in one, which involved hard work for the boatmen. On the way down, two hawks were seen attacking a great eastern purple heron, which, probably would have been killed had the hawks not been disturbed by our presence. Vernay also saw a hawk kill a common egret and was able to recover the latter. At Hopwood's suggestion the five boats took part in a race with only the boatmen paddling. We had noticed that Hopwood's boatmen had been paddling in a most regular and disciplined manner for sometime prior to this, and it transpired that he had been preparing them for the race, needless to say his boat won! Dalu was reached at 7 p.m. the journey having taken just 12 hours. On landing the writer sent off four rocket (fire-work) cartridges much to the boatmen's delight. Raven had had no luck with the tiger for which he had sat up three nights, although the animal was heard giving tongue far and near. In our absence, McCann had added mammals and birds to the collection, and while engaged in the good work met with a demonstration from a tiger late in the evening in dense undergrowth. He sat up for this tiger (over a goat) with no better success. The minimum temperatures recorded at Dalu during the nights ranged from 54° to 58° and 76° to 80° during the day. On February 15th, four Wanga Nagas came in and were subjected to photography for some time. Their village was apparently away in the interior of the Naga Hills, at an elevation of about 8,000 ft. They were small men compared to the Nagas we saw later on, but even so they were fine specimens of humanity and bore themselves well. Endeavours to persuade these men to take us to their village met with no success: they were adamant in their refusal on the grounds that it would be too dangerous. On February 16th Hopwood left us to return to Rangoon taking with him cases of prepared specimens and 58 of our mules for which we no longer had loads. The writer then developed fever and had to lie up. McCann, while sitting under a *Ficus* in fruit, made an excellent collection of gibbons (capturing a young one as well), flying lizards and squirrels. In the evening Raven and Vernay took flashlight photos of the interior of the Kachin houses.

While at Dalu, a member of the party received a letter addressed to him 'C/o Veterinary-Hospital Expedition' (for Vernay-Hopwood Expedition)! The 17th found the writer still in bed with fever. McCann added to his previous day's collection under the fig tree, and in the adjoining jungle secured four more gibbons, another specimen of the flying lizard, and some birds. Unfortunately the young gibbon caught alive on the previous day strangled itself to death in McCann's tent. By February 18th the writer's fever had eased off and camp was struck. A short journey was made down river to Lakechang Ga, a Kachin village, on the western bank. The mules swam across the river while our outfit was taken across in two twin boats formed of two dugouts lashed together with a curved mat roof over the centre. Both Lakechang Ga and Dalu are surrounded by paddy fields bordered by dense

evergreen forest. Around these villages a species of lemon, originally cultivated, now grows in wild profusion, especially in abandoned *taungya*. The fruit is quite uneatable. The Kachins displayed the keenest interest in us and in our work. At Dallu we were favoured with the visit of a Chin man and two women who had come on a three days' journey to catch their first glimpse of white men. They brought eggs and a piece of hand-woven cloth and in return received half a bag of salt, which to them was worth far more than it sounds. The headman of Lakchang Ga was a man of some substance and importance, owning a large tract of country, mostly heavy forest including however several Kachin and Chin villages. In times past the Chief of Lakchang Ga owned a number of slaves, who were bought their freedom by Government, the Chief receiving some thousands of rupees in cash and, as the slaves continued to work for him contentedly though free he did not lose much! At the request of the Kansi Duwar, the Chief of Lakchang Ga had continued the good work of clearing a path for the expedition on the western side of the Chindwin. Between these two Chiefs about 85 miles of path had been cleared for the expedition through dense jungle, no mean work, and without which, the expedition's progress would have been fraught with greater difficulties. Leaving Lakchang Ga on February 19th we journeyed down-river for about 8 miles pitching camp at Rasa, a Chin village on the west bank. The Chin villages are noticeably not as clean or as orderly as those of the Kachins. In the evening a species of langur not yet obtained (*Pithecius pileatus*) was secured. On the following morning, camp was struck and the expedition now divided, Vernay and Rowley continuing down-river in the boats, while Raven, McCann and the writer carried on west of the Chindwin with the mules. The path from Rasa followed the bank of the Chindwin for a mile or two and then cut through heavy evergreen jungle. At one or two places on the bank small patches of surface coal were noticed. Pausing for refreshments at the deserted village of Jantang (750 ft.), we finally arrived at the place selected for our camp on the Tagum Hka shortly after 3 p.m. (elevation about 750 ft.). The path from Jantang had taken us up to 1,150 ft., and we crossed the Mergui Hka two or three miles further before reaching our camping site. Here three langur (*Pithecius pileatus*), including a young one, and a female gibbon and her young were secured. At Jantang we collected several specimens of sunbirds. Heavy rain fell during the night. For dinner we ate langur but thought it a bit tough. We found that our otherwise excellent 1 in.=1 mile maps were a bit out for this region, the Tagum Hka not being marked in at all. The writer was nearly sucked dry by the father and mother of all leeches, of a colossal size, and this monster was quickly consigned to the fire. One of the party's 12-bore guns had ceased to function, but temporary repairs to the broken lock-spring were cleverly effected by Raven, quite the most handy man of the party, even to the extent of resoling boots. February 21st saw us add two gibbons, two grey-tailed *Callosciurus* and two macaques which were new to the collection.

These macaques were closely allied to *Macacus rhesus*, but larger and more heavily built. It is now almost certain that they were the long-tailed *rhesus* of Burma, specimens of which are badly required by the British Museum. The forests in these parts include many species of *Ficus* and *Dipterocarpus*. On the following day a large langur and two grey langurs collected on the east bank of the Chindwin, were brought in by Vernay who visited the camp from his boats away down on the Chindwin river. Temperatures recorded at Tagum Hka were 54° to 57° minimum and 66° to 71° maximum. On February 23rd we struck camp and while marching came on a troop of gibbons of which Raven took movies, and subsequently a male and a female were secured. I should have mentioned that the variations in colour in these Hoolock gibbons from adolescence to maturity is most interesting. In infancy the colour of both sexes is silvery, gradually darkening, until within a year both sexes are black. On reaching the adult state however the female becomes fawn-coloured, the male remaining black.

One of the most interesting features of the collection was the natural bar afforded by the Chindwin river. In the case of nearly all species of mammals we found, the male adult gibbons, east of the Chindwin have a patch of white hair in the region of the scrotum, apart from the white bands across the forehead, the bridge of the nose and under the chin. West of the Chindwin river the adult male has the white band across the forehead, but the white hair round the scrotum is completely absent. By far the most interesting differences however were displayed in the range of squirrels (*Callosciurus*), collected on both sides of the Chindwin.<sup>1</sup> Whereas from Nanyaseik to Dalu the colour of the animal remained fairly constant, it was found that on crossing the Chindwin river, west of Dalu, the *Callosciurus* with their almost white tails presented quite a different appearance. This type remained fairly constant all through our journey on the western side, the only variation occurring in the amount of white to be seen on the tail. For instance, on the 23rd February, two specimens were secured with tails slightly darker than those collected on the western side previously.

Our next camp was located at Changa Hka about 12 miles from Tagum Hka. The path from Tagum Hka to Changa Hka at first rose rapidly to 1,200 ft. finally dropping steeply to our camp site at 1,700 ft. Two gibbons and some specimens of *Callosciurus* were added to the collection. On February 24th sixteen mammals were collected, including four gibbons, ten *Callosciurus*, one *Dremomys* and a young macaque. As a collecting area this seemed a promising one, but unfortunately we had to move on as difficulties arose in regard to fodder for the mules. *Callosciurus* especially were very plentiful and there were evidences of

<sup>1</sup> A coloured plate with descriptions of seven different colour forms of one species of squirrel (*C. sladeni*) collected along the Chindwin River between Hkamti and Yin by the Society's Mammal Survey will be found in the Society's *Journal* (vol. xxiv, p. 224)—Eds.

a number of muntjac. The minimum night temperature 54° and the maximum day temperature 64°. A dinner of squirrels proved good eating. We left Changa Hka next morning the path rising at the start very steeply and gradually ascending till a height of 2,900 ft. was reached, whence we descended to 2,110 ft., the elevation of our next camp at Hai Bum. This is quite a large Chin village, not however shown on the maps, and about 15 miles from our last camp. On the way specimens of *Ratufa*, five gibbons and a langur were collected, and one or two birds, and unfortunately we wounded and lost two or three langurs. While chasing these langurs McCann had rather an unpleasant fall leaving him rather shaken. On our arrival at Hai Bum the headmen of seven villages paid a call and brought Naga spears, dahs, chickens, eggs and plantains, all of which were duly paid for! We were now in the Chin country; and the Chins brought us pheasants (both silver and peacock), a number of birds, and three brush-tailed porcupines. After tea a ceremonial visit was paid to the house of the Headman of Hai Bum and we all, with the aid of our interpreter, conversed round a fire in his house, sitting on little rattan stools. He shortly produced a certificate given him by the Assistant Superintendent, Frontier Service, a few years before, in which it was indicated that the Headman had promised to hold no more human sacrifices and to keep no more slaves. Our query as to whether he had kept his promises was received with considerable mirth! When human sacrifices were prevalent the person selected, usually a slave, had a really wonderful time for quite a lengthy period before he was sacrificed. Fed on the fat of the land and country beer (to fatten him up) and doped with opiates, the victim probably did not worry at all on the score that he was soon to shake of this mortal coil.

The Kachins, Chins and Nagas are all spirit ('Nat') worshippers, and the symbols of their worship are to be seen in the large number of funnel-topped 'Nat' poles outside their villages and their sacrificial houses. Semi-wild buffaloes are retained entirely for sacrificial purposes and in no case is any milk of cattle or buffaloes drunk by them; in fact they consider milk to be in the nature of excreta. Raven, who had had years of experience collecting in the Dutch East Indies was extremely interested in these tribes and found that in features, dress, many of their customs, in the black fibre 'garters' worn below the knee, and in other respects they corresponded closely with the Dyaks of Borneo and the Taragas of the Celebes, many words also being common to or similar in their languages. In our subsequent expedition to the Malayan jungles, Raven and the writer found certain similar features in the case of the Sakais of Malaya, and his view was that at one time an Indo-Malayan migration southwards from the north of Assam and Burma must have taken place.

On February 26th, specimens of *Callosciurus*, a *Tomeutes*, a langur and a gibbon were collected and a variety of birds, fifty of which, including a peacock pheasant and a partridge, were brought in by the Chins. The Chins are adept at shooting birds and squirrels, and clever at spearing them with sharpened bamboo

splinters stuck into bamboo poles. Raven was pleased at being able to secure for the anthropological side of the collection a piece of bark cloth made from the bark of the Upas tree (*Antiaris toxicaria* Lesch.), from which also a deadly poison is collected by these tribes for the tips of their darts and spears. Here it is interesting again to record that the same tree is utilised for the manufacture of bark cloth and the extraction of poison by the Dyaks and Taragas of the Dutch East Indies. On the following morning we left camp early and the day's collection comprised a greater hornbill, a number of *Callosciurus*, four *Tamiops*, a *Ratufa* and a number of birds including an oriole and an owlet. This being the Chin New Year's day the Headman brought us two goats, a fowl and eggs, expecting of course the usual return in cash which was duly paid, and invited us to a Chin dance in the evening. At their request six firework cartridges were fired by the writer, while Raven took flashlight photographs of the scene which was most picturesque: dancing in a complete circle, men and women with arms interlocked, the men sang the first phrase of each song and this was taken up by the women and boys. The Headman's son in particular presented a fine appearance in his tribal dress, akin to that worn by the Nagas. On February 28th we were just about to leave camp when Vernay and Rowley turned up having climbed about 1,600 to 1,700 ft. up the steep path from the Chindwin river. They brought with them a specimen of Slow Loris (*Nycticebus*) and another specimen of the Long-tailed Rhesus. They had had good fishing, especially at the Kyaukse rapids where unfortunately Vernay lost a mighty mahseer; they were the first white men to fish there. The total collected for the day amounted to three gibbons, a number of squirrels, and birds including a peacock-pheasant secured while displaying. A 'goom' in the jungles at night produced no result. For night work these jungles are like a grave-yard, and do not compare with the evergreen jungles of South India in the amount of life held. Temperatures recorded varied from minimum 56° to 63° to maximum 82° to 92°. An interesting feature of Hai Bum is its boat-building industry. Although situated 1,600 or 1,700 ft. above the Chindwin river fine big dugouts were carved out of the trees of the forest adjoining Hai Bum and dragged down to the river far below.

On March 1st, several *Callosciurus*, a *Tomeutes*, three gibbons and a number of birds were collected while the Chins brought in birds, pheasants, a snake and two *Tomeutes*: the last shot with cross bows.

Neither the Chins nor the Kachins seemed to be able to grasp the idea of driving animals towards guns. If sent in to the jungle they would invariably go straight towards the object to be driven instead of encircling it, thus driving it in the opposite direction. Another point they have in common is their habit of cutting leaves to sit on when sitting on the ground.

We had now collected over 100 mammals since leaving Lachang Ga alone. The next day ten more mammals were added to the collection including three giant squirrels, two gibbons, a langur and four specimens of *Callosciurus*, also a number of birds

and a terra-cotta-coloured snake, probably a species of *Zamenis*. The collections of mammals were made at elevations between 700 ft. (near the Chindwin river) and 1,700 ft. Temperatures during the last two days and nights recorded were 56° minimum and 84° and 87° maximum. The locals brought in 27 bats consisting of *Hipposiderus armiger*, *Rhinolophus* and a *Pipistrellus*. The three goats presented us previously by the Chins were today slaughtered for the Museum, and the meat utilised for the pot and very good it was too, not a trace of goaty flavour. The Chins, in these parts, like the Kachins, are not good tree climbers and prefer felling a tree of any size to climbing it. We found the Chins less talkative than the Kachin fraternity and possessed with a somewhat less degree of humour. Large species of *Dipterocarpus* were plentiful in the forests round Hai Bum and from these the dug-outs were hewn. Fine specimens of a species of *Pterospermum* and of *Elaeocarpus* also abounded, the nuts of the last two being eaten by *Ratufa* and *Callosciurus*. Many and large also were the Upas trees (*Antiaris toxicaria*) from which the Chins, as already stated, made bark cloth and derived poison for darts and spear heads. McCann drew the writer's attention to the fact that little puffs of 'smoke' seemed to appear as the 'fruit' fell from these trees which for a time puzzled us, but we eventually discovered that they were actually puffs of pollen dust and probably Nature's means for the dispersal of the pollen. The fruit lay in abundance on the ground, but neither mammal nor bird were seen to feed on it.

On March 3rd camp was struck and we left for Sailung on the Chindwin river passing through the village of Lachu Ga *en route*. Our path from Hai Bum to Sailung took us up to 2,500 ft. and then dropped rapidly down the valley to the Chindwin. The views obtained of the surrounding country and of the Chindwin valley were superb. A specimen of *Callosciurus* and some birds were collected. Sailung was reached at noon and here a message from Mr. Vernay was handed to the writer intimating that the mules were to be paid off and the journey down river to Singkaling Hkamti made in twin dugouts connected by a bamboo platform, in pontoon formation. Their accounts settled, the muleteers swam the mules across the Chindwin. The men first pushed out into the river on a raft and when some distance off the shore called to the mules which at once entered the water and commenced swimming—a most interesting spectacle. Pitching camp on a large sandbank at the river's edge, McCann and the writer paddled up-river in a dugout that evening in the hopes of obtaining further specimens of the long-tailed *rhesus*. On the way a peacock was unsuccessfully stalked. It was fairly dark as we came up to a troop of macaques on a tree overhanging the river. Landing on the rocks at the water's edge we climbed the banks which were almost sheer. While attempting to locate the macaques, McCann slipped and just saved himself from a nasty fall though his gun sustained a little damage. He was certainly the champion faller of the party! At dusk while using our jack-lights, McCann stalked and fired at the glowing embers of a fire left by fishermen on a sandspit taking them for the eyes

of an animal! Curried turtle eggs were served for dinner that night and proved quite tasty. On the following morning we left Sailung at 8 a.m. in three twin boats with the double flies of tents rigged up over each boat. Movies were taken of men locating and digging out turtle eggs on a sandbank, and an otter was shot, but unfortunately sank and was carried away by the current before it could be recovered. Two otters were seen and were found to be eating a young turtle. Singkaling Hkamti was reached at 6 p.m., Vernay and Rowley meeting us at the riverside and introducing us to the Sawbwa of that State. The Sawbwa proved quite a useful collector and added a number of specimens to our already valuable collection. Specimens of *Callosciurus* collected here showed a distinct change in colouration being very much lighter than those collected on the eastern side up-river. Next morning Rowley and the writer accompanied the Sawbwa on a round through the jungle nearby. Three specimens of *Callosciurus* were obtained and a number of birds. Two tanks holding duck, geese, snipe and other water fowl were visited but we were only able to secure a single snipe, shot by the Sawbwa. The Sawbwa used Vernay's .22 rifle on doves with considerable accuracy. In the evening a further specimen of *Callosciurus* and an owl were secured and later, a group of Nagas came into camp and gave us an exhibition of their war-dancing and singing which was quite impressive. Most of the Nagas had splendid deep voices and their chanting was most harmonious. The whole was supposed to represent a party out head hunting and the dance on their return with their spoils. On March 6th Vernay, Rowley, Raven and the writer, together with the Sawbwa, left for the village of Hahti, away in the Naga Hills. This village had been concerned recently in a successful head hunting expedition. Crossing the river in boats we walked for about 18 miles reaching an elevation of 2,200 ft. It was a very hot day and the switch-back nature of the route made it all the more tiring. Our loads were carried by Nagas who rested for a little at the Naga village of Kawai (half way) while we had our lunch. The writer secured a couple of gibbons and a *Tamiops*, while the Sawbwa shot a *Callosciurus* and a partridge. On approaching Hahti, which we reached at 5 p.m., one of the headmen advanced out of the village to meet us and, satisfying himself that the party had not come with any hostile intent, he led the way back to the village, and we were accommodated in huts that had been prepared for a military expedition expected soon to deal with an head-hunting affair. It was noticeable that the Naga villages were generally situated on bare hill tops or ridges with the jungle cleared away all round, presumably to safeguard themselves as much as possible from surprise attacks. That such attacks could nevertheless be carried out successfully was shown by the fact that the Nagas of Hahti and five other villages attacked at dawn the large Naga village of Wantung about 30 miles away. First completely surrounding the village, the attackers on three sides yelled and, as some of the inhabitants, in panic, attempted to escape in what appeared to be a safe direction, fifteen were cut down and decapitated. Satisfied with their spoils,

the attackers returned and divided the heads equally amongst the six villages, each village being allotted two and a half heads! A report on the affair was transmitted to Government by the Singkaling Hkamti Sawbwa, and the village was heavily fined as being the instigators of the raid. We were informed that the Wantung villagers would certainly retaliate in due course, though possibly not for some years. It should be mentioned that the Sawbwa had been induced to take us to Hahti with a promise of Vernay's 20-bore shot gun and 200 cartridges! We were shown a hut where the Nagas placed their dead, the corpse or corpses being kept on a raised platform inside. Eventually the huts collapse together with the remains of the dead and a ceremony is then performed over the skull which is subsequently put back with the remains. At times we were unpleasantly reminded of the proximity of these burial huts when the wind happened to be blowing in our direction.

Magnificent specimens of manhood these wild Nagas! Their dahs (long-handled choppers), stuck in short wooden sheaths slung on their backs hang nearly vertical up the centre of the back and are drawn out over the shoulder—a contrast to those of the Kachins and Chins, who carry their dahs slung to one side. The blades of their dahs are narrower and considerably lighter; and in most cases the slings are adorned with a portion of a tiger's or panther's jaw. The Naga men were nude except for a short black cloth hanging from the waist in front, and the women wore a short black skirt of coarsely-woven material. The men always carry spears, the blades of which are sometimes protected by a bamboo sheath. Both men and women are tattooed on the face and body.

On the following morning the writer collected a specimen of *Callosciurus* (both this specimen and that secured on the day before had very much darker feet) while the Sawbwa secured a *Tomeutes* and three or four birds. Photos, both still and movies, were taken in the village of the 'Nat' poles, the war drum, and the skulls of the victims of the recent raid. A portion of one of their victims' hands was nailed up on a tree-trunk at one of the entrances to the village while the remains of a tiger-skin were stretched over a wicker frame above the human skulls. The Nagas here appeared to have a special breed of goats with black heads and white bodies. One of these was purchased for the Museum, the meat being given to the Nagas. The expedition also paid for two pigs which were slaughtered by the Nagas for the feast. Tied up in the village was a fine specimen of a bull Mithun. The remainder of the herd were apparently in the jungle and were said to return to the village at nightfall. As in the case of the semi-wild buffaloes to be found in the vicinity of Kachin and Chin villages, these animals are only used for sacrificial purposes. The buffaloes were rarely aggressive and would generally crash away into the jungle on our approach. In the afternoon the Naga women gave us an exhibition dance while the men put on their full war regalia and reacted the outgoing and return of a Naga head-hunting expedition. First the Naga warriors

were called together by the beating of the war drum (a hollowed-out tree trunk). This was done in a most rhythmical way with poles, and the party then left the village. Returning with their spoils the party danced into the village headed by two warriors dancing backwards at the head of the column. As they reached the centre of the village the column formed into a ring and with dahs drawn the dancing and chanting continued for some time, a most impressive scene. Some of the warriors carried oblong-shaped shields of either stout leather or beaten-out kerosene tin. The men's war helmets, or wicker caps were topped with a ring of bear's fur and adorned with hornbill feathers, while in front, in some cases is sewn a pair of very fine boar's tushes. The Headmen's helmets were generally crowned with a thick fringe of goat's hair dyed red. During pauses in the dancing, exhibition duels with spears and shields took place between a couple of warriors, while the ever-present funny man was really amusing with his antics—a true clown. The Assistant Headman, a magnificent specimen, when not drinking beer out of a bamboo receptacle, was continually exhorting the men to further efforts. After it was all over the men were presented through the Sawbwa, with beads and the women with skeins of yarn and needles, all of which were much appreciated. At night the village presented a most animated appearance, large fires burning in the centre of the village, and sounds of mirth emanated from the houses around. Built upon stilts, as are the Kachin and Chin houses, the Naga huts were akin to those of the Chins in appearance, not being so clean or well kept as the long houses of the Kachins. After dining we returned to the village where Vernay and Raven took flashlight photos of scenes in the interior of two houses. In the first the inhabitants were sitting round a pot of boiling pork and goat's meat, in the second house, the people had just prepared themselves for the night; a young couple were on a bench to one side, a group of bachelors were lying on the floor in the centre of the house, and other inmates occupying suitable spots in the long room. Many of the Nagas kept up a Gregorian-like chant to a late hour, their musical voices blending in fine harmony. We were told that the tiger which had once borne the skin now hanging in tatters on the wicker frame had been shot by the Headman's brother with a bow and poisoned arrow. We were up early next morning and after purchasing a few things the Nagas brought for sale we bade a regretful farewell to Hahti and its Nagas, a cheerful and good lot they appeared to be.

The journey back to Singkaling Hkamti was considerably easier than the march up. A *Tomeutes* and a gibbon were collected. Some of the jungle passed through was typical Serow country and evidence of their existence was provided by the number of Serow horns worn by the Nagas on their dah sheaths, the Serow being hunted by the Nagas with their dogs. On reaching the Chindwin river, Vernay, Raven and the writer stripped and had an enjoyable bathe in the cool water. McCann had not been idle in our absence having collected about two dozen specimens of *Callos-*

*ciurus*, a *Ratufa*, *Tamiops*, two gibbons, a *Loris (Nycticebus)*, and a number of birds.

I should mention that at Singkaling Hkamti, Raven discovered that Vernay had found what proved to be a valuable addition to the collection, the fossilised tooth of a Stegadon (a pre-historic elephant) anything from two to thirty million years old. Vernay had picked this up while fishing on the banks of the Chindwin river near the Kyaukse rapids. Subsequently further pre-historic fossil remains were presented to the collection by Mr. Bodekar, District Forest Officer at Mawlaik, earning the gratitude of the expedition and the Museum.

As a reward for arranging our visit to Hahti the Sawbwa of Singkaling Hkamti was duly presented with Vernay's 20-bore shot gun and cartridges.

The 9th March was taken up in a re-sorting of cases of stores, camp equipment, calls on the Sawbwa and a further visit to the jungle around. During dinner one of our servants nearly trod on a Banded Krait which McCann adroitly caught. Later two of the party 'goomed' up river in a dugout but had no luck. A 3- or 4-lb. fish however, possibly dazzled by the lights, leapt right over the boat hitting the front boatman in the back!

Singkaling Hkamti is the capital of the Shan State of that name. We were able to obtain here a few provisions such as condensed milk, cigarettes, sugar, potatoes, etc. An extensive area of paddy cultivation extended to the east and south of the village. Beyond this lay a mixed forest of evergreen and deciduous trees, chief among the latter being *Ficus glomerata*, *Woodfordia fruticosa*, *Elaeocarpus* sp., *Bombax* and *Phyllanthus Emblica*. A certain amount of tea is cultivated on both banks of the river and the writer noticed a few coffee trees (*arabica*) growing in the compounds of the houses.

While we were striking camp on the 10th the villagers brought in a civet cat and two turtles. Loading all our equipment on twin dugouts we travelled downstream till nearly dusk, dining and sleeping on the sands at Heinsun. The Sawbwa accompanied the expedition downstream as far as the limit of his territory. Early next morning the party divided to collect on both banks, the total collection for the morning resulting in a *Ratufa*, nine *Callosciurus* and two macaques. Quite a large area of tea is cultivated here, typical of Shan villages in tea country. Leaving Heinsun at noon we tied up again at Linhpa in the evening. A 'goom' after dinner produced a civet (*Paradoxurus*). On the 12th collecting proceeded on both banks of the river. Continuing our journey at noon Kunghein was reached late in the afternoon, camp being pitched on the west bank at the confluence of the Nanswa and Chindwin rivers. 'Gooming' after dinner (at which an excellent squirrel curry was served) an owl was added to the collection. Vernay and Rowley set out on a fishing expedition up the Nanswa river next morning, while the remainder of the party collected on both banks of the Chindwin. The Sawbwa went out collecting daily and produced quite a number of specimens. That night a peacock was collected by Raven while 'gooming'! On the 14th

Vernay and Rowley returned having had no success whatever. During the day 35 *Callosciurus* including four with white tails similar to those previously obtained at Taga Hku, a crab-eating mongoose (*Herpestes urva*), a *Dremomys* and a number of birds were collected on both banks of the river. 'Gooming' in the evening McCann and the writer drew a blank, but Raven returned at midnight with a civet, five turtles and some of their eggs. He had come on men who had turned a turtle over and were digging out its eggs. While watching them Raven spotted four more turtles and turning them over captured them too. Unfortunately two managed to right themselves and escaped. They had been left lying on their backs on the sand near our cots to be dealt with in the morning. Our departure from Kunghein was delayed by the work on the turtles, and in the meantime a few birds were collected. This area was quite one of the best for squirrels. The village lies on the eastern bank, and near our camp was a pagoda standing high over the confluence of the Nanswa and Chindwin. To the east of the village was the usual extensive tract of paddy lands beyond which lay the jungle, a feature of which was an abundance of large *Dillenia indica* trees, their fruit continually dropping off with loud thuds. The jungle bordering the river on the western bank here is a dense mass of bamboo and cane beyond which lies a forest of large trees composed of many species of figs and *Elaeocarpus*. Large stretches of old *taungya* covered with dense growth including *Zalacca* and *Calamus* palms made collecting difficult. A certain amount of tobacco was cultivated on both banks of the Nanswa at its junction with the Chindwin. Leaving Kunghein at noon, camp was pitched at a village named Moklok. Hearing from the villagers that elephants were raiding their crops nightly, two of the party visited the village cultivation on the 16th morning to see the damage done, but found that the elephants had not turned up during the night. Collections on both banks comprised a langur, a Rhesus macaque, three *Callosciurus*, a *Tamiops*, a *Tomeutes*, two large hornbills, and other birds. Leaving at noon we landed at Malin, where a 'pwe' was in progress, and visited the stalls and shops on the riverside. Proceeding down-river we arrived at Minsun in the afternoon and here bade farewell to the Sawbwa, Minsun being the southern limit of his State. From here we carried on till evening pitching camp on the sandbank at Awthaw for the night. Within 200 yards of camp a langur was collected, definitely different from specimens obtained up river, one of a troop in a tope of *Dillenia* trees. The weather was getting noticeably warmer every day. The specimens of *Callosciurus* collected on the east bank were still different from those on the west, while *Tomeutes* on the east bank were yellowish on the underside compared to the grey of those on the west bank. Ticks were very bad in the areas from Singkaling Hkamti southwards.

Early next morning, the 17th, the whole party visited the tope where the troop of langurs were seen on the previous evening and a further six langurs were added to the collection before breakfast. We were afloat again at noon and arrived at Tamanthi, about 14 miles down-river just after sunset. On the way down an otter

was shot but unfortunately sank before it could be recovered. Our boats were moved to near the Tamanthi Rest House which we occupied. Tamanthi, with its Post and Telegraph office, fortnightly postal service and military police outpost, was our first real link with civilization again. The local doctor and the Subadar of the military police called on the leader of the expedition and the former was able to diagnose a case of illness among our servants as that of appendicitis, the first casualty among the staff. On the 18th camp provisions were checked up and supplies replenished from the local shops, while the writer and Raven made some tomato jam which we considered excellent though not apparently appreciated to the same extent by the remainder of the party! The *Callosciurus* collected here exhibited a paler form than those collected previously. Vernay went through the floor of one of the rooms in the bungalow grazing his leg rather badly. The appendicitis case was taken on board the Government Mail Launch (a stern-wheel paddle steamer) for the hospital at Homalin or Mawlaik.

Engaging two small dugouts next morning, the party travelled down both sides of the river collecting squirrels, several birds including a cormorant, a darter and a tern; also a crab-eating mongoose. Reaching Sinnraig in the evening we dined and continued the journey in the two small boats with headlamps, Rowley and the writer occupying one boat followed later by Raven and Stubbs, the skinner, in the other dugout. Both Vernay and McCann were feeling unwell and came down on the larger boat-rafts. Rowley and the writer taking two-hour shifts collected two owls and three nightjars.

At dawn on the 20th we landed at Hulaung and were joined by Raven shortly afterwards. Here more squirrels and several birds were collected including a fine fish-eagle. The *Callosciurus* from this area showed a much whiter coat than any previously secured. Raven and the writer were badly stung by the poisonous giant nettles (*Laportea crenulata*), the *taungya* on the borders of the river being full of it. After two or three days our arms and legs were still most painful. All along the eastern bank were a number of beautiful *Bauhinia* trees in flower. Camp was pitched for the night at Maungkan, the writer landing and walking along the east bank for the last few miles collecting two specimens of *Callosciurus*, a Rhesus macaque, two Imperial green pigeons and a few other birds. At dusk four bats were secured on the western bank.

On the 21st Vernay and Raven left in small boats on a fast run to Homalin, while the rest of the party followed on down-river collecting on both banks. That night camp was pitched on a sandbank in mid-river opposite the village of Kawya, quite a large place bordered on the east by an extensive area of tea. Here two *Callosciurus* were collected, the tails being quite white and their bodies nearly so. The 'Tuck-too' lizard call was heard by us for the first time. More attention is obviously paid to the tea here, the plantations being of a better standard than hitherto seen.

We found a great difference between the Shans who are Buddhists and do not take life, and our former guides the Kachins

and Chins, the Shans being obviously not interested in the fauna sought for. That night an amusing incident occurred though rather riling to the writer at the time. The party, 'gooming', had separated and the writer managed to secure our only specimen of the large Yunnanese flying squirrel (*Petaurista*), a fruit bat (*Cynopterus*) and two birds. We were to foregather at midnight on the river-bank. The writer's guide however did not seem to understand this, with the result that camp was not reached till 2 a.m. Every effort to make the guide return to camp only resulted in a long journey in the opposite direction! A few minutes after camp was eventually reached (Rowley and McCann having returned two or three hours earlier) a violent gale suddenly sprang up blowing down mosquito-nets and nearly carrying away a tent off one of the boats. The gale subsided after half an hour as quickly as it had started. The writer, being still fully dressed, was the only member unaffected.

Striking camp early next morning, a collection of eleven *Callosciurus*, eight *Tomeutes* and a gibbon were made on both banks of the river, one of the party collecting as far as Tampao on the west bank was picked up by the boats at noon. At 4 p.m. Rowley and the writer landed on the east bank and walked the rest of the way to Homalin securing two langurs near Kaungkan. McCann with the rafts reached Homalin at 8.30 p.m. Camp was pitched in the compound of the Inspection bungalow where Vernay and Raven were already installed. Here we received an accumulation of mail, Homalin being the northernmost point of call for the Irrawaddy Flotilla steamers. On the 23rd most of the day was spent in going through and re-packing our outfit while in the evening a single *Callosciurus* was collected, nearly white in colour and four bats at night round the bungalow. Collecting was continued on both banks of the river on the following day, the bag from the western bank comprising fourteen specimens of *Tomeutes* and some birds. The scrub jungle in parts seemed to be alive with this species. Quite a large number of coffee trees are grown in the compounds of the houses at Homalin as also in Kaungkan and Kawya. At about 10 p.m. the well-known explorer and botanist, Kingdon Ward, turned up with Tunstell (Mycologist at the Tocklai Tea Station in Assam), having walked through the Naga Hills, and climbed within 2,000 ft. of the summit of Saramathi, the elevation of which is 12,000 ft. Apparently they were unable, for want of time, to climb the last 2,000 ft. but the snow line which was the limit of the forest was reached and here snow was still lying among the rhododendrons which formed the major part of the forest at the higher altitudes. Kingdon Ward and Tunstell, with an escort of twenty Sepoys, and about 120 coolies, reached the Chindwin at Tamanthi having followed the Nantaleik river. They had seen no game and few birds but droppings of either Serow or Goral on the slopes of Saramathi were observed. They spent the next day with us at Homalin. Collections were made during the day on both sides of the river. The *Callosciurus* obtained on the eastern side were nearly white. Successful flashlight photos of the whole party

were taken in the bungalow late that night. On the 26th morning Kingdon Ward and Tunstell left in a boat downriver. 'Gooming' after dinner, eight 'Tuck-toos' and two tree-frogs were secured. Villagers brought in a small Himalayan bear cub which was taken over by the writer. On the 27th two gibbons were collected in a patch of evergreen jungle bordering a reservoir near Homalin and a further four specimens of 'white' *Callosciurus* were also added to the collection. In the afternoon all our heavy camp kit was put on board the Irrawaddy Flotilla steamer *Namtu* which had arrived. 'Goomers' that night secured two different specimens of civets, *Viverricula* and *Vivera zibetha*.

Homalin is quite a large town, the Headquarters of a Sub-Division Officer, on the eastern bank of the Chindwin, boasting in a number of shops mostly owned by Sikhs. The forest on the east bank is composed of small deciduous trees among which are *Careya arborea*, *Holarrhena antidysenterica*, *Feronia*, *Dillenia pentagyna*, *Zizyphus*, *Ficus glomerata* and other species of figs, also *Congea*, *Bombax*, *Combretum*, *Elaeocarpus* and a large species of *Smilax* which was in flower. A number of *Meliaceae* and *Rhamnaceae*, *Apocynaceae* and *Urticaceae* also occur. In the evergreen patches bordering the reservoir and stream the following were noticed:—*Myrtaceae*, *Araliaceae*, *Araceae*, *Scitaminaceae*, *Palmae*, and *Pygeum*. The last was fairly abundant and in fruit. The stomach of a female gibbon shot at Homalin contained fifty-four fruits of *Pygeum* entire, while the alimentary canal contained numerous seeds of the same kind. In the swamps grasses, *Cyperaceae*, *Onagraceae* (*Ludwigia*), a species of a rose (white), and the water hyacinth were common, while a willow (*Salix*) was observed along the banks of the stream. Very extensive paddy fields lie round Homalin; cocoanut, betelnut, plantains and pawpaws are also cultivated. The deciduous forest contained large numbers of a species of *Erythrina*, while a species of *Rumex* was common along the river-banks.

By 8.30 a.m. on the following morning all our light luggage had been loaded on the steamer which left Homalin on the last stage of our journey down the Chindwin river. The steamer stopped at four places to pick up cargo and tied up for the night at Phaunglyin passing during the day several of the quaint native craft known as 'Hoolongs'. As we travelled down-river the forest appeared to become more and more deciduous, *Butea frondosa* showing up in full bloom on the eastern side. The river was very shallow in parts and our boat, a stern-wheel paddle steamer, frequently either stuck on or grated over sandbanks. At this time of the year a passage for the steamers is continuously charted and marked out by bamboos painted either red or black. Owing to this all steamers only travel by day. From here onwards Talipot palms, a number of them in flower, were in evidence near villages. The steamer continued the journey down-river calling at several places *en route* including Pantha, where there is a large oil refinery, and Kindat. At noon we passed some very interesting rock formations. Mawlaik was reached at about 7 p.m. and here we had to change steamers. After breakfast next morning the

jungle on both sides of the river was visited and four *Callosciurus*, three *Tomeutes*, a *Tamiops*, and several birds were secured. The forests entered were purely deciduous. The following species were common:—*Bombax* sp., *Dillenia pentagyna*, *Randia uliginosa*, *Zizyphus* sp., *Lagerstroemia*, *Elaeocarpus* sp., and some of the *Combretaceae*, *Mimosac* and *Albizzia* also *Butea frondosa*, species of *Ficus*, *Strebulus asper*, *Cassia fistula*, and trees of the *Begoniaceae*.

The *Callosciurus* collected were unlike *any of those secured hitherto* being dark with rufous tipped tails and a rufous blaze on the forehead, those collected at Homalin being nearly white. The Uyu river joining the Chindwin 3 miles below Homalin apparently forms a barrier to the white squirrel area, the *Callosciurus* on the south and east of the Uyu being more of the type occurring in the interior east of the Chindwin. That night we moved into the larger boat *Sima* which had excellent accommodation and electric lights. The *Sima* was due to travel up river to Pantha, halting at Kindat on the way, and as this provided an opportunity for collecting at Kindat, the writer landed here at 8-30 a.m., and crossed over to the west bank in a dugout with two villagers. During the night while 'gooming' in the Rest House compound a large civet (*Paradoxurus*) was brought down from a fig tree and several 'Tuck-too' lizards caught. Early on the following morning (April 1st) the writer travelled out east, but came to no jungle and hearing the whistle of the steamer had to hurry back, reaching the boat at 7-30 a.m. The villagers informed the writer that there was scrub jungle out further east but that only *Tomeutes* occurred. This was interesting being a complete reversal of conditions, as from Singkaling Hkamti southwards the east bank had been the productive area for *Callosciurus*, the west bank producing mainly *Tomeutes* which were rare on the eastern side. At Mawlaik the east bank again produced *Callosciurus*, only *Tomeutes* occurring on the western side; at Kindat the *Callosciurus* shot on the west bank was dark grey with a grey white tail and chestnut underparts. McCann collected a *Callosciurus* on the east bank at Pantha, similar to the specimen secured at Mawlaik. A number of 'Tuck-too' lizards had also been collected and a leopard cat unfortunately lost.

McCann records that the forests on the eastern bank at Pantha are dry and deciduous except along the banks of streams where evergreen trees occur, the deciduous forests being composed chiefly of the following trees and shrubs:—*Tectona grandis*, *Elaeocarpus* sp., *Gmelina arborea*, *Careya arborea*, *Bassia* sp., *Odina woodiar*, *Butea frondosa*, *Calycopteris floribunda*, *Woodfordia fruticosa*, *Ficus* sp., *Eugenia* sp., *Randia* sp., and a tree of the *Papilionaceae* with a purple bloom. *Gliricidia maculata* was also common.

The civet (*Paradoxurus*) collected at Kindat contained five foetuses. Halting at Mawlaik for a short time the steamer arrived at Kalawa soon after 4 p.m. and here six *Callosciurus* were secured, mostly in the compounds of the houses in the village on the eastern bank, also 11 *Tomeutes* on the western bank. The *Callosciurus* were of the same type as collected at Mawlaik and Pantha. The *Tomesutes* were apparently feeding on the fruit of *Calycopteris*.

*floribunda*. In front of nearly every Burmese and Shan house in these towns and villages stands a long pole headed with a plaited bamboo mat, about 18 in. square, and a crook: apparently it is an unwritten law that one of these has to be maintained in front of every house to beat out fires and pull out burning materials.

Leaving Kalawa at 5 a.m. in the morning the steamer reached Okina on the eastern bank at 4.30 p.m. calling at several villages *en route*. In the evening squirrels and some birds and frogs were collected and after dinner 14 'Tuck-toos' and seven nightjars. The giant squirrels (*Ratufa*) were different to those shot previously being much lighter in colour and smaller. We were now in the typical dry zone of Burma and much of the scrub jungle is similar to that occurring in the dry parts of South India. Leaving at 5 a.m. next morning we arrived at Monywa at 1.30 p.m. and so completed our journey down the Chindwin river and our collection work. Our train left Monywa early next morning, and travelling most comfortably in a special reserved carriage, we arrived at Rangoon on the morning of April 5th, and were met by Hopwood.

Our collection consisted of some 1,000 mammals, 750 birds and a large number of reptiles and fishes. The most interesting side of the collection was definitely the squirrels (*Callosciurus*) which exhibited a remarkably interesting variation in colouration of coat. Those collected on the eastern side of the Chindwin showed the most interesting changes, while the specimens of *Callosciurus* collected on the western side remained far more constant. It is suggested that an explanation for the variety of colour displayed east of the Chindwin might possibly be found in an examination of the flora in the different localities producing the different colour forms. In the dense forest of the northern areas the colouration was definitely darker than those in the lighter deciduous forest further south, continuing down to Homalin, where the *Callosciurus* were almost white. McCann observes that in studying the vegetation it would be necessary to take into consideration the colouration of the bark of the trees and the predominance of either dark or light coloured vegetation, and it would be also necessary to study this in connection with the rainfall figures of the various places. At the time the expedition visited the area the squirrels were observed to be feeding on *Elaeocarpus* sp., and *Pterospermum* sp. An examination of the embryological material collected by Raven would provide interesting information on the breeding season of those animals.

The writer cannot conclude these notes without expressing his obligation to McCann for his notes, of which he has made full use. The botanical notes in this article are almost entirely quoted from his notes as also the opinion expressed on the possible bearing the vegetation in the various localities has on the variation in colouration exhibited by specimens of *Callosciurus* collected east of the Chindwin down to Homalin. The writer cannot but observe however that one obvious hitch to this theory is provided by the colouration of the *Callosciurus* collected south of Homalin which appear to be a definite throw-back to that of specimens collected in the denser jungles of the interior up north, west of the Uyu river.