THE INSIDE STORY OF THE TARSIER

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"WOULDN'T it be great if we could get half a dozen tarsiers!" The speaker, Lieutenant Donald Heyneman, always an optimist, was sitting in my tent in an abandoned rice field just outside Manila, helping plan the Philippine Zoological Expedition for the Chicago Museum. "I'll be happy with half that number," I told him, and secretly hoped for at least *one*. Six months later Don was traveling back to the States with a serious case of malaria and I was in Mindanao heatedly telling Monobos and Bila-ans not to bring me any more tarsiers—I already had too many.

There are practically no references in the literature to the tarsier in its wild state and the several known species, ranging from the central Philippine Islands through the East Indies, have always been considered fantastically rare. Yet the tarsier is regarded by anatomists as a tremendously important animal. It is one of man's closest relations, closer even than the monkeys, which are considered to climb off on a separate branch from the tarsier and man on the "Tree of Life," though both stem from more primitive primate stock.

Visitors to Brookfield Zoo, where two specimens of the Mindanao tarsier, *Tarsius carbonarius*, are now living, usually first remark on their small size, which is no larger than that of a medium-sized rat (they have an equally long tail, too); and secondly on their strange appearance, which according to particular fancies is a cross between that of a monkey and of a bat. Tarsiers are strictly nocturnal and during the daytime one sees a lightly mottled, slate-colored furry little animal with almost naked, large, bat-like ears, and a long tail, hairy only near the tip, clinging tightly to a branch with strangely human hands and feet. The face is like that of a chinless, low-browed man, without snout, but the eyes are remarkably enlarged and close together and occupy most of the front of the head. During the daytime the iris is only a pinpoint, but as light dims, the central circle enlarges until it occupies much of the eyeball.

BALL-BEARING NECK

The eyeballs are hardly if at all mobile, but the head can be turned an astonishing 160 or 170 degrees, just before it appears that it will twist completely off its short neck. The tiny nose lies just below the great eyes and above the wide, thin mouth, which, when open, reveals a glistening set of needle-like, closely spaced teeth.

As surprising as the round, peering head are the long, bony hands and feet, the palms and soles of which have small fleshy pads and some of the fingers and toes of which have greatly expanded disks, both modifications for the animal's clutching mode of sleep. Some of the toes and fingers have tiny protruding claws and others flattened forerunners of our fingers and toenails. To go to a more distant branch or to make progress over the ground, it stands up on its greatly elongated hind legs, which are lengthened by an unusual elongation of two of the tarsal, or ankle, bones (from which

TARSIER IN CAPTIVITY

One of the tarsiers now living at the Brookfield Zoo. The ears are partly folded back, in the strange manner peculiar to the tarsiers. (Photograph by Catherine Hoogstraal Walker).

peculiarity the generic name is derived), places its arms almost straight out or slightly bent at the elbow, and from its toe-tips jumps in a low trajectory so far that the observer jerks his head to see where the little beast landed. We have not measured its jump, but consider three to four feet to be a conservative estimate. Our guess, when they jumped from trees that were being felled in Mindanao, might have been even longer.

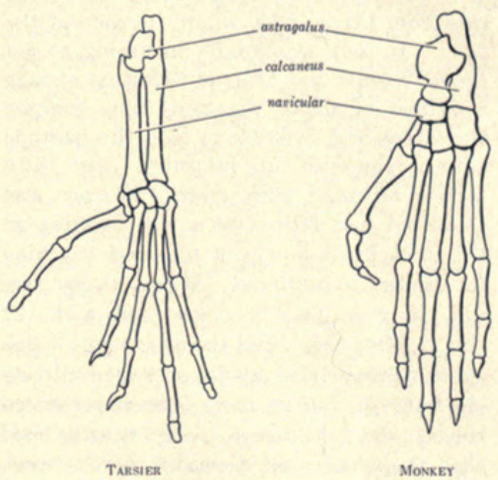
BROAD STUDIES PLANNED

Anatomically the tarsier is an interesting combination of primitive and more advanced characteristics, and specialized and unspecialized characteristics. For instance, many features of the brain, the number of vertebrae, and the viscera are primitive or archaic, and relate the tarsier to other lemurs. The erect position, the general form of the skull and face, the aortic arches, and several features of the urogenital system are highly advanced, or anthropoid, in character. The specializations peculiar to the tarsier for nocturnal vision, clinging, and leaping fascinate not only the zoo visitor but the anatomist, to whom these characters offer many interesting problems.

The series now at the Museum, which is considerably more extensive than any other material available, will be studied not only by the staff but by numerous other anatomists and medical men in other parts of the country. Studies which will be under way shortly concern themselves with the urogenital system, dentition, embryonic development, the eye and retina, limb musculature, the brain, and the contents of the stomach. As the presence of this series becomes more widely known, other specialists will undoubtedly request material for further study.

We knew before starting our Philippine work that *Tarsius fraterculus*, the peculiar species inhabiting only the island of Bohol in the Visayan group of the Philippine Islands, was usually found in bamboo clumps, but otherwise had no information on where to look for *Tarsius carbonarius*, the Mindanao species. It was entirely a surprise when Arturo Castro, our hardest-working Filipino assistant, came running into camp one morning yelling at the top of his voice that he had gotten a tarsier, and in a rat trap at that. We were ending our first month in Mindanao, and had been camped during that time between 3,000 and 8,000 feet elevation on Mt. McKinley in the Mt. Apo range. Tongue-like areas of abaca, the banana plant that is stripped for its tough fiber and comes to us as Manila hemp, reached our 3,500-foot camp in a sheltered valley. Beside it was old second-growth forest, and above it to the peak, original forest and stunted mossy forest. Naturally we had kept our eyes open for tarsiers in each of these types of growth.

Castro's smoked-coconut baited trap line that week was at about 3,600 feet around old fallen logs at the edge of original and old second-growth forest, and each morning he had sadly reported little or no catch. I had examined the line the day before the great catch and, judging it to be rather poorly



ORIGIN OF TARSIER'S NAME

The peculiar tarsus that gives the names tarsier and Tarsius to the small Philippine primate. Compared to the tarsus of a monkey (right).

For photographs of the tarsier in its natural surroundings, see "Pangolins, Tarsiers, and Flying Lemurs of the Philippines" by Karl P. Schmidt, Chicago Natural History Bulletin, Vol. 18, No. 7, July, 1947.

set, suggested that he move it to a more promising location the next morning.

We carefully combed our prize tarsier for external parasites, of which it was singularly free, as were all the tarsiers we examined later, and the whole camp kibitzed as Castro nervously made up the skin and I tried to imagine which way the exacting mammalogists in Chicago would want its strange legs and head arranged. We put the remarkable eyes in formalin, and then injected the remaining carcass with formalin for the Museum's Anatomy Division. All of the 200 traps out were then reset where we supposed they might catch the most tarsiers, and our eyes were as large as a tarsier's as we intensified our hunt for them in the forest. But we never found another much above sea level or in original forest or old second-growth forest.

LIVE SPECIMENS CAPTURED

When our Mt. McKinley operations ended a few weeks later we decided to warm up and dry out with some lowland collecting at the northern end of Davao Gulf. While there, a Moro brought in our second specimen, this one alive, which he said was taken in a thicket near his field. At this time our own collecting and the specimens brought in by Filipinos were so fruitful that we could hardly care for everything properly, and so I regretfully ordered that the second tarsier become a victim of the "no pets or wild animals" rule, though my popularity with the rest of the members was hardly increased by this action.

Most Filipinos know nothing of the tarsier, but from time to time, in reply to our constant queries, one would tell of tarsiers in great abundance, and always they were in bamboo or low, thick, rather new second-growth forest. We were packing specimens for shipment to the States and preparing to go back into the mountains when an unusually reliable Filipino told us that he knew of an exact bamboo clump spilling over with tarsiers only a bumpy day's jeep ride from Davao City where we were at the time. It took absolutely no urging to get Floyd Werner and Manuel Celestino to take a couple of days' vacation from packing specimens and supplies to look the bamboo clump over with our informer. Our third tarsier returned with them. Werner and Celestino had been alternately banging at the thick bamboo with a club and watching for tarsiers to jump out. When, at last, one did, it was quickly dispatched with .22 shot. After they tired themselves with this exertion they tried smoke and then cutting the bamboo, but no more tarsiers presented themselves. Filipinos living nearby said that they had seen several only the week before, but had seldom seen any during wet seasons, and the rains had just begun.

In December, an American veteran of the Spanish American War, who had lived on his isolated coconut plantation ever since that time, told us that William Joyce, the son of another veteran, who lived on the east coast near the southern end of Mindanao, had once mentioned animals like a tarsier on his land, and that this man would be available the next day. To this day I regret my skepticism when Joyce replied the next morning, "Oh, yes, we have lots of those little animals on our place, come down with me and get some of them."

We had just been joined by Charles Wharton, another discharged soldier, who had stayed in the Philippines to make arrangements for handling monkeys for the Infantile Paralysis Commission, and then had decided to stay on for awhile and make his fortune collecting animals for American zoos. Chief Curator Karl P. Schmidt had always much impressed us with one of his pet maxims, that zoos should be a source of much valuable scientific information concerning animals, and so we happily invited Wharton to attach himself to our group when we went to Joyce's place, and offered him our facilities and co-operation. Wharton was able to purchase even more specimens than he could conveniently handle when once we arrived, and it is a tribute to his tender care of his wards that he was able to reach the States with thirty live ones. So far as we have been able to find out, only one pair of tarsiers had previously been exhibited in an American zoo—that in San Diego.

HANDS OF A TARSIER

Closeup view showing the claws, fingernails and pads at the fingertips as animal clings to a branch. (Photograph by Catherine Hoogstraal Walker).

TEN TO TWENTY A DAY

Caburan, the spot to which our new friend Joyce took us (it is marked in large letters on some maps but consists of less than two dozen houses), is only irregularly reached by small boats, but this week the hemp boat was calling twice. I had sent Celestino and Oañe on the first trip with most of the equipment. When Wharton and I arrived a few days later we found that they had disembarked at the wrong place, two days' hard walk up the coast, and that Celestino had injured his foot in landing in the surf. I lacked almost all types of preserving and collecting equipnent, and Wharton lacked some of his larger cages. In reply to Joyce's instructions, his workers quickly began to bring in live tarsiers for Wharton's fabulous price of $5 American, which is equivalent to far more than a week's wages. They arrived at the rate of ten to twenty or more a day, and we quickly scurried around making additional cages of bamboo and urging children to hunt grasshoppers at a penny apiece and lizards and geckos at a nickel apiece for tarsier food. Tarsiers were brought tied to the ends of poles, in woven baskets of all descriptions, in tin cans, or wrapped in the captor's shirt.

We had struck this spot in January, just when dense thickets of low second-growth trees were being cleared for miles up and down the coast, and the work was often seriously interrupted as a cutter dashed after a tarsier and walked from one to ten miles to claim his reward. My end of the porch on which we were quartered was deemed most suitable for housing animals and at night my sleep was fitful as more than a hundred tarsiers loudly crunched grasshoppers and lizards, and scampered around in their fights. Their strong odor, by which Bila-an and Monobo natives say they can easily find tarsiers, did not improve my sleep, and neither did the restless twelve-foot python in a sack under my cot or the flying lemurs scratching at their cages. I dreamed of the python crawling over me, but when it finally did escape, it was done so unspectacularly that we did not know about it till we found the empty sack the next morning. My conscience is clear though I fear Wharton still suspects me.

'TARSIER MARKET' CRASHES!

The hemp boat paid its third visit, the last for some time, a few days later, and Wharton took his purchases back to Davao City where he could handle them more easily. I remained on to get some for our collections and to go into the forest and see where and how tarsiers actually lived. By this time the bottom had dropped out of the local market, especially since Wharton had used all of his money and much of mine, and so fewer were offered for sale and those at a third to a fourth of Wharton's price. Indeed, with my own collections, these were still more than I could adaquately handle, for it was some days before equipment from our lost party up the coast arrived, and still longer before Oañe could leave recuperating Celestino and join me. The area was rich in snakes and insects, and I had organized an almost hundred-mile-wide search for monkey-eating eagles, so time was well occupied though equipment was short.

(To be continued next month.)

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