

# The Ecology of the High Himalayas

*Around 15,000 feet the slopes below Mount Everest support a typical alpine community of plants and animals. Above this altitude there is a unique community that is founded on wind-blown organic matter*

by Lawrence W. Swan

**T**he several parties of adventurous climbers who have stood on the summit of Mount Everest during the past decade have not tarried there long enough to find out whether or not the top of the earth harbors any permanent inhabitants. It may be that the upper limit of the settled community of life lies somewhere below on the flanks of the mountain. Little is known about the ecology of the high Himalayas under the lofty peaks of Everest, Kanchenjunga, Makalu and Cho Oyu. This area, embracing some 2,000 square miles of wilderness high above the tree line, is without vehicles or laboratories. The investigator is only as good as his lungs, legs and endurance; he must walk and climb for a month to acclimatize himself, and even then, in the thin air among the barren rocks, he finds it difficult to shake the impression that he is only one step from the moon.

Lack of air sets the primary ceiling on the altitude to which a man may climb and function. But the black, yellow-billed birds called choughs (*Pyrrhocorax graculus*) visited the high camps of early Everest expeditions at nearly 27,000 feet, and last year the Indian expedition to Everest found the frozen carcass of an eagle at over 25,000 feet. The British explorer George Lowe, who has spent as much time as anyone at mountain altitudes above 23,000 feet, has told me of watching from the slopes of Everest while a flock of bar-headed geese (*Eulabeia indica*) flew in echelon directly over the summit. On an April night from a camp at 15,000 feet on Barun Glacier, I myself have heard the distant honking of these birds flying miles above me unseen against the stars over Makalu, on their way to the lakes of Tibet. It is known that the bar-headed geese start from the lakes of India at sea level and complete their

spring migration in a single majestic flight; one can only speculate on what adaptations permit them to accomplish this feat. All of these birds, however, must be reckoned along with men as no more than occasional and transient visitors to the high places of the Himalayas.

The first creature credited as a permanent resident of the extreme heights of these mountains was a species of jumping spider (family Salticidae). Several immature specimens were collected at 22,000 feet on Mount Everest by members of a British expedition in 1924. For many years this find was a subject of controversy. Small spiders can be carried great distances by their air-borne threads, and it was argued by some that the Everest spiders had been carried up the side of the mountain by the wind. Those who insisted that the spiders had been collected from their native habitat had to solve a problem of logic. Spiders are universally predaceous; it was necessary to show that there were insects as well as spiders at 22,000 feet. Furthermore, there would have to be plant food for the insects. The collectors had seen neither plants nor insects, only rock and ice. One partisan advanced the self-defeating notion that the spiders ate other spiders. Spiders do eat other spiders, but this would scarcely provide the basis for a permanent population, at any altitude.

**A**s a student of the ecology of the alpine regions of North America, I had my first opportunity to look into the enigma of the jumping spiders of Mount Everest in 1954 when I accompanied the American Himalayan Expedition to Makalu. (Last year I made a second trip to the region, on an expedition led by Sir Edmund Hillary and sponsored by the World Book Encyclopedia.) At first

it seemed that these spiders were truly a wind-blown myth. There were no jumping spiders of any species seen during my first month of acclimatization on the lower slopes of the mountain.

Spiders of many other kinds, however, were observed occupying easily understandable environmental niches. Below the tree line, at 13,500 feet, in the sheltering fir and rhododendron forests, there were orb-weaving spiders. For some distance above the tree line the irregular webs of theridiid spiders were common, but these disappeared with the shrubs. In the higher regions I collected grass spiders of the family Agelenidae. Still higher there were ground-hunting wolf spiders of the family Lycosidae, but these became scattered and infrequent in the rock-strewn slopes at 17,000 feet. Above this level there were some plants and hidden insects, but spiders—even wind-blown spiders—were not to be seen. At higher levels the south-facing slopes of the range were sheathed in massive ice.

The alpine zone of the Himalayas, above the tree line and below the upper limit of green plants, supports the complete sort of biological community that is observed in other comparable regions of the world. The heights to which it reaches are a function, from place to place, of local conditions, determined especially by the altitude of the snow line, the character of the soil, the availability of water in the liquid state and the exposure of the mountain slope to sunlight. Up to 17,000 feet there is still what can be called a plant cover, dominated by dwarf rhododendron (*Rhododendron setosum* and *R. anthopogon*) and juniper (*Juniperus squamata*) and including various grasses, sedges, buckwheats, gentians and small primulas, plus the sandwort (*Arenaria*), edelweiss (*Leontopodium*), rock jasmines, (*Andro-*