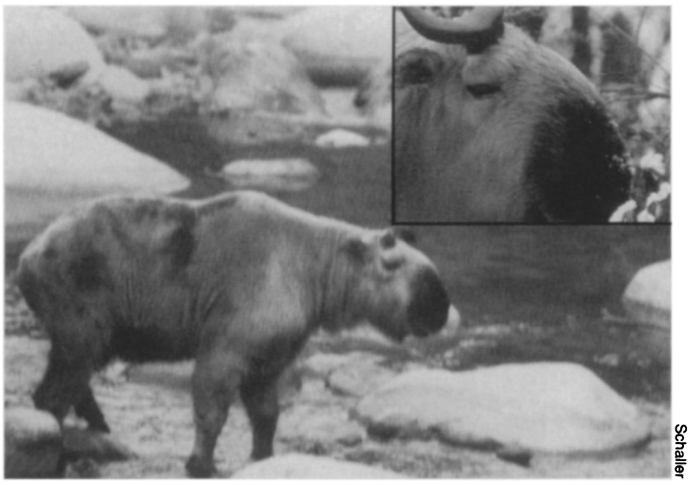
SCIENCE NEWS of the week

Observations on a Legend: Takin in the Wild

Alongside the panda in China's remote and rugged mountain forests lives an even larger and more obscure animal. Called the takin, this least known of all the large hoofed animals weighs up to 650 pounds and may stand 50 inches high at the shoulder. Some biologists believe that one of the three subspecies of takin was the source of the golden fleece that Jason brought to Greece in classical times.

A dense forest habitat with often cloudy and wet weather long hid the takin lifestyle from naturalists. But while studying giant pandas in northern Sichuan, George B. Schaller of the New York Zoological Society and his Chinese colleagues recently recorded their encounters with takins. He now presents their findings, along with the first photographs of takins to be published in the Western world, in the September-October issue of the society's magazine, ANIMAL KINGDOM. He says the takin is related to sheep, goats and, most closely, to arctic musk oxen.

Schaller describes the takin as having the bulky, humped body of a bear, the sloping hindquarters of a hyena, the legs of a cow, the tail of a goat, the horns of a wildebeest and the face of a moose with mumps. He writes, "If, as has been said, the camel resembles an animal designed by a committee, then the takin looks like an animal assembled by the same committee from spare parts."



Schaller

Takin bull with a broken horn stops at a boulder-strewn river for a late-afternoon drink. Inset: Takin bull, in the snow, chews its cud.

"We were out every day, and when we were lucky we saw a herd of takins crossing an opening," Schaller told SCIENCE NEWS. "More often we saw solitary bulls."

Schaller and Chinese naturalists have begun to compile lists of plants takins eat. "But it might be easier to list the plants they don't eat," Schaller says. He easily tallied more than 100 food species.

Takins have an impressive reach; Schaller observed them balancing on hind legs to nip branch tips 8 feet above the ground. He also reports that a takin can push a thin tree trunk until it breaks, and that the animal can bend and straddle a tree trunk that is up to 5 inches in diameter for leisurely browsing.

In the spring, Schaller observed a herd of about 100 females and their offspring leaving the forest for a clearing. Several young bulls and yearlings came bucking and bounding, followed by females leaping sedately but rather gracelessly. "It puzzled me [at first] to see no young," Schaller says. "But then they came, all together—a tumble of takin, dark-brown and fuzzy — gamboling after one female." He reports that the young spend many hours each day tended by one female in a "kindergarten" while the mothers forage and socialize.

Although it is overshadowed by the panda in the public eye, the takin has friends in high places, Schaller says. The Chinese government has given the animal full protection and created two takin preserves. In addition, the takin, whose population is thought to be several thousand, benefits from the 12 reserves established for pandas. The only takin in the United States, at the Catskill (N.Y.) Game Farm, was captured in the 1960s before the animals became protected. Takins are on exhibit in the zoo in East Berlin and in a few zoos in China. The Chinese government now prohibits the export of takins to foreign zoos.

"The takin's habits are still relatively unknown—how far herds roam, how flexible the herd composition is, what are the reproductive and death rates," Schaller says. "I think that within the next few years, a more intensive [observation] effort will be made." *—J.A. Miller*

Rare earths: Oil's signature in air

Tracing pollutants back to the oil refineries and oil-fired power plants from which they spewed should become less of a forensic puzzle now that trackers know what to look for. Chemists at the University of Maryland in College Park have identified a distinctive metallic signature for these emissions in air.

Because rare-earth oxides contained in most crude-oil products resist chemical transformation, pollutant plumes can carry a recognizable oil signature over long distances. For example, the University of Maryland's Glen Gordon notes, the rare-earth signature should permit the identification of air masses coming from areas that have a high density of oil refineries — like Houston and the Texas Gulf Coast. On a regional scale, he says, "we can use these tracers to associate air masses that have high acid-rain content with their source."

Most products refined from crude oil have been subjected to catalysts made from synthetic zeolites. Formed from a mix of oxides and rare earths, these zeolites apparently impart to oil products a telltale sign of their encounter—unusual proportions of such rare-earth metals as lanthanum, neodymium, samarium, ytterbium, lutetium and vanadium.

The proportion of one rare-earth element to another in any sample of dirt or rock tends to be fairly constant, explains Gordon. However, in bastnäsite and monazite — minerals that serve as the two major commercial rare-earth sources — the relative ratios of rare-earth metals are dramatically skewed from that otherwise constant pattern, which geochemists call the "crustal abundance."

For example, the ratio of lanthanum to samarium in dirt is usually about 5 to 1. However, among particles 2.5 microns in diameter or smaller emitted from the smokestacks of oil refineries and oil-fired power plants, that ratio is typically between 20 to 1 and 40 to 1, Gordon says. The difference appears to represent the influence of the zeolite catalysts, according to Gordon and Ilhan Olmez, writing in the Sept. 6 SCIENCE.

Arsenic and selenium provide similar tracers for coal-derived pollutants. Still missing, Gordon says, are comparable signatures for carbonaceous polluters, such as diesel engines and wood stoves. The goal, he says, is to identify what proportion of the pollution mix in any setting is attributable to particular sources —even distant ones. *—J. Raloff*