are sometimes taken (Rodríguez-Robles et al. 1999. J. Zool., Lond. 248:49–58). Rubber Boas have been reported to raid rodent nests and consume multiple individuals during a single feeding event (Rodríguez-Robles et al. 1999. J. Zool. 248:49–58). Their blunt tails often show evidence of injury (Hoyer 1974. Herpetologica 30:275–283) and may serve to misdirect attacks by predators (Greene 1973. J. Herpetol. 7:143–161) or protective mother rodents (Hoyer and Stewart 2000. J. Herpetol. 34:354–360).

On 10 July 2004 we collected an adult male *C. bottae* (457 mm SVK, 64 mm TL, 61.4 g) from inside a fallen Lodgepole Pine (*Pinus contorta*) at the edge of an open meadow in mixed coniferous forest at Sagehen Creek Field Station, Nevada County, California (39.43228ºN, 120.24150ºW, 2014 m elev.). The boa voluntarily regurgitated two adult Montane Voles (*Microtus montanus*) shortly after capture. The combined mass of the prey was 38.4 g, a relative prey mass (prey mass/predator mass) of 0.63. To the best of our knowledge, this is the first verified report of *C. bottae* predation on *M. montanus*, although Fitch (1936. Am. Midl. Nat. 41:513–579) mentions a possible record. The voles and boa are deposited in the Museum of Vertebrate Zoology (MVZ 245392).

We thank J. Patton and E. Lacey for assistance.

Submitted by **THOMAS J. DEVITT** (e-mail: tdevitt@socrates.berkeley.edu), **RYAN I. HILL**, Museum of Vertebrate Zoology and Department of Integrative Biology, University of California, Berkeley 94720-3160, USA; and **SUSAN E. CAMERON**, Department of Environmental Science and Policy, One Shields Avenue, University of California, Davis, California 95616-8573, USA.

CHRYSOPELEA ORNATA, C. PARADISI (Flying Snakes). **BEHAVIOR**. Animals subject to airborne predation are known to react defensively to stimuli moving overhead. For example, Tinbergen (1948. Wilson Bull. 60:6–51) demonstrated that raptor-like silhouettes elicit defensive responses in gallinaceous birds. However, relatively few studies have examined such behavior in reptiles (Macias Garcia and Drummond 1995. Ethology 101:101–111; Fine 1999. J. Herpetol. 33:128–131). Here we report orienting responses of *Chrysopelea ornata* and *C. paradisi* to visual stimuli of overhead flyers. These observations were made during experiments designed to evaluate takeoff and gliding performance of these species in semi-natural conditions (Socha 2002. Ph.D. Thesis, Univ. Chicago).

On separate occasions, we observed two *C. ornata* specimens visually track airplanes that flew overhead in the course of an aerial performance study in Lockport, Illinois. A branch (1 m long) was affixed horizontally to a scaffolding tower at a height of 8.3 m in the middle of an open, grassy field. In a typical flight trial, the snake was placed at the proximal end of the branch with its head facing outward; most snakes immediately moved to the distal end of the branch and jumped. In one trial, the snake (92 cm SVL, 158 g) moved to the end of the branch and stopped. While resting, the snake made a sudden move with its head, shifting its anterior body (ca. 8 cm) upward from horizontal to the vertical and twisting to the right, as if pointing up into the sky. We looked in the same direction and determined that the snake was directly facing an orange and tan Southwest Airlines passenger jet (casting a ca. 3 cm silhouette) as it moved slowly across the sky. The snake tracked the plane in saccadic fashion as it crossed from right to left, making three separate twisting movements. At the time of our initial sighting, we could not hear the airplane. Once the plane disappeared from view, the snake returned to its original posture. Several weeks later, JS observed identical plane-watching behavior in a second *C. ornata* (89 cm SVL, 150 g) and photographed the snake's posture (Fig. 1). The total duration of this behavior was ca. 30 s.

While conducting experiments at the Singapore Zoological Gardens, JS observed one instance of a similar visual orienting

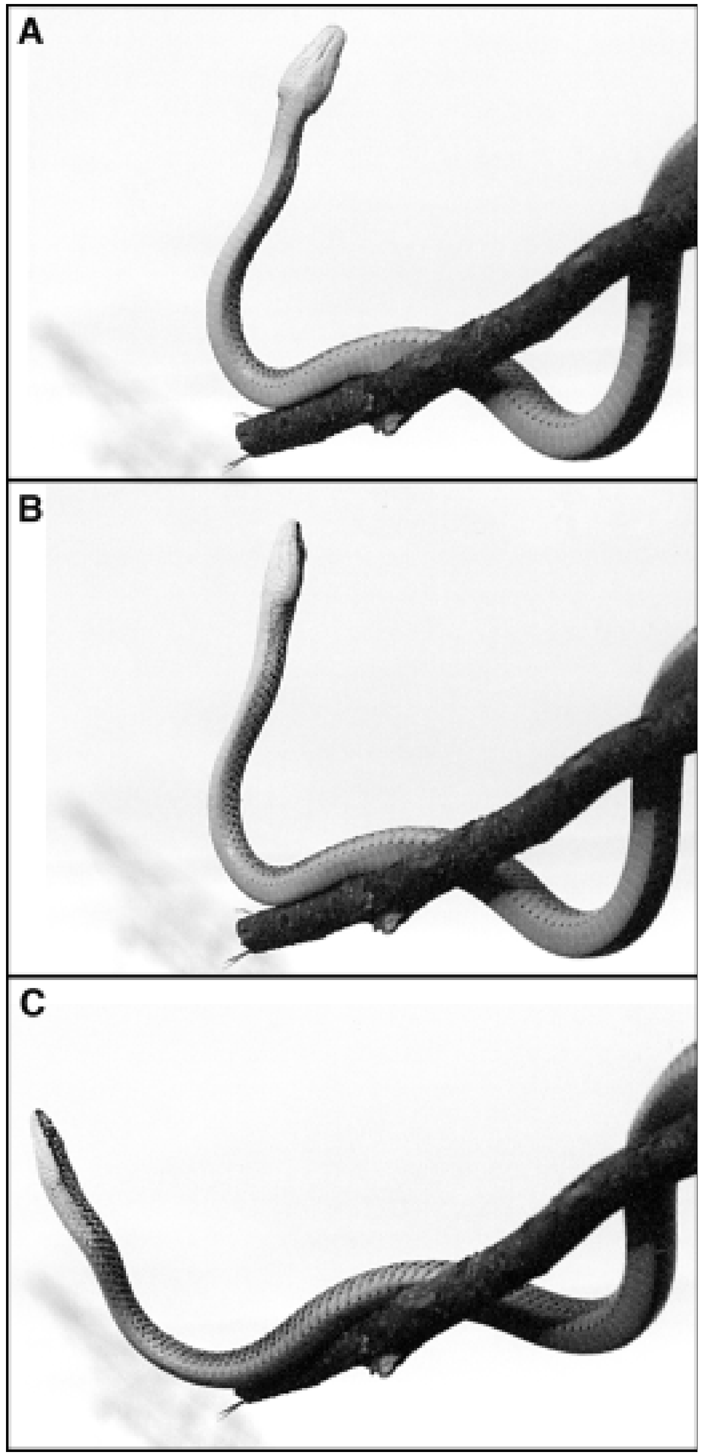

FIG. 1. *Chrysopelea ornata* visually tracking an airplane as it passed overhead through the sky. Temporal sequence is from top to bottom.

behavior in *C. paradisi*. This time, the stimulus was an unidentified bird (wingspan ca. 1 m) and the snake (85 cm SVL, 83 g) was facing to the left with ca. 15 cm of the anterior end in the air and the remainder of the body perched along the branch. The bird flew overhead, passing from the left to right at an estimated height of 100 m. The snake first reacted to the bird at a distance of ca. 200 m by turning its head 20° to the right and upward at an angle of 45°. The snake tracked the bird in saccadic fashion, making four discrete movements and rotating through a total angle of ca. 90° over 13 s. During this behavior, the snake moved its head from side-to-side intermittently with an amplitude of a few mm. After the bird was out of view, the snake returned to a forward-facing position.

Vision was presumably responsible for the initial detection of the overhead flyers in these observations. The first plane spotted by a *C. ornata* specimen was relatively small, and although the ophidian auditory system is more sophisticated than popularly believed (Young 2003. J. Comp. Physiol. B 167:481–493), it seems improbable that the snake was alerted by a sound that we could not hear (at any frequency, the threshold of audibility is lower in humans than in snakes; Hartmann 1997. Signals, Sound, and Sensation, American Institute of Physics, Woodbury, New York; Young 2003, *op. cit.*). Furthermore, the bird detected by the *C. paradisi* specimen appeared to make no sound.

Although our behavioral observations were made in semi-natural conditions, these data suggest two broad predictions regarding *Chrysopelea*. First, birds are important predators of flying snakes in the wild; this prediction can be tested through natural observations or dietary studies. Furthermore, possible links between detection of predators and initiation of takeoff may lend insight into the conditions under which aerial locomotion in snakes evolved. Second, we predict that flying snakes have excellent vision relative to most non-flying snakes, which can be tested by examining the distribution of morphological characters associated with keen visual acuity across a phylogenetically appropriate sample of snake taxa. Although snakes are generally thought to have poor vision, some taxa (e.g., *Ahaetulla* spp., Walls 1942. Bull. Cranbrook Inst. Sci. 19:1–785) possess foveae, which function to increase visual acuity in a diversity of animals (Ross 2003. *In* Anthropoid Origins: New Visions, pp. 463–521. Kluwer Academic/ Plenum Publishers, New York). We predict that *Chrysopelea* spp., with their unique command of aerial navigation and possible pre-takeoff target selection (Socha 2002, *op. cit.*) have functional foveae.

Submitted by **JOHN J. SOCHA***, Department of Organismal Biology and Anatomy, University of Chicago, Chicago, Illinois 60637, USA (e-mail: jjsocha@midway.uchicago.edu); and **CHRISTIAN A. SIDOR**, Department of Anatomy, New York College of Osteopathic Medicine, Old Westbury, New York 11568, USA. *Current address (JS): Argonne National Laboratory, Building 431, Sector 1, 9700 Cass Avenue, Argonne, Illinois 60439, USA.

CROTALUS ATROX (Western Diamondback Rattlesnake). **PREDATION.** At ca. 1000 h on 20 March 2004, we observed from a distance of ca. 60 m a Bobcat (*Lynx rufus*) with a rattlesnake on San Bernardino National Wildlife Refuge, Cochise Co., Arizona. The *L. rufus* swiped and bit at the snake, and eventually grabbed and tore a piece of flesh from it. The snake then struck at the *L. rufus*, which jumped several feet into the air. The *L. rufus* subdued the snake, picked up its prey, and walked in front of the parked vehicle at a distance of ca. 10 m (Fig. 1). At this time the snake was identified as *Crotalus atrox*, and appeared to exceed 100 cm TL. The *L. rufus* proceeded to a riparian area, where it disappeared.

At 2330 h on 13 August 2004, we observed a *L. rufus* carrying a dead *C. atrox* crossing New Mexico Highway 61 at 38.1 km N and 12.2 km W of Deming, New Mexico. The *L. rufus* dropped the snake on the pavement and then slowly wandered off in a disoriented manner. It zigzagged and held its head down, suggesting it had been struck one or more times. The body of the *C. atrox* (MSB 71139; 970 mm SVL, 605 g) had numerous puncture wounds, primarily over the posterior 2/3 of the body. Many tail punctures were evident and the rattle string appeared to have been ripped off during the encounter with the *L. rufus*.

Shaw and Campbell (1974. Snakes of the American West. Alfred A. Knopf, Inc., New York 330 pp.) mention, “Coyotes, foxes, wildcats, and badgers all will eat rattlesnakes.” Klauber (1997. Rattlesnakes: Their Habits, Life Histories, and Influence on Mankind. University of California Press, Berkeley. 1580 pp.) describes a *L. rufus* consuming a dead *Crotalus mitchelli* (Speckled Rattlesnake). To the best of our knowledge, there are no accounts of *L. rufus* taking live *Crotalus*, and *Crotalus* are not listed as prey items for *L. rufus* in the mammalian literature (Lariviere and Walton 1997. Mammalian Species 563:1–8). We thank C. Painter for advice and assistance.

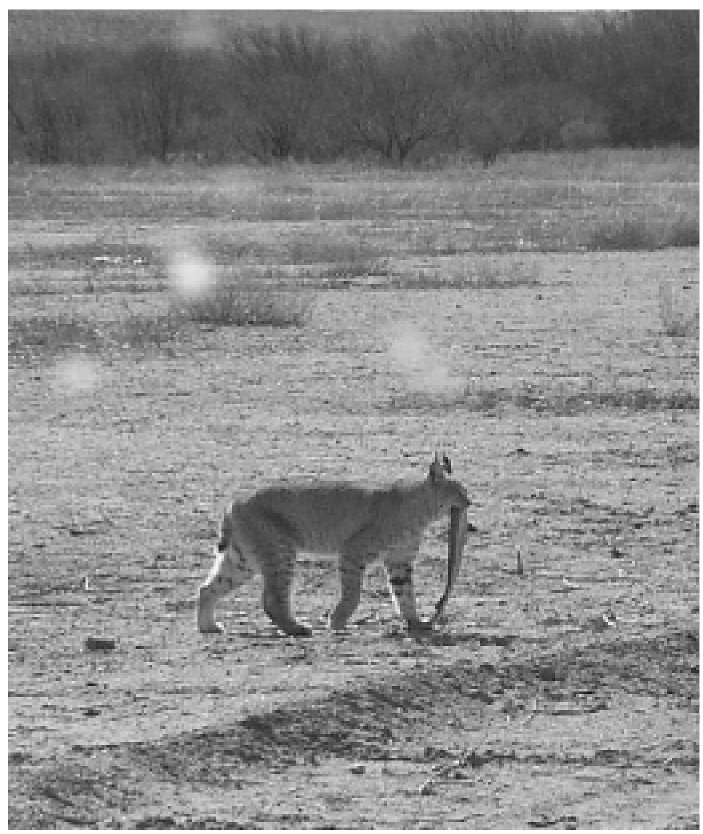

FIG. 1. Bobcat (*Lynx rufus*) with a Western Diamondback Rattlesnake (*Crotalus atrox*) that it had just killed in the San Bernardino Valley, Cochise County, Arizona.