We thank B. K. McNab for critically reviewing this manuscript and R. Colwell for allowing us access to these interesting animals.

Literature Cited

BROWN, J. H., AND R. C. LASIEWSKI. 1972. Metabolism of weasels: the cost of being long and thin. Ecology, 53:939–943.

EBISU, R. J., AND G. C. WHITTOW. 1976. Temperature regulation in the small Indian mongoose (*Herpestes auropunctatus*). Comp. Biochem. Physiol., 54A:309–313.

EWER, R. F. 1973. The carnivores. Cornell Univ. Press, Ithaca, 494 pp.

INGLES, J. M. 1965. Zambian mammals collected for the British Museum (Natural History). Puku, 3:75–86.

IVERSEN, J. A. 1972. Basal energy metabolism of mustelids. J. Comp. Physiol., 81:341–344.

KLEIBER, M. 1961. The fire of life. An introduction to animal energetics. John Wiley and Sons, Inc., New York, 454 pp.

MCNAB, B. K. 1974. The energetics of endotherms. Ohio J. Sci., 74:370–380.

———. 1978. The comparative energetics of Neotropical marsupials. J. Comp. Physiol., 125:115–128.

———. 1979. The influence of body size on the energetics and distribution of fossorial and burrowing mammals. Ecology, 60:1010–1021.

———. 1980. On estimating thermal conductance in endotherms. Physiol. Zool., 53: 145–156.

MORRISON, P., M. ROSENMANN, AND J. A. ESTES. 1974. Metabolism and thermoregulation in the sea otter. Physiol. Zool., 47:218–229.

NELLIS, D. W., AND J. J. MCMANUS. 1974. Thermal tolerance of the mongoose, *Herpestes auropunctatus*. J. Mamm., 55:645–647.

NOLL-BANHOLZER, U. 1979. Body temperature, oxygen consumption, evaporative water loss and heart rate in the fennec. Comp. Biochem. Physiol., 62A:585–592.

ROWE-ROWE, D. T. 1978. The small carnivores of Natal. Lammergeyer, 25:1–48.

VERSCHUREN, J. 1958. Ecologie et biologie des grands mammiferes (Primates, Carnivores, Ongules). Exploration du Parc National de la Garamba, 9 (Inst. Parcs Nat. Congo Belge: Brussels). 225 pp.

WALKER, E. P., ET AL. 1968. Mammals of the world. Johns Hopkins Press, Baltimore, 1,500 pp.

WILLARD W. HENNEMANN III AND MICHAEL J. KONECNY, *Department of Zoology, University of Florida, Gainesville, FL 32611.* *Submitted 18 April 1979. Accepted 21 January 1980.*

J. Mamm., 61(4):747–750, 1980

FEAR BRADYCARDIA IN FREE-RANGING WOODCHUCKS, *MARMOTA MONAX*

The classic response to fear is increased heart rate and an overall readiness for "fight or flight." Sympathetic activity increases and the animal is generally prepared for stress (Grinnell, 1977). Alternately, an animal may respond to danger by passively "hiding and freezing;" the latter response often results in bradycardia. Telemetrically measured heart rate from a free-ranging submerged alligator, *Alligator mississippiensis,* dropped from 30 bpm to less than 2 bpm when frightened (Smith et al., 1974). Gabrielsen et al., (1977) reported a 30% reduction of heart rate when telemetered, incubating willow grouse, *Lagopus lagopus*, were approached by man or dog. Jacobsen (1979) reported a mean reduction in heart rate of 38% when white-tailed deer, *Odocoileus virginianus*, fawns responded to stimuli by "freezing." Smith and Worth (in press) recorded a mean heart rate reduction of 25% during fear bradycardia in eastern cottontail rabbits, *Sylvilagus floridanus*, that could not be abolished with atropine treatment. Free-ranging Uinta ground squirrels, *Spermophilus armatus*, showed a reduction in heart rate of 100 bpm when approached by man (Ruff, 1971). Edgar Folk, University of Iowa Medical School, observed fear bradycardia in active woodchucks and disturbance tachycardia in hibernating woodchucks (pers. comm.).

Woodchucks are large fossorial rodents that live in extensive burrows (Grizzell, 1955; Merriam, 1966; Hayes, 1976). Cardiovascular response to hypoxia and oxygen affinities were described (Hall, 1965; Burlington et al., 1971). Woodchucks exhibit a marked respiratory sinus arrhythmia