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Chironectes minimus.

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Chironectes Illiger, 1811

Chironectes Illiger, 1811 (1815):76. Type species *Chironectes minimus* by monotypy.
Memina Fischer, 1813:576. Type species *Lutra memina* (*sic*).
Gamba Liais, 1872:329. Type species *Gamba palmata*.

CONTEXT AND CONTENT. Order Marsupialia, Superfamily Didelphoidea, Family Didelphidae, Subfamily Didelphinae. The genus *Chironectes* includes only one living species, *Chironectes minimus*.

Chironectes minimus (Zimmermann, 1780)

Water Opossum or Yapok

Lutra minima Zimmermann, 1780:317. Type locality Cayenne, French Guiana.
[*Lutra*] *menina (sic)* Boddaert, 1784:168—misprint for *minima*.
M[*ustela*] *(Lutra) guianensis* Kerr, 1792:174. Name based on the *small Guiana otter* of Smellie's (1780) translation of Buffon (1776). Type locality Cayenne, French Guiana.
M[*ustela*] *(Lutra) paraguensis* Kerr, 1792:172. Name based on *saricovienne* of Smellie's (1780) translation of Buffon (1776). Type locality "Rio de La Plata."
L[*utra*]*gujanensis* Link, 1795:84. Name based on the *petite loutre d'eau douce de Cayenne* of Buffon (1776), by implication. Type locality Cayenne, French Guiana by patrimony.
Lutra saricovienna Shaw, 1800:447. Name based on the *petite loutre d'eau douce de Cayenne* of Buffon (1776), and the *saricovienne* of Pennant (1793:82).
[*Mustela*] *cayennensis* Turton, 1802:58. Name based on the *petite loutre d'eau douce de Cayenne* of Buffon (1776). Type locality Cayenne, French Guiana.
Didelphis palmata Lacépède, 1803:152. Name based on the *petite loutre d'eau douce de Cayenne* of Buffon (1776).
Mustela lutris Lacépède, 1803:164. Name based on the *saricovienne* of Buffon (1776).
Chironectes variegatus Illiger, 1811 (1815):107. Substitute name for *Lutra minima* Zimmermann (1780).
Chironectes yapock Desmarest, 1820:261. New name for *Lutra minima* Zimmermann (1780).
Chironectes langsdorffii Boitard, 1845:288. Type locality near Rio de Janeiro, Brazil.
Chironectes panamensis Goldman, 1914:1. Type locality Santa Cruz de Caña, Upper Río Tuyra, Darién, 2000 ft., mountains of eastern Panamá.
Chironectes argyrodytes Dickey, 1928:15. Type locality Hda. Zapotitán, Río Sucio, 1500 ft., La Libertad, El Salvador.

CONTEXT AND CONTENT. Context noted above. Four subspecies are recognized (for a complete listing of synonymies and literature citations see Thomas, 1888:368; and Cabrera, 1957:44).

C. m. minimus (Zimmermann, 1780:317) Krumbiegel, 1940:66, see above. The type specimen is not in existence (Thomas, 1888:370).
C. m. panamensis (Goldman, 1914:1) Krumbiegel, 1940:67, see above. Holotype—USNM Biological Surveys Collection no. 179164, skin and skull, male, old adult.
C. m. argyrodytes (Dickey, 1928:15) Krumbiegel, 1940:68, see above. Holotype—no. 12986, collection of Donald R. Dickey, adult male.
C. m. bresslaui Pohle, 1927:242. Type locality Therezopolis, near Río de Janeiro, Brazil. Type—BZM no. 35441, an adult female.

DIAGNOSIS. Form, general structure, and size are similar to *Philander opossum* (figure 1). Fur is relatively short, dense, and with a few longer hairs intermixed with it. Rhinarium has a short backward extension on top of muzzle. Ears are moderately large, naked, and rounded, their anterior basal projections are rudimentary, and the metatragus is small. In addition to usual whiskers there are supernumerary facial bristles that are stout and long. These bristles are placed in tufts, of which one occurs above each eye, one on each cheek below and in front of base of ears, and a single median one on throat between rami of lower jaw.

Tail is longer than head and body, round, and powerful; it is furred for basal inch or two, with fur ceasing sooner in median line above and below than on sides. Remainder of tail is nearly naked, and is coarsely scaled (Thomas, 1888:369). Base of tail tapers gradually from body and is shorter relative to body length than in most other didelphids. Both sexes have a well-developed pouch or marsupium (see figs. A and B, p. 32, in Oliver, 1976). In males, scrotum is pulled into marsupium when animal is in water (Walker *et al.*, 1968:25; Enders, 1925:415). Females have four or five mammae (Brack, 1963:57; Mondolfi and Padilla, 1958:155).

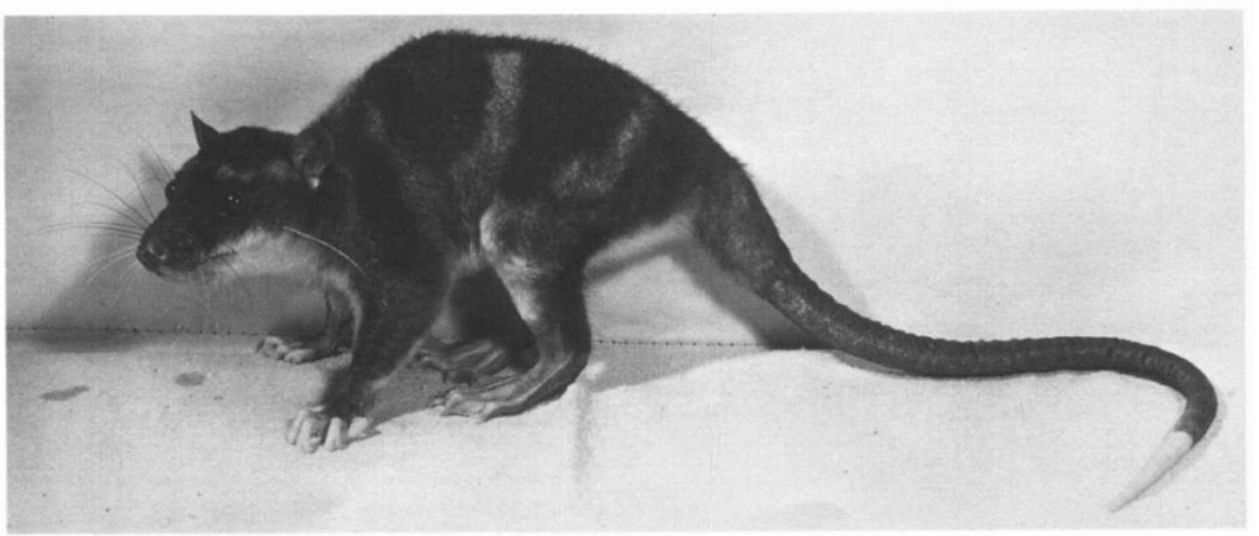

FIGURE 1. Photograph of *Chironectes minimus*. Courtesy of New York Zoological Society.

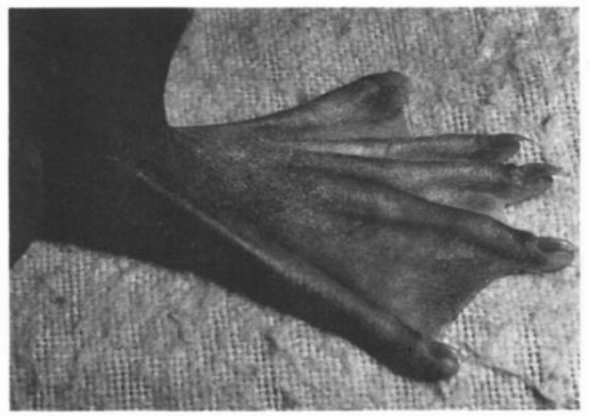

FIGURE 2. Photograph of right hind foot of *Chironectes minimus*. Courtesy of New York Zoological Society.

Forefeet are not webbed and fingers are long, naked and tactile, and the claws are greatly reduced. Pisiform bone is greatly enlarged, forming a prominent accessory tubercle, and giving appearance of a sixth digit (see fig. 1 in Mondolfi and Padilla, 1958:142, and fig. 1b in Oliver, 1976). Hind feet are webbed to ends of toes; terminal toe-pads alone extend beyond webbing (figure 2). Hallux is involved in webbing, and is less distinctly opposable than in species of *Didelphis, Philander, and Metachirus* (Thomas, 1888:366; Lydekker, 1894:221). Palms and soles of feet are uniformly finely granulated and have scarcely a trace of pads.

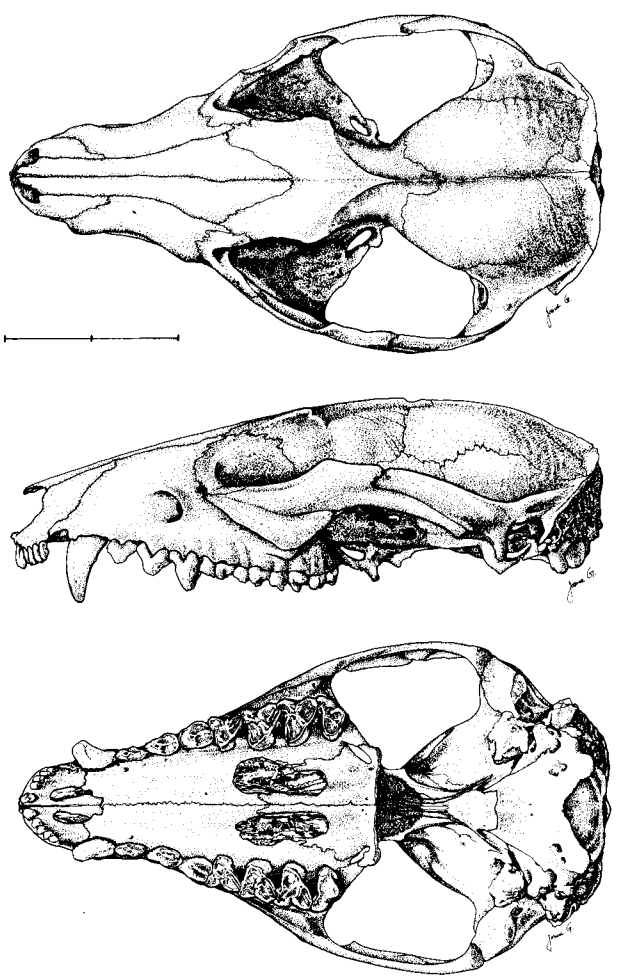

FIGURE 3. Skull of *Chironectes minimus* (FMNH 75092, female, from Cuzco, Perú) shown, from top to bottom in dorsal, lateral, and ventral views. Scale = 20 mm.

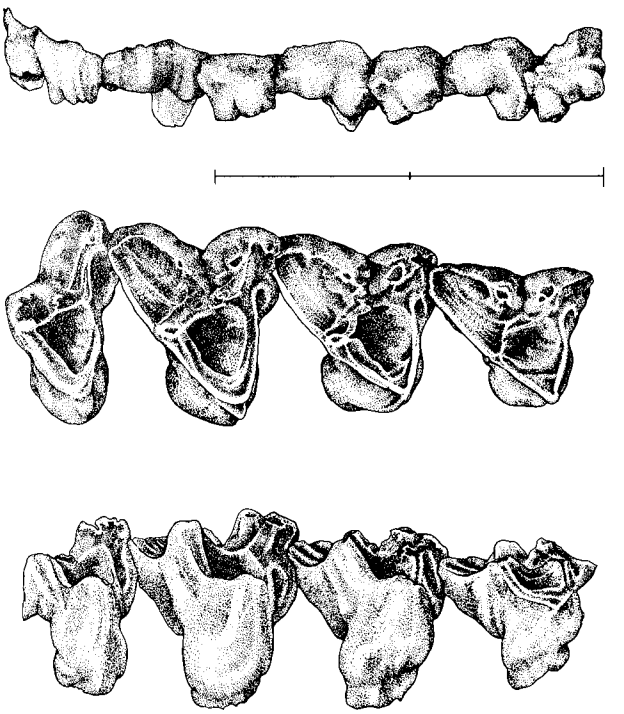

FIGURE 4. Detail of right upper molars of *Chironectes minimus* (FMNH 75092, female, from Cuzco, Perú), shown from top to bottom in lateral, occlusal, and medial views. Scale = 10 mm.

Skull resembles that of *Philander opossum* in size and proportions (figure 3). Nasals are markedly expanded posteriorly. Interorbital area is broad, flattened, and square-edged. Postorbital processes are prominent. Temporal ridges coalesce in old age, forming a sagittal crest. Zygomatic arches are strong, and widely expanded laterally. Posterior part of palate has a single pair of large vacuities opposite molars, and is without a smaller central pair behind as in other didelphids. Posterior nares are narrow as in *P. opossum* (Thomas, 1888:369).

GENERAL CHARACTERS. Dental formula is i 5/4, c 1/1, p 3/3, m 4/4. General color grayish-white, marbled with deep brown. Muzzle, crown of head, and a band extending through eye to below ear are deep blackish-brown in color. A prominent grayish-white crescentic band passes below eyes from front of one ear to other. Back of animal is marbled gray and black, rounded black areas coming together along midline and extending from crown of head to base of tail, and expanding laterally into four broad, transverse patches placed respectively over shoulders, center of back, loins, and rump; ground color between them is a pale slaty-gray. Chin, chest, and belly are pure white. Arms and legs are white inside, grayish out, but with legs showing a continuation of posterior dark body-band running down their backs to heel. Hands and feet are nearly naked, brown proximally, and silvery gray on digits. Tail is deep black proximally, yellowish terminally (Cabrera, 1919; Thomas, 1888:369).

The following ranges of measurements (in millimeters) were compiled from Crespo (1974:4), Pohle (1927:243), Hall and Kelson (1959:9), Mondolfi and Padilla (1958), Lydekker (1894:222), Walker *et al.* (1968:25), Goodwin (1942:113, 1946:283), and Goldman (1914:1). Total length of animal, 645 to 745; total length of head and body, 270 to 400; length of tail, 310 to 430; length of hindfoot, 60 to 72; height of ear, 22 to 31. Skull measurements: length, 68.2 to 81.0; zygomatic breadth, 38.0 to 45.2; length of nasals, 26.3 to 37.5; breadth of nasals, 10.0 to 14.0; interorbital breadth, 11.1 to 16.9; length of upper cheektooth row (P1-M4), 23.0 to 34.2; length of M1-3, 10.9 to 13.3; length of lower cheektooth row (p1-m4), 24.8 to 32.0. Weight ranges from 604 to 790 grams (Mondolfi and Padilla, 1958:141).

DISTRIBUTION. *Chironectes minimus* is confined mostly to tropical and subtropical habitats (figure 6). It is considered rare throughout its range, which extends from southernmost México and Central America, through Colombia, Venezuela, the Guianas, Ecuador, Perú, Paraguay, along the eastern side of Brazil, to

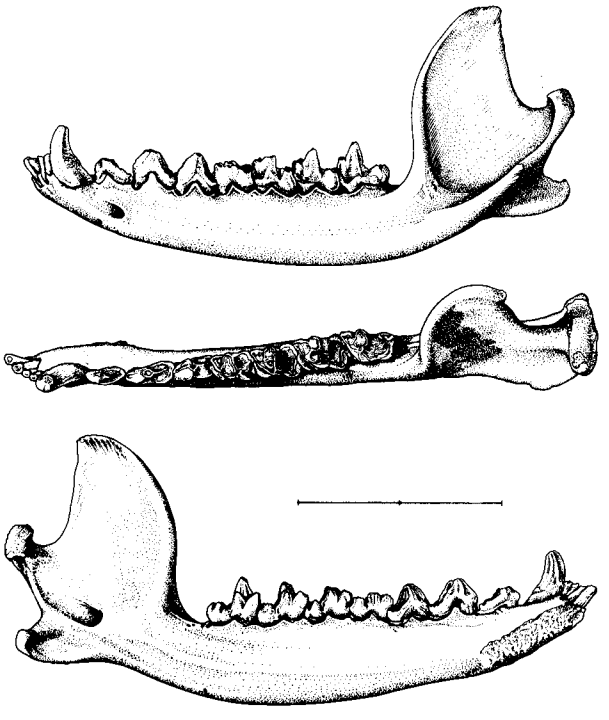

FIGURE 5. Mandible of *Chironectes minimus* (FMNH 75092, female, from Cuzco, Peru) shown, from top to bottom in labial, occlusal, and medial views. Scale = 20 mm.

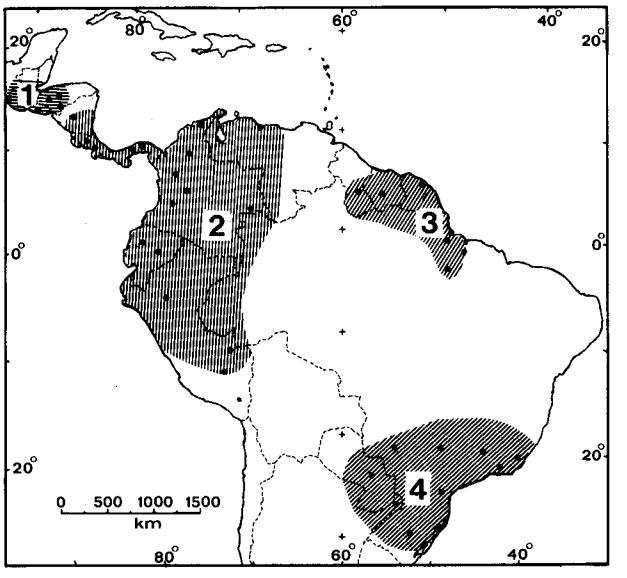

FIGURE 6. Map of Central America and northern half of South America showing known geographic distribution of *Chironectes minimus*. Solid circles represent specific localities referred to in the literature and from which specimens were collected; hatching represents the presently known occupied range, based on all literature references. For literature sources see text. Subspecies are: 1, *C. m. argyrodytes*; 2, *C. m. panamensis*; 3, *C. m. minimus*; and 4, *C. m. bresslaui*.

the Province of Misiones in northeastern Argentina (figure 6; Cabrera, 1957:44; Krumbiegel, 1940:67, fig. 2; Miranda-Ribiero, 1936:390; Collins, 1973:84; Hall and Kelson, 1959:10, map 2; Thomas, 1888:370; Goodwin, 1942:112; 1946:283).

Four races of *Chironectes minimus* are presently recognized. *C. m. minimus* occurs in the northeastern parts of South America, in the Guianas and basins of the Orinoco and Amazon of Brazil.

C. m. bresslaui occurs in southern Brazil (San Lorenzo, Therezopolis, Rio Grande do Sul) to Paraguay and in the Province of Misiones, Argentina (Crespo, 1950:5; 1974:4; Massoia, 1976:105; Winge, 1893; Pohle, 1927:242; Vieira, 1949).

C. m. argyrodytes is known from the mountains of El Salvador, east to central Honduras (Las Flores, Minas de Oro, Tegucigalpa), and southernmost México (Río Teapa, 3.2 km north of Teapa, Tabasco) (Dickey, 1928:15; Lay, 1962:374; Goodwin, 1942:112). Goodwin (1969:31) reported a specimen from the Isthmus of Tehuantepec in the northern Juchitán District, Río Sarabia, 30.4 km north of Matías Romero, Oaxaca, México.

C. m. panamensis ranges over northwestern South America, from Perú (Marcapata, Moyobamba; see Osgood, 1914:150; Pohle, 1927:242) in the south, throughout Ecuador (Gualea; see Lönnberg, 1921:67) (Cadena, Santo Domingo, Valle Grande del Departamento de Puno), Colombia (Bagado, Barbacoas, Guanchito, Porto Frío, Río Cauca, Palmira), Venezuela (El Lagunetas, El Consejo, Caracas, Estado Aragua, Ríos Periquito, Cumboto, Ocumare, Tuy, and Choroní, and in the National Park of Rancho Grande; see Brack, 1963:58; Mondolfi and Padilla, 1958:141, 144), and northward through Panamá (Caña, Río Chagres), Costa Rica (La Palma, Carillo, San José), to Nicaragua (Matagalpa; see Goldman, 1914:2; 1920:45). This animal may also occur on Trinidad (Walker *et al.*, 1968:25). Beebe (1923:150) noted that 25 of these animals were collected and others seen on a tributary of the Río Chagres, Panamá.

FOSSIL RECORD. Ameghino (1907:70) reported on a partial left mandibular ramus, with canine, first two molars, and alveoli for most of other teeth, of this species. The specimen is from "las grutas calcáreas" in the region of the Río Iporanga, São Paulo, Brazil. The aspect of preservation indicates that the specimen is a subfossil and Holocene in age. Lydekker (1887:289) reported a specimen, British Museum (Natural History) no. 188901, from the late Pleistocene–Recent cave deposits of Lagoa Santa, Minas Gerais, Brazil. Specimens referred to the living species are reported by Marshall (1977) from the late Pliocene (Montehermosan) "Formacíon Enterriana," Barrancas del Río Paraná, near Paraná, Entre Ríos Province, Argentina.

FORM. The muscles of this animal were described by Sidebotham (1885), and Augustiny (1942) discussed various aspects of structure associated with an aquatic mode of life.

Chironectes minimus is the only marsupial adapted for a semi-aquatic life, for which it has a dense water-repellent fur, webbed hind feet, a "water-proof" pouch, and a streamlined body. Supernumerary stout, and long facial bristles act as tactile organs under water (Tate, 1933:14).

The hallux is lengthened so that the hind foot is practically symmetrical. This arrangement is the most suitable shape for mammals that swim by actions resulting in equal water force being applied to both borders of the feet. In *Chironectes* the hallux nail is not clawlike as are those of the other digits, but is of the same general shape as the nails in man and is little more than a callosity (Howell, 1930:27). Howell (p. 26) noted that it is remarkable that the hind feet of this animal should be so highly specialized whereas the tail is perfectly terete.

The female urogenital organ of a young unbred animal was described in detail by Hill and Fraser (1925:207–208, pl. 1, fig. 5, text fig. 6). The fallopian tubes are relatively short, thick, and merge gradually into the short uteri. The uterine necks converge to meet in the middle line, and their terminal portions extend posteriorly, attached on either side of the vaginal septum and open by slit-like apertures, bounded by prominent lips that extend deep into the median vaginas. The lateral vaginal canals extend outwards and forwards and then bend posteromedially to form single loops; their posterior segments are short. The medial vaginae are dorsoventrally flattened cul-de-sacs, but not so wide transversely as in *Monodelphis*. They are separated by a thick septum and terminate some distance behind the ureter openings into the neck of the bladder and about 1.7 mm in front of the sinus. The clitoris appears freely exposed as a blunt dorsoventrally compressed structure, 1.25 mm in length and about 1.0 mm in breadth, a result of the fact that, in this specimen at least, there is no cloaca. The urogenital sinus and rectum open separately at the surface. These results indicate that there is no close relationship between *Chironectes* and the *Metachirus* group of didelphids as thought by earlier workers (see Hill and Fraser, 1925:216).

FUNCTION. Enders (1925:415; 1937:25; 1966:200) has noted that in *Chironectes*, as in other opossums, the young are born in an immature condition and spend some weeks attached to the

mammae, which are located in a well-developed marsupium. The strong development of the *m. pars pudenda* sphincter indicates that the pouch which opens to the rear, can be closed completely during a dive (Rosenthal, 1975:5) and the young thus protected from the water. The fatty secretions of the pouch and the hairs about the lips suggest that if the lips were brought together, the contact might exclude water without necessarily being airtight. Examination of a female with four pouch young has shown that the *m. pars pudenda* is so strong that on contraction not only will the lips meet in the midline, but they can be so strongly appressed that they are thrown into a ridge, increasing greatly the area of contact between them. The resulting contact plus the "seal" furnished by the hair and fatty secretions are effective even in diving. A "water-tight" compartment is thus created for the young. In relation to this it is known that pouch-young can suspend breathing for many minutes without harm; they are tolerant of low O_2 levels and are highly resistant to asphyxia (Rink and Miller, 1967). Howell (1930:26), for example, reported the capture of a swimming opossum of the genus *Didelphis* with live pouch-young. Mondolfi and Padilla (1958:155) have noted that remains of fish were found in the stomachs of two females with pouch-young. (One of these was killed in the water, confirming that the female is able to swim and dive with young in the pouch.) Howell (1930:26) speculated, however, that the problem of maintaining the young under these conditions "has probably been of exceeding importance in limiting the degree of aquatic specialization of this animal."

In the male the *m. pars pudenda* cannot close the pouch, but is nevertheless effective in retaining the scrotum. When the animal contracts the *m. cremaster*, the scrotum is pulled up to the body, and the anterior surface of the scrotum is brought into contact with the ventral body wall in the region forming the dorsal surface of the pouch. If the *m. pars pudenda* is then contracted, the scrotum is held in this position even after relaxation of the *m. cremaster*. Apparently the pouch is used only when moving swiftly or swimming, for the scrotum hangs pendant under most circumstances (Enders, 1937:25). The scrotum is external and is clearly visible by its mustard-colored fur, even though it is incorporated within the rudimentary marsupium (Oliver, 1976:32).

ONTOGENY AND REPRODUCTION. The largest reported litter of *Chironectes* is five (Mondolfi and Padilla, 1957:151; Rosenthal, 1975:4) although litters of two and three are most common (Enders, 1966:200). In Brazil, the young are born in December and January, and one female was seen in February with five young (Walker *et al.*, 1968:25). The record longevity for a captive animal is two years and 11 months for an animal kept at the New York (Bronx) Zoo (Crandall, 1964:23).

In two litters observed by Rosenthal (1975:4), hair first appeared on the young on day 22 and body pigmentation began to develop on day 28. On day 34 distinct color bands were visible on the pelage. On day 38 the eyes began to open and they were fully open on days 40 to 43. By day 40 the young are too large to fit completely into the pouch, although they were still nursing and the teeth had not yet broken through the gumline. Females nursed on their side, and after day 40 the heads of the young were seen inside the pouch while nursing and the rest of the body remained outside. By day 48 the young began to detach themselves from the female, but go to the pouch to suckle, sleep beside the head and body of the female, and sometimes climb onto her back to be carried. Growth weights and measurements of two pouch-young from day 60 to day 160 are given by Rosenthal (1975:5, table 1).

Oliver (1976:36) reported *Chironectes* to be polyestrous. Precopulatory behavior always comprised close association, with circling or male following female, and oral-genital contact. The male pulls the female towards him while mounting (*ibid.*).

ECOLOGY AND BEHAVIOR. The main den, a subterranean cavity, is usually reached through a hole in the stream bank just above water level (Walker *et al.*, 1968:25). Excavation of a yapok's stream-bank burrow revealed an entrance 102 mm in diameter located just above water level and a tunnel descending at a 45-degree angle for approximately 0.6 meters, where it terminated in a somewhat enlarged nest chamber. (Zetek, 1930).

Ground nests of leaves or grasses in dimly lit areas may be used as a place of rest during the day (Goodwin, 1946:283; Collins, 1973:86; Walker *et al.*, 1968:25). Zetek (1930:470) reported an adult male near Fort Sherman, on the Atlantic side of the Canal Zone in Panamá, which was found about mid-forenoon asleep on the ground above a stream bank and close to it. The animal had a definite nest measuring about six inches (150 mm) in diameter made of leaves of various sorts. As soon as the animal was disturbed, it jumped into the water and dove, surfacing shortly on the opposite bank where it entered a hole about 100 mm in diameter, just above the level of the water in the stream. An artificial nest box that was used sucessfully to house several yapoks is described by Oliver (1976:33).

Adult animals observed by Oliver (1976:34) never defecated in nesting chambers, although they make no effort to remove soiled nesting material, which is accumulated rather than replaced. Yapoks forage for nesting material and collect it by pushing strands under their bodies with their forepaws into a bundle held by the tail. They also bite off growing grasses for this purpose (*ibid.*).

Yapoks are nocturnal and spend the day sleeping in unlit areas. An animal kept in captivity slept during the daytime, covering itself with whatever materials were placed in the cage. During the night it was extremely active (Zetek, 1930:470). Oliver (1976:33) reported, however, that yapoks do not seem to be strictly nocturnal or even crepuscular and often were observed active during the day phase. Moreover, activity is always sporadic and a circadian rhythm was not apparent.

During foraging activity, yapoks frequent freshwater streams and lakes, and in some areas are found at considerable elevations (5000 ft.) along mountain rivers (Enders, 1966:200; Walker *et al.*, 1968:25). Yapoks are carnivorous and feed on aquatic life such as fish, crustaceans, insects, and frogs (Lydekker, 1894:223; Mondolfi and Padilla, 1958:150–151; Collins, 1973:86). A den excavated by Zetek (1930:470) contained abundant remanants of crustaceans. Davis (1966) reported that yapoks maintained at the zoo in New York in 1966 thrived on slices of butterfish and a meat mix containing ingredients that aided in oil production for fur maintenance. An animal that lived about three years was fed on chopped raw meat, with finely ground bone meal and cod-liver oil added (Crandall, 1964:211). On the whole yapoks are voracious feeders and adult animals show marked agonostic behavior when feeding (Oliver, 1976:34).

Enders (1925:414) described a young male that was given a large piece of beef to eat. "Pieces were chewed off, using the back teeth as sectorials and then, even though the chunks thus cut off were large enough to cause straining, were swallowed whole. During this process the animal sat on its haunches using a somewhat tripodal posture and holding the meat in its forepaws with a skill much greater than that displayed by any other marsupial observed."

Oliver (1976:34) reported that favored foods in captivity included mice, pink to weaned rats, and chicks one to 14 days old. These were fed freshly killed but intact, and everything including fur and extremities were consumed. Feeding was facilitated if whole animals were first wetted. In the wild, foodstuffs are located in the water by contact with the forefeet, which are held stretched out in front while the animal is swimming. It is probable that yapoks feel for foods such as crustacea in much the same way as do raccoons (*ibid.*).

Yapoks are excellent swimmers and divers. Enders observed an animal swimming in a small pool of an outdoor cage. The use of the forefeet was not determined. The hind feet were used alternately in locomotion as in a "dog paddle," the tail streaming out behind or being used as a rudder (Oliver, 1976:32). The broadly webbed hind feet are strong and effective paddles. The stroke is made along the median line so the hip region does not swing from side to side. Change in direction was apparently made by using the front feet and changing the body position.

Although *Chironectes* can climb, it does so unwillingly. When placed on a branch, these animals used the tail either by placing it about the support or by holding it out stiffly as a balancing organ. While prehensile and similar to that of *Metachirops*, the tail in *Chironectes* is too thick for effective use in climbing, although it is used for the collection of nesting material (Oliver, 1976, fig. 1a). On a hard rough surface there is a marked tendency to pull out the nails of the forefeet (Enders, 1925:414).

The supposed rarity of these animals may be due, at least in part, to their secretive nocturnal habits and the inaccessibility of their habitat (Walker *et al.*, 1968:25). One specimen was taken in a basket-trap similar to those used for catching eels in Europe (Lydekker, 1894:223).

Zetek (1930:470) reported that a captive male would arch its back as if to jump, and when in this attitude the tail appeared to be much longer than in reality. When first caught, the animal did not remain quiet and kept opening and snapping its jaws. After the fourth day in captivity it allowed itself to be handled. Contrary to Crandall's (1964) findings, specimens maintained by the Lincoln Park Zoo tended to be aggressive when handled and would

attempt to bite (Rosenthal, 1975:4). For the most part, individuals are antisocial and solitary (Oliver, 1976:34).

At least five zoos have maintained yapoks. The New York (Bronx) Zoo received two specimens in 1949 and had two more in 1966. The zoo in Barranquilla, Colombia, maintained a specimen during 1967, and as of 31 January 1972 the National Zoological Park was maintaining a female received as a young adult in October, 1970 (Collins, 1973:84). The Lincoln Park Zoo in Chicago received five yapoks, two males and three females, in the summer of 1972; all three females had pouch-young of which two of the litters were successfully raised (Rosenthal, 1975:4). Two males and one female were presented to the Jersey Zoo in March, 1975 (Oliver, 1976:32); they were retained there until October 1976 when they were exported to the Duisberg Zoo.

Recorded parasites include: Arthropoda—*Doloisia, Rhopalias, Stenopsylla, Tritopsylla;* Cestoda (tapeworms)—*Ligula, Sparganum;* and Trematoda (flukes)—*Amphimerus* (Collins, 1973:84).

GENETICS. The diploid chromosome number of *Chironectes minimus* is 22; 10 pairs of autosomes and one pair of sex chromosomes. The autosomes are three large acrocentric pairs and seven medium-sized acrocentric pairs. The X-chromosome is acrocentric and is hardly distinguishable from medium-sized autosomes. The Y-chromosome is small and acrocentric; its size is comparable to that of the X-chromosome in *Didelphis marsupialis*. Sex is determined by the XX/XY mechanism (Yunis *et al.*, 1972:266; Hayman and Martin, 1974:7).

The morphological and karyological affinities between *Chironectes* and *Didelphis* (both are didelphids of large size, with a well-developed pouch and chromosome number of 2n = 22) support the hypothesis that *Chironectes* may well have been derived from a common ancestor shared with *Didelphis* (Yunis *et al.*, 1972:268).

REMARKS. This animal is known by diverse local names. The Indians of Guiana call it "yapok"; the Brasilians use the name "cuica d'agua" or "chichica d'agua"; in Panamá it is called "gato de agua"; in Ecuador "raposa del agua"; in Venezuela "perrito de agua"; in México "tlacuaches del agua"; and in Perú it is "cuica." Other vernacular names included "pequeña nutria de la Guayana," "yapó," "cuica de agua," "cuicapé-depata," "comadreja acuática," "opossum de agua," "guaiquica acuática," "quira," and "mucura chichica" (Cabrera and Yepes, 1960:27; Massoia, 1976:31; Brack, 1963:59; Mondolfi and Padilla, 1958:145).

Chironectes minimus panamensis was diagnosed by Goldman (1914:1) as being similar to *C. m. minimus* of Guiana in size and color, but differing in cranial details, especially the longer braincase, and much longer, evenly tapering, and posteriorly pointed nasals. The nasals are longer, encroaching farther on frontal platform, and their ends are pointed instead of truncated, and sides are not constricted near the middle.

Chironectes minimus argyrodytes was characterized by Dickey (1928:15) as being similar to *C. m. panamensis*, but darker (a blackish brown rather than a chestnut-brown), with dark masses in the pattern of dorsal pelage larger and with the intervening broken bands of gray proportionately reduced in width, the band across the hips being especially reduced and inconspicuous; the gray of the sides and narrow broken dorsal bands being darker and clearer (less drab). Nasals are much longer and wider, and the rostrum is broader and heavier throughout. The maxillary toothrow is longer, the premolars in particular are less crowded, and the molar series (especially M2 and M3) is slightly heavier. The most outstanding characters are the heavy rostrum and broad interorbital area.

Dickey (1928:16) has noted that specimens from Costa Rica combine characters of both *C. m. argyrodytes* and *C. m. panamensis*, although on the whole they are closer to *C. m. panamensis*. The comparatively long braincase and pointed end of the nasals in *C. m. argyrodytes* and *C. m. panamensis* serve to distinguish these forms from "their South American Neighbors" (Goodwin, 1942:113).

The generic name is formed from the Greek prefix *Chiro-* or *cheiros* (hand), and the suffix *-necto* or *nektes* (swimmer) and refers to the webbed feet of this animal and hence to its aquatic adaptations. The specific name *minimus* is the Latin word for least. Zimmerman (1780) applied the name *minimus* to the "*Petite loutre d'eau douce de Cayenne*" of Buffon (1776:159, pl. 22). Buffon's specimen was probably young as he stated that the length of the body was only seven inches (Tate, 1939:160). The name *minimus* was given to mean a small ("least") otter (*Loutre* or *Lutra*).

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