Redescriptions of Two Poorly Known Slender Skinks, *Brachymeles bicolor* and *Brachymeles pathfinderi* (Reptilia: Squamata: Scincidae), from the Philippines

Author(s) :Cameron D. Siler, Ronald I. Crombie, Arvin C. Diesmos, and Rafe M. Brown
Source: Journal of Herpetology, 45(3):355-369. 2011.
Published By: The Society for the Study of Amphibians and Reptiles
DOI: 10.1670/10-103.1
URL: http://www.bioone.org/doi/full/10.1670/10-103.1

Journal of Herpetology, Vol. 45, No. 3, pp. 355–369, 2011

Redescriptions of Two Poorly Known Slender Skinks, *Brachymeles bicolor* and *Brachymeles pathfinderi* (Reptilia: Squamata: Scincidae), from the Philippines

Cameron D. Siler,[1,2] Ronald I. Crombie,[3] Arvin C. Diesmos,[4] and Rafe M. Brown[1,5]

[1]*Natural History Museum and Biodiversity Institute, Department of Ecology and Evolutionary Biology, University of Kansas, Lawrence, Kansas 66045-756 USA*
[3]*Department of Vertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560 USA*
[4]*Herpetology Section, Zoology Division, National Museum of the Philippines, Rizal Park, Burgos Street, Manila, Philippines*

Abstract.—*Brachymeles bicolor* (Gray 1845), from the Sierra Madre Mountain Range of Luzon Island, and *Brachymeles pathfinderi* Taylor 1925, from southern Mindanao Island, are among the most distinctive species in the genus, representing the largest species and one of only two known nonpentadactyl species with unequal digit numbers respectively. However, both species are inadequately diagnosed, based on a total of only five specimens. Here we provide brief taxonomic histories, discuss and clarify type localities, and redescribe each species using larger sample sizes and specimens well documented and collected during our recent biodiversity surveys. We include new information on morphological variation, distribution, ecology, and microhabitat.

Scincid lizards of the genus *Brachymeles* are a predominately Philippine radiation (25 recognized species currently) with only a single extralimital species (*Brachymeles apus* from Borneo). They are noteworthy from both evolutionary and developmental standpoints for their varying degrees of limb and digit reduction (Brown and Alcala, 1980; Hikida, 1982; Siler et al., 2009, 2010a,b). Only three other genera of lizards are known to have a similar diversity of body forms, from limbless to fully pentadactyl species (*Chalcides*, *Lerista*, and *Scelotes*; Lande, 1978; Wiens and Slingluff, 2001; Brandley et al., 2008). Although there have been two major revisions of the genus (Brown, 1956; Brown and Rabor, 1967), Philippine *Brachymeles* alpha taxonomy has continued to change. Brown and Alcala (1980) revised the species/subspecies status of some populations and described one new species (Brown and Alcala, 1995), providing a workable framework for future studies. However, Brown and Alcala's approach to species and relationships was phenetic and has not yet been tested phylogenetically. Even though large areas of the Philippines remain sparsely sampled or untouched herpetologically, recent fieldwork has confirmed that *Brachymeles* diversity is still seriously underestimated. Six new species have been described in the past two years, and several others await description (Siler et al., 2009, 2010a,b; Siler and Brown, 2010).

Members of the genus have similar body plans and external morphology, which has proven problematic for diagnosing species diversity on the basis of morphology alone (Brown and Alcala, 1980; Siler et al., 2009, 2010a,b; Siler and Brown, 2010). Additionally, the general paucity of collections for certain species has led to a lack of understanding of the enigmatic species, representing extremes in body form variation. Two examples of this problem are embodied by the poorly known species *Brachymeles bicolor* and *Brachymeles pathfinderi*. Neither *B. bicolor* nor *B. pathfinderi* have been observed for more than 80 years.

Over the last five years, we have conducted biodiversity surveys throughout many islands in the Philippines. This study focuses on collections of *Brachymeles* obtained recently in several sites in the Sierra Madre Mountain Range, the Cordillera Mountain Range of northern Luzon Island, and in southern Mindanao Island, Philippines (Fig. 1). Twenty-eight specimens of *B. bicolor* were collected between 1989 and 2009 from 150–500 m elevation on Luzon Island (Fig. 1). Subsequently, during a survey in the Municipality of Glan (the type locality of *B. pathfinderi*) in southern Mindanao Island, Philippines, 40 specimens of *B. pathfinderi* were collected between 22 and 25 September 2009 at sea level (Fig. 1). In this paper, we redescribe both species and report new information on their natural history, ecology, and habitat.

[2]Corresponding Author. E-mail: camsiler@ku.edu
[5]E-mail: rafe@ku.edu

Materials and Methods

We examined alcohol-preserved specimens that were fixed in 10% formalin (Appendix 1). Sex was determined by gonadal inspection, and measurements were taken with digital calipers to the nearest 0.1 mm. To minimize interobserver bias and other sources of potential error (Lee, 1990), all measurements were scored by CDS. Museum abbreviations follow Leviton et al. (1985).

Meristic and mensural characters were chosen based on Siler et al. (2010a,b; Fig. 2) except where definition clarifications provided: snout–vent length (SVL), axilla–groin distance (AGD: distance between posterior edge of forelimb insertion and anterior edge of hind-limb insertion, with limbs extended at right angles to body), total length (TotL), midbody width (MBW), midbody height (MBH), tail length (TL), tail width (TW), tail height (TH), head length (HL: from tip of snout to posterior margin of retroarticular process of mandible), head width (HW), head height (HH), snout–forearm length (SnFa), eye diameter (ED: at widest point of palpebral split), eye–narial distance (END: from anterior margin of palpebral split to posterior margin of nares), snout length (SNL), internarial distance (IND), forelimb length (FLL: measured from forelimb insertion to tip of Finger-III or longest digit, with limbs extended at right angles to body), hind-limb length (HLL: measured from hind-limb insertion to tip of Toe-IV or longest digit, with limbs extended at right angles to body), midbody scale-row count (MBSR), paravertebral scale-row count (PVSR), axilla–groin scale-row count (AGSR), Finger-III lamellae count (FinIIIlam), Toe-IV lamellae count (ToeIVlam), supralabial count (SL), infralabial count (IFL), supraciliary count (SC), and supraocular count (SO). Although juvenile and subadult specimens were examined, only measurements from adult specimens were included in calculations of summary statistics. In the description, ranges are followed by mean ± standard deviation in parentheses.

Brachymeles bicolor (Gray, 1845)
Figures 1–4

Senira bicolor (part) Gray, 1845:98; Günther, 1879; Fischer, 1885.

Brachymeles bicolor Boettger, 1886:103; Boulenger, 1887; C. de Elera, 1895; Taylor, 1917, 1922a; Brown, 1956; Brown and Rabor, 1967; Brown and Alcala, 1980.

Type Specimens.—Four syntypes from ''Mr. Cuming's collection.'' Type series composite (see Taxonomic history below).

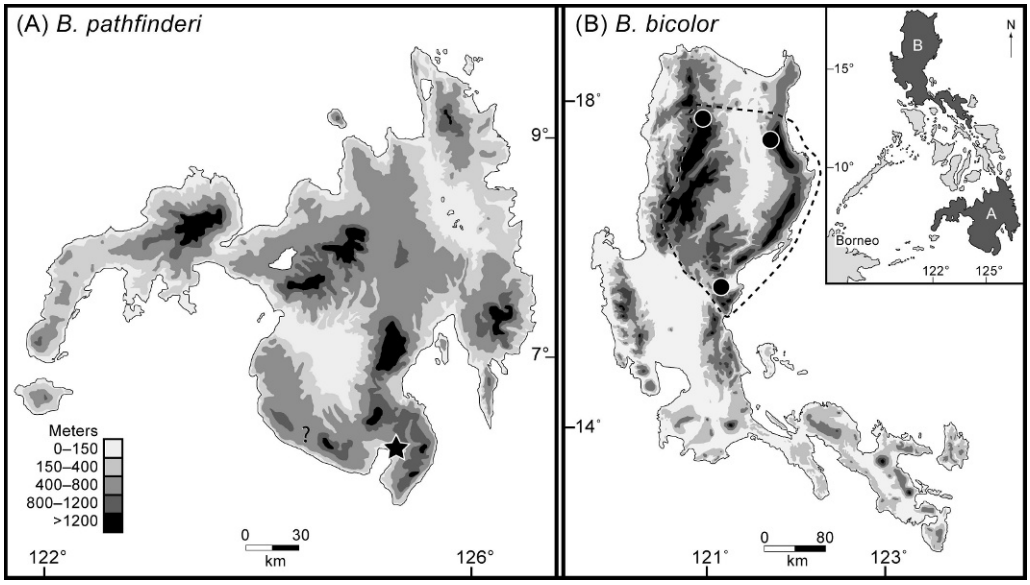

FIG. 1. Known distribution of *Brachymeles bicolor* on Luzon Island, and *Brachymeles pathfinderi* in southern Mindanao Island, Philippines. Sampling localities for *B. bicolor* are indicated by black dots, whereas the sampling and presumed type locality for *B. pathfinderi* (Municipality of Glan, Sarangani Province, Mindanao Island) is indicated by a black star. Dashed lines indicate the hypothesized geographic distribution for *B. bicolor*. The uncertain collection site for the single specimen of *B. pathfinderi* reported from ''Tatayan'' (possibly in error), along the southern coast of Mindanao is indicated by a question mark.

Taxonomic History.—Gray's (1845:98) description of *S. bicolor* was based on four specimens (a–d) from Hugh Cuming's Philippine collection in the British Museum, none of which were accompanied by specific locality data. Gray's decision to place the species in a monotypic genus, *Senira*, rather than *Brachymeles* (which Gray discussed on the same page) was hardly surprising because the only species of *Brachymeles* known at that time was the much smaller, morphologically dissimilar species *Brachymeles bonitae* (Duméril and Bibron, 1839). The two species represent opposite ends of the morphological spectrum in the genus, *bicolor* being the largest, with small but well-developed pentadactyl limbs, and *B. bonitae* being one of the smaller species, possessing rudimentary mono- or didactyl limbs. Gray's description was thorough, but his four syntypes are clearly not conspecific, as first recognized by Boettger (1886:103). He transferred *bicolor* to *Brachymeles* and listed ''*Senira bicolor* Gray part'' as synonyms of both *Brachymeles gracilis* and *Brachymeles schadenbergi*, two species described by Fischer (1885). Soon thereafter Boulenger (1887:386–388) further clarified the situation by specifically identifying Gray's specimens ''b & c'' as *B. schadenbergi* and specimen ''d'' as *B. gracilis*, leaving specimen ''a'' as the only true *bicolor* in the BMNH. Boulenger (1887:pl. 31) also provided an exceptionally detailed illustration of the species (specimen ''a''), consisting of line drawings of the dorsal and lateral head scales and other meristic data.

Brown (1956:2), Brown and Rabor (1967:545), and Brown and Alcala (1980:35) incorrectly refer to a BMNH ''holotype'' of *B. bicolor*, but only Brown and Alcala (1980) list the catalog number (1946.8.20.62). Brown and Alcala (1980) also provide some confusion on the identifications and synonymies of the reidentified syntypes. Although Brown (1956) and Brown and Rabor (1967) regarded *Brachymeles boulengeri* as a subspecies of *B. gracilis*, Brown and Alcala (1980:40–49) elevated *boulengeri* to a full species with several subspecies also previously referred to *gracilis*. Clearly the status and synonymy of the paralectotypes of *S. bicolor* need clarification but this does not affect the discussion of *B. bicolor* (sensu stricto).

Brachymeles bicolor continued to be elusive and rarely mentioned in the literature. Günther's (1879:76) record of the species from ''South Negros,'' probably based on the three Everett specimens listed as *B. gracilis* by Boulenger (1887:387), was referred to the synonymy of *B. gracilis* by Boettger (1886:103). The British Museum catalog now lists these specimens (BMNH 77.12.13.17–19) as ''*B. g. taylori* Brown.'' This taxon is currently considered as a valid species, *Brachymeles taylori* (Siler and Brown, 2010), but Günther's reference is incorrectly listed in the synonymy of *B. bicolor* and not *B. taylori* by Brown and Alcala (1980:35, 47).

Fischer (1885) and Elera (1895) merely mention the species in passing and provide no new data. Taylor (1917:272) discovered the second known specimen, an unnumbered adult in the Santo Tomas Museum, Manila, lacking specific locality data. He provided a dorsal view photograph (1917:pl. 1, fig. 3; reprinted in Taylor, 1922b:pl. 22, fig. 3; 1928:pl. 32, fig. 3) and line drawings of the chin shields. Some of the collections of the Museo Santo Tomas are still extant, but herpetological collections could not be located in 2009 (M. Diesmos, pers. comm.), and the status of this specimen is unknown. Brown and Rabor (1967:545) included data on this specimen in their discussion, but it is unclear whether they reexamined it or merely used the information provided by Taylor (1917). Taylor (1922b:251–253) again described the Santo Tomas specimen, reprinted Boulenger's (1887) plate (Taylor, 1922b:pl. 13, fig. 1, also partially copied in Brown and Alcala, 1980:fig. 2c, but attributed to Taylor), and speculated that the species, ''is an inhabitant of northern, central, and eastern Luzon,'' somewhat contradicting his earlier (1917) prediction that ''it is an inhabitant of north-central and western Luzon….''

Brown (1956:9) reported the third known specimen of *B. bicolor* but provided no specimen number for it. He did, however, say that both the ''Holotype and one additional specimen'' were examined for him by J. C. Battersby; thus, the specimen was presumably in the British Museum. The specimen in question probably is BMNH 96.3.25.1, a specimen donated by the Royal College of Surgeons in 1896. It also had no locality data other than ''Philippines.''

When W. Brown and A. Alcala began their extensive field program in the Philippines, *B. bicolor* remained known from these three specimens, only two of which were readily

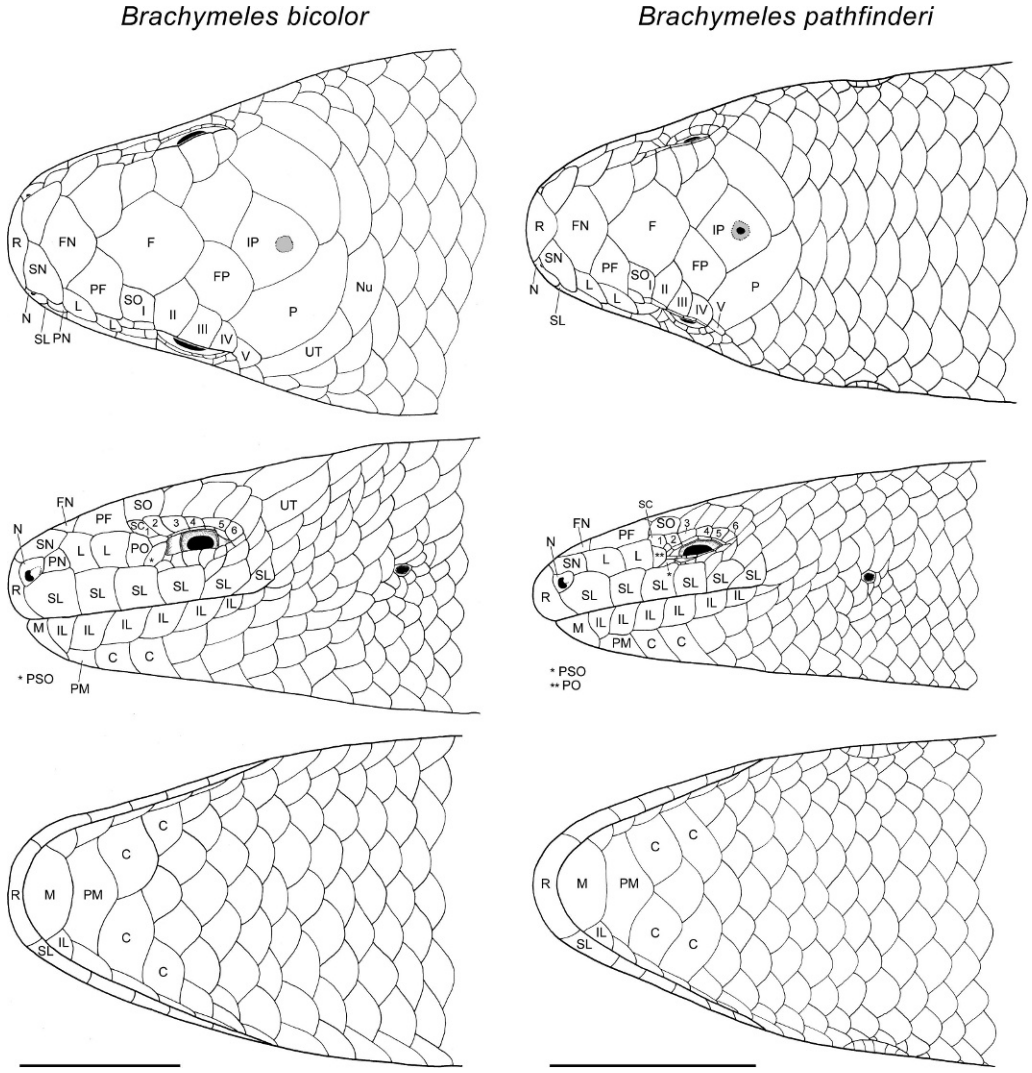

FIG. 2. Illustration of head of an adult female of *Brachymeles bicolor* (KU 323152) and an adult female of *Brachymeles pathfinderi* (KU 324073) in dorsal, lateral, and ventral views. Taxonomically diagnostic head scales are labeled as follows: C, chin shield; F, frontal; FN, frontonasal; FP, frontoparietal; IL, infralabial; IP, interparietal; L, loreal; M, mental; N, nasal; Nu, nuchal; P, parietal; PF, prefrontal; PM, postmental; PN, postnasal; PO, preocular; PSO, presubocular; R, rostral; SC, supraciliary; SL, supralabial; SN, supranasal; SO, supraocular; and UT, upper secondary temporal. Roman numerals indicate scales in the supraocular series, with numbers indicating scales in the supraciliary series. Scale bars = 5 mm. Illustrations by CDS.

available for study (Brown, 1956:9; Brown and Rabor, 1967:545). This situation had not changed by the time of their most recent review (Brown and Alcala, 1980).

Diagnosis.—*Brachymeles bicolor* can be distinguished from congeners by the following combination of characters: (1) body size large; (2) pentadactyl; (3) limbs short; (4) Finger III lamellae four or five; (5) Toe IV lamellae six or seven; (6) midbody scale rows 27–29; (7) axilla–groin scale rows 64–72; (8) paravertebral scale rows 88–92; (9) pineal eye spot present; (10) supranasals in contact; (11) prefrontals not in contact; (12) parietals in contact; (13) postmental wider than mental; (14) first pair of chin shields in contact; (15) third pair of enlarged chin shields absent; (16) nuchal scales differentiated; (17) dorsolateral stripes absent; (18) continuous dorsal longitudinal rows absent; and (19) sharply defined lateral stratification between dorsal and ventral coloration (Tables 1, 2).

Comparisons.—In size and body shape, *B. bicolor* is most similar to *B. schadenbergi*, *Brachymeles talinis*, and *Brachymeles makusog*, *Brachymeles tungaoi*, *Brachymeles kadwa*, and *Brachymeles vindumi*, differing by having a longer body, smaller relative limb lengths, Finger III lamellae five or fewer, Toe IV lamellae seven or fewer, greater axilla–groin scale rows, greater paravertebral scale rows, and differentiated nuchals. These and additional distinguishing characters are summarized in Tables 1 and 2.

From all small to moderate-sized pentadactyl species and subspecies (*Brachymeles boholensis*, *B. boulengeri*, *Brachymeles mindorensis*, *Brachymeles gracilis gracilis*, *Brachymeles gracilis hilong*, and *B. taylori*), adult *B. bicolor* differs by having snout–vent length greater than 120.4 mm (vs. less than 106.8 mm), total length greater than 225.3 mm (vs. less than 206.7 mm), axilla–groin scale rows 64–72 (vs. fewer than 50), paravertebral scale rows 88–92 (vs. fewer than 72), first pair of enlarged chin shields wider than second (vs. narrower), supranasals in contact (vs. separated, except in *B. mindorensis*), and the presence of differentiated nuchals (vs. absence). Additionally, *B. bicolor* differs from all species except *B. g. gracilis* by having Toe IV lamellae six or seven (vs. eight or greater), and from all except *B. taylori* by the absence of dorsolateral stripes (vs. presence).

In addition to digit number (but see Variation for *B. pathfinderi*), adult *B. bicolor* differs from all nonpentadactyl species (*B. apus*, *B. bonitae*, *Brachymeles cebuensis*, *Brachymeles elerae*, *Brachymeles lukbani*, *Brachymeles minimus*, *Brachymeles miriamae*, *Brachymeles muntingkamay*, *B. pathfinderi*, *Brachymeles*

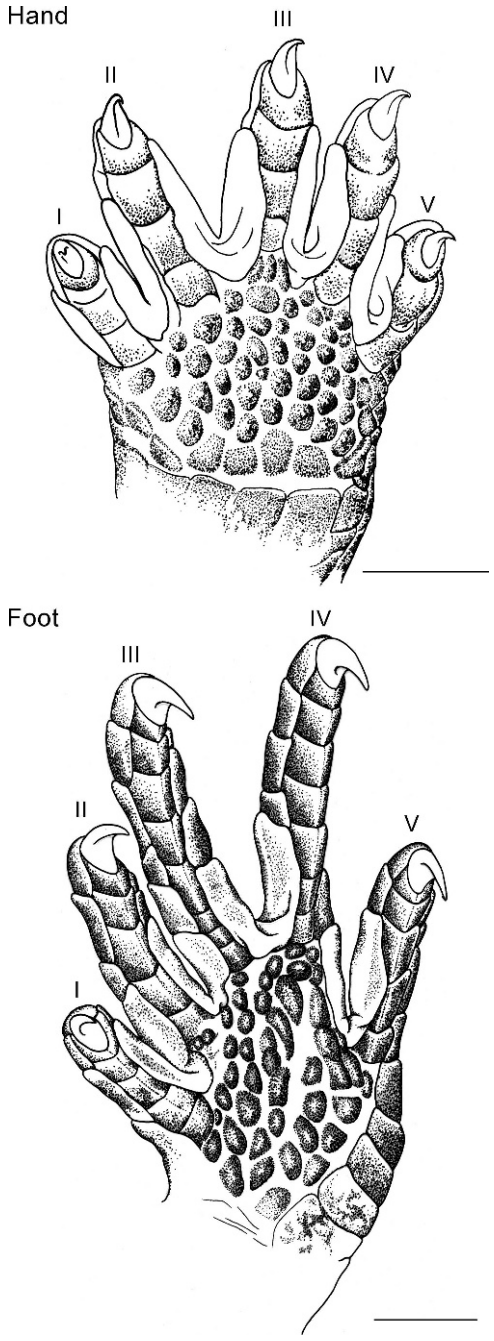

FIG. 3. Illustration of hand and foot of a subadult male of *Brachymeles bicolor* (USNM 498831). Digits labeled with roman numerals. Scale bars = 1 mm. Illustrations by RIC.

samarensis, *Brachymeles tridactylus*, *Brachymeles vermis*, and *Brachymeles wrighti*) by having: sharply defined break between dorsal and ventral color patterns (vs. absence), presence of a postnasal scale (vs. absence), presence of auricular openings (vs. absence, except in *B. pathfinderi* and *B. wrighti*), snout–vent length greater than 120.4 mm (vs. less than 106.2 mm), total length greater than 225.3 mm (vs. less than 175.3 mm), and midbody scale rows 27–29 (vs. fewer than 24). *Brachymeles bicolor* has well-developed limbs, distinguishing it from all nonpentadactyl species, particularly the limbless ones (*B. apus*, *B. minimus*, *B. miriamae*, *B. vermis*, and *B. lukbani*).

Description.—Based on syntype and 28 specimens. Details of the head scalation of an adult male (KU 323152) are shown in Figure 2. Body proportions not summarized in Table 4 are given as a range followed by mean ± standard deviation. Body robust, long; maximum SVL 139.7 mm for males, 143.5 mm for females (Tables 3, 4); head weakly differentiated from neck, nearly as wide as body, HW 7.7–9.5% (8.8 ± 0.6) SVL, 105.5–121.2% (113.1 ± 4.1) HL; HL 30.1–38.5% (34.7 ± 2.1) SnFa; SnFa 20.2–24.2% (22.4 ± 1.1) SVL; snout long, broadly rounded in dorsal and lateral profile, SNL 51.2–59.0% (55.7 ± 2.3) HL; auricular opening present; eyes moderate, ED 1.4–2.2% (1.8 ± 0.2) SVL, 18.9–28.7% (23.1 ± 2.5) HL, 46.0–80.5% (60.4 ± 8.7) END, pupil nearly round; body slightly depressed, MBW 103.5–140.6% (123.6 ± 10.6) MBD; scales smooth, glossy, imbricate; longitudinal scale rows at midbody 27–29; paravertebral scale rows 88–92; axilla–groin scale rows 64–72; limbs well developed, short, pentadactyl; FinIIIlam 4–5; ToeIVlam 6–7; FLL 9.3–12.7% (10.7 ± 1.0) AGD, 6.6–8.8% SVL (7.7 ± 0.7); HLL 15.9–20.6% (18.0 ± 1.7) AGD, 11.3–14.9% SVL (13.0 ± 1.1); order of digits from shortest to longest for hand: I = V < II = IV < III, foot: I < V < II < III < IV; tail long, not as wide as body, moderately tapered towards end, TW 65.7–84.1% (75.2 ± 5.9) MBW, TL 62.0–115.7% SVL (97.4 ± 21.7).

Rostral projecting dorsally to level of anterior edge of nasals, broader than high, separated from frontonasal; frontonasal wider than long; nostril ovoid, in center of single rectangular nasal, longer axis directed anteriorly and posteriorly; supranasals large, broadly in contact; postnasals absent; prefrontals moderately separated; frontal a 7–8 sided polygon, its anterior margin in narrow contact with frontonasal, in contact with first two anterior supraoculars, 4 × wider than anteriormost supraocular; supraoculars five; frontoparietals large, in medial contact, each frontoparietal in contact with supraoculars 2–4; interparietal large, nearly diamond-shaped, wider anteriorly, slightly longer than wide, 1.5 × midline length of frontoparietal; parietal eyespot on posterior third of scale; parietals as long laterally (anterior–posterior) as frontoparietals, slightly narrower and in medial contact behind interparietal; four enlarged, differentiated nuchals; loreals two, anterior narrower than and 1.5 × higher than posterior, in contact with prefrontal, supranasal, postnasal, frontonasal, and second supralabial; single preocular, nearly reaching dorsal edge of second loreal; presubocular single; supraciliaries six, the anteriormost contacting prefrontal and separating posterior loreal from first supraocular; single subocular row complete, in contact with supralabials; lower eyelid with one row of scales; supralabials six, first nearly 2 × size of other supralabials, fifth and sixth beneath center of eye; infralabials six.

Mental wider than long, in contact with first infralabial on both sides; single enlarged postmental, slightly wider than mental, in contact with infralabials I and II; followed by two pairs of enlarged chin shields, scales of first pair in broad contact, scales of second pair slightly wider than first, broadly separated by single row of undifferentiated scales (Fig. 2).

Scales on limbs smaller than body scales; scales on dorsal surfaces of digits large, extending to lateral edges of digits; lamellae undivided to bases of digits; palmar surfaces of hands and plantar surfaces of feet covered by small, irregular scales, each with irregular raised anterior edges (Fig. 3); scales on dorsal surface of hands and feet smaller than limb scales, lacking raised edges.

Coloration in Preservative.—Dorsal and ventral coloration sharply defined along dorsolateral boundaries. Dorsum medium chocolate brown, nearly homogenous, dark pigment spanning 8–10 scale rows, extending from posterior edge of parietals to tail tip (except for regenerated tails). Head scales brown, slightly lighter than body; rostral, nasals, postnasals, supranasals, and first supralabials dark gray, mental and first infralabials light gray, pineal eyespot light cream. Lateral and ventral coloration uniform yellowish-cream. Limbs mottled medium brown dorsally, yellowish-cream ventrally, with

FIG. 4. Photograph in life of *Brachymeles bicolor* (PNM 9575), male, SVL = 139.1 mm. Photograph by ACD. Color reproduction supported by the Thomas Beauvais Fund.

sharp lateral demarcation; dorsal and ventral surfaces of digits dark brown.

Coloration in Life.—Differences from preserved specimens. Dorsum chocolate to rusty-brown; the lateral/ventral surfaces bright, yellow-orange (Fig. 4).

Variation.—Variation in mensural characters measured in the series are presented in Table 3.

Distribution.—*Brachymeles bicolor* is now known from 150–500 m elevation in the Sierra Madre Mountain Range in northeastern Luzon Island (from three sites in Aurora, Cagayan, and Isabela Provinces), and a single specimen has been collected from Balbalasang-Balbalan National Park in the Cordillera Mountain Range (Kalinga Province) in northwestern Luzon Island (Fig. 1).

Etymology.—An appropriate descriptor for the striking difference between the dorsal and lateroventral coloration, well illustrated in Boulenger (1887:pl. 31), even more vivid in life (Fig. 4).

Ecology and Natural History.—*Brachymeles bicolor* occurs in primary- and secondary-growth forest. We have never seen it in heavily disturbed or residential habitats, and it is likely a forest-obligate species. Most of our specimens were found an inch or more below the surface of leaf litter, inside pulpy rotten logs, or in pitfall traps around logs. Only two specimens were seen on the surface, in an area where we were excavating leaf litter plots between the buttresses of a large tree, perhaps disturbed by the activity. When first noticed both were moving slowly with a normal quadrupedal gait but when pursued they adopted a rapid serpentine progression across an open area and under the nearest area of deep litter between the buttresses. Despite removing all the litter in the area, neither was seen again. Individuals exposed inside logs also used this serpentine movement to burrow further through the pulpy wood and nearby forest floor detritus.

Other lizard species recorded from the Sierra Madre and Cordillera Mountain Ranges include (Agamidae) *Bronchocela cristatella*, *Draco spilopterus*, *Gonocephalus sophiae*, *Hydrosaurus pustulatus*; (Gekkonidae) *Cyrtodactylus philippinicus*, *Gehyra mutilata*, *Gekko gecko*, *Gekko mindorensis*, *Hemidactylus frenatus*, *Hemidactylus platyurus*, *Lepidodactylus* sp., *Luperosaurus* sp. (Brown et al., 2011), *Pseudogekko smaragdina*, *Pseudogekko compressicorpus*; (Scincidae) *B. bonitae*, *B. boulengeri*, *B. elerae*, *B. muntingkamay*, *B. kadwa*, *Emoia atrocostata*, *Dasia grisea*, *Eutropis cumingi*, *Eutropis multicarinata borealis*, *Eutropis multifasciata*, *Lamprolepis smaragdina philippinica*, *Lipinia pulchella pulchella*, *Sphenomorphus abdictus aquilonius*, *Sphenomorphus cumingi*, *Sphenomorphus decipiens*, *Sphenomorphus jagori*, *Sphenomorphus leucospilos*, *Sphenomorphus steerei*, *Sphenomorphus tagapayo*, *Tropidophorus grayi*; (Varanidae) *Varanus bitatawa*, *Varanus marmoratus*.

Brachymeles pathfinderi Taylor, 1925

Brachymeles pathfinderi, Taylor, 1925; Brown, 1956; Brown and Rabor, 1967; Brown and Alcala, 1970, 1980.

Holotype.—''No. 750, E. H. Taylor third collection; collected Apr, 1923…Adult female'' (Taylor 1925:104), now MCZ R-26581. Jose Rosado kindly provided information from the MCZ collection and original ledgers and verified that EHT 750 was entered as the field number in the original ledger for this specimen when it was cataloged but that the tag is no longer associated with the specimen. The locality (Glan, Davao Gulf, Mindanao) and date (April 1923) in the ledger generally agree with Taylor's original description and the sex of the specimen is not externally obvious. Following evaluation of the specimen by CDS, we are confident that it is the holotype.

Paratypes.—Taylor (1925: 105) mentioned that ''Several specimens of this species … were collected at the type locality'' but provided no EHT numbers for them, and the description was clearly based on a single specimen with no variation reported for any characters. Whether these specimens should be regarded as paratypes is debatable, but we prefer to maintain them as such (see below). We note that Taylor's early work used the terms ''Type'' and ''Cotype(s)'' fairly consistently. Although his descriptions are based primarily on the single ''Type,'' sometimes variation in the ''Cotype(s)'' is discussed; therefore, his terminology corresponds to the modern holotype and paratype(s) rather than the 19th-century cotypes or syntypes, as he himself later confirmed (Taylor, 1944).

Taylor (1944:143, but without listing the EHT numbers, as he did for the holotype) listed MCZ 26582-83 as paratypes. The data for MCZ R-26582 are identical to that of the holotype, with its field number EHT 445 both in the ledger and on Taylor's tag associated with the specimen. The status of MCZ R-26583 as a paratype is more problematical, because the original ledger entry for the locality is ''Tatayan, Cotobato, Philippine Ids.,'' with no date of collection and field number EHT 1783, none of which associate this specimen with Taylor's type series. Jose

TABLE 1. Summary of meristic and mensural characters in all known pentadactyl species of *Brachymeles*. Sample size, body length, and total length among males and females and general geographical distribution (PAIC = Pleistocene Aggregate Island Complexes, sensu Brown and Diesmos, 2002) are included for reference (SVL, TotL, MBW, FLL, and HLL given as range over mean ± standard deviation; all body proportions given as percentage over mean ± standard deviation; tail lengths measured for complete, original tails only). In cases of scale count variation within species, numbers of individuals showing specific counts are given in parentheses.

	bicolor (7 m, 6 f)	*talinis* (11 m, 10 f)	*makusog* (7 m, 4 f)	*orientalis* (21 m, 19 f)	*schadenbergi* (14 m, 10 f)	*tungaoi* (2 m, 6 f)	*kadwa* (12 m, 15 f)	*vindumi* (1 m, 1 f)	*boholensis* (5 m, 14 f)	*boulengeri* (7 m, 8 f)	*mindorensis* (6 m, 12 f)	*taylori* (8 m, 13 f)	*gracilis gracilis* (7 m, 11 f)	*gracilis hilong* (8 m, 12 f)
Range	Luzon Island	Visayan PAIC	Luzon PAIC	Mindanao PAIC	Mindanao PAIC	Masbate Island	Luzon, Babuyan Claro, Calayan Islands	Jolo Island	Bohol Island	Luzon PAIC	Mindoro Island	Negros & Cebu Islands	Mindanao PAIC	Mindanao PAIC
SVL (f)	125.9–153.3 (139.4 ± 10.1)	103.8–126.7 (116.5 ± 6.8)	98.6–118.0 (108.8 ± 8.0)	97.6–115.2 (104.6 ± 5.9)	93.1–113.5 (104.8 ± 6.7)	78.2–106.2 (95.6 ± 10.7)	90.6–135.7 (109.7 ± 11.7)	104.9	83.8–94.0 (88.4 ± 3.1)	60.5–95.5 (84.0 ± 11.2)	90.0–106.8 (98.8 ± 5.3)	65.8–93.2 (83.9 ± 7.4)	62.8–75.8 (67.6 ± 3.7)	59.9–81.5 (71.8 ± 7.0)
SVL (m)	120.4–140.3 (134.0 ± 7.6)	103.1–123.1 (113.6 ± 7.1)	82.5–123.5 (110.9 ± 13.7)	84.7–112.3 (99.0 ± 8.4)	94.4–115.8 (104.5 ± 6.1)	89.9, 104.8	97.0–128.2 (109.3 ± 9.1)	113.6	84.1–93.6 (89.1 ± 4.1)	72.3–93.1 (82.5 ± 6.7)	93.9–104.2 (100.2 ± 4.1)	83.1–99.2 (87.0 ± 5.2)	60.1–82.3 (67.5 ± 7.6)	61.5–78.5 (70.5 ± 5.1)
TotL (f)	225.3–290.7 (260.7 ± 30.7)	187.5–236.2 (209.4 ± 18.0)	183.8–217.3 (201.5 ± 17.7)	159.7–213.0 (194.3 ± 17.1)	180.8–217.4 (202.4 ± 17.6)	168.9–206.5 (187.2 ± 15.9)	170.4–221.0 (196.3 ± 18.7)	–	129.6–174.8 (154.1 ± 14.7)	129.7–167.4 (159.3 ± 13.1)	162.5–206.7 (180.2 ± 14.2)	130.3–168.5 (149.9 ± 13.0)	116.4–134.4 (126.3 ± 5.5)	94.3–159.2 (126.4 ± 17.1)
TotL (m)	233.4–301.4 (280.1 ± 24.9)	191.7–238.4 (209.0 ± 12.4)	162.3–241.3 (201.5 ± 25.1)	154.6–221.1 (184.8 ± 22.3)	179.2–219.7 (203.0 ± 14.4)	178.3, 203.1	181.9–255.2 (208.3 ± 20.3)	–	154.5–166.2 (160.7 ± 5.9)	124.3–173.1 (151.4 ± 19.4)	165.3–197.0 (184.9 ± 11.5)	149.6–176.7 (164.3 ± 11.3)	113.9–133.7 (123.2 ± 8.8)	116.7–139.4 (127.4 ± 7.8)
MBW	13.6–15.3 (14.4 ± 0.6)	15.9–20.9 (18.5 ± 1.5)	13.0–19.9 (17.5 ± 2.1)	11.0–18.9 (15.1 ± 1.8)	13.5–19.1 (15.2 ± 1.7)	11.9–17.0 (14.4 ± 1.6)	14.3–21.0 (16.9 ± 1.8)	14.2, 14.8	11.9–15.0 (13.4 ± 1.0)	9.9–14.7 (12.4 ± 1.7)	12.8–20.8 (16.0 ± 1.8)	11.0–16.8 (13.8 ± 1.7)	8.1–11.6 (9.5 ± 0.9)	7.9–12.1 (10.1 ± 1.2)
TL/SVL	62–116 (97 ± 22)	61–107 (84 ± 12)	61–117 (84 ± 16)	62–106 (85 ± 12)	65–103 (92 ± 11)	82–116 (97 ± 11)	68–106 (87 ± 12)	–	53–90 (76 ± 13)	67–114 (89 ± 16)	60–99 (85 ± 11)	69–103 (83 ± 10)	69–100 (88 ± 10)	57–98 (78 ± 14)
FLL	9.0–12.0 (10.5 ± 1.1)	11.3–17.7 (14.2 ± 1.4)	12.8–17.0 (14.5 ± 1.1)	10.4–15.6 (13.4 ± 1.5)	11.1–13.5 (12.5 ± 0.8)	11.0–13.8 (12.2 ± 0.9)	10.7–15.0 (13.0 ± 1.2)	13.2, 13.3	9.0–11.2 (10.1 ± 0.7)	8.2–11.7 (10.5 ± 0.8)	10.0–13.0 (11.4 ± 0.8)	9.0–10.4 (9.8 ± 0.4)	5.9–7.9 (6.9 ± 0.6)	7.1–9.3 (8.3 ± 0.6)
FLL/SVL	6.6–8.8 (7.7 ± 0.7)	10–15 (12 ± 1)	12–17 (13 ± 1)	11–15 (13 ± 1)	10–14 (12 ± 1)	11–14 (13 ± 1)	10–16 (12 ± 1)	12, 13	10–13 (11 ± 1)	12–14 (13 ± 1)	10–13 (11 ± 1)	10–14 (12 ± 1)	9–12 (10 ± 1)	10–14 (12 ± 1)
HLL	16.1–20.5 (17.6 ± 1.3)	20.5–27.9 (23.7 ± 2.2)	19.4–25.3 (22.1 ± 1.9)	18.6–25.3 (22.1 ± 2.2)	18.5–21.9 (20.6 ± 1.2)	17.0–22.4 (20.0 ± 1.8)	17.9–24.1 (21.8 ± 1.6)	22.7, 22.7	15.4–18.7 (17.2 ± 1.0)	14.3–18.7 (17.2 ± 1.1)	18.8–23.1 (20.6 ± 1.2)	15.6–18.7 (17.0 ± 1.0)	10.3–13.6 (12.0 ± 0.7)	12.2–16.0 (14.3 ± 1.0)
HLL/SVL	11.3–14.9 (13.0 ± 1.1)	18–25 (21 ± 2)	18–25 (20 ± 2)	18–24 (22 ± 2)	17–22 (20 ± 1)	20–23 (21 ± 1)	17–26 (20 ± 2)	20, 22	18–22 (19 ± 1)	18–24 (21 ± 2)	18–24 (21 ± 2)	18–25 (20 ± 2)	15–20 (18 ± 1)	17–23 (20 ± 1)
FinIIIlam	4 (8)	5 (19)	5 (6)	6 (36)	5 (13)	5 (5)	5 (25)	6 (2)	6 (19)	5 (14)	5 (16)	5 (12)	4 (8)	5 (20)
	5 (5)	6 (2)	6 (5)	7 (4)	6 (11)	6 (3)	6 (2)			6 (1)	6 (2)	6 (9)	5 (10)	
ToeIVlam	6 (2)	8 (2)	9 (6)	8 (4)	8 (14)	9 (5)	7 (1)	9 (1)	9 (7)	9 (13)	8 (14)	9 (10)	7 (4)	8 (13)
	7 (11)	9 (12)	10 (5)	9 (29)	9 (10)	10 (3)	8 (14)	10 (1)	10 (12)	10 (2)	9 (4)	10 (11)	8 (14)	9 (7)
		10 (7)		10 (7)			9 (11)							
							10 (1)							

TABLE 2. Summary of qualitative diagnostic characters (present, absent) in all known pentadactyl species of *Brachymeles*. The pairs of enlarged scales posterior to the postmental scale are abbreviated as chin shield pairs with reference to the 1st, 2nd, and 3rd pairs (when present).

	bicolor (7 m, 6 f)	*talini* (11 m, 10 f)	*makusog* (7 m, 4 f)	*orientalis* (21 m, 19 f)	*schadenbergi* (14 m, 10 f)	*tungaoi* (2 m, 6 f)	*kadwa* (12 m, 15 f)	*vindumi* (1 m, 1 f)	*boholensis* (5 m, 14 f)	*boulengeri* (7 m, 8 f)	*mindorensis* (6 m, 12 f)	*taylori* (8 m, 13 f)	*gracilis gracilis* (7 m, 11 f)	*gracilis hilong* (8 m, 12 f)
MBSR	27–29	26–30	25–28	26–28	26–28	26–28	26–28	30, 31	26–28	26–27	26–28	26–28	24–26	27–30
AGSR	64–72	43–48	42–47	46–49	45–50	46–49	47–49	49, 49	42–46	42–46	42–45	42–47	46–49	44–50
PVSR	88–92	67–72	60–69	69–72	67–72	66–68	68–70	74, 74	63–66	63–66	63–65	62–69	67–70	66–73
SL	6 (13)	7 (20)	6 (7) 7 (4)	6 (31) 7 (9)	6 (2) 7 (22)	7 (4)	7 (27)	7 (2)	7 (19)	6 (12) 7 (3)	7 (18)	6 (21)	6 (18)	6 (20)
IFL	6 (13)	7 (21)	6 (10) 7 (1)	6 (7) 7 (33)	6 (10) 7 (14)	6 (4)	6 (27)	6 (2)	7 (19)	7 (15)	6 (18)	7 (21)	7 (18)	6 (20)
SC	6 (13)	6 (21)	6 (11)	6 (40)	6 (24)	6 (4)	6 (27)	6 (2)	6 (19)	5 (1) 6 (14)	6 (18)	6 (21)	6 (18)	6 (20)
SO	5 (13)	5 (21)	5 (11)	5 (40)	5 (24)	5 (4)	5 (27)	5 (2)	5(19)	5 (15)	5 (18)	5 (21)	5 (18)	5 (20)
Pineal eyespot	+	+	+	+	+	+	+	+	+	+	+	+	−	+
Supranasal contact	+	+	−	−	+	+	+	+	−	−	− or +	−	−	−
Prefrontal contact	−	−	−	−	−	−	−	−	−	−	− or +	−	+	−
Frontoparietal contact	+	+	+	+	+	+	− or +	+	+	+	+	+	+	− or +
Parietals contact	+	− or +	−	− or +	− or +	− or +	− or +	+	− or +	− or +	− or +	− or +	+	+
1st chin shield pair contact	+	− or +	− or +	− or +	− or +	+	− or +	−	− or +	+	+	− or +	−	− or +
Enlarged chin shield pairs	2	2	2	2	2	2	2	2	3	2	2	2	3	3
Chin shield pair size	2 < 1	2 < 1	2 < 1	2 < 1	2 < 1	1 = 2	1 < 2	2 < 1	3 < 1 < 2	1 < 2	1 < 2	1 < 2	3 < 1 < 2	3 < 1 < 2
Chin shield pair separation[a]	1(0); 2(3)	1(0/1); 2(3)	1(1); 2(3)	1(0/1); 2(3)	1(0); 2(3)	1(0); 2(1)	1(0/1); 2(1)	1(1); 2(1)	1(0/1); 2(1); 3(3)	1(0/1); 2(1)	1(0); 2(1)	1(0); 2(1)	1(1); 2(1); 3(3)	1(0/1); 2(1); 3(3/5)
Subocular supralabial	supralabial 4,5	supralabial 5,6	supralabial 4,5 or 5,6	supralabial 4,5	supralabial 5,6	supralabial 5,6	supralabial 5,6	supralabial 5,6	supralabial 5,6	supralabial 4,5	supralabial 5,6	supralabial 4,5	supralabial 4,5	supralabial 4,5
Differentiated nuchals	+	−	−	−	−	−	−	−	−	−	−	−	−	−
Uniform body color	−	−	−	−	−	−	−	−	−	−	−	−	+	+
Continuous, light dorsolateral stripes	−	− or +	−	−	−	+, poorly defined	+, poorly defined	+	+	+	+	−	+	+
Continuous dark middorsal stripes[b]	−	− or +	−	−	− or +	+	+	−	+	−	+	+	+	− or +
Dark lateral stripes[b]	−	+	−	−	− or +	+	+	+	+	+	+	+	+	+
Dark ventral pigmentation	−	−	−	−	−	−	+	+	+	−	−	−	+	+

[a] Parentheses show the number of small ventral scale rows separating each enlarged pair of chin shields.
[b] Character refers to longitudinal rows of dark scale pigmentation, often in the form of spots, aligned into rows.

TABLE 3. Summary of univariate morphological variation among mensural characters in series of *Brachymeles pathfinderi* and *Brachymeles bicolor*.

	pathfinderi		*bicolor*	
	Males, $N = 15$	Females, $N = 25$	Males, $N = 7$	Females, $N = 6$
SVL	54.5–65.1 (59.4 ± 3.8)	55.8–68.3 (62.0 ± 3.4)	120.4–140.3 (134.0 ± 7.6)	125.9–153.3 (139.4 ± 10.1)
AGD	35.9–44.2 (39.3 ± 3.0)	36.4–46.6 (42.2 ± 2.7)	88.9–103.2 (98.0 ± 4.9)	92.1–108.8 (99.0 ± 6.8)
TotL	–	111.1–133.2 (119.7 ± 8.2)	233.4–301.4 (280.1 ± 24.9)	225.3–290.7 (260.7 ± 30.7)
MBW	6.4–8.6 (7.5 ± 0.6)	6.7–9.1 (8.1 ± 0.7)	13.6–15.1 (14.4 ± 0.6)	13.8–15.3 (14.6 ± 0.6)
MBH	4.1–5.7 (4.8 ± 0.5)	4.2–6.9 (5.4 ± 0.8)	11.2–13.6 (12.0 ± 0.9)	10.3–12.5 (11.4 ± 0.9)
TL	–	53.4–64.9 (58.2 ± 4.9)	94.4–161.6 (143.8 ± 24.8)	88.9–153.6 (121.3 ± 29.7)
TW	4.5–5.9 (5.3 ± 0.5)	5.0–6.1 (5.6 ± 0.4)	9.6–11.7 (10.7 ± 0.7)	10.2–12.4 (11.1 ± 0.9)
TH	3.8–5.2 (4.3 ± 0.4)	3.8–5.2 (4.5 ± 0.4)	8.2–11.2 (9.7 ± 0.9)	9.1–11.5 (10.2 ± 0.9)
HL	4.8–6.0 (5.5 ± 0.3)	4.6–6.2 (5.5 ± 0.4)	9.8–11.5 (10.6 ± 0.6)	9.8–11.4 (10.5 ± 0.6)
HW	5.7–6.6 (6.1 ± 0.3)	5.2–6.7 (6.1 ± 0.4)	11.5–12.7 (12.0 ± 0.4)	11.0–12.6 (11.7 ± 0.6)
HH	3.9–7.9 (4.6 ± 1.0)	3.8–5.4 (4.6 ± 0.4)	8.0–10.0 (9.3 ± 0.6)	8.7–10.6 (9.4 ± 0.8)
SnFa	14.6–16.8 (15.8 ± 0.7)	13.8–17.2 (15.7 ± 1.0)	37.5–31.7 (29.8 ± 1.6)	29.1–32.6 (31.4 ± 1.4)
ED	1.0–1.4 (1.2 ± 0.1)	1.0–1.4 (1.2 ± 0.1)	2.2–2.9 (2.5 ± 0.2)	2.0–2.6 (2.3 ± 0.2)
END	2.2–2.6 (2.3 ± 0.1)	2.0–2.8 (2.3 ± 0.2)	3.7–4.4 (4.0 ± 0.3)	3.7–4.4 (4.1 ± 0.3)
SNL	3.1–4.0 (3.3 ± 0.2)	3.0–3.6 (3.3 ± 0.2)	5.4–6.2 (5.9 ± 0.3)	5.5–6.3 (5.9 ± 0.4)
IND	1.8–2.1 (2.0 ± 0.1)	1.7–2.2 (2.0 ± 0.1)	3.2–3.8 (3.5 ± 0.2)	2.9–3.7 (3.4 ± 0.4)
FLL	4.8–6.3 (5.8 ± 0.5)	4.4–6.9 (5.8 ± 0.6)	9.3–12.0 (10.1 ± 0.9)	9.0–11.7 (11.0 ± 1.1)
HLL	8.8–120 (10.9 ± 0.9)	8.4–12.9 (10.7 ± 1.1)	16.2–20.5 (18.3 ± 1.3)	16.1–17.5 (16.8 ± 0.6)

Rosado concurred that it is likely not a paratype and noted that in Loveridge's original ledger entry the ''Paratype'' comment for 26582 is not dittoed, but a slash is drawn below it in the 26583 data, indicating no type status.

Clearly some problems remain with Taylor's original hypodigm, and we suspected other specimens may be undiscovered in collections. This was confirmed by an information request to the BMNH, one of Taylor's exchange partners (Taylor, 1944), and another paratype was discovered, BMNH 1946.8.18.46 (formerly 1932.4.3.1). Colin McCarthy kindly confirmed that the locality data agree with Taylor's description (but no collection date is found in the original ledger), and the field tag (EHT 951) is still attached to the specimen.

Taxonomic History.—The small and highly unique species was described on the basis of a single specimen (MCZ 26581) collected in Cotobato Province, Mindanao Island, Philippines, although Taylor (1925) alluded to a series of specimens that were morphologically similar to the type. Brown's (1956) revision of the genus noted two additional specimens examined (MCZ 26582–83). *Brachymeles pathfinderi* is a small species, with greatly reduced limbs and unequal digit numbers on the fore- and hind limbs (Taylor, 1925). The type specimens possess five small digits on the forelimbs and four small digits on the hind limbs (Taylor, 1925). Since Brown's (1956) description, *B. pathfinderi* has only been known from the brief description of these three specimens and no illustrations or photographs have ever appeared in the literature.

Diagnosis.—*Brachymeles pathfinderi* can be distinguished from congeners by the following combination of characters: (1) body size small; (2) digits on the fore- and hind limbs five and four, respectively; (3) Toe IV lamellae 5–8; (4) relative axilla–groin distance small; (5) limbs slender; (6) midbody scale rows 23–25; (7) axilla–groin scale rows 44–48; (8) paravertebral scale rows 64–67; (9) supralabials six; (10) infralabials six; (11) supraciliaries five or six; (12) supraoculars five; (13) pineal eye spot present; (14) frontoparietal contact present or absent; (15) prefrontal contact present or absent; (16) postmental wider than mental; (17) first pair of chin shields not in contact; (18) third pair of enlarged chin shields absent; (19) nuchal scales undifferentiated; (20) auricular opening present; (21) dorsolateral stripes present; and (22) continuous dorsal longitudinal rows six (Tables 4, 5).

Comparisons.—*Brachymeles pathfinderi* is morphologically most similar to *B. elerae* and *B. wrighti*, the only other species with four digits on the hind limbs (Table 5), differing from both in having five forelimb digits, dorsolateral stripes, six dorsal, longitudinal rows of dark spots, shorter relative axilla–groin distance, longer relative limb lengths, fewer paravertebral scale rows, and presence of an auricular opening (Tables 4, 5). Additionally, *B. pathfinderi* is smaller than *B. wrighti* with fewer midbody scale rows and six infralabials; it has fewer axilla–groin scale rows than *B. elerae*, with five supraoculars, a pineal eyespot, postmental wider than mental scale, and lacks a third pair of enlarged chin shields (Tables 4, 5). Additional characters distinguishing the new species from all nonpentadactyl, limbed species of *Brachymeles* are summarized in Tables 4 and 5.

Brachymeles pathfinderi differs from all limbless species of *Brachymeles* (*B. apus*, *B. lukbani*, *B. minimus*, *B. miriamae*, and *B. vermis*) in having limbs, auricular openings, dorsolateral stripes, and fewer paravertebral scale rows (64–67 vs. greater than 91) and lacking a third pair of enlarged chin shields. The absence of enlarged, differentiated nuchal scales further distinguishes it from *B. minimus*, *B. vermis*, and *B. lukbani*, the greater number of infralabials (6 vs. 5) and supraciliaries (5–6 vs. fewer than 2) from *B. apus* and *B. vermis*, and the lack of mental-first infralabial fusion from *B. apus*.

From all pentadactyl species of *Brachymeles* (*B. bicolor*, *B. boholensis*, *B. boulengeri*, *B. gracilis*, *B. makusog*, *B. mindorensis*, *Brachymeles orientalis*, *B. schadenbergi*, *B. talinis*, *B. taylori*, *B. tungaoi*, *B. kadwa*, and *B. vindumi*), *B. pathfinderi* differs in usually having a reduced number of hind-limb digits (4 vs. 5; Fig. 5, but see Variation); Finger III lamellae three (vs. 4–7); and Toe IV lamellae 5–8 (vs. 7–10; Table 4). *Brachymeles pathfinderi* differs from all species except *B. g. gracilis* by the presence of six continuous, longitudinal rows of dark spots on the dorsum (vs. absence or presence and greater than eight), from *B. g. gracilis* by the presence of a pineal eyespot (vs. absence), from *B. g. gracilis*, *B. gracilis hilong*, and *B. boholensis* by the absence of a third pair of enlarged chin shields (vs. presence), from *B. makusog*, *B. schadenbergi*, *B. orientalis*, *B. bicolor*, and *B. taylori* by the presence of dorsolateral stripes (vs. absence), and from *B. schadenbergi*, *B. talinis*, *B. boholensis*, *B. mindorensis*, *B. tungaoi*, *B. kadwa*, and *B. vindumi* by having the fourth and fifth supralabial beneath the eye (vs. fifth and sixth).

Description.—Based on holotype and 42 specimens. Details of the head scalation of an adult male (KU 324073) are shown in Figure 2. Body proportions not summarized in Table 4 are given as a range followed by mean ± standard deviation. In the following description, we describe the range of variation exhibited in all specimens and provide the data for the holotype (when given by Taylor) in parentheses: body small, slender; maximum SVL 65.1 mm for males, 68.3 mm for

TABLE 4. Summary of meristic and mensural characters in *Brachymeles pathfinderi* and specimens of all other known limbed, nonpentadactyl species of *Brachymeles*. Sample size, body length, and total length among males and females and general geographical distribution (PAIC = Pleistocene Aggregate Island Complexes, sensu Brown and Diesmos, 2002) are included for reference (linear measurements given as range over mean ± standard deviation; ratios given as percentage over mean ± standard deviation; tail lengths measured for complete, original tails only). Dashes denote missing data in cases where specimens were unavailable for examination.

	pathfinderi (15 m, 25 f)	*elerae* (2 m, 1 f)	*wrighti*[a] (1?, 1 f)	*muntingkamay* (12 f)	*tridactylus* (9 m, 11 f)	*cebuensis* (8 f)	*bonitae* (6 m, 7 f)	*samarensis* (5 f)
Range	Mindanao Island	Luzon Island	Luzon Island	Luzon Island	Visayan PAIC	Cebu Island	Mindoro & Luzon PAICs	Samar, Leyte, Bicol
SVL (f)	55.8–68.3 (62.0 ± 3.4)	68.2, 71.9	120.02[b]	61.8–81.3 (73.6 ± 5.9)	45.5–59.1 (52.1 ± 5.0)	51.5–67.9 (61.8 ± 5.3)	49.7–59.8 (56.4 ± 3.9)	62.4–66.1 (63.4 ± 1.5)
SVL (m)	54.5–65.1 (59.4 ± 3.8)	71.5	—	N/A	55.7–78.3 (68.5 ± 7.4)	N/A	65.1–80.0 (73.5 ± 6.4)	N/A
TotL (f)	111.1–133.2 (119.7 ± 8.2)	109.9, 131.9	—	107.4–136.0 (124.0 ± 8.6)	102.6–154.1 (132.6 ± 14.0)	104.3–128.0 (119.0 ± 8.5)	93.4–150.4 (126.7 ± 19.9)	97.7–112.9 (107.3 ± 8.3)
TotL (m)	101.4–107.0 (104.2 ± 4.0)	N/A	—	N/A	105.3–133.67 (115.9 ± 15.4)	N/A	102.6–144.5 (121.3 ± 15.6)	N/A
FLL	4.4–6.9 (5.8 ± 0.5)	3.3–3.5 (3.4 ± 0.1)	4.5	2.4–3.0 (2.7 ± 0.2)	1.5–2.5 (2.0 ± 0.3)	1.1–1.8 (1.5 ± 0.3)	1.0–1.5 (1.3 ± 0.1)	1.1–2.6 (1.7 ± 0.5)
HLL	8.4–12.9 (10.8 ± 1.0)	4.3–5.4 (5.0 ± 0.6)	12.2	5.3–6.0 (5.7 ± 0.2)	2.6–3.6 (3.1 ± 0.3)	2.3–3.0 (2.7 ± 0.3)	1.3–2.0 (1.6 ± 0.2)	2.5–3.1 (2.8 ± 0.2)
TL/SVL	69–95 (84 ± 10)	61–84 (72 ± 16)	—	50–79 (65 ± 10)	69–112 (92 ± 12)	78–115 (92 ± 13)	35–93 (69 ± 18)	57–81 (71 ± 13)
HL/SVL	7–10 (9 ± 1)	7–8 (8 ± 0)	—	8–10 (8 ± 1)	6–9 (8 ± 0)	7–11 (8 ± 2)	6–8 (7 ± 1)	8–9 (8 ± 1)
AGD/SVL	64–71 (67 ± 2)	71–74 (73 ± 2)	78	72–77 (75 ± 2)	72–87 (76 ± 3)	70–78 (75 ± 3)	72–84 (78 ± 4)	70–76 (74 ± 3)
FLL/SVL	8–11 (10 ± 1)	5–5 (5 ± 0)	4	3–4 (4 ± 0)	2–3 (3 ± 0)	2–3 (2 ± 0)	1–2 (2 ± 0)	2–4 (3 ± 1)
HLL/SVL	15–21 (18 ± 1)	6–8 (7 ± 1)	10	7–9 (8 ± 1)	3–6 (5 ± 1)	3–5 (4 ± 0)	2–3 (2 ± 0)	4–5 (5 ± 0)
FLL/AGD	12–17 (14 ± 1)	6–7 (7 ± 0)	—	4–6 (5 ± 1)	2–5 (4 ± 1)	2–4 (3 ± 1)	2–3 (2 ± 0)	2–6 (4 ± 1)
HLL/AGD	21–32 (26 ± 3)	8–11 (10 ± 1)	13	8–11 (10 ± 1)	4–8 (6 ± 1)	5–7 (6 ± 1)	2–4 (3 ± 0)	5–7 (6 ± 1)
ToeIVlam	5–8	3	3–4	0	0	0	0	0
MBSR	23–25	22–24	28	22–24	22–24	22–24	21–23	20
AGSR	44–48	63–67	—	65–70	70–79	65–69	73–90	67–72
PVSR	64–67	84–87	102–108	85–90	88–98	84–88	90–109	86–92
SL	6 (37)	6 (3)	6	6 (12)	6 (12)	6 (8)	6 (12)	6 (5)
					7 (8)		7 (1)	
IFL	6 (37)	6 (3)	5 (1)	6 (12)	6 (12)	6 (5)	5 (1)	7 (5)
			7 (1)		7 (8)	7 (3)	6 (10)	
							7 (2)	
SC	5 (17)	5 (2)	—	6 (10)	5 (20)	6 (8)	5 (12)	6 (5)
	6 (19)	6 (1)		7 (2)			6 (1)	
SO	5 (37)	4 (2)	5	5 (11)	4 (20)	5 (8)	4 (13)	5 (5)
		5 (1)		6 (1)				

[a] Measurements and counts for *Brachymeles wrighti* were taken from Taylor (1925), Brown and Alcala (1980), and measurements of a single juvenile female specimen by RIC.
[b] The sex of the single specimen of *B. wrighti* is not found in the literature; thus, it is unknown whether the SVL shown is that of a male or female.

TABLE 5. Summary of qualitative diagnostic characters (present, absent) in *Brachymeles pathfinderi* and specimens of all other known limbed, nonpentadactyl species of *Brachymeles*. The pairs of enlarged scales posterior to the postmental scale are abbreviated as chin shield pairs with reference to the 1st, 2nd, and 3rd pairs (when present). Dashes denote missing data in cases where specimens were unavailable for examination.

	pathfinderi (15 m, 25 f)	*elerae* (2 m, 1 f)	*wrighti*[a] (1?, 1 f)	*muntingkamay* (12 f)	*tridactylus* (9 m, 11 f)	*cebuensis* (8 f)	*bonitae* (6 m, 7 f)	*samarensis* (5 f)
Number of digits (fore/hind)	5/4	4/4	4/4	3/3	3/3	3/2	0–2 claws/ 0–2 claws	1–3 claws/ 1–3 claws
Pineal eyespot	Present	Absent	—	Absent	Present	Present	Present	Present
Prefrontal contact	Absent	Present	Present	Present	Absent	Present or Absent	Absent	Absent
Frontoparietal contact	Present or Absent	Present	Present	Absent	Absent	Present	Absent	Present
Postmental vs. mental width	PMW > MW	Equal	—	PMW > MW	PMW > MW	Equal	PMW < MW	Equal
1st chin shield pair contact	Absent	Absent	Absent	Absent	Present or Absent	Present	Absent	Present
3rd chin shield pair	Absent	Present	Present	Present	Present	Present	Present	Present
Chin shield pair size	1 < 2	1 < 3 < 2	—	3 < 1 < 2	3 < 1 < 2	1 = 3 < 2	3 < 2 < 1	1 < 3 < 2
Chin shield pair separation[b]	1(1); 2(1)	1(1); 2(1); 3(3)	—	1(1); 2(1); 3(3)	1(0/1); 2(1); 3(3)	1(0); 2(1); 3(3)	1(1); 2(1); 3(3)	1(0); 2(1); 3(3)
Mental/1st IFL fusion	Absent	Absent	—	Absent	Absent	Absent	Present or Absent	Absent
Differentiated nuchals	Absent	Absent	—	Absent	Present	Present	Present	Present
Continuous subocular scale row	Present	Present	—	Absent	Absent	Present	Present	Present
Auricular opening	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Dorsolateral stripes	Present	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Longitudinal rows of dark spots	Present, 6	Present, around body	Absent	Present, around body	Present, vague to indistinct	Absent	Absent	Absent

[a] Character states and presence/absence data for *Brachymeles wrighti* were taken from Taylor (1925), Brown and Alcala (1980) and measurements of a single juvenile female specimen by RIC.
[b] Parentheses show the number of small ventral scale rows separating each enlarged pair of chin shields.

females (59), Tables 3 and 4; head weakly differentiated from neck, nearly as wide as body, HW 8.8–11.0% (10.0 ± 1.0) SVL (11.0), 97.9–135.2% (112.0 ± 8.0) HL; HL 29.7–38.7% (34.8 ± 2.2) SnFa; SnFa 23.9–28.7% (26.0 ± 1.4) SVL; snout moderately long, rounded in dorsal and lateral profile, SNL 50.3–71.8% (60.6 ± 4.7) HL; auricular opening present, minute; eyes moderate, ED 1.5–2.4% (2.0 ± 0.2) SVL, 17.9–26.3% (21.8 ± 2.0) HL, 39.9–64.8% (51.8 ± 5.3) END, pupil nearly round; body slightly depressed, MBW 131.9–187.1% (154.1 ± 13.9) MBD; scales smooth, glossy, imbricate; longitudinal scale rows at midbody 23–25 (24); paravertebral scale rows 64–67; axilla–groin scale rows 44–48; limbs well developed, short, slender, five digits on the forelimbs, four digits on the hind limbs; FinIIIlam 3; ToeIVlam 5–8; FLL 11.5–16.8% AGD (10.5), 8.1–11.1% SVL (6.8); HLL 20.8–32.5% AGD (21.1), 14.6–21.0% SVL (13.6); order of digits from shortest to longest for hand: I = V < II = III = IV, for foot: I < II < III = IV; tail not as wide as body, sharply tapered toward end, TW 57.5–80.5% (69.4 ± 6.2) MBW, TL 68.5–95.1% SVL (101.7).

Rostral projecting onto dorsum to level of center of nasal, broader than high, forming a moderate suture with frontonasal; frontonasal wider than long; nostril ovoid, in center of single quadrilateral nasal, longer axis directed anteriorly and posteriorly; nasals well separated; supranasals large, broadly separated; postnasals absent; prefrontals moderately separated; frontal nearly diamond-shaped, its anterior margin in moderate contact with frontonasal and first two anterior supraoculars, 2.5 × wider than anteriormost supraocular; supraoculars five; frontoparietals moderate, slightly separated or in slight contact mesially, each in contact with supraoculars 2–4; interparietal large, slightly longer than frontoparietal, square shaped, equally wide and long, its length nearly equal to two-thirds of frontal length; parietal eyespot present in posterior half of scale; parietals as long laterally (anterior–posterior) as frontoparietals, narrower mesially, moderately in contact behind interparietal; enlarged, differentiated nuchals absent; loreals two, anterior about as long as and 1.2 × higher than posterior, in contact with prefrontal, supranasal, first and second supralabials, and second loreal; preoculars two, ventral nearly equal in size to dorsal, nearly half as high as second loreal; supraciliaries five or six, the anteriormost contacting prefrontal and separating posterior loreal from first supraocular; single subocular row complete, in contact with supralabials; lower eyelid with one row of scales; supralabials six, first 1.7 × size of others, fourth and fifth beneath center of eye; infralabials six.

Mental wider than long, in contact with first infralabial on both sides; single enlarged postmental, slightly wider than mental; followed by two pairs of enlarged chin shields, scales of first pair moderately separated, scales of second pair slightly wider than first, broadly separated; both pairs separated by single row of undifferentiated scales (Fig. 2).

Scales on limbs smaller than body scales; scales on dorsal surfaces of digits large, extending to lateral edges of digits; lamellae undivided to bases of digits; palmar surfaces of hands and plantar surfaces of feet covered by small, irregular scales, each with irregular raised anterior edges (Fig. 5); scales on dorsal surface of hands and feet smaller than limb scales, lacking raised edges.

Coloration in Preservative.—Dorsal ground color dark brown; lateral body with dark scale spots, reduced in size ventrally, pigmentation covering three-fourths or more of dorsal scales; entire dorsal surface with six continuous dark stripes, extending from posterior edge of parietals to tail tip; on each side, light tan to cream dorsolateral stripe, two half-rows of scales wide, bordered below by dark lateral stripe two scale rows wide. Limbs mottled medium and dark brown dorsally, lighter brown ventrally; dorsal and ventral surface of digits

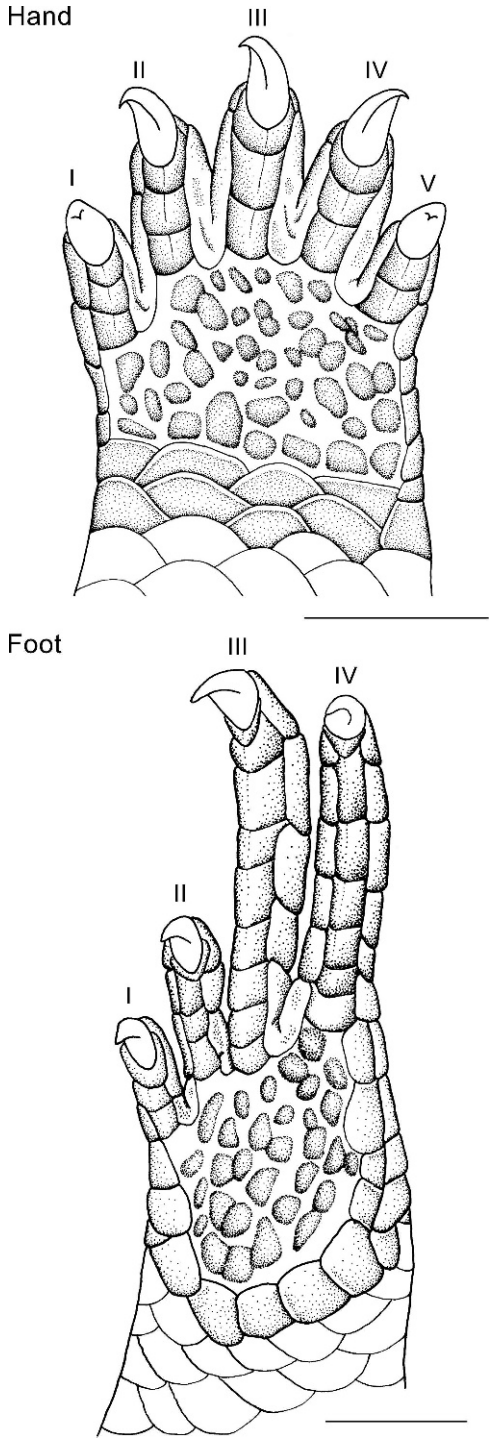

FIG. 5. Illustration of hand and foot of an adult male of *Brachymeles pathfinderi* (KU 324083). Digits labeled with roman numerals. Scale bars = 1 mm. Illustrations by CDS.

medium brown. Head brown, darker brown to black on some scale edges; pineal eyespot light cream.

Coloration in Life.—Differences from preserved specimens, based on Taylor (1925). Dorsal coloration light gray to brown, scales with dark brown spots. Lateral and ventral surfaces tan to white with light brown scale spots.

Variation.—Variation in mensural characters is presented in Table 3. In the recently collected sample of 40 specimens, three individuals deviated from the normal four-toed condition: KU 324071 had five digits on the left foot, and a malformed formed digit on the right foot; KU 324060 had five digits on the right foot; and KU 324076 had a malformed fifth digit on the left foot. All extra digits were on the lateral side of the foot.

Distribution.—''Glan, Cotabato Province, Mindanao'' (Taylor 1925:104), slightly modified to, ''a headland near Glan, Cotabato Province'' on page 105. See also comments for Paratypes above. Since the description, Cotabato Province has been divided, with the Municipality of Glan now residing in Sarangani Province. Additionally, a single specimen (MCZ R-26583) is reported from ''Tatayan, Cotobato, Philippine Ids.'' (Taylor, 1944); however, this locality is possibly in error. See also comments for Paratypes above.

Etymology.—Named in honor of the United States Coast and Geodetic Survey steamship *Pathfinder.* Director of the Coast and Geodetic Suveys in the Philippines, E. H. Pagenhart, invited Taylor to join surveys of a large portion of the southern Mindanao coast. It was during these surveys that the type series was collected.

Ecology and Natural History.—Recent collections are from second-growth and agricultural areas, especially in coconut groves with mature coconut trees. Individuals were found inside rotting logs, beneath piles of rotting coconut husks, and in loose soil and leaf litter surrounding the root networks of trees. This species is quite common at the presumed type locality (Municipality of Glan). In a single pile of rotting coconut husks, 4–7 individuals regularly were observed (J. Fernandez, pers. obs.). When disturbed, individuals immediately moved in a rapid serpentine manner and attempted to burrow back into loose soil or humus. Sympatric lizard species observed in the type locality include *H. frenatus*, *H. platyurus*, *L. smaragdina*, and *Sphenomorphus fasciatus*.

DISCUSSION

Comments on the Taylor Philippine Collections.—As the first significant collection from the area with specific locality and habitat data, Edward H. Taylor's specimens are unquestionably one of the most important historical resources for modern biodiversity studies. Taylor personally described more than 125 new species and subspecies and three new genera of amphibians and reptiles, plus 21 species/subspecies and two new genera of mammals (Taylor, 1944); other authors have described additional new taxa based, entirely or in part, on Taylor material. As recent faunal surveys discover more new species and molecular data help clarify taxonomic status and relationships, Taylor's pioneering efforts become even more important for establishing a credible Philippine biotic inventory of the country's vertebrates. Taylor's specimens and data are fundamental for studies on distribution and zoogeography (Brown and Alcala, 1970), temporal changes in the fauna, the effects of alien species or habitat loss (Diesmos et al., 2006), and establishing conservation priorities (Diesmos et al., 2004).

Unfortunately, significant inconsistencies, contradictions, and other problems hamper the use and proper interpretation of the EHT (later EHT-HMS collection, with the incorporation of the Hobart M. Smith Mexican collections) material and associated data. Taylor (1944) provided a useful (if flawed) list of the institutional deposition sites for his type material, including both EHT original and corresponding institutional numbers for holotypes. At the time Taylor wrote his paper, it was not yet clear whether type material deposited in the Bureau of Sciences and Museo Santo Tomas collections had survived the bombing of Manila during World War II. The Bureau of Science was completely destroyed and the types therein lost, but at least some of the University of Santo Tomas collections survived. These have not yet been inventoried; thus, the status of types there remains unknown. Although Taylor's information on holotypes is generally accurate, his records on the whereabouts of paratypes are sparse and inconsistent. We have discovered several errors and contradictions when

comparing the paratype information in Taylor (1944) with the associated data in the institution where they were deposited; the paratypes of many species are not mentioned at all. This is an important issue, not only for species with lost or destroyed holotypes, but also for taxa known only from Taylor's original series (e.g., some *Brachymeles*). For the past two decades, we have accumulated and verified data on Taylor types in many museums, where the lack of resources to resolve problems with Taylor specimens is a common complaint. We provide a brief summary of the problems we have encountered for the benefit of curatorial staff in collections housing Taylor material and as a guide for the research community (Appendix 2).

Comments on the Rediscovery of Brachymeles Species.—Data on the systematics and distribution of *Brachymeles* are considerably improved since Brown and Alcala's (1980) review of the genus (Siler and Brown, 2010, 2011; Siler et al., 2011). Although a definitive zoogeographic discussion is still premature, the new information on *B. bicolor* and *B. pathfinderi* presented here is adequate to place them in the context of distributional patterns developed from the better known species. Ten species of *Brachymeles* are known from Luzon Island and 11 from the Luzon PAIC (Siler and Brown, 2010). As such, the Luzon PAIC represents the greatest diversity of species and body form of any faunal region within the archipelago. Five large, pentadactyl species occur in the Luzon PAIC (*B. bicolor*, *B. boulengeri*, *B. makusog*, *B. tungaoi*, and *B. kadwa*), but only *B. bicolor* and *B. kadwa* occur in the Sierra Madre Mountain Range. However, in areas of sympatry, *B. bicolor* was observed only in primary- to secondary-growth forest. In contrast, *B. kadwa* (Siler and Brown, 2010) were common in disturbed and agricultural habitat, often found under piles of rotting coconut husks (Siler and Brown, 2010). In addition, two limbless species (*B. lukbani*, *B. minimus*), two species with 0–3 claws on each limb (*B. bonitae*, *B. samarensis*), one tridactyl species (*B. muntingkamay*), and two tetradactyl species (*B. elerae*, *B. wrighti*) occur in the Luzon PAIC. Luzon is a complex island comprised of several paleoislands (Dickerson, 1928; Auffenberg, 1988; Defant et al., 1989), and large areas of it remain inadequately surveyed (Brown et al., 2000, 2007; Welton et al., 2010). However, we have made at least preliminary collections in most of these subregions, and *B. bicolor* was found only in the Sierra Madre Mountain Range and the northern tip of the Cordillera Mountain Range (Fig. 1).

Like Luzon, Mindanao is a large composite island, recognized at the time by Taylor (1925:105–106), who stated, ''The distribution of recent coral reefs on the present land body of Mindanao gives conclusive proof of the union of several islands to form Mindanao, as it exists today.'' Both species- and body form-diversity are low in the area. Four species are recorded from the Mindanao Faunal Region, three of which occur on Mindanao proper (*B. gracilis*, *B. pathfinderi*, and *B. schadenbergi*), and one is known from Samar, Leyte, and the Lapinig Group Islands off the coast of Bohol (*B. samarensis*). *Brachymeles* cf. *samarensis* also occurs on Catanduanes Island and the Bicol Peninsula of Luzon Island, both part of the Luzon Faunal Region. Two of these species (*B. gracilis*, *B. schadenbergi*) are pentadactyl and two nonpentadactyl (*B. pathfinderi*, *B. samarensis*). The lower diversity for this geographically diverse region could represent a more recent dispersal of *Brachymeles* into the Mindanao Faunal Region, but is more likely the result of a near absence of recent collections from much of the region. Most surveys on Mindanao have concentrated on the isolated montane areas (Fig. 1), with Taylor's surveys of the south coast of the island and our recent expeditions being the only significant collections from these areas. Much of the remaining coast and offshore islands remain unsampled. Given the amount of time Taylor spent and the number of localities he sampled along the southern Mindanao coast (see Paratypes above) and finding *B. pathfinderi* only at Glan (with the exception of a single specimen recorded from Tatayan, possibly in error), his suggestions on the insular nature of the area are plausible. As originally noted by Taylor (1925:105) and confirmed by our data, *B. pathfinderi* is morphologically most similar to *B. gracilis* and appears to replace this species at the type locality.

The rediscovery of these two rare and elusive species further emphasizes the need for the continuing focused survey efforts recommended by Brown and Diesmos (2002). The cryptic nature and fossorial habits of *Brachymeles* render them less likely to be recorded by casual inventories, and larger, well-documented samples are required to resolve taxonomic and distribution issues in several species. Although ''rarity'' and restricted distribution are criteria for conservation concerns, both *B. bicolor* and *B. pathfinderi* are common at the localities where we sampled, and their restricted or widely disjunct distributions are likely artifacts of inadequate surveys. Therefore, according to the IUCN categories and classification structure, we consider the conservation status of these species as ''Least Concern (LC),'' pending the collection of additional information suggesting otherwise.

Acknowledgments.—We thank the Protected Areas and Wildlife Bureau (PAWB) of the Philippine Department of Environment and Natural Resources (DENR) for facilitating collecting and export permits necessary for this and related studies, wherein we are particularly grateful to M. Lim, C. Custodio, J. L. De Leon, and A. Tagtag. Financial support for fieldwork for CDS was provided by a Panorama Fund grant from the University of Kansas Biodiversity Institute, a Madison and Lila Self Fellowship from the University of Kansas, a Fulbright-Hayes Fellowship, and NSF DEB 0804115. Financial support for RMB and ACD provided by NSF EF-0334952 and DEB 0743491 funds to RMB. For the loans of specimens, we thank J. Vindum, R. Drewes, and A. Leviton (CAS); V. Papallatoc and C. Alvina (PNM); J. Ferner (CMNH); A. Resetar and H. Voris (FMNH); K. de Queiroz (USNM); and T. LaDuc (TNHC). Critical reviews of the manuscript were provided by J. Esselstyn and two anonymous reviewers. CDS gratefully acknowledges CAS's Stearns Fellowship and the MCZ Ernst Mayr's Fellowship for funding recent visits to examine comparative material.

Literature Cited

Auffenberg, W. 1988. Gray's Monitor Lizard. University of Florida Press, Gainesville.

Boettger, O. 1986. Aufzahlung der von Philippinen bekannten Reptilien und Batrachier. Bericht der Senckenbergischen Naturforschenden Gesellschaft 1886:91–134.

Boulenger, G. A. 1887. Catalogue of the lizards in the British Museum (Natural History. Vol. III. Lacertidae, Gerrhosauridae, Scincidae, Anelytropidae, Dibamidae, Chamaeleontidae). Taylor and Francis, London.

Brandley, M. C., J. P. Huelsenbeck, and J. J. Wiens. 2008. Rates and patterns in the evolution of snake-like body form in squamate reptiles: evidence for repeated re-evolution of lost digits and long-term persistence of intermediate body forms. Evolution 62:2042–2064.

Brown, R. M., and A. C. Diesmos. 2002. Application of lineage-based species concepts to oceanic island frog populations: the effects of differing taxonomic philosophies on the estimation of Philippine biodiversity. Silliman Journal 42:133–162.

Brown, R. M., J. A. McGuire, J. W. Ferner, N. Icarangal Jr., and R. S. Kennedy. 2000. Amphibians and reptiles of Luzon Island, II: preliminary report on the herpetofauna of Aurora Memorial National Park, Philippines. Hamadryad 25:175–195.

Brown, R. M., A. C. Diesmos, and M. V. Duya. 2007. A new species of *Luperosaurus* (Squamata: Gekkonidae) from the Sierra Madre of Luzon Island, Philippines. Raffles Bulletin of Zoology 55:167–174.

Brown, R. M., A. C. Diesmos, and C. Oliveros. 2011. New flap-legged forest gecko (Genus *Luperosaurus*) from the northern Philippines. Journal of Herpetology 45:202–210.

BROWN, W. C. 1956. A revision of the genus *Brachymeles* (Scincidae), with descriptions of new species and subspecies. Breviora 54: 1–19.

BROWN, W. C., AND A. C. ALCALA. 1970. The zoogeography of the herpetofauna of the Philippine Islands, a fringing archipelago. Proceeding of the California Academy of Sciences 38:105–130.

———. 1978. Philippine Lizards of the Family Gekkonidae. Silliman University Press, Dumaguete City, Philippines.

———. 1980. Philippine Lizards of the Family Scincidae. Silliman University Press, Dumaguete City, Philippines.

———. 1995. A new species of *Brachymeles* (Reptilia: Scincidae) from Catanduanes Island, Philippines. Proceedings of the Biological Society of Washington 108:392–394.

BROWN, W. C., AND D. S. RABOR. 1967. Review of the genus *Brachymeles* (Scincidae), with descriptions of new species and subspecies. Proceedings of the California Academy of Sciences 15:525–548.

DEFANT, M. J., D. JACQUES, R. C. MAURY, J. DE BOER, AND J.-L. JORON. 1989. Geochemistry and tectonic setting of the Luzon arc, Philippines. Geological Society of America Bulletin 101:663–672.

DICKERSON, R. E. 1928. Distribution of Life in the Philippines. Philippine Bureau of Science, Manila.

DIESMOS, A. C., G. V. A. GEE, R. M. BROWN, P. J. WIDMANN, AND J. C. DIMALIBOT. 2004. Rediscovery of the Philippine forest turtle, *Heosemys leytensis* (Cheldonia; Bataguridae), from Palawan Island, Philippines. Asiatic Herpetological Research 10: 22–27.

DIESMOS, A. C., M. L. DIESMOS, AND R. M. BROWN. 2006. Status and distribution of alien invasive frogs in the Philippines. Journal of Environmental Science and Management, Philippines 9: 41–53.

DUMERIL, A. M. C., AND G. BIBRON. 1839. Erpetologie generale our Histoire Naturelle complete des reptiles. Tome Cinqieme. Librairie Encyclopédique de Roret, Paris.

ELERA, C. DE. 1895. Catalogo sistematico de toda la fauna de Filipinas conocida hasta el presente a la vez el de la collecion zoological del Museo de P.P. Dominicos del Colegio-Universidad de Sto. Tomas de Manila. Vol. 1. Vertebrados. Imprenta Colegio Santo Tomas, Manila, Philippines.

FISCHER, J. G. 1885. Ichthyologische und herpetologische Bemerkungen. V. Herpetologische Bemerkungen. Jahrbuch der Hamburgischen Wissenschaftlichen Anstalten, Hamburg 2:82–121.

GRAY, J. E. 1845. Catalogue of the Specimens of Lizards in the Collection of the British Museum. Edward Newman, London.

GÜNTHER, A. 1879. List of the mammals, reptiles, and batrachians sent by Mr. Everett from the Philippine Islands. Proceedings of the Zoological Society of London 1879:74–79.

HIKIDA, T. 1982. A new limbless *Brachymeles* (Sauria: Scincidae) from Mt. Kinabalu, North Borneo. Copeia 4:840–844.

LANDE, R. 1978. Evolutionary mechanisms of limb loss in tetrapods. Evolution 32:73–92.

LEE, J. C. 1990. Sources of extraneous variation in the study of meristic characters: the effect of size and of inter-observer variability. Systematic Zoology 39:31–39.

LEVITON, A. E., R. H. GIBBS JR., E. HEAL, AND C. E. DAWSON. 1985. Standards in herpetology and ichthyology. Part I. Standard symbolic codes for institutional resource collections in herpetology and ichthyology. Copeia 1985:802–821.

OTA, H., K.-Y. LUE, S.-H. CHEN, AND W. C. BROWN. 1989. Taxonomic status of the Taiwanese *Gekko*, with comments on the synonymy of *Luperosaurus amissus* Taylor. Journal of Herpetology 23:76–78.

SILER, C. D., AND R. M. BROWN. 2010. Phylogeny-based species delimitation in Philippines slender skinks (Reptilia: Squamata: Scincidae: *Brachymeles*): taxonomic revision of the large-bodied, pentadactyl species groups and description of three new species. Herpetological Monographs 24:1–24.

———. 2011. Evidence for repeated acquisition and loss of complex body form characters in an insular clade of southeast Asian semi-fossorial skinks. Evolution. doi:10.1111/j.1558-5646/2011.01315.x.

SILER, C. D., E. L. RICO, M. R. DUYA, AND R. M. BROWN. 2009. A new limb-reduced, loam-swimming skink (Reptilia: Squamata: Scincidae: genus *Brachymeles*) from central Luzon Island, Philippines. Herpetologica 65:449–459.

SILER, C. D., A. C. DIESMOS, AND R. M. BROWN. 2010a. A new loam-swimming skink, genus *Brachymeles* (Reptilia: Squamata: Scincidae) from Luzon and Catanduanes Islands, Philippines. Journal of Herpetology 44:49–60.

SILER, C. D., D. S. BALETE, A. C. DIESMOS, AND R. M. BROWN. 2010b. A new legless loam-swimming lizard (Reptilia: Squamata: Scincidae: genus *Brachymeles*) from the Bicol Peninsula, Luzon Island, Philippines. Copeia 2010:114–122.

SILER, C. D., A. C. DIESMOS, A. C. ALCALA, AND R. M. BROWN. 2011. Phylogeny of Philippine slender skinks (Scincidae: *Brachymeles*) reveals underestimated species diversity, complex biogeographical relationships, and cryptic patterns of lineage diversification. Molecular Phylogenetics and Evolution 59:53–65.

TAYLOR, E. H. 1917. *Brachymeles*, a genus of Philippine lizards. Philippine Journal of Science 12:267–279.

———. 1922a. Additions to the herpetological fauna of the Philippine Islands, I. Philippine Journal of Science 21:161–206.

———. 1922b. The lizards of the Philippine Islands. Department of Agriculture and Natural Resources, Bureau of Science, Manila, Publication 17:1–269.

———. 1925. Additions to the herpetological fauna of the Philippine Islands, IV. Philippine Journal of Science 26:97–111.

———. 1928. Amphibians, lizards and snakes of the Philippines. *In* R. Dickerson (ed.), Distribution of Life in the Philippines, pp. 214–242. Monograph, Bureau of Science, Manila, Philippines.

———. 1944. Present location of certain herpetological and other type specimens. University of Kansas Science Bulletin 30:117–187.

———. 1962. New oriental reptiles. University of Kansas Science Bulletin 43:209–263.

WELTON, L. J., C. D. SILER, D. BENNETT, A. DIESMOS, M. R. DUYA, R. DUGAY, E. L. RICO, M. V. WEERD, AND R. M. BROWN. 2010. A spectacular new Philippine monitor lizard reveals a hidden biogeographic boundary and a novel flagship species for conservation. Biology Letters. 2010:doi:10.1098/rsbl/2010.0119.

WIENS, J. J., AND J. L. SLINGLUFF. 2001. How lizards turn into snakes: a phylogenetic analysis of body-form evolution in anguid lizards. Evolution 55:2303–2318.

Accepted: 30 November 2010.

APPENDIX 1

Specimens Examined

With the exception of *Brachymeles apus*, all specimens examined are from the Philippines. Numbers in parentheses indicate the number of specimens examined for each species. Several sample sizes are greater than those observed in the description as a result of the examination of subadult specimens which were excluded from summary statistics.

Brachymeles apus.—(1 specimen) BORNEO: MALAYSIA: *Sabah*: Mt. Kinabalu National Park, Sayap Sub-Station: SP 06915.

Brachymeles bicolor.—(29 specimens) LUZON ISLAND: Aurora Province: *Municipality of Maria Aurora*: Barangay Villa Aurora, Sitio Dimani, Aurora Memorial National Park: KU 323149–52; CAGAYAN PROVINCE: *Municipality of Baggao*: Sitio Hot Springs: CAS 186111, USNM 140847, 498717, 498830–33; ISABELA PROVINCE, Sierra Madres Mountain Range: KU 324097–99, PNM 5785, 9568–77, ACD 1897 (deposited at PNM), ACD 1961 (deposited at PNM); KALINGA PROVINCE: Balbalasang-Balbalan National Park: FMNH 259438; ''Philippines'': BMNH (Syntype) 1946.8.20.62.

Brachymeles bonitae.—(13 specimens) MASBATE ISLAND: MASBATE PROVINCE: *Municipality of Mobo*: Tugbo Barrio: CAS 144223; Mapuyo Barrio: Palangkahoy: CAS 144270; MINDORO ISLAND: MINDORO ORIENTAL PROVINCE: Mt. Halcon: southeastern slope of Barawanan Peak: CAS-SU 25713, 25793, 25886–88, 25904; Sumagui: CAS 62064 (Paratype); POLILLO ISLAND: QUEZON PROVINCE: *Municipality of Polillo*: Barangay Pinaglubayan: KU 307747–49, 307755.

Brachymeles boholensis.—(19 specimens) BOHOL ISLAND: BOHOL PROVINCE: *6 km south of Municipality of Sierra Bullones*: Teachers Park: CAS-SU (Holotype) 24528; *13 km southeast of Municipality of Sierra Bullones*: Dusita Barrio: CAS-SU (Paratypes) 24502–04, 24518, 24520–25, 24541, 24543, CAS-SU 25443–44, 25447; 1 km east of Dusita Barrio: Abacjanan: CAS-SU 24867; *Municipality of Sierra Bullones*: Sandayong: CAS-SU 18709, 18717.

Brachymeles boulengeri.—(26 specimens) LUZON ISLAND: AURORA PROVINCE: *Municipality of Baler*: KU 322314–20; LUZON ISLAND: LAGUNA PROVINCE: *Municipality of Los Banos*, Barangay Batong Malake: KU 32058–60; *Municipality of Los Banos*: CAS 61096; Mt. Maquiling: CAS 61297; POLILLO ISLAND: QUEZON PROVINCE: *Municipality of Polillo*: CAS

(Paratypes) 62272–73, 62276–77; Barangay Pinaglubayan: KU 307438–9, 307750–54, 307756 (Neotype), 307757–58.

Brachymeles cebuensis.—(8 specimens) CEBU ISLAND: *40 km southwest of Cebu City*: Tapal Barrio, Sitio Mantalungon: CAS-SU (Holotype) 24400, (Paratypes) 24396–97, 24399, 24401, 24403; *10 km from Municipality of Carcar*: Tapal Barrio: CAS 102405 (Paratype); *3 km northwest of Cebu City*, Buhisan Barrio, Buhisan Reforestation Project: CAS-SU 27537.

Brachymeles elerae.—(5 specimens) LUZON ISLAND: Kalinga Province: *Municipality of Balbalan*: CAS 61499–500, CM (Paratype) 1717, PNM 9563–4.

Brachymeles gracilis gracilis.—(18 specimens) MINDANAO ISLAND: Davao del Sur Province: *Municipality of Malalag*: Sitio Kibawalan: CAS-SU 24163, 24165, CAS 124811, 139307–09; *Davao City*: Buhangin, Kabanti-an: CAS 124803–04, 139293–95, 139303–05; *Digos City*: Tres de Mayo Barrio: CAS 124806–08, 139300.

Brachymeles gracilis hilong.—(20 specimens) MINDANAO ISLAND: Agusan del Norte Province: *Municipality of Cabadbaran*: Diuata Mountain Range: Mt. Hilonghilong: Balangbalang: CAS-SU (Holotype) 24407, (Paratype) 102406, 133578, CAS-SU 24411, 133577, 133581–82, 133609, 133612, 133692–93, 133703–06, 133743, 133745–47; Surigao del Sur Province: *Municipality of Lanuza*: Diuata Mountain Range: Sibuhay Barrio: CAS-SU (Paratype) 24315.

Brachymeles kadwa.—(101 specimens) LUZON ISLAND: Aurora Province: *Municipality of Baler*: Barangay Zabali, Aurora State College of Technology campus: PNM (Holotype) 9721, KU (Paratopotypes) 232092, 323094–96, 323100, 323104, 323106, KU 323090–91, 323093, 323097–99, 323101–03, 323105, 323107; *Municipality of Casiguran*, IDC property: KU 323108–48; *Municipality of San Luis*, Barangay Real, Sitio Minoli: KU 322320; CALAYAN ISLAND: Cagayan Province: *Municipality of Calayan*: Barangay Magsidel: KU (Paratypes) 304875, 304897, 304900, 304902–3, 304905–6, 304915, 304929, 304941, KU 304908, 304899, 304907, 304909, 304921, 304941; CAMIGUIN NORTE ISLAND: Cagayan Province: *Municipality of Calayan*: Barangay Balatubat: KU (Paratypes) 304559, 304575, 304593, 304708, 304754, 307984, 307996, 307998, 308011, KU 304558, 304562–65, 304569, 304571–74, 304627–30, 304643, 304647, 304696–99, 304704–07, 304709–12, 304714, 304753, 304755–59, 307965–66, 307985–86, 307997, 307999–8003, 308006–10, 308012–15, 308017–18.

Brachymeles lukbani.—(14 specimens) LUZON ISLAND: Camarines Norte Province: *Municipality of Labo*: Barangay Tulay Na Lupa, Mt. Labo: PNM (Holotype) 9567, (Paratopotypes) 9589–92, KU (Paratopotypes) 313597–99, 313601, 313603–04, 313606, 313608, FMNH (Paratopotype) 270191.

Brachymeles makusog.—(17 specimens) CATANDUANES ISLAND: Catanduanes Province: *Municipality of Gigmoto*: Barangay San Pedro, Sitio Tungaw: PNM (Holotype) 9565, (Paratopotypes) 9583–9584, KU (Paratopotypes) 308126, 308128, 308136, 308208; LUZON ISLAND: Camarines Norte Province: *Municipality of Labo*, Barangay Tulay Na Lupa, Mt. Labo: KU (Paratypes) 313612–313614, 313616, 313617, PNM (Paratypes) 9585–9588, FMNH (Paratype) 270200.

Brachymeles mindorensis.—(34 specimens) MINDORO ISLAND: Mindoro Occidental Province: KU 304351–5, 304412–3, 304488, 307739–42, 308404, 308447–8, 308534; MINDORO ISLAND: Mindoro Oriental Province: *30 km southeast of Municipality of Calapan*: Bank of Tarogin River: CAS-SU (Holotype) 24487; southeastern slope Mt. Halcon, Tarogin Barrio: CAS-SU (Paratypes) 24549–54, 24561–62, 24564; 24566, 24568, 24573–74, 24577–79; Mt. Halcon, southeastern slope Barawanan Peak: CAS-SU (Paratype) 24570.

Brachymeles minimus.—(6 specimens) CATANDUANES ISLAND: Catanduanes Province: *Municipality of Gigmoto*: Barangay San Pedro: KU 308129–31, 308210–12.

Brachymeles miriamae.—(2 specimens) THAILAND: NAKHON RATCHASIMA PROVINCE: Wang Nam Khieo District; Sakaerat Environmental Research Station: KU 327692, 327693.

Brachymeles muntingkamay.—(17 specimens): LUZON ISLAND: Nueva Vizcaya Province: *Municipality of Quezon*: Barangay Maddiangat, Mt. Palali: PNM (Holotype) 9566, (Paratopotypes) 9578–82, KU (Paratopotypes) 308865–66, 308900–06, 308908, 308953.

Brachymeles orientalis.—(53 specimens) BOHOL ISLAND: Bohol Province: *Municipality of Sierra Bullones*: Dusita Barrio: CAS-SU (Holotype) 24436, CAS-SU (Paratypes) 24428, 24434, 24437, CAS (Paratype) 102404, CAS-SU 25452; Dusita Barrio: Abacjanan: CAS-SU (Paratypes) 24446–51, CAS-SU 25460; Cantaub Barrio: CAS-SU (Paratypes) 18702, 24442, 24458; CAMIGUIN SUR ISLAND: Camiguin Province: *Municipality of Catarman*: Mt. Mambajao: Sitio Sangsangan: CAS 110976–83; LEYTE ISLAND: Leyte Province: *Municipality of Baybay*: KU 311231–5, 311241; MINDANAO ISLAND: Agusan del Norte Province: *Municipality of Cabadbaran*: Diuata Mountain Range: Mt. Hilonghilong: Kasinganan: CAS-SU 133301, 133616, 133749, 133752, 133754; SAMAR ISLAND: Eastern Samar Province: *Municipality of Taft*: KU 305470, 310734–6, 310739, 310942–6, 310949, 310951, 310955.

Brachymeles pathfinderi.—(43 specimens) MINDANAO ISLAND: Sarangani Province: *Municipality of Glan*: Barangay Tanibulad, Sitio Padido: KU 324057–88; Barangay Taluya: KU 32789–96; Davis Gulf: MCZ (Holotype) 26581, (Paratype) 26582; Cotabato Province: *Municipality of Tatayan*: MCZ (Paratype) 26583.

Brachymeles samarensis.—(7 specimens) LEYTE ISLAND: Leyte Province: *Municipality of Baybay*: Barangay Pilim: Sitio San Vicente: KU 311225; SAMAR ISLAND: Eastern Samar Province: *Municipality of Taft*: Barangay San Rafael: KU 310849–50, 310852, 311294–6.

Brachymeles schadenbergi.—(34 specimens) BASILAN ISLAND: Basilan Province: Port Holland: Sawmill: CAS 60493; MINDANAO ISLAND: Misamis Occidental Province: 2 km northwest of Masawan: CAS 23468–69; 4 km northwest of Masawan: CAS 23471; 3 km northwest Masawan: south bank of Dapitan River: CAS 23479–81, 23484–85; Zamboanga del Norte Province: Dapitan River: CAS-SU 23494–96; Zamboanga City Province: *Municipality of Pasonanca*: Barangay Baluno: Pasonanca Natural Park: KU 314967, 314969, 314970–8, 314980, 314984–85, 314988–92, 314994, 314996–7.

Brachymeles talinis.—(31 specimens) NEGROS ISLAND: Negros Oriental Province: *6 km west of Municipality of Valencia*: Cuernos de Negros Mountain Range: ridge on north side of Maite River: CAS-SU (Holotype) 18358, (Paratype) 89813; Cuernos de Negros Mountain Range: Dayungan Ridge: CAS 133871; *Dumaguete City*: CAS-SU (Paratype) 12225; *Municipality of Siaton*: 20 km north of Bondo Barrio: CAS-SU 22311–12; 22317, 22323; INAMPULAGAN ISLAND: Guimaras Province: *Municipality of Sibunag*: 8 km west of Pulupandan Town: CAS-SU 27972, 27996–97; PANAY ISLAND: Antique Province: *Municipality of San Remigio*: KU 306756–60, 306762–7, 306769, 306770–6, 306786.

Brachymeles taylori.—(34 specimens) NEGROS ISLAND: Negros Occidental Province: *Municipality of Silay City*, Barangay Patag: KU 324044–56; NEGROS ISLAND: Negros Oriental Province: *3 km west of Municipality of Valencia*: Cuernos de Negros Mountain Range: Sitio Lunga: ridge on north side of Maiti River: CAS-SU (Holotype) 18615, CAS-SU 21873; ridge on south side of Maiti River: CAS-SU (Paratype) 18641, 18656–57, 18748; Cuernos de Negros Mountain Range: CAS-SU (Paratype) 18649; top of Dayungan Ridge: CAS-SU 21877, 21880, 21883–84; 24 km northwest of Bondo Barrio: Bantolinao: CAS-SU 22355–56; CEBU ISLAND: Cebu Province: *Municipality of Carcar*: Tapal Barrio: Sitio Mantalongon: CAS 154671, 154673, 154678–82, 154686.

Brachymeles tridactylus.—(20 specimens) NEGROS ISLAND: Negros Occidental Province: *16 km east of Municipality of La Castellana*: Barrio Cabagna-an: Southern Slope of Mt. Canlaon: CAS-SU 19424, 19426–27, 19429, 19452, 19458; *20 km east of Municipality of La Castellana*: Sitio Kalapnagan: CAS-SU 27082–83; Negros Oriental Province: Hills North and northwest of Mayaposi: CAS-SU (Holotype) 18354; PANAY ISLAND: Antique Province: *Municipality of Culasi*: Barangay Alojipan: KU 307726–36.

Brachymeles tungaoi.—(12 specimens) MASBATE ISLAND: Masbate Province: *Municipality of Masbate City*: PNM (Holotype) 9722, KU (Paratopotypes) 323934–36; *Municipality of Mobo*, Barangay Tugbo: CAS (Paratypes) 144229–30, 144290, 144306–7, 144313, 144341–2.

Brachymeles vermis.—(5 specimens) JOLO ISLAND: Sulu Province: CAS-SU (Paratype) 62489, CAS-SU 60720–22, 60857.

Brachymeles vindumi.—(4 specimens) JOLO ISLAND: Sulu Province: CAS (Holotype) 60724, CAS (Paratypes) 60723, 60725, MCZ (Paratype) 26577).

Brachymeles wrighti.—(1 specimen) LUZON ISLAND: Baguio City: USNM 140756.

Appendix 2

Additional Comments on the Taylor Philippine Collections

Taylor commonly exchanged EHT specimens to obtain important comparative material for his research, paratypes obviously commanding greater exchange value. Taylor (1944:175–187) listed some of the material exchanged (FMNH, MCZ, UMMZ and ZMA explicitly mentioned or implied) but not the specimens' original catalog number (nor the EHT specimens sent in the transaction). This creates another possibility for errors in data transcription when the EHT material was finally deposited

in a museum collection, usually (but not always) different from the institution where it originated. Such errors can only be detected if the original museum tag is still attached and the data verified with their records, at best a record-keeping challenge for the institutions involved.

Tracking the Taylor material sent on exchange or deposited in museums is far more complex, involving far more institutions, including some unexpected ones. In trying to resolve data discrepancies in more than 10 museums, we repeatedly encountered two major problems: Taylor's field tags and lack of access to his original field notes. For his Philippine collections (at least) Taylor used small tin tags with numbers manually scratched on them, not always legibly and with no consistency as to which side is up (e.g., 186 could be 981 upside down). Not surprisingly, the thread Taylor used to tie the tags on almost a century ago has often disintegrated, leaving the tag or tags on the bottom of the jar, often unreassociatable with individuals of a series. During curation activities tags have sometimes been retied (not always to the correct specimen) or accidentally lost in realcoholing/rebottling. Even when tags are confidently associated with specimens, verifying the data in the original notes is often impossible. Taylor's notes, like his specimens, are scattered in several institutions, some apparently lost, others age-damaged or becoming illegible. No inventory of the deposition sites exists.

Many of these problems manifested themselves in the ''simple'' attempt to verify the data for Taylor's original type series of *Brachymeles pathfinderi*, but we philosophically believe that even modest resolution is a step in the right direction. Our attention to such detail may seem trivial, obsessive, or even unnecessary, but the issues involved can be quite important. The minor discrepancies in the distribution of *B. pathfinderi* are not critical, but similar problems with Taylor data led to the description of *Luperosaurus amissus* by Taylor himself (1962). Described from a precise locality (near Odiongan, Tablas Island) from a unique holotype (EHT M30), the species remained a valid member of the Philippine herpetofauna until Brown and Alcala (1978:54) discovered that the holotype was actually a *Gekko japonicus* (later corrected to *Gekko hokouenesis* by Ota et al., 1989). Neither species occurs in the Philippines, nor is there any indication that Taylor ever collected anywhere they do occur; thus, the mystery remains unresolved. Awareness of the potential problems inherent in using unverified Taylor data is virtually nonexistent in the literature; hence we use this opportunity to reemphasize such an important point.