

A NEW GENUS OF RIODINID, WITH A NEW SPECIES FROM PANAMA (LEPIDOPTERA: RIODINIDAE: NYMPHIDIINI)

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ABSTRACT.— The new genus *Archaeonympha* n. gen., in the tribe Nymphidiini Bates, 1859, is described for the "*drepana* Bates, 1868, group" of species formerly included in the genus *Theope* Doubleday, 1847. A new species in this genus, *Archaeonympha smalli* n. sp., is also described from Panama.

KEY WORDS: *Adelotypa*, *Archaeonympha* n. gen., *Archaeonympha smalli* n. sp., Brazil, Central America, Chocó, cladistics, Colombia, *Comphotis*, Costa Rica, Ecuador, morphology, Neotropical, Peru, South America, taxonomy, *Theope*, Trinidad.

This paper is one in a series by the first author (Willmott and Hall, 1994; Hall and Willmott, 1996a; DeVries and Hall, 1996; Hall and Austin, 1997; Hall, *in press*) to more fully elucidate the species diversity of the genus *Theope* Doubleday, 1847, and relatives.

The sister taxa *drepana* Bates, 1868, and *urichi* Vane-Wright, 1994, are currently placed in *Theope* (Bridges, 1994), but a morphological cladistic analysis of the tribe Nymphidiini (*sensu* Harvey, 1987) indicates that they do not belong in that genus or any other (Hall, *in prep*). In order to maintain the monophyly of *Theope*, a new genus is described to include these two species and a third undescribed species from Panama. To evaluate the geographic distribution and abundance of these species, the private collections of G. W. Busby and R. C. Busby (Boston, MA), and P. J. DeVries (Eugene, OR) as well as the following museums, whose acronyms are used in the text, were examined:

AME	Allyn Museum of Entomology, Florida Museum of Natural History, Sarasota, FL, USA
AMNH	American Museum of Natural History, New York, NY, USA
BMNH	Natural History Museum, London, England
FSCA	Florida State Collection of Arthropods, Division of Plant Industry, Gainesville, FL, USA
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge, MA, USA
USNM	National Museum of Natural History, Smithsonian Institution, Washington, DC, USA
ZMHU	Zoologische Museum für Naturkunde, Humboldt Universität, Berlin, Germany

ARCHAEONYMPHA Hall, new genus

Fig. 1-9.

Type species: *Archaeonympha smalli* Hall & Harvey, n. sp.

Description.— MALE: forewing length 10-11mm. *Wing shape*: distal margin of both wings variably angular, forewing apex variably falcate, distal hindwing margin variably serrate. *Venation* (Fig. 4a): four forewing radial veins, veins Sc and R₁ joined for a short distance but not fused. *Dorsal surface*: ground color dark brown; both wings predominantly blue and variably traversed by jagged dark brown discal and postdiscal lines, submarginal dark brown spots on hindwing variably present; fringes brown. *Ventral surface*: ground color a grainy mixture of pale and darker brown scaling; both wings with orange-brown markings forming broken and dis-

jointed basal, mid-discal and postdiscal lines, orange-brown line marks discal cell end of both wings, white distal to apical portion of postdiscal forewing line variably present; submarginal line of small black spots on both wings lined with white proximally consists of two spots in cell 1A+2A and one in cells Cu₂ to M₁, slightly darker brown scaling forms indistinct line proximally; thin orange-brown line at distal margin; fringes brown. *Head*: ventral surface of labial palpi gray, dorsal surface brown, second and third segments elongate (Fig. 4b). Eyes bare and brown, margins brown. Frons brown, paler brown at margins. Antennae brown or orange-brown with pale brown at base of each segment; tubular clubs brown or orange-brown, tips pale orange-brown. *Body*: dorsal surface of thorax and abdomen dark brown, ventral surface gray-brown. All legs gray-brown. Tarsus of foreleg unimerous, coxa elongate (Fig. 4c); midleg and hindleg with a tibial spur and a group of spines at inner distal tip of tarsal segments one to four, three further spines along inner distal margin of first tarsal segment (Fig. 4d). *Genitalia* (Fig. 5-6): distal margin of uncus concave; falci small and compact; valvae form an approximate rectangle, with a basal, lateral bulge, a variably sized, rounded lower projection and an upwardly pointed tip with a small bulge below; aedeagus tapers sharply towards tip (*A. smalli*) or is of even width (*A. drepana*), tip of vesica contains a double row of small spines (*A. smalli*) or a jagged sclerotized line (*A. drepana*); pedicel broad. Eighth tergite has a small triangular point at lower posterior corner. Eighth sternite is a simple rectangle that is weakly indented at posterior margin.

FEMALE: differs externally from male in following ways: forewing length 10-15mm. *Wing shape*: distal margins of both wings less angular, forewing apex never falcate. *Dorsal surface*: ground color of both wings paler brown; blue coloration on both wings a paler lilac, submarginal dark brown spots on hindwing always present. *Ventral surface*: ground color slightly paler. *Head*: second palpal segment slightly more elongate (Fig. 4e). Inside edge of antennae bare brown. *Body*: foreleg with a group of spines at inner distal tip of tibia and tarsal segments two to four (Fig. 4f). *Genitalia* (Fig. 7-9): corpus bursae variably constricted at or below signae, signae form pointed invaginations that are inwardly curved (*A. smalli*) or sinuate (*A. drepana* and *A. urichi*), triangular (*A. smalli*) or more ovate (*A. drepana* and *A. urichi*) at base; ductus bursae hardened or sclerotized and bulbous at posterior end with small areas of heavy sclerotization at margin, a variably elongate, hollow, sclerotized structure that is medially divided in posterior half positioned opposite opening of ductus seminalis; ostium bursae forms a roundly triangular sclerotized ring; region between ostium bursae and eighth tergite partially sclerotized with a pair of small indentations. Eighth tergite has a heavily sclerotized disc at dorsal posterior corner.

Etymology.— The name is derived from the Greek words for "ancient" and "nymph" and refers to the basal position of the genus in the tribe Nymphidiini.

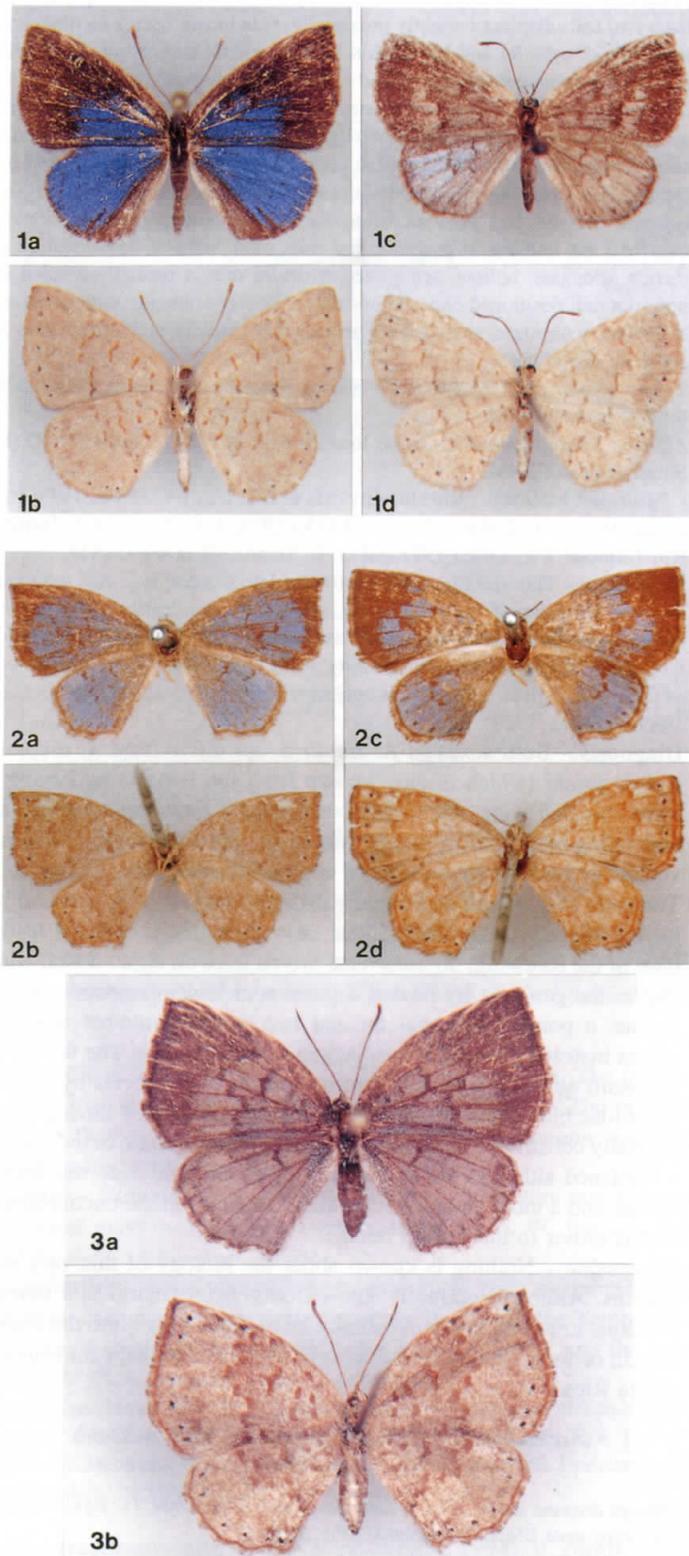


Fig. 1-3. 1. *Archaeonympha smalli* Hall & Harvey n. sp., holotype male: a) dorsal surface; b) ventral surface. Allotype female c) dorsal surface; d) ventral surface. 2. *Archaeonympha drepana* (Bates, 1868). Holotype male, Ega, Brazil: a) dorsal surface; b) ventral surface. Allotype female, Ega, Brazil: c) dorsal surface; d) ventral surface. 3. *Archaeonympha urichi* (Vane-Wright, 1994). Female, El Llano, Panama: a) dorsal surface; b) ventral surface.

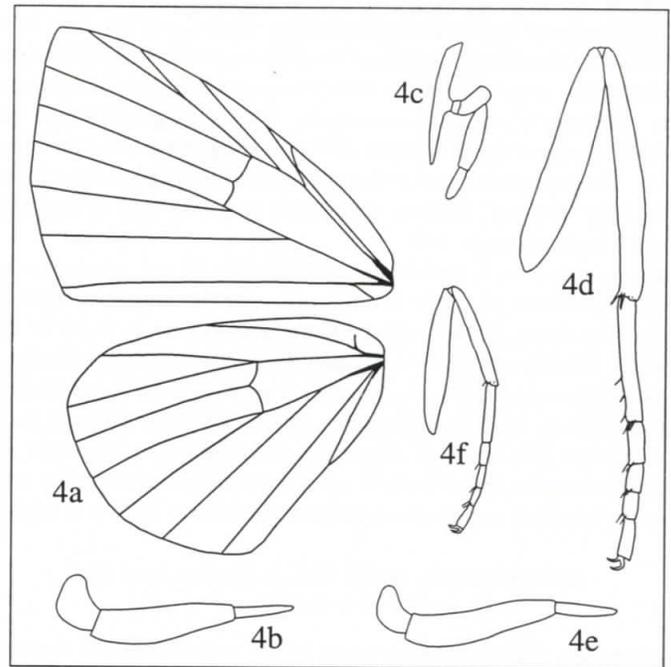


Fig. 4a-f. Morphology. 4. *Archaeonympha smalli* n. sp., male: a) venation; b) palpus; c) foreleg; d) hindleg. Female: e) palpus; f) foreleg.

Systematic position.— *Archaeonympha* species have been treated in both *Comphotis* Stichel, 1910, because of their small size and similarly patterned ventral surface, and *Theope*, because of their blue dorsal surface, but their true systematic position has been uncertain (Hall and Willmott, 1996b). The ventral position of the spiracle on male abdominal segment three of *Archaeonympha* species places them in the tribe Nymphidiini (*sensu* Harvey, 1987) and they are thus not closely related to *Comphotis* species, which lack the synapomorphic characters of any existing tribe and can only be placed in the *incertae sedis* section (four forewing radial veins) of Harvey (1987); *Comphotis* species also have brown, orange or red dorsal coloration with a slightly different and diagnostic ventral pattern (Hall and Willmott, 1996b).

A comprehensive morphological cladistic analysis of the Nymphidiini, based on over 85% of species from all described genera, indicates that while *Archaeonympha* species are closely related to those of *Theope* they do not together form a monophyletic clade (Hall, in prep). *Archaeonympha* species appear to be most closely related to the taxon *senta* Hewitson, [1853], which is currently misplaced in the polyphyletic genus *Adelotypa* Warren, 1895, and all four species occupy a basal position in the tribe (Hall, in prep). Although the ventral patterning of *Archaeonympha* species and *senta* is very similar and unique to these species, the differences in the remaining pattern elements, and male and female genital morphology are so gross as to indicate that at least one of these groups has undergone substantial anagenesis. For this reason, and uncertainty concerning the monophyly of *Archaeonympha* + *senta*, *senta* is not included in *Archaeonympha* and indeed it requires its own monotypic genus (Hall, in prep.).

Diagnosis.— *Archaeonympha* species are superficially readily recognisable by their small size, angular wing shape, blue dorsal coloration that is typically divided by brown transverse lines, and orange-brown ventral patterning with tiny, black, white-encircled submarginal spots around both wings. The lack of a sclerotized

transtilla at the tip of the valvae of the male genitalia distinguishes *Archaeonympha* from most nymphidiine genera and the lack of a dorsal sclerotized invagination of the eighth male abdominal sternite distinguishes *Archaeonympha* from *Theope* and its closest relatives. The monophyly of *Archaeonympha* is best supported by the following unique synapomorphy of the female genitalia: the presence in the ductus bursae, opposite the opening of the ductus seminalis, of a variably elongate, hollow, sclerotized structure that is medially divided in its posterior half.

Biology.— Nothing is known about the biology of any species in the genus and all are very rare in collections. Of the examined riodinid collections listed above, only the three largest, namely those of the BMNH, USNM and ZMHU, contain *Archaeonympha* specimens.

Distribution.— *Archaeonympha* species are known to occur in only a few disjunct localities in Panama, Brazil, Peru and Trinidad (Fig. 10), but the true range of the genus undoubtedly encompasses all intervening areas where there is suitable habitat. Panama is the only country in which two *Archaeonympha* species are known to occur.

Archaeonympha smalli Hall & Harvey, new sp.

Fig. 1a-d; 4a-f; 5,7.

Description.— MALE: forewing length 11mm. Costal margin of forewing slightly convex, distal margin slightly angular; hindwing slightly angular. **Dorsal surface:** forewing ground color dark brown; blue coloration in basal third of wing occupies basal two-thirds of cells above and below vein 1A+2A, basal half of cell Cu_2 and basal third of cell Cu_1 , distal margin of blue in these cells being slightly concave, and entire discal cell except for narrow black bands at middle and towards end. Hindwing ground color blue, anal margin gray-brown; dark brown occupies all but base and anal margin of cell 1A+2A, streak of dark brown at distal margin of cell Cu_2 , very thin line of dark brown around entire distal and costal margins. **Ventral surface:** forewing ground color pale, grainy gray-brown; three orange-brown marks in discal cell, one at base, middle and cell end, the latter being convex; two orange-brown marks at base of cell 1A+2A directly below those in discal cell; postdiscal line of orange-brown marks consists of small spots at base of cells M_1 and R_3 , middle of cell R_2 and distal end of cell R_1 , a slightly convex series of outwardly diagonal marks in cells M_2 to Cu_1 and vertical marks in cells Cu_2 and 1A+2A, that in latter being uneven and largely dark brown; indistinct, slightly darker brown, convex postmedial band, submarginal line of small black spots lined with white proximally consists of two spots in cell 1A+2A and one in cells Cu_2 to M_1 ; thin orange-brown line at distal margin. Hindwing differs from forewing in following ways: two orange-brown marks below discal cell in cell Cu_2 , two additional orange-brown marks immediately above distal discal cell markings in cell Rs; postdiscal line of orange-brown marks consists of a shallowly concave series of three marks in cells M_1 to M_3 and a deeply concave series of three marks in cells Cu_1 to 1A+2A, that in latter partially dark brown. **Head:** ventral surface of labial palpi gray, dorsal surface brown, second segment elongate. Eyes bare and brown, margins brown. Frons brown, paler brown at margins. Antennae orange-brown with pale brown at base of each segment that becomes increasingly reduced towards clubs; tubular clubs orange-brown, tips pale orange-brown. **Body:** dorsal surface of thorax and abdomen dark brown, ventral surface gray. All legs gray-brown. **Genitalia** (Fig. 5): distal margin of uncus concave; falci small and compact; valvae form an approximate rectangle, with a basal, lateral bulge, a large, rounded lower projection and an upwardly pointed tip with a small bulge below; aedeagus tapers sharply towards tip, double row of small spines towards tip of everted vesica; pedicel broad. Eighth tergite with a small triangular point at lower posterior corner. Eighth sternite a simple rectangle that is weakly indented at posterior margin.

FEMALE: differs externally from male in following ways: forewing length 10.5mm. Distal margin of both wings more smoothly rounded. **Dorsal surface:** ground color of both wings paler brown; blue coloration on both wings a paler lilac; brown mark at base of cell 1A+2A on forewing;

postdiscal line of lilac squares in cells Cu_1 to 1A+2A of forewing, those in latter two cells displaced slightly proximally; pale brown occurs on hindwing in middle of cells Rs and M_1 , as thin lines at middle and end of discal cell, as a thin, uneven, postdiscal line and as submarginal spots in cells 1A+2A to M_1 , two in the former, one in the remainder. **Ventral surface:** postdiscal line of orange-brown marks displaced slightly distally on both wings. **Head:** second palpal segment slightly more elongate. Inside edge of antennae bare brown. **Genitalia** (Fig. 7): corpus bursae narrower in posterior half, signae inwardly curved and pointed, triangular at base; ductus bursae slightly hardened and bulbous at posterior end with small areas of sclerotization at margin, elongate, hollow, sclerotized structure that is medially divided in posterior half positioned opposite opening of ductus seminalis; ostium bursae a bilobed sclerotized ring. Eighth tergite with heavily sclerotized disc at posterior dorsal corner.

Types.— *Holotype male:* PANAMA.— *Canal Zone:* Cocoli, 20 Jan 1975 (G. B. Small); in the USNM.

Allotype female: PANAMA.— same locality data as HT, 25 Jan 1973 (G. B. Small); in the USNM.

Paratypes: PANAMA.— same locality data as HT: 2 ♂, 1 ♀, 18 Feb 1973; 1 ♂, 20 Jan 1975; 2 ♂, 2 Mar 1973; 1 ♂, 13 Oct 1974; 1 ♀, 18 Jan 1973. *Darién:* Río Tuquesa: 1 ♀, 11 Jul 1973 (all G. B. Small); all in the USNM.

Etymology.— This species is named for the late Gordon B. Small who was the sole collector of the type series. During his residency in Panama he amassed one of the most comprehensive butterfly collections ever made for a Neotropical country and the enormity of his contribution to the systematics of Central American butterflies is only now being fully realised (see Nicolay, 1989; DeVries, 1989).

Diagnosis.— Both sexes of *A. smalli* n. sp. differ from *A. drepana* and *A. urichi* (which is only known from the female) by having a more rounded wing shape, without a falcate forewing apex and an undulating margin to an angular hindwing, and a paler, more uniform ventral ground colour with more contrasted orange-brown macules. The male of *A. smalli* additionally differs from that of *A. drepana* by having slightly darker blue dorsal coloration that is reduced to the base of the forewing, no transverse brown lines on either dorsal wing and in the genitalia by having a prominent lower projection on the valvae, a pointed aedeagal tip and two rows of internal aedeagal spines instead of a continuous, jagged sclerotized line. The female of *A. smalli* additionally differs from those of both species by having paler lilac blue dorsal coloration and in the genitalia by having a less medially constricted corpus bursae, a less elongate base to the signae, a hardened although not sclerotized posterior portion to the ductus bursae and a more elongate sclerotized structure in the ductus bursae that is closer to the ostium bursae.

Discussion.— Nothing is known about the biology of this very rare species. Although currently known only from central and eastern Panama, it will probably eventually be found to range into the Chocó region of west Colombia and west Ecuador and perhaps into eastern Costa Rica.

Archaeonympha drepana (Bates, 1868), n. comb.

Fig. 2a-d; 6,8

Theope drepana Bates, 1868. *J. Linn. Soc. Lond. Zool.* 9:409. TL: Ega, W. Brazil. Holotype male BMNH [Examined]. (Fig. 2a,b).

= *Comphotis sinuata* Stichel, 1925. *Z. wiss. Insektbiol.* 20:53. TL: Manicoré, C. Brazil. Holotype male ZMHU [Examined].

Identification and taxonomy.— Average FW length 10mm.

The sexes are similar but the female has a less falcate forewing, slightly reduced blue postdiscally on the dorsal forewing, and more prominent transverse brown lines through the blue on both dorsal wing surfaces. *A. drepana* differs from its closest relative *A. urichi* by its considerably smaller size, and by having a more distally positioned postdiscal line on both ventral wings and a more promi-

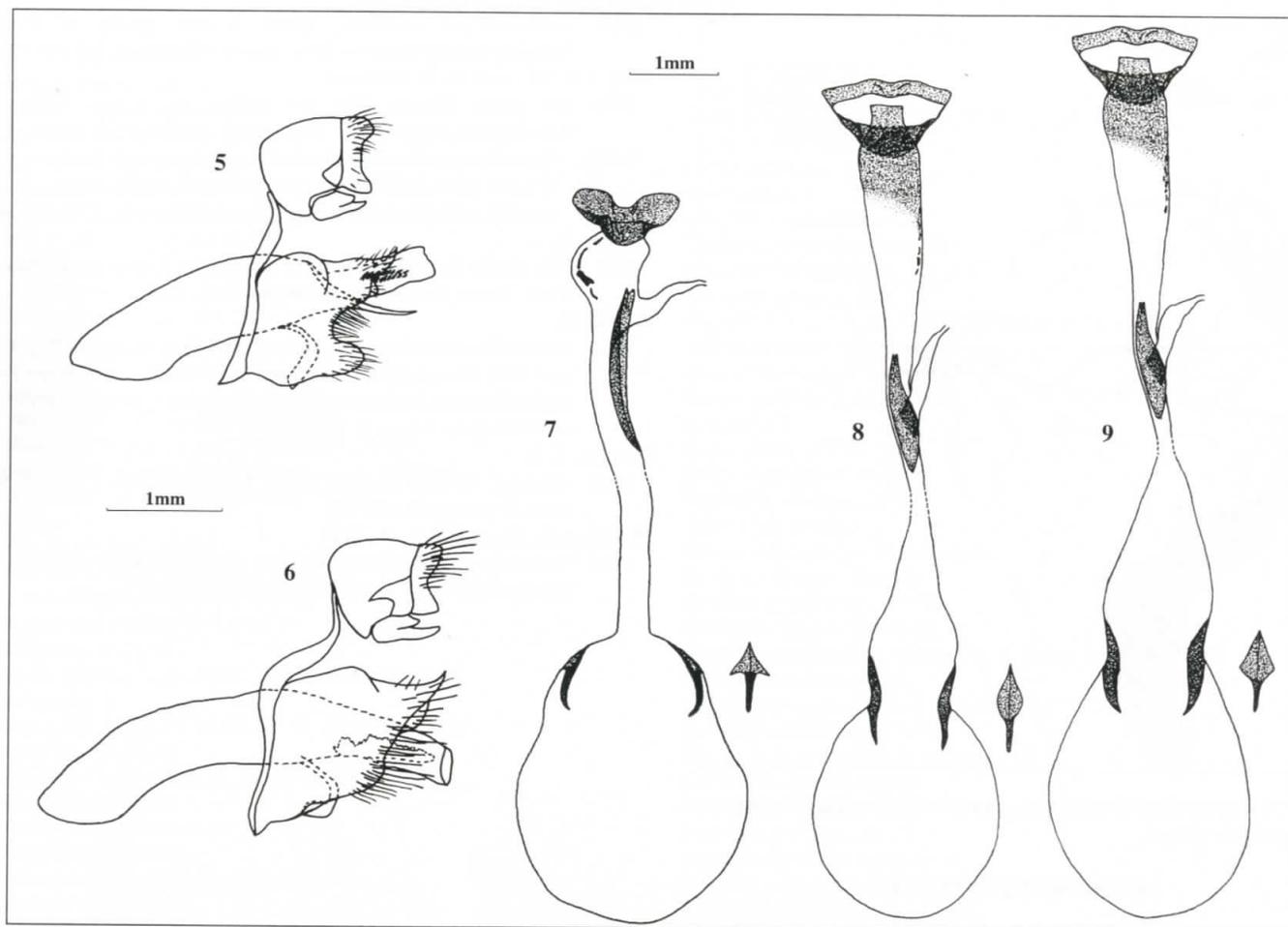


Fig. 5-9. Male genitalia: 5. *Archaeonympha smalli* n. sp.. 6. *Archaeonympha drepana*. Female genitalia: 7. *Archaeonympha smalli* n. sp.. 8. *Archaeonympha drepana*. 9. *Archaeonympha urichi*.

inent whitish square in the apex of the ventral forewing. The female genitalia of the two species do not differ significantly. The type of *sinuata* Stichel differs very little from that of *A. drepana* and was synonymized with it by Hall and Willmott (1996b).

Biology.— Nothing is known of the biology of this very rare species and most museum specimens were collected by H. W. Bates in the 1850's.

Distribution.— Specimens of *A. drepana* have been examined only from the disjunct areas of central-western Brazil and the Tambopata reserve of southeast Peru (as listed by Lamas (1994)), and the true extent of its Amazonian range is uncertain.

Specimens Examined.— 7♂, 2♀: PERU.— *Madre de Dios*: Reserva Tambopata, 12°50'S 69°17'W, Oct, 1♂ (USNM?). BRAZIL.— *Amazonas*: Ega 3♂, 1♀ (BMNH); Manicoré, Dec, 1♂ (ZMHU); Amazon, 1♂ (BMNH). Undetermined locality data, 1♀ (ZMHU). No locality data, 1♂ (BMNH).

***Archaeonympha urichi* (Vane-Wright, 1994), n. comb.**

Fig. 3a,b; 9

Theope urichi Vane-Wright, 1994. In B. D'Abbrera, *Butts. Neotropical Region, Part VI*:1002, fig. TL: Sangre Grande, Trinidad. Holotype female in ♂oll: F. C. Urich, Sangre Grande, Trinidad; type illustration [Examined].

Identification and taxonomy.— Average FW length 15mm.

A. urichi is the only *Archaeonympha* species for which the male is unknown. Female *A. urichi* consistently differs from that of *A. drepana* only in its considerably larger size and by having a slightly

proximally displaced postdiscal line of chestnut-brown spots on both ventral wing surfaces. These two characters unite the single illustrated Panamanian specimen with the nominotypical Trinidadian ones (figured in D'Abbrera, 1994), although the latter have greatly reduced blue on both dorsal wing surfaces. It remains to be seen whether these specimens really are conspecific and whether *A. urichi* is actually a different species to *A. drepana*, especially in light of the fact that the female genitalia of the two species do not differ. More material, including males, is needed from intervening areas to answer these questions.

Biology.— F. C. Urich (pers. comm. to JPWH) reports that both female types were collected flying across the lawn on his forested estate.

Distribution.— *T. urichi* is only known with certainty from the two female types collected by the eponymous F. C. Urich on Sans Souci Estate, Sangre Grande, Trinidad. A female from Panama, which is tentatively illustrated here as belonging to this species, suggests a broader northern South American range.

Specimens Examined.— 1♀: PANAMA.— *Panamá*: N. of El Llano (330m), Oct, 1♀ (USNM).



Fig. 10. A map of Central and South America showing the distribution of *Archaeonympha* species.

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